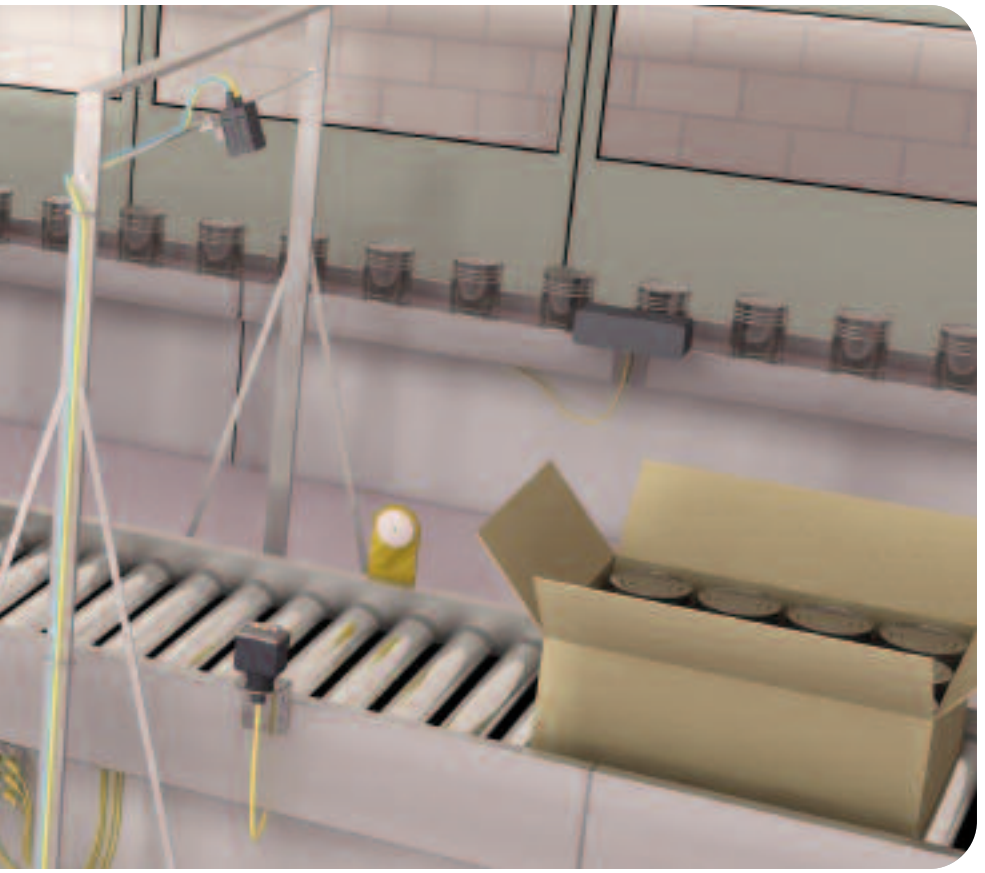
Allen-Bradley

# Sensors



- Photoelectric Sensors
- Inductive Proximity Sensors
- Ultrasonic Sensors
- Capacitive Proximity Sensors
- Limit Switches
- Encoders
- Solid-State Condition Sensing Switches
- Connection Systems
- Network Media
- DeviceNet™ Sensors
- RFID

LISTEN. THINK. SOLVE.®

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§ For information on additional On-Machine™ Connectivity Products, see the *On-Machine Connectivity* catalog or visit *www.ab.com/catalogs*.

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## Important User Information

This guide has been developed as a quick reference tool to Allen-Bradley industrial automation controls and factory assemblies. It is not intended to replace factory user manuals or technical documentation supplied with Allen-Bradley equipment.

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes, and standards. Factory provided user manuals and technical documentation should not be solely relied on for those purposes.

Rockwell Automation reserves the right to change the features or characteristics of its products at any time. Therefore, the information contained in this publication is subject to change at any time without notice.

The illustrations, charts, diagrams, and layout examples shown in this guide are intended solely as examples. Since there are many variables and requirements associated with any particular installation, Rockwell Automation can not assume responsibility or liability (including intellectual property infringement liability) for actual use based upon the examples shown in this publication.

Allen-Bradley Publication SGI-1.1 "General Information Safety Guidelines for Solid-State Control" (available from you local Rockwell Automation office) describes some important differences between solid-state equipment and electromechanical devices, which should be taken into consideration when applying products such as those described in this publication.

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Buyer-requested order changes, including those affecting the identity, scope and delivery of the Products, must be documented in writing and are subject to Seller's prior approval and adjustments in price, scheduling and other affected terms and conditions. In any event, Seller reserves the right to reject any change that it deems unsafe, technically inadvisable or inconsistent with established engineering or quality guidelines and standards, or incompatible with Seller's design or manufacturing capabilities. Seller further reserves the right to substitute using the latest superseding revision or series or equivalent Product having comparable form, fit and function.

## Returns

All returns of Products will be pursuant to Seller's instructions. Non-warranty returns of unused and resalable Products for credit will be subject to Seller's return policies in effect at the time, including applicable restocking charges and other conditions of return. Products returned under warranty must be properly packed and shipped to Seller-specified locations. Shipping containers must be clearly

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## Order Cancellation

Cancellation by Buyer prior to shipment is permitted only by written notice and upon payment to Seller of reasonable cancellation and restocking charges, including reimbursement for direct costs. Cancellation charges associated with orders for custom Products or Products specifically manufactured to Buyer's specification may equal the actual selling price of the Products. Seller has the right to cancel an order for cause at any time by written notice, and Seller will be entitled to cancellation and restocking charges as identified above. No termination by Buyer for cause will be effective unless and until Seller has failed to correct such alleged cause within forty-five (45) days after receipt of Buyer's written notice specifying such cause.

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Seller will not be liable for any loss, damage or delay arising out of its failure (or that of its subcontractors) to perform hereunder due to causes beyond its reasonable control, including without limitation, acts of God, acts or omissions of Buyer, acts of civil or military authority, fires, strikes, floods, epidemics, quarantine restrictions, war, riots, acts of terrorism, delays in transportation, or transportation embargoes. In the event of such delay, Seller's performance date(s) will be extended for such length of time as may be reasonably necessary to compensate for the delay.

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Application of government contract regulations and clauses to the Products or the agreement evidenced by these terms and conditions are subject to the separate review and consent by an authorized representative at Seller's headquarters. Products sold or licensed hereunder are not intended to be used, nor should they be used, in any nuclear-related application either as a "Basic Component" as defined under United States nuclear regulations or under similar nuclear laws and regulations of any other country or otherwise.

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## Governing Law and Forum

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The agreement evidenced hereby may not be assigned by either party without the written consent of the other (which consent will not be unreasonably withheld). However, consent will not be required for internal transfers and assignments as between Seller and its parent company, subsidiaries or affiliates as part of a consolidation, merger or any other form of corporate reorganization.

## Language

The parties acknowledge that they have required that the agreement evidenced hereby be drawn up in English. Les parties reconnaissent avoir exigé la rédaction en anglais du Contrat. In the event of a conflict between the English and other language versions, the English version will prevail.

# Maintenance of Solid-State Control

This section is excerpted from Allen- Bradley publication SGI-1.1, Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control. It is formatted so that explanatory comments from Rockwell Automation appear in blue headings along with the corresponding parts of Section 5 of NEMA Standards Publication No. ICS 1.1-1987, titled Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control. The text from the NEMA Standard has been reprinted verbatim, with NEMA's permission captioned "NEMA Standard Text." "Explanatory Information," contains the Rockwell Automation comments. The comments provide information to help readers better understand the characteristics of industrial equipment employing solid state technology. NEMA text is provided solely as a convenience to the reader, and Rockwell Automation assumes no responsibility for its completeness or validity.

NEMA Standards Publication No. ICS 1.1-1984, Rev. No. 1 - October 1987, is available from the National Electrical Manufacturers Association, 2101 L Street, N.W., Washington, DC 20037. Allen-Bradley publication SGI-1.1 is available from your local Rockwell Automation office.

## NEMA Standard Text Section 5 Preventive Maintenance and Repair Guidelines

### 5.1 General

A well-planned and executed maintenance program is essential to the satisfactory operation of solid-state electrical equipment. The kind and frequency of the maintenance operation will vary with the kind and complexity of the equipment as well as with the nature of the operating conditions. Maintenance recommendations of the manufacturer or appropriate product standards should be followed.

Useful reference publications for setting up a maintenance program are NFPA 70B-1983, Maintenance of Electrical Equipment, and NFPA 70E-1983, Electrical Safety Requirements for Employee Workplaces.

### 5.2 Preventive Maintenance

The following factors should be considered when formulating a maintenance program:

1. Maintenance must be performed by qualified personnel familiar with the construction, operation, and hazards involved with the control.

2. Maintenance should be performed with the control out of operation and disconnected from all sources of power. If maintenance must be performed while the control is energized, the safety related practices of NFPA 70E should be followed.

3. Care should be taken when servicing electrostatic sensitive components. The manufacturer's recommendations for these components should be followed.

4. Ventilation passages should be kept open. If the equipment depends upon auxiliary cooling, e.g., air, water, or oil, periodic inspection (with filter replacement when necessary) should be made of these systems.

5. The means employed for grounding or insulating the equipment from ground should be checked to assure its integrity (see 4.5).

6. Accumulations of dust and dirt on all parts, including on semiconductor heat sinks, should be removed according to the manufacturer's instructions, if provided; otherwise, the manufacturer should be consulted. Care must be taken to avoid damaging any delicate components and to avoid displacing dust, dirt, or debris in a way that permits it to enter or settle into parts of the control equipment.

7. Enclosures should be inspected for evidence of deterioration. Accumulated dust and dirt should be removed from the top of the enclosures before opening doors or removing covers.

8. Certain hazardous materials removed as part of maintenance or repair procedure (e.g., polychlorinated biphenyls (PCB) found in some liquid filled capacitors) must be disposed of as described in Federal regulations.

### C.5.2 Preventive Maintenance [Explanatory Information (Supplementary Comments—Not part of NEMA Standards Publication No. ICS 1.1)]

Lithium batteries are frequently used for memory backup in solid state equipment due to their excellent shelf life and high energy-to-weight ratio. Lithium is a highly reactive metal that can cause burns if there is contact with skin. The batteries are sealed so there is seldom a problem of contact with lithium as long as reasonable care is exercised when handling them. They should only be used in their intended application and not subjected to rough handling. When batteries are replaced in equipment, the batteries removed should be disposed of in accordance with the battery supplier's instructions.

The Department of Transportation has certain regulations that prohibit shipment of equipment with batteries installed if the batteries contain 0.5 grams or greater of lithium. The batteries must be removed from equipment and shipped separately in a container approved by the Department of Transportation. Additional Department of Transportation restrictions apply to the shipment of lithium batteries.

NEMA Standards Publication No. ICS 1.3-1986, Preventive Maintenance of Industrial Control and System Equipment, is recommended for personnel responsible for maintenance of equipment.

### 5.3 Repair

If equipment condition indicates repair or replacement, the manufacturer's instruction manual should be followed carefully. Diagnostic information within such a manual should be used to identify the probable source of the problem, and to formulate a repair plan. The level of field repair recommended by the manufacturer should be followed.

When solid state equipment is repaired, it is important that any replacement part be in accordance with the recommendations of the equipment manufacturer. Care should be taken to avoid the use of parts which are no longer compatible with other changes in the equipment. Also, replacement parts should be inspected for deterioration due to "shelf life" and for signs of rework or wear, which may involve factors critical to safety.

After repair, proper start-up procedures should be followed. Special precautions should be taken to protect personnel from hazards during start-up.

### C.5.3 Repair [Explanatory Information (Supplementary Comments—Not part of NEMA Standards Publication No. ICS 1.1)]

Follow manufacturer's instructions exactly when replacing power semiconductors mounted on heatsinks since improper installation may become the source of further difficulties. Torque semiconductors or bolts retaining semiconductors to the value specified with a torque wrench. Too much pressure against a heatsink can damage a semiconductor, while too little can restrict the amount of heat transferred from the semiconductor to the heatsink, and resulting in operation at higher temperature with decreased reliability.

Exercise care when removing modules from a system during maintenance. Failed modules are frequently returned to the manufacturer for repair. Any physical damage sustained during removal may result in more expensive repair or render the module unrepairable if damage is too great.

Modules with electrostatic sensitive components should be handled by the edges without touching components or printed circuit conductors. Use packaging material supplied with the replacement module when shipping the module to the manufacturer for repair.

When the scope of repairs exceeds the manufacturer's recommendations for field repair, the module(s) should be returned to the manufacturer for repair. Doing so will help to ensure that only properly selected components are used and that all necessary hardware and firmware revisions are incorporated into the repair. Failure to make necessary updates may result in safety, compatibility, or performance problems, which may not become apparent for some time after the repaired module has been placed back in service. When firmware is protected by copyright law, updates can be provided legally only by the manufacturer or licensee.

### 5.4 Safety Recommendations for Maintenance Personnel

All maintenance work should be done by qualified personnel familiar with the construction, operation, and hazards involved with the equipment. The appropriate work practices of NFPA 70E should be followed.

## Product Compliance Information

For your quick reference, product certification information can be found at the following URL (http://www.ab.com/certification/ http://www.ab.com/certification/) Actual product certification is indicated by the label(s) on the product and not by a listing on this web site or in product literature.

### UL Certification

Generally, Rockwell Automation pursues applicable UL certification for its products. There are four relevant types of certification granted by Underwriters Laboratories (UL):

- UL Recognized or Recognized to Canadian safety requirements under the Component Recognition Program of Underwriters Laboratories, Inc.:

**Actual UL recognition is indicated by the label on the product, and not by statements in this catalog or any product literature.**

- UL Listed, UL Listed to Canadian, or UL Listed to US and Canadian safety standards.

**Actual UL listing is indicated by the label on the product, and not by statements in this catalog or any product literature.**

### CSA Certification

Generally, Rockwell Automation pursues applicable CSA certification for its products. CSA certifies products for general use as well as for use in hazardous locations. Products in this catalog might be certified in one of these two ways:

- CSA Class I, Division 2 Hazardous Location Certification: This product is listed by the Canadian Standards Association as certified for use in Class I, Division 2, Group A, B, C, D, or non-hazardous locations only.

Class I Div 2 Hazardous

Although Rockwell Automation is only using the Class I Division 2 Group A, B, C, D designation on its products, it should be noted that this hazardous location classification is equivalent to the internationally defined Class I Zone 2 Group IIC area classification (see IEC publication 79-10). Therefore, products labeled Class I Division 2 Group A, B, C, D may be used in Class I Zone 2 Group IIC environments.

- CSA Certification: The product is certified by the Canadian Standards Association for non-hazardous locations.

NRTL/C

**Actual CSA certification is indicated by the label on the product, and not by statements in this catalog or any product literature.**

### ISO 9001 Registration

Rockwell Automation has registered facilities encompassing more than 45 separate sites around the world to the ISO 9001 standard. This registration means that itsour quality system governing the design, development, manufacture, and delivery of itsour products has been verified by third-party audits.

### DEMKO Certification

A limited number of Allen-Bradley branded products have DEMKO certification. DEMKO certifies products for general use as well as hazardous locations. As a Notified Body for the European Hazardous Location Directives, DEMKO verifies that our products comply with the applicable European directives and standards for use in hazardous locations. Refer to the specific product nameplate for the actual hazardous location rating.

### CENELEC Intrinsically Safe (IS) Approval

A limited number of Allen-Bradley branded products have CENELEC IS Approval. CENELEC approves products for use in hazardous locations.

**Actual CENELEC Approval is indicated by the label on the product, and by statements in the installation publication for the product.**

### Compliance with European Union Directives

Allen-Bradley branded products covered by European Union Directives are intended for sale and use within the European market and conform to the essential requirements of these directives:

- Products specifically required to do so bear the CE marking per the relevant European Union Directives and CE marking regulations
- Declarations of Conformity for Allen-Bradley branded products are available as required
- The necessary technical documentation is on file within Rockwell Automation.

**Actual CE conformity is indicated by the label on the product or its packaging, and not by statements in this catalog or any product literature.**

# Product Compliance

## C-Tick Compliance

Allen-Bradley branded products covered by Australian acts are intended for sale and use within the Australian market and conform with the essential requirements of these acts. Declarations of Conformity for Allen-Bradley branded products are available as required.

N223

**Actual C-Tick conformity is indicated by the label on the product, and not by statements in this catalog or any product literature.**

## FM Approved

A limited number of Allen-Bradley branded products have Factory Mutual Approval. FM approves products for general use as well as for use in hazardous locations. Products in this catalog may be FM Approved in one of these two ways:

- FM Class I Division 2 Hazardous Location Approval: The product is approved by Factory Mutual Research Corporation for use in Class I, Division 2, Group A, B, C, and D, or non-hazardous locations only.

FM APPROVED Class I, Division 2, Group A, B, C, D

- FM Approval: The product is approved by Factory Mutual Research Corporation for use with specific FM Approved Class I, Division 2 products.

FM APPROVED

**Actual FM Approval is indicated by the label on the product, and not by statements in this catalog or any product literature.**

## ControlNet Conformance

ControlNet International's "Conformance Tested" certification mark is a ControlNet International logo, the authorized use of which indicates that a product has passed conformance testing at an official ControlNet International test lab.

ControlNet

## DeviceNet Conformance

The DeviceNet conformance-tested service mark may be placed on a product, its literature, and/or advertising, only after it has successfully passed conformance testing at an official independent test lab of the Open DeviceNet Vendor Association.

DeviceNet

## Certification for Marine and Off-Shore Applications

If a product or its packaging has a certification for marine and off-shore applications, it is listed in the Marine Certification Applications publication CIG-2.2.

Many Allen-Bradley branded products, such as selected PLC-5 programmable controllers, 1771 I/O, and Dataliner Message Displays, have been certified for use in marine and offshore applications around the world by:

- Lloyd's Register
- Registoro Italiano Navale
- Germanischer Lloyd
- Korean Register of Shipping
- American Bureau of Shipping
- Bureau Veritas
- Det Norske Veritas

BUREAU VERITAS

## Contacting Standards Organizations

Use the addresses and phone numbers below to contact the organizations regarding standards that may impact the installation, application and/or interoperability of Allen-Bradley branded products.

**American National Standards Institute (ANSI)**
Sales Department
11 West 42nd Street
New York, NY 10036
Phone: 212-642-4900
Fax: 212-398-0023
URL:*http://www.ansi.org/*

**CSA International**
178 Rexdale Boulevard
Etobicoke (Toronto), ON M9W 1R3
Phone: 416-747-4058
Fax: 416-747-4149
e-mail: info@csa.ca
URL: *http://www.csa-international.org*

**ControlNet International, Ltd.**
20423 State Road 7
Suite 315
Boca Raton, FL 33498
Phone: 561-477-7966
Fax: 561-477-6621
e-mail: controlnet@powerinternet.com
URL: *http://www.controlnet.org*

**DEMKO**
Lyskaer 8, P.O. Box 514
DK-2730 Herlev
Phone: 45-44-85-6565
Fax: 45-44-85-6500
e-mail: info@demko.dk
URL: *http://www.demko.dk*

**European Committee for Electrotechnical Standardization (CENELEC)**
Rue de Stassart 35
B-1050 Brussels
Belgium
Phone: 32 2 519 68 71
Fax: 32 2 519 69 19
e-mail: general@cenelec.be
URL: *http://www.cenelec.eu*

**Factory Mutual**
FM Global Corporate Headquarters
PO Box 7500
Johnston, R.I. 02919
USA
Phone: 877-364-6726
e-mail: information@fmglobal.com
URL: *http://www.fmglobal.com*

**Institute of Electrical and Electronics Engineers**
(IEEE), Inc.
IEEE Standards Information
445 Hoes Lane
P.O. Box 1331
Piscataway, NJ 08855-1331
Phone: Phone: 732-562-3800
Fax: 732-562-1571
e-mail: stds.info@ieee.org
URL: *http://www.ieee.org*

**International Association of Classification Societies LTD.**
(IACS)
5 Old Queen Street
London SW1H 9JA
United Kingdom
Phone: +44 (0) 171 976 0660
Fax: +44 (0) 171 976 0440
e-mail: permsec@iacs.org.uk
URL: *http://www.iacs.org.uk*

**ISA (International Society for Measurement and Control)**
ISA
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, NC 27709
Phone: 919-549-8411
Fax: 919-549-8288
e-mail: info@isa.org
URL: *http://www.isa.org*

**International Electrotechnical Commission (IEC)**
3 Rue de Varembe
P.O. Box 131
1211 Geneva 20
Switzerland
Phone: +41 22 919 02 11
Fax: +41 22 919 03 00
e-mail: info@iec.ch
URL: *http://www.iec.ch/*

**International Organization for Standardization (ISO)**
ISO Central Secretariat
1 Rue de Varembe
Case Postale 56
CH-1211 Geneva 20
Switzerland
Phone: +41 22 749 01 11
Fax: +41 22 733 34 30
e-mail: central@iso.ch
URL: *http://www.iso.ch/*

**National Electrical Manufacturers Association (NEMA)**
1300 North 17th Street
Suite 1847
Rosslyn, VA 22209
Phone: 703-841-3200
Fax: 703-841-3300
e-Mail: webmaster@nema.org
URL: *http://www.nema.org/*

**National Fire Protection Association (NFPA)**
1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
Phone: 800-344-3555
Fax: 617-770-0700
e-mail: library@nfpa.org
URL: *http://www.nfpa.org*

**National Institute of Standards and Technology (NIST)**
National Center for Standards and Certification Information
100 Bureau Drive, Stop 3460
Gaithersburg, MD 20899
Phone: 301-975-6478
e-Mail: inquiries@nist.gov
URL: *http://www.nist.gov/*

**Open DeviceNet Vendors Association, Inc. (ODVA)**
20423 State Road 7
Suite 499
Boca Raton, FL 33498
Phone: 954-340-5412
Fax: 954-340-5413
e-mail: odva@powerinternet.com
URL: *http://www.odva.org*

**Standards Council of Canada**
Standards Sales Section
45 O'Connor Street
Suite 1200
Ottawa, ON K1P 6N7
Phone: 613-238-3222 or 800/267-8220 (in Canada)
Fax: 613-995-4564
e-Mail: info@scc.ca
URL: *http://www.scc.ca/*

**TÜV Süddeutschland**
TÜV America Inc.
5 Cherry Hill Drive
Danvers, MA 01923
Toll Free in US: 800-TUV-0123
Phone: 978-739-7000
Fax: 978-777-8441
URL: *http://www.tuvglobal.com*

**Underwriters Laboratories, Inc. (UL)**
333 Pfingsten Road
Northbrook, IL 60062-2096
Phone: 847-272-8800
Fax: 847-272-8129
e-Mail: northbrook@ul.com
URL: *http://www.ul.com/*

# NEMA Enclosures

## Enclosure Selection Criteria

### Enclosures for Nonhazardous Locations

| For a Degree of Protection Against: | Designed to Meet Tests No. ❶ | Type | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | For Indoor Use | | | Outdoor Use | | Indoor or Outdoor | | |
| | | 1 | 12 | 13 | 3R | 3 | 4 | 4X | 6P |
| Incidental contact with enclosed equipment | 6.2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Falling dirt | 6.2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Rust | 6.8 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Circulating dust, lint, fibers and flyings ❷ | 6.5.1.2 (2) | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Windblown dust | 6.5.1.1 (2) | | | | | ✓ | ✓ | ✓ | ✓ |
| Falling liquids and light splashing | 6.3.2.2 | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Rain (Test evaluated per 6.4.2.1) | 6.4.2.1 | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Rain (Test evaluated per 6.4.2.2) | 6.4.2.2 | | | | | ✓ | ✓ | ✓ | ✓ |
| Snow and sleet | 6.6.2.2 | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hosedown and splashing water | 6.7 | | | | | | ✓ | ✓ | ✓ |
| Occasional prolonged submersion | 6.11 (2) | | | | | | | | ✓ |
| Oil and coolant | 6.3.2.2 | | ✓ | ✓ | | | | | |
| Oil or coolant spraying and splashing | 6.12 | | | ✓ | | | | | |
| Corrosive agents | 6.9 | | | | ✓ | ✓ | | ✓ | ✓ |

❶ See below for abridged description of NEMA enclosure test requirements. Refer to NEMA Standards Publication No. 250 for complete test specifications.

❷ Nonhazardous materials, not Class III ignitable or combustible.

# NEMA Enclosures

## Selection Criteria

### Enclosures for Hazardous Locations (Division 1 or 2) ❶

| For A Degree of Protection Against Atmospheres Typically Containing: ❸ | Designed to Meet Tests: ❷ | Class (National Electrical Code) | Type | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 7, Class I Group: | | | | 9, Class II Group: | | |
| | | | A | B | C | D | E | F | G |
| Acetylene | Explosion Test | I | ✓ | | | | | | |
| Hydrogen, Manufactured Gas | Hydrostatic Test | I | ✓ | ✓ | | | | | |
| Diethyl Ether, Ethylene, Hydrogen Sulfide | | I | | | ✓ | | | | |
| Acetone, Butane, Gasoline, Propane, Toluene | Temperature Test | I | | | ✓ | ✓ | | | |
| Metal dusts and other combustible dusts with resistivity of less than $10^5$ ohm-cm. | Dust Penetration Test | II | | | | | ✓ | | |
| Carbon black, charcoal, coal or coke dusts with resistivity between $10^2$ - $10^8$ ohm-cm. | | II | | | | | | ✓ | |
| Combustible dusts with resistivity of $10^5$ ohm-cm or greater. | Temperature Test with Dust Blanket | II | | | | | | | ✓ |
| Fibers, flyings | ❹ | III | | | | | | | ✓ |

❶ For indoor locations only unless cataloged with additional NEMA Type enclosure number(s) suitable for outdoor use as shown in table on page General-10. Some control devices (if so listed in the catalog) are suitable for **Division 2** hazardous location use in enclosures for non-hazardous locations. For explanation of CLASSES, DIVISIONS and GROUPS, refer to the National Electrical Code.
**Note: Classifications of hazardous locations are subject to the approval of the authority having jurisdiction. Refer to the National Electrical Code.**

❷ See abridged description of test requirements below. For complete requirements, refer to UL Standard 698, compliance with which is required by NEMA enclosure standards.

❸ For listing of additional materials and information noting the properties of liquids, gases and solids, refer to NFPA 497M-1991, Classification of Gases, Vapors, and Dusts for Electrical Equipment in Hazardous (Classified) Locations.

❹ UL 698 does not include test requirements for Class III. Products that meet Class II, Group G requirements are acceptable for Class III.

## IEC Enclosure Classification

The degree of protection is indicated by two letters (IP) and two numerals. International Standard IEC 529 contains descriptions and associated test requirements that define the degree of protection each numeral specifies. The following table indicates the *general* degree of protection—refer to Abridged Descriptions of IEC Enclosure Test Requirements below. **For complete test requirements refer to IEC 529.**

| First Numeral ❺ | | Second Numeral ❺ | |
|---|---|---|---|
| Protection of persons against access to hazardous parts and protection against penetration of solid foreign objects. | | Protection against ingress of water under test conditions specified in IEC 529. | |
| **0** | Nonprotected | **0** | Nonprotected |
| **1** | Back of hand; objects greater than 50 mm (1.97 in.) diameter | **1** | Vertically falling drops of water |
| **2** | Finger; objects greater than 12.5 mm (0.49 in.) diameter | **2** | Vertically falling drops of water with enclosure tilted 15° |
| **3** | Tools or objects greater than 2.5 mm (0.1 in.) diameter | **3** | Spraying water |
| **4** | Tools or objects greater than 1.0 mm (0.04 in.) diameter | **4** | Splashing water |
| **5** | Dust-protected (dust may enter during specified test but must not interfere with operation of the equipment or impair safety) | **5** | Water jets |
| | | **6** | Powerful water jets |
| **6** | Dusttight (no dust observable inside enclosure at end of test) | **7** | Temporary submersion |
| | | **8** | Continuous submersion |
| | | **9** | Close range high pressure washdown |

**Example:** IP**41** describes an enclosure that is designed to protect against the entry of tools or objects greater than 1mm in diameter and to protect against vertically dripping water under specified test conditions.

**Note:** All first numerals and second numerals up to and including characteristic numeral **6**, imply compliance also with the requirements for all lower characteristic numerals in their respective series (first or second). Second numerals **7** and **8** do **not** imply suitability for exposure to water jets (second characteristic numeral **5** or **6**) unless dual coded; e.g., **IP_5/IP_7**.

❺ The IEC standard permits use of certain supplementary letters with the characteristic numerals, e.g., IP69**K** (K signifies high temperature water).

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**42JS & 42JT VisiSight**
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**45CRM Contrast**
**45FPL Long Range**


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**† For information on these products, please visit our web site at *www.ab.com/catalogs*.**

# Quick Selection Guide

| Specifications | **42EF** RightSight™ | **42KL** MiniSight™ | **44R** AccuSight™ | **42CA** 18 mm Cylindrical |
|---|---|---|---|---|
| **Features** | • Patented housing design with 1200 psi washdown rating<br>• Universal 18 mm and thru-hole mounting options<br>• 360° visible status indicators<br>• DC only and universal supply models<br>• Variety of sensing modes<br>• Variety of output types | • Industry standard housing design with 1200 psi washdown rating<br>• Universal 18 mm and thru-hole mounting options<br>• 360° visible status indicators<br>• 2- and 3-wire models<br>• Variety of sensing modes<br>• 2 m cable and micro QD connections | • Patented status indicators<br>• Low profile housing design<br>• Universal 18 mm and thru-hole mounting options<br>• 360° visible status indicators<br>• Low voltage DC operation<br>• Variety of sensing modes<br>• 2 m cable and micro QD connections | • Industry standard 18 mm housing design<br>• Patented ASIC design offers linear sensitivity adjustment, stability indication, and excellent noise immunity<br>• Stability Indication for ease of alignment and forewarning against detection of background<br>• Complementary light/dark outputs |
| **Applications** | • Medium range, general purpose sensing<br>• Washdown applications | • Medium range, general purpose sensing<br>• Washdown applications | • Medium range, general purpose sensing<br>• Conveyors | • Medium range, general purpose sensing<br>• Embedded mounting |
| **Sensing Modes and Max. Range** | • Polarized retroreflective 3 m (10 ft)<br>• Retroreflective 4.5 m (14.7 ft)<br>• Diffuse 500 mm (20 in.)<br>• Background suppression 50 mm (2 in.), 100 mm (4 in.)<br>• Transmitted beam 20 m (60 ft), 4 m (13 ft), 8 m (26 ft)<br>• Large aperture fiber optic<br>• Sharp cutoff diffuse 130 mm (5 in.) | • Retroreflective 5 m (16.4 ft) or 2.5 m (8.2 ft)<br>• Polarized retroreflective 2 m (6.6 ft) or 1 m (3.3 ft)<br>• Diffuse 380 mm (15 in.) or 190 mm (7.5 in.)<br>• Wide angle diffuse 180 mm (7 in.) or 90 mm (3.5 in.)<br>• Fixed focus diffuse 43 mm (1.7 in.) or 16 mm (0.63 in.)<br>• Transmitted beam 30 m (98 ft) or 10 m (33 ft)<br>• Large aperture fiber optic<br>• Small aperture fiber optic | • Polarized retroreflective 3 m (10 ft)<br>• Diffuse 300 mm (12 in.)<br>• Wide angle diffuse 200 mm (7.8 in.) | • Retroreflective 4.8 m (15.7 ft) and 7 m (23 ft)<br>• Polarized retroreflective 3.8 m (12.5 ft)<br>• Diffuse 100, 400 and 1000 mm (3.94, 15.75, and 39.37 in.)<br>• Transmitted Beam 16 m (52.5 ft) |
| **Operating Voltage** | • 10.8…30V DC<br>• 21.6…264V AC/DC | • 10.8…30V DC<br>• 21.6…250V AC/DC | • 10…30V DC | • 10…30V DC |
| **Output Type** | • NPN or PNP 100 mA<br>• Dual NPN/PNP 100 mA<br>• MOSFET 100 mA | • Dual NPN/PNP 100 mA<br>• 2-wire AC 100 mA | • NPN or PNP 100 mA<br>• NPN and PNP 100 mA | • NPN or PNP 100 mA |
| **Response Time** | • 1…16 ms | • DC = 1 ms<br>• DC high speed=300 µs<br>• AC = 8.3 ms | • 10 ms | • 1 ms<br>• 0.5 ms (background suppression) |
| **Connections** | • 300V PVC cable 2 m<br>• Micro and pico QD | • 300V PVC cable 2 m<br>• Micro and pico QD | • 300V PVC cable 2 m<br>• Micro QD (6 in.) pigtail | • 2 m cable<br>• Micro QD |
| **Enclosure** | • Mindel, Acrylic<br>• NEMA 4X, 6P; IP67, IP69K<br>• 1200 psi washdown | • Noryl®, Acrylic<br>• NEMA 4X, 6P; IP67<br>• 1200 psi washdown | • Valox®<br>• NEMA 12; IP51 | • PBT<br>• IP67 |
| **Additional Info** | • See page 1-31 | • See page 1-40 | • See page 1-48 | • See page 1-52 |

| **42CM**<br>**18 mm Metal Cylindrical** | **42CF**<br>**12 mm Metal Cylindrical** | **Series 9000**<br>**Standard and Timing** | **44B**<br>**Adjustable Background and Foreground Suppression** | **42BT**<br>**Long Range Background Suppression** |
|---|---|---|---|---|
| • 18 mm industry standard package<br>• Wide selection of sensing modes<br>• 30V DC operation<br>• NPN or PNP outputs<br>• Fast response time<br>• Variety of connection types | • Industry standard 12 mm housing design<br>• Durable metal housing<br>• Low voltage DC operation<br>• Fast response time<br>• Variety of sensing modes<br>• 2 m cable and micro QD connections | • Industry standard housing design with 1200 psi washdown rating<br>• Universal 30 mm and thru-hole mounting options<br>• 360° visible status indicators<br>• DC and AC only models<br>• Variety of sensing modes<br>• Variety of output types | • Adjustable background and Foreground suppression models<br>• Power, output and stability status indication<br>• Micro QD connection with 90° swivel | • Adjustable long range background suppression sensing mode<br>• Industry accepted housing design<br>• 360° visible status indicators<br>• Low voltage DC operation<br>• Dual NPN and PNP outputs<br>• 2 m cable, pico and micro QD connections |
| • Short range, general purpose sensing<br>• Embedded mounting | • Short range, general purpose sensing<br>• Embedded mounting | • Long range, general purpose sensing<br>• Washdown applications | • Medium range background suppression, foreground suppression<br>• Material handling and packaging applications | • Long range, background suppression sensing<br>• Light duty industrial environments |
| • Retroreflective 3 mm…4 m (0.12 in…13.2 ft)<br>• Polarized retroreflective 3 mm…3 m (0.12 in…9.9 ft)<br>• Standard diffuse 0…100 mm (3.9 in.) (Adjustable) and 0…400 mm (13.6 in.) (Adjustable)<br>• Background Suppression 50 mm (1.97 in.) and 100 mm (3.9 in.)<br>• Transmitted beam 3 mm…14 m (0.12 in…45.9 ft) (Adjustable) | • Polarized retroreflective 2 m (6.6 ft)<br>• Standard diffuse 100 mm (3.9 in.) and 300 mm (11.8 in.)<br>• Transmitted beam 4 m (13.1 ft) | • Retroreflective 9.14 m (30 ft)<br>• Polarized retroreflective 5 m (16 ft)<br>• Standard diffuse 1.5 m (5 ft)<br>• Long range diffuse 3 m (10 ft)<br>• Transmitted beam 61 m (200 ft)<br>• Long range transmitted beam 152 m (500 ft)<br>• Large aperature fiber optic<br>• Small aperature fiber optic | • Background suppression 300 mm (11.8 in.)<br>• Foreground suppression 200 mm (7.87 in.) | • 1 m or 2 m (3.28 or 6.56 ft) mechanically adjusted background suppression |
| • 10…30V DC | • 10…30V DC | • 10…40V DC<br>• 10…55V DC; 20…40V AC<br>• 70…264V AC/DC<br>• 45…264V AC; 40…264V DC | • 20…30V DC | • 12…24V DC |
| • NPN or PNP 100 mA | • NPN or PNP 100 mA | • NPN and PNP 250 mA<br>• EM relay 2 A<br>• Isolated NO solid state 300 mA | • NPN and PNP 100 mA | • NPN or PNP 100 mA |
| • 2 ms (0.5 ms for background suppression) | • 1.25…2.0 ms | • 2…15 ms | • 1 ms | • 2 ms |
| • 2 m cable<br>• 4-pin DC micro QD | • 300V PVC cable 2 m<br>• Micro QD | • 300V PVC cable 2 m<br>• Mini QD<br>• Micro QD | • Micro QD | • 300V PVC cable 2 m<br>• Pico QD<br>• Micro QD |
| • Nickel-plated brass<br>• IP67 | • Nickel-plated brass<br>• IP67 | • Valox®<br>• NEMA 3, 4X, 6P, 12 & 13; IP67, IP69K<br>• 1200 psi washdown | • Acrylic<br>• NEMA 3, 4X,6P,12,13,IP67 | • Polyarylate<br>• IP65 |
| • See page 1-57 | • See page 1-62 | • See page 1-65 | • See page 1-72 | • See page 1-76 |

# Quick Selection Guide

| Specifications | <br>**42BC**<br>**Long Range Background Suppression** | <br>**42BA**<br>**Short-Range Background Suppression** | <br>**42JS**<br>**VisiSight™** | <br>**42KA**<br>**Subminiature Flat Pack** |
|---|---|---|---|---|
| **Features** | • Adjustable long range background suppression sensing mode<br>• Industry accepted housing design<br>• 360° visible status indicators<br>• DC and AC only models<br>• Transistor or EM-Relay output models<br>• Screw terminal connections | • Adjustable short range background suppression sensing mode<br>• Industry accepted housing design<br>• 360° visible status indicators<br>• Low voltage DC operation<br>• Fast response time<br>• Diagnostic output<br>• 2 m cable connections | • Visible light source offered on all models for ease of alignment<br>• Patented ASIC design offers linear sensitivity adjustment, stability indication and excellent noise immunity<br>• Compact sealed housing and cavity-free design to minimize collection of dust and debris while allowing for easy sensor cleanup | • Subminiature form factor<br>• Side and end-view options<br>• High visibility LED status indicators<br>• Variety of sense modes<br>• Low voltage DC operation<br>• 2 m cable connection |
| **Applications** | • Long range, background suppression sensing<br>• Light duty industrial environments | • Short range, background suppression sensing<br>• Small parts assembly | • Medium range, general purpose sensing<br>• Material handling, packaging and assembly | • Short range general purpose sensing<br>• Small parts assembly |
| **Sensing Modes and Max. Range** | • Background Suppression 1 m (3.3 ft) and 2 m (6.6 ft) | • Sharp cutoff diffuse: small sensor 3…5 cm (1.18…1.97 in.); large sensor 10…20 cm (3.94…7.87 in.) | • Polarized retroreflective 3.5 m (11.5 ft)<br>• Diffuse 800 mm (31.5 in.)<br>• Transmitted Beam:<br>Red LED source 10 m (32.8 ft)<br>Infrared LED source 10 m (32.8 ft) | • Standard diffuse 3…5 cm (1.18…1.97 in.)<br>• Sharp cutoff diffuse 3 cm (1.18 in.)<br>• Transmitted beam 50 cm (19.7 in.) |
| **Operating Voltage** | • 12…24V DC ±10% 30 mA<br>• 24…240V AC/DC ±10%<br>30 mA (DC)<br>15 mA (AC) | • 11…26V DC | • 10…30V DC | • 12…24V DC<br>• 24V DC ±10% (transmitted beam) |
| **Output Type** | • NPN/PNP Selectable 100 mA<br>• S.P.S.T. N.O. Relay<br>3A (250V AC, 750V A)<br>3A (30V DC, 90 W) | • NPN: 100 mA stability - 50 mA<br>• PNP: 100 mA | • NPN or PNP 100 mA | • NPN or PNP 80 mA |
| **Response Time** | • 20 ms<br>• 30 ms | • 0.35 ms | • 1 ms | • 0.5 ms |
| **Connections** | • Screw terminals accepts up to two 16 AWG (1.3 mm sq.) conductors | • 300V PVC cable 2 m | • 2 m cable<br>• Micro QD<br>• Pico QD | • 300V PVC cable 2 m |
| **Enclosure** | • Polycarbonate<br>• NEMA 1, 12, 13 IP65 (IEC529) | • Polyarylate/ABS<br>• NEMA 1, 4, 6P, 12 & 13; IP67 | • ABS/PMMA<br>• IP67 | • Polyester<br>• NEMA 1 & IP40 |
| **Additional Info** | • See page 1-78 | • See page 1-81 | • See page 1-84 | • See page 1-88 |

| **42KB** Micro Rectangular | **42KC** Miniature Rectangular | **Series 7000** Miniature Rectangular | **Series 7000** LTD Miniature Rectangular | **42EF** LaserSight™ RightSight™ |
|---|---|---|---|---|
| • Industry standard form factor<br>• Diagnostic output<br>• High visibility LED status indicator<br>• Variety of sense modes<br>• Low voltage DC operation<br>• 2 m cable or pico QD connections | • Industry standard form factor<br>• Diagnostic output<br>• High visibility LED status indicator<br>• Variety of sense modes<br>• Low voltage DC operation<br>• 2 m cable or pico QD connections | • Industry standard form factor<br>• High visibility LED status indicator<br>• Variety of sense modes<br>• Complimentary light/dark outputs<br>• Low voltage DC operation<br>• 2 m cable or micro QD connections | • Economy with performance<br>• Industry standard form factor<br>• High visibility LED status indicator<br>• Standard sense modes<br>• Low voltage DC operation<br>• 2 m cable or micro QD connections | • Universal 18 mm and thru-hole mounting options<br>• 360° visible status indicators<br>• Class 1 eye-safe visible laser |
| • Short range general purpose sensing<br>• Small parts assembly | • Short range general purpose sensing<br>• Small parts assembly | • Short range general purpose sensing<br>• Small parts assembly | • Short range general purpose sensing<br>• Small parts assembly | • Medium range, general purpose sensing<br>• Material handling, assembly and packaging |
| • Retroreflective 2 m (6.56 ft)<br>• Standard diffuse 70/200/300/400 mm (2.75/7.87/11.81/15.75 in.)<br>• Transmitted beam 1/7/10 m (3.3/22.75/32.8 ft)<br>• Sharp cutoff diffuse 30/40 mm (0.18/1.57 in.) | • Polarized retroreflective 1.5 m (5 ft)<br>• Standard diffuse 50 cm (19.68 in.)<br>• Transmitted beam 7 m (22.96 ft) | • Retroreflective 3.66 m (12 ft)<br>• Polarized retroreflective 1.98 m (6.5 ft)<br>• Standard diffuse 0.30 m (12 in.)<br>• Wide angle diffuse 0.28 m (11 in.)<br>• Fixed focus diffuse 17.8 mm (0.60 in.)<br>• Transmitted beam 7.62/9.15 m (25/30 ft)<br>• Small aperature fiber optic<br>• Transparent object detection | • Retroreflective 0.76/2.13/3.65 m (2.5/7/12 ft)<br>• Standard diffuse 0.30 m (12 in.)<br>• Antiglare retroreflective 1/2 m (3.28/6.5 ft) | • Polarized retroreflective 15 m (49 ft)<br>• Diffuse 300 mm (11.8 in.)<br>• Transmitted Beam 40 m (131 ft) |
| • 11…26V DC | • 11…26V DC | • 11…28V DC | • 11…28V DC | • 10…30V DC |
| • NPN or PNP 100 mA | • NPN or PNP 100 mA | • NPN or PNP 100 mA | • NPN or PNP 100 mA | • NPN and PNP 100 mA |
| • 0.35 ms | • 0.5 ms | • 0.5…1 ms | • 1 ms | • 1 ms (4 ms for transmitted beam) |
| • 300V PVC cable 2 m<br>• Pico QD | • 300V PVC cable 2 m | • PVC cable 3 m<br>• Micro QD | • PVC cable 3 m<br>• Micro QD | • 2 m cable<br>• Micro QD |
| • Polyarylate<br>• NEMA 1, 4, 6, 12 & 13; IP67 | • Polyarylate<br>• NEMA 1, 4, 6P, 12 & 13; IP67 | • Valox®<br>• NEMA 3, 4X, 6P, 12 & 13; IP67 | • Valox®<br>• NEMA 12 & 13; IP62 | • Mindel/Acrylic<br>• IP54 |
| • See page 1-92 | • See page 1-98 | • See page 1-102 | • *www.ab.com/catalogs* | • See page 1-108 |

# Quick Selection Guide

| Specifications | <br>**Series 9000**<br>**LaserSight™** | <br>**42CM**<br>**18 mm Cylindrical LaserSight™** | <br>**45MLD**<br>**Laser Background Suppression** | <br>**45CPD**<br>**Analog and Discrete Output** |
|---|---|---|---|---|
| **Features** | • Class 2 visible red laser source<br>• Polarized retroreflective and transmitted beam sensing modes<br>• Industry standard housing design with 1200 psi washdown rating<br>• Universal 30 mm and thru-hole mounting options<br>• 360° visible status indicators<br>• DC and AC only models | • Industry standard 18 mm housing design<br>• Metal housing for heavy duty industrial applications<br>• Class 1 eye safe visible laser<br>• Small spot size | • Short range laser background suppression sensing mode<br>• Adjustable sensing range and beam focus (0.5 mm (0.02 in.))<br>• Industry accepted housing design<br>• Low voltage DC operation<br>• Fast response time<br>• Pico QD connections | • Multiple programming modes (object detection, object position)<br>• Easy set-up using teach-in buttons<br>• Class 1 eye safe visible laser for operation<br>• Class 2 visible red laser for set-up |
| **Applications** | • Long range, general purpose sensing<br>• Small parts placement | • Medium range, general purpose sensing<br>• Embedded mounting | • Short range, precise sensing<br>• Small parts assembly | • Long range, general purpose analog sensing<br>• Object positioning, analog measuring |
| **Sensing Modes and Max. Range** | • Polarized retroreflective 40 m (130 ft)<br>• Transmitted beam 300 m (1000 ft) | • Polarized retroreflective 30 m (98 ft)<br>• Diffuse 300 mm (11.8 in.)<br>• Transmitted Beam 50 m (164 ft) | • Background suppression diffuse 50…300 mm (1.9…11.8 in.) | • Diffuse 6 m (20 ft) |
| **Operating Voltage** | • 10…40V DC<br>• 70…264V AC/DC | • 10…30V DC | • 10…30V DC | • 18…30V DC |
| **Output Type** | • NPN and PNP 250 mA<br>• Em-Relay 2 A | • NPN or PNP 100 mA | • NPN or PNP 100 mA | • Analog output: 4…20 mA;<br>Discrete: two PNP outputs |
| **Response Time** | • 500 µsec…15 ms | • 0.7 ms | • 200 µsec | • Fast/slow: 13 ms/30 ms |
| **Connections** | • 300V PVC cable 2 m<br>• Mini QD<br>• Micro QD | • 2 m cable<br>• Micro QD | • 4-pin pico QD | • Micro QD |
| **Enclosure** | • Valox®, Acrylic<br>• NEMA 3, 4X, 6P, 12 & 13; IP67 | • Nickel-plated brass/glass<br>• IP67 | • Polyamide<br>• IP65 | • ABS/PMMA<br>• IP67 |
| **Additional Info** | • See page 1-112 | • See page 1-115 | • See page 1-119 | • See page 1-121 |

# Quick Selection Guide

| **45BPD** **Analog and Discrete Output** | **45BRD** **Analog Output** | **42CRC** **Color Registration** | **Series 9000** **ColorSight™** | **45CLR** **ColorSight™** |
|---|---|---|---|---|
| • Industry accepted 50 mm (1.97 in.) compact enclosure<br>• Self-contained laser measurement solution<br>• Class 2 visible red laser | • Industry accepted 50 mm (1.97 in.) compact enclosure<br>• 20 µm resolution<br>• Class 2 visible red laser<br>• 270° rotatable connector | • Selectable red or green light sources<br>• Manual or teachable operation<br>• Diagnostic output<br>• Fast response time<br>• Selectable pulse stretcher output<br>• Durable IP66 housing design | • Teachable true RGB color sensor<br>• Fiber optic sensing for application flexibility<br>• Industry standard housing design with 1200 psi washdown rating<br>• Universal 30 mm and thru-hole mounting options<br>• 8 color match precision levels<br>• Low voltage DC operation | • Three channel color matching (3 outputs)<br>• Wide sensing range tolerance (±6 mm (±0.24 in.))<br>• Adjustable tolerance for high precision general color matching<br>• External teach capability<br>• Compact size enclosure<br>• RS-485 communication models available |
| • Medium range, general purpose analog sensing<br>• Object positioning, analog measuring | • Short range, precision general purpose measurement<br>• Object positioning, analog measuring | • High speed contrast sensing<br>• Color registration | • Precise color match sensing<br>• Part inspection and sortation | • Precise color match sensing<br>• Part inspection and sortation |
| • Diffuse 300 mm (11.8 in.) | • Diffuse 85 mm (3.35 in.) | • Color registration mark control 12.7 mm (0.5 in.) | • Large aperture fiber optic | • Diffuse 12…32 mm (0.47…1.26 in.) |
| • 18…30V DC | • 18…30V DC | • 10…30V DC | • 10…30V DC | • 18…30V DC |
| • Analog output: 4…20 mA; Discrete: PNP (100 mA) | • Analog output: 0…10V DC | • NPN and PNP 100 mA<br>• Diagnostic alarm NPN 30 mA | • Bipolar output | • 3 PNP outputs (discrete models)<br>• RS485 models: 1 PNP or 1 NPN output by cat. no. |
| • 0.4 ms | • 30 ms | • 0.25 ms | • Selectable 1.5…16 ms | • 1 ms |
| • Micro QD | • Micro QD | • Micro QD | • 300V PVC cable 2 m<br>• Micro QD | • Micro QD |
| • ABS/PMMA<br>• IP67 | • ABS/PMMA<br>• IP67 | • Epoxy-coated aluminum<br>• NEMA 3, 4, 6, 12 & 13; IP66 | • Valox®, Acrylic<br>• NEMA 4; IP54 | • ABS/PMMA<br>• IP67 |
| • See page 1-123 | • See page 1-125 | • See page 1-127 | • See page 1-130 | • See page 1-134 |

# Quick Selection Guide

| Specifications | <br>**45FVL**<br>**Digital Fiber Optic** | <br>**45FSL**<br>**Slim DIN-Rail Fiber Optic** | <br>**42FT**<br>**42FT Visible Red or Green Plastic Fiber Optic** | <br>**42FA**<br>**Slim Fiber Optic** |
|---|---|---|---|---|
| **Features** | • Teachable contrast sensor<br>• Accepts all plastic fiber optic cables<br>• Automatic and manual configuration with LCD display<br>• Red, green, blue, and white light source models<br>• "Power bus" feature reduces wiring<br>• DIN Rail mountable housing design | • Adjustable plastic fiber optic contrast sensor<br>• Fast response time<br>• Red or white light source models<br>• "Power bus" feature reduces wiring<br>• Crosstalk protection<br>• DIN Rail mountable housing design | • Red or green light source<br>• Local and remote self-teach operation<br>• Supports 1.5 mm and 1.25 mm plastic fiber optic cables<br>• Selectable pulse-stretcher<br>• Selectable hysteresis<br>• Dual "RUN" modes to prevent crosstalk with other sensors | • In-line fiber optic sensor<br>• Accepts all plastic fiber optic cables<br>• Fast response time<br>• Red light source models<br>• Low voltage DC operation<br>• DIN Rail mount option |
| **Applications** | • General contrast sensing<br>• Color registration, part inspection and sortation | • High speed contrast sensing<br>• Color registration, part inspection and sortation | • General contrast sensing<br>• Color registration, part inspection and sortation | • Short range sensing<br>• Small part assembly |
| **Sensing Modes and Max. Range** | • Retroreflective (bifurcated fiber)<br>• Standard diffuse (bifurcated fiber)<br>• Transmitted beam (individual fiber) | • Retroreflective (bifurcated fiber)<br>• Standard diffuse (bifurcated fiber)<br>• Transmitted beam (individual fiber) | • Small aperature fiber optic | • Small aperature fiber optic |
| **Operating Voltage** | • 12…24V DC | • 12…24V DC | • 12…24V DC | • 12…24V DC ±10%<br>• 12…24V DC ±10% |
| **Output Type** | • NPN or PNP 100 mA | • NPN or PNP 100 mA<br>• Stability 100 mA | • NPN or PNP by model | • NPN 100 mA<br>• PNP 100 mA |
| **Response Time** | • 600 µsec | • 30 µsec, 250 µsec | • 500 µsec | • 500 µsec |
| **Connections** | • 300V PVC cable 2 m<br>• 4 pin pico QD<br>• Power Bus | • 300V PVC cable 2 m<br>• 4 pin pico QD<br>• Power Bus | • 2 m 500V 5 conductor cable | • 3-pin pico QD |
| **Enclosure** | • ABS<br>• NEMA 1 & IP40 | • ABS<br>• NEMA 1 & IP40 | • ABS resin<br>• NEMA 1, 4X, 12, 13; IP66 (IEC 529) | • Noryl®<br>• NEMA 1, 12, 13; IP65 (IEC 529) |
| **Additional Info** | • See page 1-137 | • See page 1-139 | • See page 1-141 | • See page 1-144 |

| **ClearSight™ Series*** | **45LPT** **Optical Label Sensor** | **45LFM** **Capacitive Label Sensor** | **45LSP** **Optical Fork Sensor** | **45LST** **Optical Fork Sensor** |
|---|---|---|---|---|
| • Optimized for clear object detection<br>• Three types from high performance (Series 9000, * pictured), to economical (RightSight and Series 7000)<br>• Washdown rated models<br>• DC and AC only models<br>• Variety of output types | • One-touch local and remote teach operation<br>• Industrial aluminum housing design<br>• Highly visible LED status indicators<br>• Low voltage DC operation<br>• Fast response time<br>• Pico QD connection | • Senses wide variety of label colors and material<br>• Industrial aluminum housing design<br>• Highly visible LED status indicators<br>• Low voltage DC operation<br>• Fast response time<br>• Micro QD connection | • Teach-in sensitivity adjustment<br>• Light or dark operate selectable<br>• Remote teach capability (4-pin models)<br>• Plastic housing | • Ideal for small parts detection<br>• Manual adjustment with LED status indicators<br>• Rugged aluminum construction<br>• Seven fork widths to choose from<br>• Fast response time<br>• Pico QD connections |
| • Clear object sensing<br>• Plastic and glass bottles, films | • Optical label sensing<br>• Translucent labels | • Capacitive label sensing<br>• Translucent, clear, metalized labels | • Smart parts detection<br>• Beam breakage sensing | • Beam breakage sensing<br>• Small parts assembly |
| • Polarized retroreflective | • Transmitted beam (3 mm (0.12 in.) gap) | • Capacitive (0.76 mm (0.03 in.) gap) | • Transmitted beam gap (30…120 mm (1.18…4.72 in.)) | • Transmitted beam (2…225 mm (0.08…8.86 in.) gap) |
| • 10…40V DC<br>• 40…264V AC/DC<br>• 70…264V AC/DC | • 10…30V DC | • 11…30V DC | • 10…30V DC | • 10…30V DC |
| • NPN and PNP 250 mA<br>• SPDT EM relay 2 A<br>• Isolated NO solid state 300 mA | • NPN or PNP 100 mA | • NPN or PNP 150 mA | • PNP or NPN 100 mA | • NPN or PNP 100 mA |
| • 1…10 ms | • 50 µsec | • 10 µsec | • 250 µs | • 30 µs…1 ms |
| • 300V PVC cable 2 m<br>• Mini QD<br>• Micro QD | • 4-pin pico QD | • 5-pin micro QD | • Pico QD | • 4-pin pico QD |
| • Valox®, Acrylic<br>• NEMA 3, 4X, 6P, 12 & 13; IP67 | • Aluminum<br>• IP65 | • Anodized aluminum<br>• IP54 | • Polycarbonate<br>• IP67 | • Aluminum<br>• IP65 |
| • See page 1-147 | • See page 1-151 | • See page 1-153 | • See page 1-155 | • See page 1-157 |

# Quick Selection Guide

| Specifications | <br>**45MLA**<br>**Measuring Arrays & Controllers** | <br>**45DLA**<br>**Discrete Light Arrays** | <br>**45AST**<br>**Area Arrays** | <br>**45PVA**<br>**Verification Array** |
|---|---|---|---|---|
| **Features** | • Height measuring capability<br>• Slim profile array housing<br>• Long operating range<br>• Fast reaction time and measurement speed<br>• Controllers available in I/O and serial communications (RS485 and CAN) models | • Integrated light array controller<br>• Simple, flexible mounting<br>• Optically synchronized<br>• Wiring selectable range and output state (light/dark operate)<br>• 30mm resolution | • Two-dimensional array scanning technology<br>• 11…17 mm resolution<br>• 50, 100, 150 mm scanning height models<br>• Durable aluminum housing<br>• Bracket-free mounting<br>• Low voltage DC operation | • 35 mm object resolution<br>• Robust aluminum enclosure<br>• Four heights to choose from<br>• Highly visible JOB and FAULT indicators<br>• Crosstalk immunity<br>• Low voltage DC operation |
| **Applications** | • Height based measurement and sorting<br>• Overheight/overhang detection | • Error proofing<br>• Part detection | • Small parts assembly<br>• Parts ejection sensing | • Error proofing<br>• Bin picking |
| **Sensing Modes and Max. Range** | • Transmitted beam up to 4 m (13 ft) | • Transmitted beam upto 8 m (26.2 ft) | • Transmitted beam up to 2.5 m (8 ft) | • Transmitted Beam 2 m (6.5 ft) |
| **Operating Voltage** | • 12…24V DC | • 12…24V DC | • 12…24V DC | • 12…24V DC |
| **Output Type** | • NPN and PNP or serial communications (selectable by model) | • NPN and PNP (single push/pull) | • NPN or PNP 100 mA | • NPN or PNP 50 mA |
| **Response Time** | • See 45MLA Controller User Manual | • 25…165 ms by cat. no. | • 4…8 ms | • 25…98 ms |
| **Connections** | • PVC cable with 8 pin micro-QD, 500 mm (19.7 in) between array and controller | • PVC cable with 4-pin DC micro (M12), 150 mm (6 in.) cable pigtail | • 300V PVC cable 2 m | • 300V PVC cable with micro QD |
| **Enclosure** | • Arrays: Aluminum housing, polycarbonate lens, IP54<br>• Controller: ABS housing IP54<br>• Terminal strip: IP20 | • Aluminum housing, polycarbonate lens<br>• IP54 | • Aluminum housing, acrylic window<br>• IP67 | • Aluminum housing, acrylic window<br>• IP62 |
| **Additional Info** | • See page 1-160 | • See page 1-166 | • See page 1-169 | • See page 1-171 |

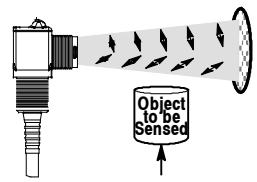
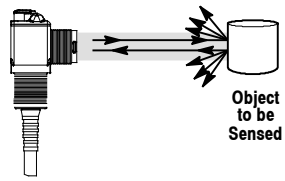
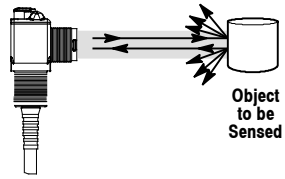
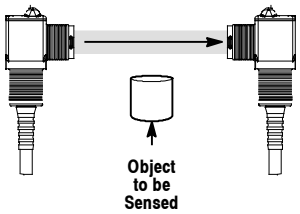
| | | | |
|---|---|---|---|
| **44N**<br>**Zone Control Sensor** | **22ZC**<br>**Zone Controller** | **Series 9000**<br>**Intrinsically Safe** | **Series 5000**<br>**Intrinsically Safe** |
| • Integral zone control logic<br>• Supports singulation and slug operation<br>• Compatible with variety of valves<br>• Polarized retroreflective sense mode<br>• Durable housing and connections<br>• Low voltage DC operation | • Selectable pneumatic or powered roller zone control logic<br>• Selectable advanced zone logic functions<br>• Selectable RUN/STOP delay timers<br>• Accepts mechanical or photoelectric sensor inputs<br>• Drives pneumatic valve or powered roller driver<br>• Proven flat cable IDC technology | • FM approved intrinsically safe design<br>• Transmitted beam sensing mode<br>• Compatible with Series 897H IS barriers<br>• Industry standard housing design with 1200 psi washdown rating<br>• Universal 30 mm and thru-hole mounting options<br>• 360° visible status indicators | • FM approved intrinsically safe design<br>• Multiple sensing modes<br>• Compatible with Series 897H IS barriers<br>• Modular housing design<br>• Screw terminal connections |
| • Zero pressure accumulation conveyors<br>• Pneumatically driven systems | • Accumulation conveyors<br>• Pneumatically and powered roller driven systems | • Intrinsically safe systems<br>• Hazardous (Classified) locations | • Intrinsically safe systems<br>• Hazardous (Classified) locations |
| • Polarized Retroreflective 50.8…4.87 m (2…16 ft) | • Compatible with a wide variety of photoelectric and mechanical switches | • Transmitted Beam<br>• 106 m (350 ft) | • Retroreflective 10 m (33 ft)<br>• Polarized retroreflective 6 m (20 ft)<br>• Standard diffuse 2.1 m (7 ft)<br>• Large aperature fiber optic/fixed focus/wide angle diffuse |
| • 10…30V DC | • 24V DC | • 13…30V DC<br>25 mA | • 13…29.5V DC |
| • PNP 100 mA | • Output signal for powered roller and drive for pneumatic valve | • PNP/8.5 mA<br>NPN/15 mA | • NPN and PNP 20 mA at 29.5V DC |
| • Variable 200 ms…10 s | • 1 ms | • 10 ms max. | • 1 ms |
| • 838 mm (33 in.) pigtail<br>• 381 mm (15 in.) pigtail<br>• Pico (M8) connector | • IDC flat cable | • 2 m 300V cable<br>• 4-pin micro QD<br>• 4-pin mini QD | • Screw terminals |
| • Valox®<br>• NEMA 4, 4X, 6, 12, IP67 | • Valox®<br>• NEMA 1, IP20 (IEC 529) | • Valox®<br>• NEMA 3, 4X, 6P, 12, 13, IP67, 1200 psi washdown | • Valox®<br>• NEMA 3, 4, 12, 13 (IP66) |
| • See page 1-177 | • See page 1-180 | • See page 1-184 | • See page 1-187 |

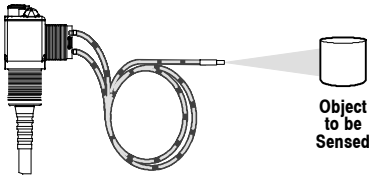
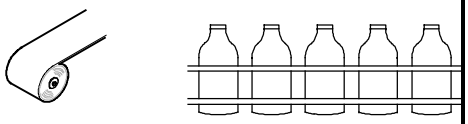
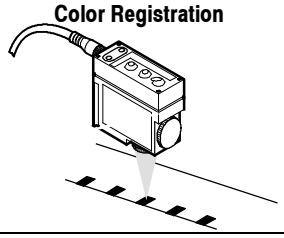
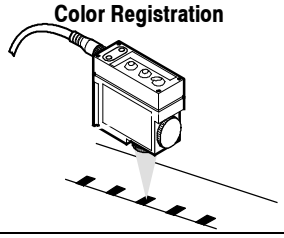
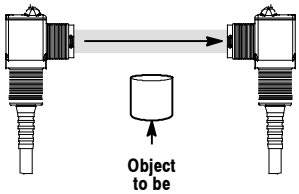
# Quick Selection Guide

| Specifications | <br>**48MS**<br>**MultiSight™** | <br>**Series 9000**<br>**Gate Entry** | <br>**Series 9000**<br>**Diagnostic** | <br>**Series 9000**<br>**Darkroom** |
|---|---|---|---|---|
| **Features** | • Ten or 32 virtual detectors<br>• Standalone vision sensor<br>• Compact, sturdy industrial housing with IP67 rating<br>• Optional EtherNet/IP with RSLogix 5000 Add-On profile for I/O data<br>• Multiple evaluation methods: pattern matching, brightness, contrast and contour matching. | • UL325 and UL508 approved<br>• Industry standard housing design with 1200 psi washdown rating<br>• Offered as kits or individual components | • Selectable static or dynamic operation<br>• Industry standard housing design with 1200 psi washdown rating<br>• Universal 30 mm (1.18 in.) and thru-hole mounting options<br>• 360° visible status indicators<br>• DC and AC only models<br>• Variety of sensing modes | • 880 nm wavelength for darkroom applications<br>• Fast response time<br>• Industry standard housing design<br>• DC and AC only models<br>• Variety of sensing modes<br>• Variety of output types |
| **Applications** | • Error proofing applications<br>• Packaging, assembly | • Automatic access control<br>• Vehicle access systems | • Long range, general purpose sensing<br>• Requirement for diagnostic output | • Darkroom, general purpose sensing<br>• Film processing |
| **Sensing Modes and Max. Range** | • Vision sensor (infinite depending on lighting conditions) | • Retroreflective 9 m (30 ft)<br>• Transmitted beam 61 m (200 ft) | • Retroreflective 9.14 m (30 ft)<br>• Polarized retroreflective 5 m (16 ft)<br>• Standard diffuse 1.5 m (5 ft)<br>• Transmitted beam 61 m (200 ft) | • Retroreflective 9.14 m (30 ft)<br>• Standard diffuse 0.91 m (3 ft)<br>• Transmitted beam 30 m (100 ft) |
| **Operating Voltage** | • 24V DC | • 10…55V DC/20…40V AC<br>• 70…264V AC/DC | • 10…30V DC<br>• 90…264V AC<br>95…264V DC | • 10…40V DC<br>• 70…264V AC/DC |
| **Output Type** | • 4 x PNP (200 mA per output) | • SPDT EM Relay | • Switch selectable NPN and PNP NO—NC 100 mA<br>• EM relay: sensor - 2 A diagnostic - 1 A | • NPN and PNP 250 mA<br>• SPDT EM relay, 2 A |
| **Response Time** | • 50…250 ms | • 23 ms | • 2…15 ms | • 2…23 ms |
| **Connections** | • Power I/O<br>• Ethernet | • 2 m cable<br>• AC mini QD | • Mini quick-disconnect<br>• Micro quick-disconnect | • 300V PVC cable 2 m<br>• Mini quick-disconnect<br>• Micro quick-disconnect |
| **Enclosure** | • Polycarbonate<br>• IP67 | • Valox/Acrylic<br>• NEMA 2, 4, 4X, 6P, IP67, 1200 psi (8270 kPa) washdown | • Valox®<br>• NEMA 3, 4X, 6P, 12 & 13; IP67 | • NEMA 3,4X, 6P, 12 & 13; IP67 |
| **Additional Info** | • See page 1-191 | • See page 1-198 | • See page 1-201 | • *www.ab.com/catalogs* |

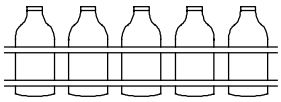
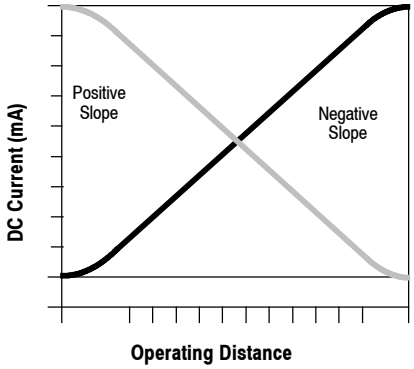
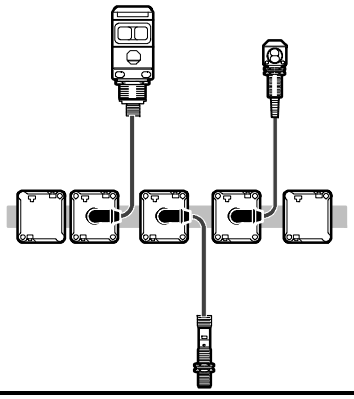
| **Series 6000** **Compact** | **Series 5000** **Modular** | **Series 4000B** **Long Range** | **Series 10,000** **Teachable** |
|---|---|---|---|
| • Compact cylindrical housing design<br>• Manual sensitivity adjustment<br>• Dual NPN and PNP outputs<br>• Variety of sense modes<br>• DC and AC only models<br>• 2 m cable and micro QD connections | • Multiple connection base and photohead options<br>• Multiple plug-in output modules<br>• Multiple plug-in logic modules<br>• DC and AC only models | • Durable housing design<br>• DC and AC only models<br>• Variety of sensing modes<br>• Multiple plug-in output modules<br>• Multiple plug-in logic modules<br>• Screw terminal connections | • Manual or teachable operation<br>• LCD display for easy setup<br>• Automatic sensitivity control with diagnostic output<br>• Industry standard housing design with 1200 psi washdown rating<br>• Low voltage DC operation<br>• Variety of sensing modes |
| • Medium range, general purpose sensing<br>• Cold temperature environments | • Long range, general purpose sensing<br>• Modular approach for maximum flexibility | • Long range, general purpose sensing<br>• Harsh duty installations | • Precise contrast sensing<br>• Small parts assembly |
| • Retroreflective 8.5 m (28 ft)<br>• Polarized retroreflective 3 m (10 ft)<br>• Standard diffuse 0.76 m (30 in.)<br>• Wide angle diffuse 0.46 m (18 in.)<br>• Fixed focus diffuse 27.9 mm (1.1 in.)<br>• Transmitted beam 36.5 m (120 ft)<br>• Large aperture fiber optic<br>• Small aperture fiber optic<br>• Sharp cutoff diffuse 0.25…7.6 cm (0.1…3 in.) | • Retroreflective 6…10 m (20…33 ft)<br>• Polarized retroreflective 6 m (20 ft)<br>• Standard diffuse 1.5…3 m (5…10 ft)<br>• Background suppression diffuse 6.3…30.5 cm (2.5…12 in.)<br>• Wide angle diffuse 0.46 m (18 in.)<br>• Fixed focus diffuse 50.8 mm (2.0 in.)<br>• Large aperture fiber optic | • Retroreflective 10.6 m (35 ft)<br>• Polarized retroreflective 7 m (23 ft)<br>• Standard diffuse 3.6 m (12 ft)<br>• Transmitted beam 274 m (900 ft) | • ClearSight 1.2 m (48 in.)<br>• Retroreflective 9 m (30 ft)<br>• Polarized retroreflective 4.6 m (15 ft)<br>• Standard diffuse 2.7 m (8.9 ft)<br>• Large aperature fiber optic<br>• Small aperature fiber optic<br>• Green fiber optic |
| • 10…30V DC<br>• 20…132V AC/DC<br>• 20…264V AC/DC | • 102…132V AC<br>• 204…254V AC<br>• 10…30V DC<br>• 40…54V AC/DC<br>• 20…30V AC/DC | • 102…132V AC<br>• 195…253V AC<br>• 40…58V AC<br>• 18…28V AC/DC | • 10…30V DC |
| • NPN and PNP 220 mA<br>• Power MOSFET 150…300 mA | • EM relay 2 A<br>• Triac 750 mA<br>• FET 30 mA<br>• NPN and PNP 100 mA | • EM relay 5 A<br>• Triac 1 A<br>• FET 30 mA<br>• NPN 250 mA<br>• DCV 30 mA | • NPN and PNP<br>• Diagnostic alarm, NPN or PNP |
| • 0.2…18 ms | • 1…20 ms | • 5…20 ms | • Selectable 250 µsec…4 ms |
| • PVC cable 3 m | • Vinyl cable 3 m<br>• Screw terminals<br>• Mini QD | • Terminals | • 300V PVC cable 2 m<br>• Mini QD<br>• Micro QD |
| • Noryl®<br>• NEMA 3, 4X 6, 12 & 13; IP67 | • Valox®<br>• NEMA 3, 4, 12 & 13; IP66 | • Noryl®<br>• NEMA 3, 4, 12 & 13; IP66 | • Valox®<br>• NEMA 3, 4X, 6P, 12 & 13; IP67 |
| • See page 1-207 | • See page 1-213 | • See page 1-227 | • *www.ab.com/catalogs* |

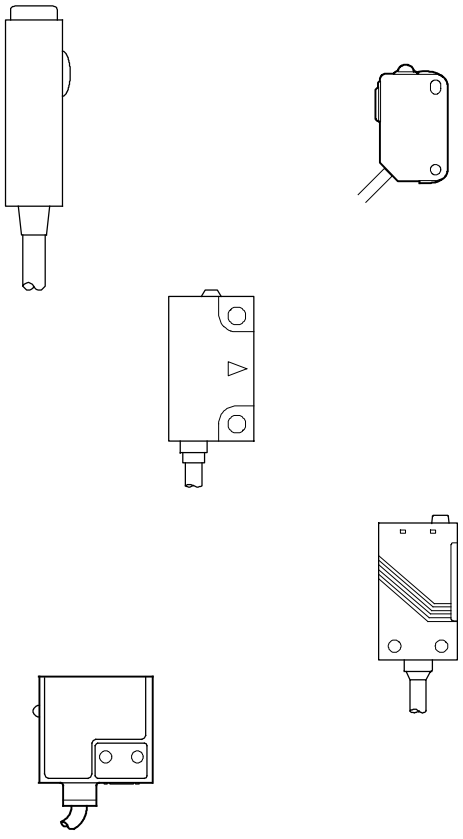
# Product Application Selector

| Standard Industrial Application | Sensing Modes | Maximum Sensing Range | Series | Page |
|---|---|---|---|---|
|  | Retroreflective | 4.8 m (15.7 ft) | 42CA | 1-52 |
| | | 7.2 m (23.6 ft) | 42CA | 1-52 |
| | Retroreflective | 4.5 m (14.7 ft) | RightSight | 1-31 |
| | | 5 m (16.4 ft) | MiniSight | 1-40 |
| | | 9 m (30 ft) | Series 9000 | 1-68 |
| | Polarized Retroreflective | 3 m (9.8 ft) | AccuSight | 1-48 |
| | | 3 m (9.8 ft) | RightSight | 1-31 |
| | | 3 m (9.8 ft) | 42CA | 1-52 |
| | | 2 m (6.6 ft) | MiniSight | 1-40 |
| | | 5 m (16 ft) | Series 9000 | 1-69 |
|  | Standard Diffuse | 500 mm (20 in.) | RightSight | 1-31 |
| | | 380 mm (15 in.) | MiniSight | 1-40 |
| | | 380 mm (1.5 in.) | AccuSight | 1-48 |
| | | 1.5 m (5 ft) | Series 9000 | 1-69 |
| | | 400 mm (13.6 in.) | 42CA | 1-52 |
| | | 100 mm (4 in.) | 42CA | 1-52 |
| | | 1000 mm (39.4 in.) | 42CA | 1-52 |
|  | Background Suppression | 50 mm (2 in.) | RightSight | 1-31 |
| | | 300 mm (11.8 in.) | 44B | 1-72 |
| | | 100 mm (4 in.) | RightSight | 1-31 |
| | | 1 m (3.3 ft) | 42BT | 1-76 |
| | | 2 m (6.5 ft) | 42BC | 1-78 |
| | | 1 m (3.3 ft) | 42BT | 1-76 |
| | | 2 m (6.5 ft) | 42BC | 1-78 |
| | | 30 mm (1.2 in.) | 42BA | 1-81 |
| | | 50 mm (2 in.) | 42CA | 1-52 |
| | | 50 mm (2 in.) | 42BA | 1-81 |
| | | 100 mm (4 in.) | 42CA | 1-52 |
| | | 100 mm (4 in.) | 42BA | 1-81 |
| | | 200 mm (8 in.) | 42BA | 1-81 |
| | Sharp Cutoff Diffuse | 100 mm (4 in.) | AccuSight | 1-48 |
| | | 130 mm (5 in.) | RightSight | 1-31 |
| | | 30 mm (1.2 in.) | 42KA | 1-88 |
| | | 30 mm (1.2 in.) | 42KB | 1-96 |
| | | 40 mm (1.6 in.) | 42KB | 1-96 |
|  | Transmitted Beam | 4 m (15 ft) | RightSight | 1-31 |
| | | 16 m (52.5 ft) | 42CA | 1-52 |
| | | 20 m (65 ft) | RightSight | 1-31 |
| | | 20 m (65 ft) | MiniSight | 1-40 |
| | | 61 m (200 ft) | Series 9000 | 1-65 |
| | | 152 m (500 ft) | Series 9000 | 1-65 |

| Standard Industrial Application | Sensing Modes | Maximum Sensing Range | Series | Page |
|---|---|---|---|---|
|  | Fiber Optic, Infrared Glass | Varies with FO cable | MiniSight | 1-40 |
| | | Varies with FO cable | RightSight | 1-31 |
| | | Varies with FO cable | Series 9000 | 1-65 |
| | Fiber Optic, Visible Red Plastic | Varies with FO cable | MiniSight | 1-40 |
| | | Varies with FO cable | Series 9000 | 1-65 |
| | | Varies with FO cable | 45FVL | 1-137 |
| | | Varies with FO cable | 42FA | 1-144 |
| | | Varies with FO cable | 45FSL | 1-139 |
| | Fiber Optic, Visible Green Plastic | Varies with FO cable | 45FVL | 1-137 |
| | Fiber Optic, Visible Blue Plastic | Varies with FO cable | 45FVL | 1-137 |
| | Fiber Optic, Visible White Plastic | Varies with FO cable | 45FSL | 1-139 |
| | | Varies with FO cable | 45FVL | 1-137 |
| **Clear Bottles, Films**<br>  | Clear Object | 1.4 m (4.5 ft) | ClearSight 9000 | 1-147 |
| | | | ClearSight 10000 | 1-147 |
| | | 1.5 m (5 ft) | ClearSight 7000 | 1-150 |
| | | 1 m (3.28 ft) | ClearSight RightSight | 1-150 |
| **Color Registration**<br>  | Color Recognition | Up to 25.5 mm (1 in.) | ColorSight | 1-130 |
| | | 12…32 mm (0.4…1.26 in.) | 45CLR ColorSight | 1-134 |
| **Color Registration**<br>  | Contrast | Up to 12 mm (0.5 in.) | 45FVL | 1-137 |
| | | 12.7 mm (0.5 in.) | 42CRC | 1-127 |
| **Long Range Sensing**<br>  | Transmitted Beam | 152 m (500 ft) | Series 9000 | 1-65 |
| | Laser | 300 m (1000 ft) | LaserSight | 1-112 |
| **High Temperature (70…480°C)**<br> | Fiber Optic | Varies with FO cable | 45FVL | 1-137 |
| | Fiber Optic | Varies with FO cable | 42FT | 1-141 |
| | Fiber Optic | Varies with FO cable | 45FSL | 1-139 |
| | Fiber Optic | Varies with FO cable | RightSight | 1-31 |
| | Fiber Optic | Varies with FO cable | MiniSight | 1-40 |
| | | Varies with FO cable | Series 9000 | 1-65 |

# Product Application Selector

| Standard Industrial Application | Sensing Modes | Maximum Sensing Range | Series | Page |
|---|---|---|---|---|
| **High Speed (250 ms or better)**  | Retroreflective | 5 m (16.4 ft) | MiniSight | 1-40 |
| | Polarized Retroreflective | 2 m (6.6 ft) | MiniSight | 1-40 |
| | Standard Diffuse | 380 mm (15 in.) | MiniSight | 1-40 |
| | Wide Angle Diffuse | 180 mm (7 in.) | MiniSight | 1-40 |
| | Transmitted Beam | 30 m (98 ft) | MiniSight | 1-40 |
| | Glass (Infrared) Fiber Optic | Varies with FO cable | MiniSight | 1-40 |
| | Plastic (Visible) Fiber Optic | Varies with FO cable | MiniSight | 1-40 |
| | | Varies with FO cable | 45FSL | 1-139 |
| **Hazardous (Classified) Location** | Retroreflective | 10 m (33 ft) | Series 5000 | 1-213 |
| | Polarized Retroreflective | 6 m (20 ft) | Series 5000 | 1-213 |
| | Standard Diffuse | 2 m (7 ft) | Series 5000 | 1-213 |
| | Fixed Focus Diffuse | 50 mm (2 in.) | Series 5000 | 1-213 |
| | Wide Angle Diffuse | 500 mm (20 in.) | Series 5000 | 1-213 |
| | Transmitted Beam | 106 m (350 ft) | Series 9000 | 1-186 |
| | Glass Fiber Optic | Varies with FO cable | Series 5000 | 1-213 |
| **Analog Output**   | Retroreflective | 4.6 m (15 ft) | Series 5000 | 1-213 |
| | Standard Diffuse | 1.5 m (5 ft) | Series 5000 | 1-213 |
| | Fixed Focus Diffuse | 50 mm (2 in.) | Series 5000 | 1-213 |
| | Wide Angle Diffuse | 500 mm (20 in.) | Series 5000 | 1-213 |
| | Glass (Infrared) Fiber Optic | 500 mm (20 in.) | Series 5000 | 1-213 |
| DeviceNet  | Retroreflective | 9 m (30 ft) | SmartSight 9000 | 10-10 |
| | Polarized Retroreflective | 3 m (9.8 ft) | RightSight | 10-4 |
| | | 5 m (16 ft) | SmartSight 9000 | 10-10 |
| | Standard Diffuse | 500 mm (20 in.) | RightSight | 10-6 |
| | | 1.5 m (5 ft) | SmartSight 9000 | 10-11 |
| | Transmitted Beam | 4 m (15 ft) | RightSight | 10-7 |
| | | 20 m (65 ft) | RightSight | 10-7 |
| | | 61 m (200 ft) | SmartSight 9000 | 10-11 |
| | | 130 m (425 ft) | SmartSight 9000 | 10-11 |
| | Fiber Optic, Infrared Glass | Varies with FO cable | RightSight | 10-7 |
| | | Varies with FO cable | SmartSight 9000 | 10-11 |

| Miniature- UltraMiniature Sensors | Sensing Modes | Maximum Sensing Range | Series | Page |
|---|---|---|---|---|
|  | Retroreflective | 2 m (6.5 ft) | 42KB | 1-95 |
| | | 3.6 m (12 ft) | Series 7000 | 1-102 |
| | Polarized Retroreflective | 1.5 m (4.9 ft) | 42KC | 1-98 |
| | | 2 m (6.5 ft) | Series 7000 | 1-102 |
| | | 2 m (6.5 ft) | 42CF | 1-62 |
| | | 3.5 m (11.5 ft) | 42JS | 1-84 |
| | Standard Diffuse | 30 mm (1.2 in.) | 42KA | 1-88 |
| | | 50 mm (2 in.) | 42KA | 1-88 |
| | | 70 mm (2.8 in.) | 42KB | 1-96 |
| | | 200 mm (8 in.) | 42KB | 1-96 |
| | | 300 mm (11.8 in.) | 42KB | 1-96 |
| | | 400 mm (15.8 in.) | 42KB | 1-96 |
| | | 500 mm (20 in.) | 42KC | 1-98 |
| | | 100 mm (4 in.) | 42CF | 1-62 |
| | | 300 mm (11.8 in.) | 42CF | 1-62 |
| | | 300 mm (11.8 in.) | Series 7000 | 1-102 |
| | | 800 mm (31.5 in.) | 42JS | 1-84 |
| | Background Suppression | 30 mm (1.2 in.) | 42BA | 1-81 |
| | | 50 mm (2 in.) | 42BA | 1-81 |
| | | 100 mm (4 in.) | 42BA | 1-81 |
| | | 200 mm (8 in.) | 42BA | 1-81 |
| | Sharp Cutoff Diffuse | 30 mm (1.2 in.) | 42KA | 1-88 |
| | | 30 mm (1.2 in.) | 42KB | 1-96 |
| | | 40 mm (1.6 in.) | 42KB | 1-96 |
| | Wide Angle Diffuse | 280 mm (11 in.) | Series 7000 | 1-102 |
| | Transmitted Beam | 500 mm (20 in.) | 42KA | 1-88 |
| | | 1 m (3.3 ft) | 42KB | 1-97 |
| | | 7 m (23 ft) | 42KB | 1-97 |
| | | 10 m (33 ft) | 42KB | 1-97 |
| | | 7 m (23 ft) | 42KC | 1-98 |
| | | 7.6 m (25 ft) | Series 7000 | 1-102 |
| | | 9.2 m (30 ft) | Series 7000 | 1-102 |
| | | 533 mm (21 in.) | Series 7000 | 1-102 |
| | | 4 m (13 ft) | 42CF | 1-62 |
| | | 10 m (33 ft) | 42JS | 1-84 |

# Technical Definitions and Terminology

**AC Coupled Amplifier**: An amplifier in which only pulsed (AC) signals are amplified and direct (DC) signals are ignored. (Direct signals generated by sunlight, heat sources and other.)

**Alignment**: Positioning of light source and receiver, reflector, or target in which a maximum signal strength is obtained.

**Ambient Light**: Illumination of a receiver not generated by its light source.

**Analog**: Electronic circuit with a current or voltage output signal that varies as a function of the light intensity received by the photodetector.

**Angstrom**: Unit of measurement used to determine the wavelength of light. 10 Angstrom (A) is equal to 1 nanometer (nm)

**Attenuation**: The reduction of signal strength. An example is when light travels through a fiber optic cable. The degree of attenuation depends on the fiber material and on the total length of the fiber optic cable.

**Bifurcated**: A fiber optic bundle that divides in two legs, forming a Y.

**Complementary Output**: Output circuit with a dual output device such that when one output is energized the other output is de-energized (similar to SPDT contact.

**Dark Operate**: A dark operate sensor energizes an output when the light intensity on the photodetector has sufficiently decreased.

**Diagnostic**: Advanced warning of loss in signal strength due to misalignment, dust and more, prior to loss of control output signal.

**Differential Travel (Hysteresis)**: The distance between the operating point and the release point (see hysteresis).

**Diffuse Reflection (Proximity)**: A photoelectric sensing method in which the light emitted by the light source hits the target surface and is then diffused from the surface in all directions.

**Digital Output**: An output circuit with only two operating states that are either “On” or “Off.” These operating states often are called “Hi” or “Low.”

**Dwell-Time**: The adjustable or fixed time length of an output pulse, independent of input signal duration.

**Excess Gain**: See operating margin.

**False Pulse**: An undesired change in the state of the output of the proximity switch that lasts for more than two milliseconds.

**False Pulse Protection**: Circuitry designed to avoid false pulses during power on or power down action.

**Ferrule**: Tip or termination of a fiber optic cable.

**Field of View**: The region that is illuminated by the light source and that can be seen by the receiver. Field of view is expressed in degrees but is three dimensional.

**Gating**: The provision to apply an external signal to a sensor in order to prevent undesirable operation.

**Hysteresis**: The distance between the operating point and the release point.

**Infrared**: Invisible light radiation starting at a wavelength of 690 nanometer (or 6900 Angstrom) and longer.

**Intrinsic Safety**: A design technique applied to electrical equipment and wiring for hazardous locations. It is based on limiting electrical and thermal energy to a level below that required to ignite hazardous atmospheric mixtures.

**LED (Light Emitting Diode)**: Semi-conductor that generates monochromatic light when current flows in the conductive direction. An LED is the standard light source for most photoelectric sensors.

**Leakage Current**: Small current flowing through a solid state output when in the off state.

**Light Operate**: A light operate sensor energizes an output when the light intensity on the photodetector has sufficiently increased.

**Nanometer (nm)**: 1 Nanometer is equal to 10-9 meter.

**Noise**: Presence of undesirable voltage, current, or light that may cause the sensor to malfunction.

**Normally Closed**: Output opens when an object is detected in the active switching area.

**Normally Open**: Output closes when an object is detected in the active switching area.

**Operating Margin**: The ratio of electrical signal available at a given sensing range to the minimum signal required to trigger the amplifier and output.

**Operating Mode**: See light and dark operate.

**Optical Crosstalk**: Optical crosstalk occurs when a photoelectric receiver responds to the signal from an adjacent emitter. Crosstalk can usually be resolved by repositioning the sensors.

**Photoelectric Sensor**: Electronic device recognizing changes in light intensity and converting these changes into a change in output state.

**Pulse**: A sudden fast change of a normally constant or relatively slow changing value such as voltage, current or light intensity.

**Response Time**: The sum of the time needed for a string of electronic circuits to translate a change in light into a change of output status.

**Reverse Polarity Protection**: A circuit that uses a diode to avoid damage to the control in case the polarity of the power supply is accidentally reversed.

**Ripple %**: The percentage of alternating component left on a DC signal after rectifying. Measured peak to peak of the alternating component and compared to the DC signal value.

**Rise Time (10% Levels)**: The time required for an analog voltage or current output value to rise from 10% of its maximum value to 90% of its maximum value.

**Sink (Current)**: Transistor output that requires the current to flow from positive ( + ) through the load and then through the output to negative ( – ). A current sink output uses an NPN transistor.

**Source (Current)**: Transistor output that requires the current to flow from positive ( + ) through the output and then through the load to negative ( – ). A current source output uses a PNP transistor.

**Transmitted Beam**: A sensing mode where the light source and the receiver are opposite each other and where the target breaks the beam.

**Wavelength**: Distance traveled by light while completing one complete sine-wave. Is expressed in nanometers (nm). Each color has a specific wavelength.

**White Paper Response**: A calibration procedure performed on retroreflective sensors to eliminate all response to white paper with 90% reflectance.

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Photoelectric sensors are used in many applications and industries to provide accurate detection of objects without physical contact.

In its most basic form, a photoelectric sensor can be thought of as a “limit switch-like” device, where the mechanical actuator or lever arm function is replaced by a beam of light.

Photoelectric sensors operate by sensing a change in the amount of light that is either reflected or blocked by an object to be detected (target). The change in light could be the result of the presence or absence of the target, or as the result in a change of the size, shape, reflectivity or color of a target.

A photoelectric sensor can be used in applications to sense targets at distances from less than 5 mm (0.2 in.) to over 250m (820 ft).

Successful sensing with a photoelectric sensor requires that the object to be detected (target) causes a sufficient change of light level detected by the sensor and that the user has a clear understanding of the sensing requirements.

The following must be clearly understood:

- The sensing requirements,
- The sensing environment, and
- The capabilities and limitations of the photoelectric sensor.

Be prepared to answer the following questions:

- What is the size, shape and/or opacity of the object to be detected?
- Does the object to be detected have any reflective properties?
- What response time is required of the sensor?
- What mounting configuration is required for the sensor? Are there position or physical restraints to consider?
- What is the frequency of operation and what requirement does the operating rate impose on the output device?
- What are the load requirements, such as voltage, current, load impedance?
- What voltage and current supply are available to operate the sensor?
- What is the ambient temperature surrounding the photoelectric sensor?
- Are there other environmental conditions such as dirt or high humidity that are unique to the area surrounding the photoelectric sensor?

There are a vast number of photoelectric sensors to choose from. Each offers a unique combination of sensing performance, output characteristics and mounting options. Many sensors also offer unique embedded logic or device networking capabilities.

This introduction will help you select the optimal photoelectric sensor for each application.

## Basic Concepts and Components

There are four basic components to any photoelectric sensor:

- Light source
- Light detector
- Lenses
- Output switching device

### Light Source

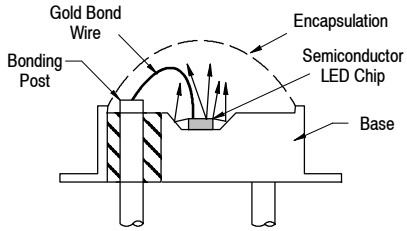
A light emitting diode (LED) is a solid-state semiconductor that emits light when current is applied. *Figure 1* (on page 1–20) shows the construction of an LED. LEDs are made to emit specific wavelengths or colors of light. Infrared, visible red, green, and blue LEDs are used as the light source (emitter) in most photoelectric sensors.

Different LED colors offer different desirable characteristics. Infrared LEDs are the most efficient, they generate the most light and the least heat of any LED color. Infrared LEDs are used in sensors where maximum light output is required for an extended sensing range.

In many applications, a visible beam of light is desirable to aid setup or confirm sensor operation. Visible red is most efficient for this requirement.

# Introduction

**Figure 1**
**LED Light-Emitting Diode**




Visible red, blue, and yellow LEDs are also used in special applications where specific colors or color contrasts must be detected. These LEDs are also used as status indicators on photoelectric sensors.

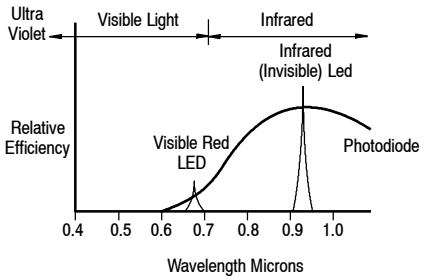
LEDs are rugged and reliable components, making them ideal for use in photoelectric sensors. They operate over a wide temperature range and are very resistant to damage from shock and vibration.

### Light Detector

A photodetector is the component used to detect the light source. A photodiode or phototransistor is a robust solid-state component that provides a change in conducted current depending on the amount of light detected.

Photodetectors are more sensitive to certain wavelengths of light. The spectral response of a photodetector determines its sensitivity to different wavelengths in the light spectrum. To improve sensing efficiency, the LED and photodetector are often spectrally matched. An example is shown in *Figure 2*.

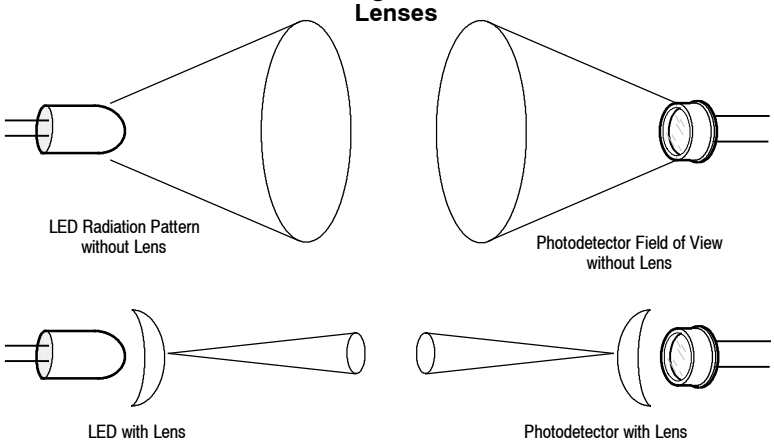
**Figure 2**
**Spectral Response**




The invisible (infrared) LED is a spectral match for this silicon phototransistor, and has much greater efficiency than a visible (red) LED.

The photodetector and associated circuitry are referred to as the receiver.

**Figure 3**
**Lenses**




### Lens

LEDs typically emit light and photodetectors are sensitive to light over a broad area. Lenses are used with LED light sources and photodetectors to narrow this area. As the area is narrowed, the range of the LED or photodetector increases. As a result, lenses also increase the sensing distance of photoelectric sensors (see *Figure 3*).

The light beam from an LED and lens combination is typically conical in shape. The area of the cone increases with distance.

Some photoelectric sensors are optimized for extra sensing distance. The light beam (or field of view) emitted by these sensors is fairly narrow. However, alignment can be difficult if the field of view is too narrow. Other photoelectric sensors are designed for detection of objects within a broad area. These sensors have a wider field of view, but a shorter overall range.

### Output Device

Once a sufficient change of light level is detected, the photoelectric sensor switches an output device to provide an interface to machine logic. Many types of discrete and variable (analog) outputs are available, each with particular strengths and weaknesses.

### Margin

Margin (operating margin, excess gain) is an important concept to understand when applying photoelectric sensors. The amount of maintenance required for a photoelectric sensing application can be minimized by obtaining the best margin levels for that application.

Margin is a measurement of the amount of light from the light source that is detected by the receiver. Margin is best explained by example:

- A margin of zero occurs when none of the light emitted by the light source can be detected by the light detector.
- A margin of one is obtained when just enough light is detected to switch the state of the output device (from OFF to ON or from ON to OFF).
- A margin of 20 is reached when 20 times the minimum light level required to switch the state of the output device is detected.

Margin is defined as:

$$\frac{\text{Actual amount of light detected}}{\text{Minimum amount required to change the output device state}}$$

and is usually expressed as a ratio or as a whole number followed by “X.” A margin of 6 may be expressed as 6:1 or as 6X.

### LED Modulation

The amount of light generated by the LED in the light source is determined by the amount of current it is conducting. To increase the range of a photoelectric sensor, the amount of current must be increased. However, LEDs also generate heat—there is an upper limit of heat that can be generated before an LED is damaged or destroyed.

Photoelectric sensors rapidly switch on and off or modulate the current conducted by the LED. A low duty cycle (typically less than 5%) allows the amount of current, and therefore the amount of emitted light, to far exceed

what would be allowable under continuous operation, see *Figure 4*.

**Figure 4**
**Modulation**

The modulation rate or frequency is often in excess of 5 kHz, much faster than can be detected by eye.

### Synchronous Detection

The receiver is designed to detect a pulsed light source from a modulated light source. To further enhance sensing reliability, the receiver and light source are synchronized. The receiver watches for light pulses that are identical to the pulses generated by the light source.

Synchronous detection helps a photoelectric sensor to ignore light pulses from other photoelectric sensors nearby or from other pulsed light sources such as fluorescent lights.

Synchronous detection is only possible when the light source and receiver are in the same housing, which is true for all sensing modes except transmitted beam as explained below.

## Photoelectric Sensing Modes

Different methods of sensing are referred to as sensing modes. There are three basic types:

- Transmitted beam (sometimes called through-beam or thru-beam)
- Retroreflective (sometimes referred to as reflex)
- Diffuse (also known as proximity)
- While many applications can be handled by any of these sensing modes, each offers specific strengths and weaknesses to consider. These strengths and weaknesses are summarized in *Table 1.*

### Transmitted Beam

In this mode (*Figure 5*) the light source and receiver are contained in separate housings. These two units are positioned opposite each other so that the light from the light source shines directly on the receiver. Targets must break (block) the beam between light source and receiver.

**Figure 5**
**Transmitted Beam Sensing**

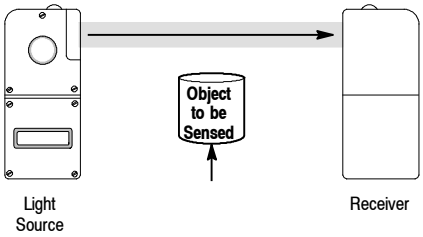



**Table 1**
**Photoelectric Sensing Modes Advantages and Cautions**

| Sensing Mode | Applications | Advantages | Cautions |
|---|---|---|---|
| Transmitted Beam | General purpose sensing<br>Parts counting | • High margin for contaminated environments<br>• Longest sensing distances<br>• Not affected by second surface reflections<br>• Probably most reliable when you have highly reflective objects | • More expensive because of separate light source and receiver required, more costly wiring<br>• Alignment important<br>• Avoid detecting objects of clear material |
| Retroreflective | General purpose sensing | • Moderate sensing distances<br>• Less expensive than transmitted beam because simpler wiring<br>• Ease of alignment | • Shorter sensing distance than transmitted beam<br>• Less margin than transmitted beam<br>• May detect reflections from shiny objects (use polarized instead) |
| Polarized Retroreflective | General purpose sensing of shiny objects | • Ignores first surface reflections<br>• Uses visible red beam for ease of alignment | • Shorter sensing distance than standard retroreflective<br>• May see second surface reflections |
| Standard Diffuse | Applications where both sides of the object cannot be accessed | • Access to both sides of the object not required<br>• No reflector needed<br>• Ease of alignment | • Can be difficult to apply if the background behind the object is sufficiently reflective and close to the object |
| Sharp Cutoff Diffuse | Short-range detection of objects with the need to ignore backgrounds that are close to the object. | • Access to both sides of the object not required<br>• Provides some protection against sensing of close backgrounds<br>• Detects objects regardless of color within specified distance | • Only useful for very short distance sensing<br>• Not used with backgrounds close to object |
| Background Suppression Diffuse | General purpose sensing<br>Areas where you need to ignore backgrounds that are close to the object | • Access to both sides of the target not required<br>• Ignores backgrounds beyond rated sensing distance regardless of reflectivity<br>• Detect objects regardless of color at specified distance | • More expensive than other types of diffuse sensors<br>• Limited maximum sensing distance |
| Fixed Focus Diffuse | Detection of small targets<br>Detects objects at a specific distance from sensor<br>Detection of color marks | • Accurate detection of small objects in a specific location | • Very short distance sensing<br>• Not suitable for general purpose sensing<br>• Object must be accurately positioned |
| Wide Angle Diffuse | Detection of objects not accurately positioned<br>Detection of very fine threads over a broad area | • Good at ignoring background reflections<br>• Detecting objects that are not accurately positioned<br>• No reflector needed | • Short distance sensing |
| Fiber Optics | Allows photoelectric sensing in areas where a sensor cannot be mounted because of size or environment considerations | • Glass fiber optic cables available for high ambient temperature applications<br>• Shock and vibration resistant<br>• Plastic fiber optic cables can be used in areas where continuous movement is required<br>• Insert in limited space<br>• Noise immunity<br>• Corrosive areas placement | • More expensive than lensed sensors<br>• Short distance sensing |

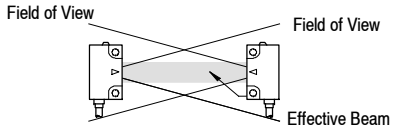
Transmitted beam sensors provide the longest sensing distances and the highest level of operating margin. For example, PHOTOSWITCH® Series 4000B Transmitted Beam sensors are capable of sensing distances of up to 274 m (900 ft).

Transmitted beam application margins at ranges of less than 10 m (3.1 ft) can exceed 10,000X. For this reason, transmitted beam is the best sensing mode when operating in very dusty or dirty industrial environments.

Another example: Series 9000 Transmitted Beam photoelectric sensors offer 300X margin at a sensing distance of 3 m (9.8 ft). At this distance, these sensors will continue to operate even if 99.67% of the combined lens area of the light source and receiver is covered with contamination.

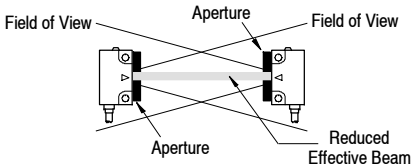
The “effective beam” of a transmitted beam sensor is equivalent to the diameter of the lens on the light source and receiver (*Figure 6*). Reliable detection occurs when the target is opaque and breaks at least 50% of the effective beam.

**Figure 6**
**Effective Beam**




Detection of objects smaller than the effective beam can best be achieved by reducing the beam diameter through means of apertures placed in front of the light source and receiver (*Figure 7*). Apertures are available for most 42KL, 42KB and 42EF transmitted beam sensors. Some users have created their own apertures for other sensor families.

**Figure 7**
**Effective Beam with Apertures**



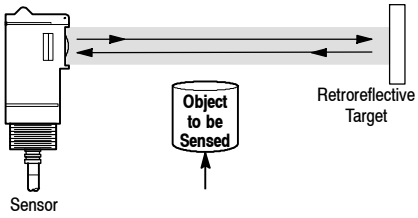

The most reliable transmitted beam applications have a very high margin when the target is absent, and a margin of zero (or close to zero) when the target is present.

Transmitted beam sensing may not be suitable for detection of translucent or transparent targets. The high margin levels allow the sensor to “see through” these targets. While it is often possible to reduce the sensitivity of the receiver, retroreflective or diffuse sensing may provide a better solution.

**Retroreflective**

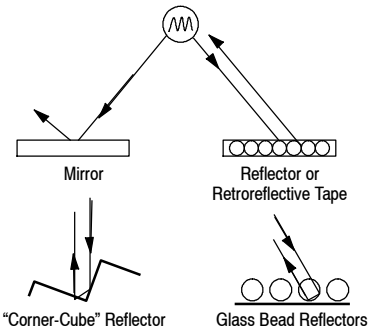
Retroreflective (reflex) is the most popular sensing mode. A retroreflective sensor contains both the light source and receiver in one housing. The light beam emitted by the light source is reflected by a special reflective object and detected by the receiver. The target is detected when it breaks this light beam (*Figure 8*).

**Figure 8**
**Retroreflective Sensing**




Special reflectors or reflective tapes are used for retroreflective sensing. Unlike mirrors or other flat reflective surfaces, these reflective objects do not have to be aligned perfectly perpendicular to the sensor. Misalignment of a reflector or reflective tape of up to 15° will typically not significantly reduce the margin of the sensing system (see *Figure 9*).

**Figure 9**
**Retroreflective Materials**




A wide selection of reflectors and reflective tapes are available.

The maximum available sensing distance of a sensor and reflector will depend in part upon the efficiency of the reflector or reflective tape. These reflective materials (page 1-306) are rated with a reflective index.

The PHOTOSWITCH standard 78 mm (3 in.) diameter round reflector (catalog number 92-39) is used to determine the maximum sensing distance of most PHOTOSWITCH sensors.

The 92-39 reflector has a reflective index of 100. The 92-99 reflective tape has a reflective index of 77 meaning that it will reflect only 77% as much light as a 92-39 reflector.

Retroreflective sensors are easier to install than transmitted beam sensors. Only one sensor housing must be installed and wired. However, margins when the target is absent are typically 10 to 1000 times lower than transmitted beam sensing, making retroreflective sensing less desirable in highly contaminated environments.

Caution must be used when applying standard retroreflective sensors in applications where shiny or highly reflective targets must be sensed. Reflections from the target itself may be detected. It may be possible to orient the sensor and reflector or reflective tape so that the shiny target reflects light away from the receiver. However, for most applications with shiny targets, *polarized retroreflective* sensing offers a better solution.

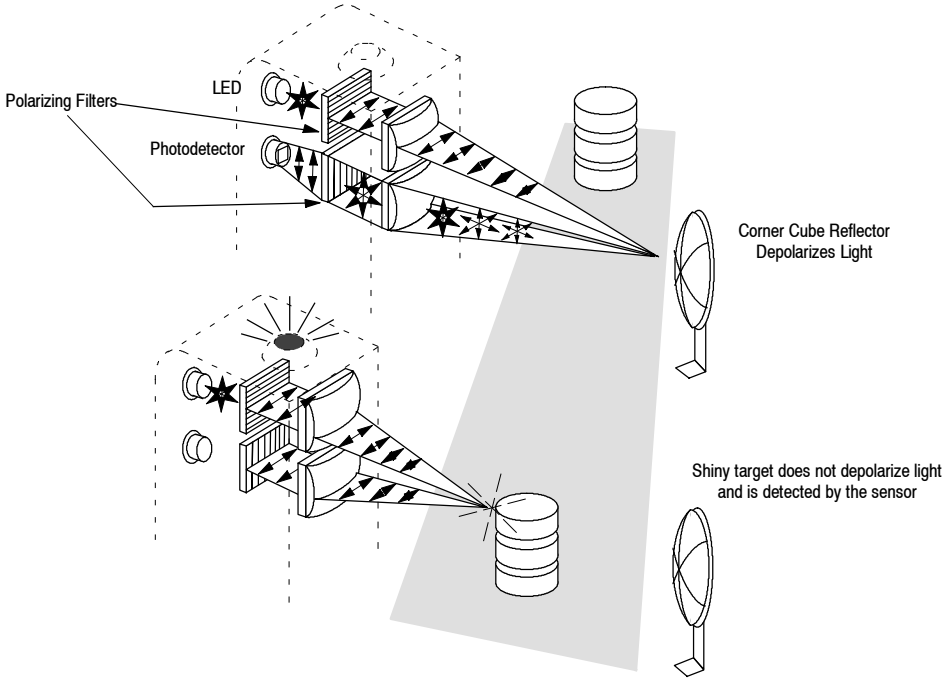
Polarized retroreflective sensors contain polarizing filters in front of the light source and receiver. These filters are perpendicular or 90° out of phase with each other (*Figure 10*, on page 1-23).

The sensor cannot see light reflected by most targets. The reflected polarized light cannot pass through the polarizing filter located in front of the receiver.

Reflectors depolarize reflected light. Some of the reflected depolarized light can pass though the polarizing filter in front to the receiver and can be detected by the sensor.

In summary, the sensor can “see” the reflection from a reflector, and it cannot “see” the reflection from most shiny targets.

**Figure 10**
**Polarized Retroreflective Sensing**




Polarized retroreflective sensors offer 30…40% shorter range (and less margin) than standard retroreflective sensors. Instead of infrared LEDs, polarized retroreflective sensors must use a less efficient visible light source (typically a visible red LED). There are additional light losses caused by the polarizing filters.

Polarized sensors will only ignore “first surface” reflections from an exposed reflective surface. Polarized light is depolarized as it passes through most plastic film or stretch wrap. Therefore, a shiny object may create reflections that are detected by the receiver when it is wrapped in clear plastic film. In the latter case, the shiny object becomes the “second surface” behind the plastic wrap. Other sensing modes must be considered for these applications.

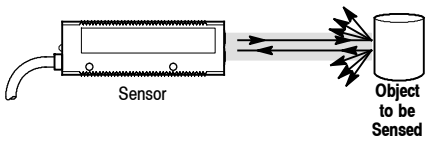
All standard reflectors depolarize light and are suitable for polarized retroreflective sensing. However, most reflective tapes do not depolarize light and are suitable only for use with standard retroreflective sensors. Specially constructed reflective tapes for polarized retroreflective sensing are available. Look for reflective tapes specifically identified as suitable for use with polarized retroreflective sensors.

**Diffuse**

Transmitted beam and standard or polarized retroreflective sensing creates a beam of light between light source and receiver or between sensor and reflector. Access to opposite sides of the target is required.

Sometimes it is difficult, or even impossible, to obtain access on both sides of a target. In these applications, it is necessary to point the light source directly at the target. Light is scattered by the surface at all angles and a small portion is reflected back to be detected by the receiver contained in the same housing. This mode of sensing is called diffuse or proximity (see *Figure 11*).

**Figure 11**
**Diffuse Sensing**




A sensing mode in which light strikes an object surface, is diffused from the surface at all angles and detected by the sensor.

There are a number of different types of diffuse sensing. The simplest, *standard diffuse*, is discussed here. Other types, sharp cutoff diffuse, fixed focus diffuse, wide angle diffuse, and background suppression diffuse, are explained in later sections.

The goal of standard diffuse sensing is to obtain a relatively high margin when sensing the target. When the target is absent, reflections from any background behind the target should provide a margin as close to zero as possible.

Target reflectivity can vary widely. Relatively shiny surfaces may reflect most of the light *away* from the receiver, making detection very difficult. The sensor face must be parallel with these types of target surfaces.

Very dark, matte objects may absorb most of the light and reflect very little for detection. These targets may be hard to detect unless the sensor is positioned very close.

The specified maximum sensing distance of a photoelectric sensor is determined using a calibrated diffuse target. Allen-Bradley uses a 216 x 292 mm (8.5 x 11 in.) sheet of white paper that has been specially formulated to be 90% reflective—meaning that 90% of the light energy from the light source will be reflected by the paper.

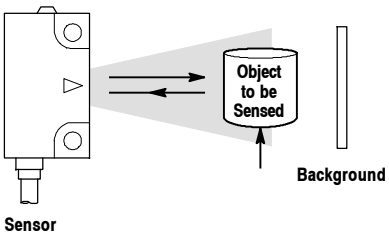
"Real world" diffuse targets are often considerably less reflective, as shown in *Table 2*.

**Table 2**

| Target | Typical Relative Reflectivity |
|---|---|
| Polished aluminum | 500 |
| White paper (reference) | 100 |
| White typing paper | 90 |
| Cardboard | 40 |
| Cut lumber | 20 |
| Black paper | 10 |
| Neoprene | 5 |
| Tire rubber | 4 |
| Black felt | 2 |

Detecting targets positioned close to reflective backgrounds can be particularly challenging. It may be impossible to adjust the sensor to obtain sufficient margin from the target without detecting, or coming close to detecting, the background (*Figure 12*). Other types of diffuse sensing may be more appropriate.

**Figure 12**




### Sharp Cutoff Diffuse

Sharp cutoff diffuse sensors are designed so that the light beam from the light source and the area of detection of the receiver are angled towards each other. This makes these sensors more sensitive at short range, and less sensitive than a longer range. This can provide more reliable sensing of targets that are positioned close to reflective backgrounds.

Note that this sensing mode provides some degree of improvement over standard diffuse sensing when a reflective background is present. However, a background that is very reflective may still be detected.

An even better solution is provided by background suppression diffuse sensors.

### Background Suppression Diffuse

Instead of attempting to ignore the background behind a target, background suppression sensors use sophisticated electronics to actively sense the presence of both the target and the background. The two signals are compared, and the output will change state upon active detection of the target, or active detection of the background.

In simple terms, background suppression sensing can allow the sensor to ignore the presence of a very reflective background almost directly behind a dark, less-reflective target. For many applications, it is the ideal diffuse sensing mode. However, background suppression sensors are more complex, and therefore more expensive than other diffuse sensors.

### Fixed Focus Diffuse

In a fixed focus (convergent beam) sensor, the light beam from the light source and the detection area of the receiver are focused to a very narrow point (focal point) at a fixed distance in front of the sensor. The sensor is very sensitive at this point, and much less sensitive before and beyond this focal point.

Fixed focus sensors have three primary applications:

- Reliable detection of small targets. Because the sensor is very sensitive at the focal point, a small target can be readily detected.
- Detection of objects at a fixed distance. As a fixed focus sensor is most sensitive at the focal point, it can be used in some applications to detect a target at the focal point, and ignore it when it is in front of or behind the focal point.
- Detection of color printing marks (color registration mark detection). In some applications, it is important to detect the presence of a printing mark on a continuous web of wrapping material. A fixed focus sensor with a specific visible light source color (typically red, green or blue) may be selected to provide the greatest sensitivity to the mark.

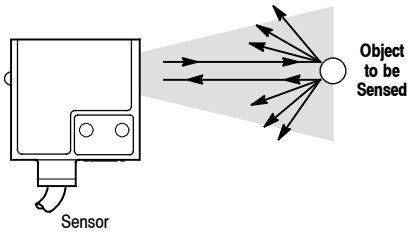
### Wide Angle Diffuse

Wide angle diffuse sensors project the light source and detection area of the receiver over a wide area (*Figure 13*).

These sensors are ideal for two applications:

- Thread detection—a wide angle diffuse sensor can detect the presence of extremely thin strands of thread or other material positioned close to the sensor. The presence or absence (thread break) of the thread can be reliably detected even when the thread moves from side to side in front of the sensor.
- Ignoring holes or imperfections in targets—because wide angle diffuse sensors can sense over a broad area, they can ignore small holes or imperfections in diffuse targets.

**Figure 13**
**Wide Angle Diffuse**




### Fiber Optics

Fiber optic sensors permit the attachment of "light pipes" called fiber optic cables. Emitted light from the light source is transmitted through transparent fibers in the cables and emerges at the end of the fiber. The transmitted or reflected beam is then carried back to the receiver through different fibers.

Fiber optic cables can be mounted in locations that would otherwise be inaccessible to photoelectric sensors. They can be used where there is a high ambient temperature and in applications where extreme shock and vibration or continuous movement of the sensing point is required (as described below).

Both glass and plastic are used as transparent materials to create fiber optic cables.

#### Glass

Glass fiber optic cables contain multiple strands of very thin glass fiber that are bundled together in a flexible sheath.

Glass fiber optic cables are typically more durable than plastic fiber optic cables. Glass cables will withstand

much higher temperatures. Standard Allen-Bradley glass fiber optic cables with a stainless steel sheath rated up to 260°C (500°F). Special order cables can be obtained with temperature ratings of up to 480°C (900°F).

Most glass cables are available with a choice of PVC or flexible stainless steel sheath. PVC-sheathed cables are typically less expensive. Stainless steel sheathing adds even greater durability and allows the cables to operate at higher temperatures

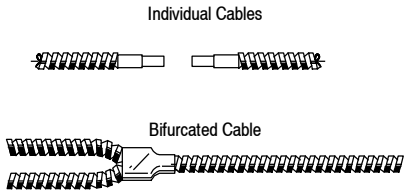
**Plastic**

Plastic fiber optic cables are typically constructed of a single acrylic monofilament. There is no protective sheathing, making plastic fiber optic cables less durable, but typically less expensive than glass cables.

Plastic cables can be used in applications where continuous flexing of the fiber optic cable is required. Coiled plastic cables are also available for these applications.

Fiber optic cables are available in *individual* or *bifurcated* configurations (*Figure 14*).

**Figure 14**
**Fiber Optic Cables**




Two individual cables are used for transmitted beam sensing. Some individual cables are packaged separately, others are sold in packages of two. Order carefully to receive two cables.

**Comparison of Fiber Optic Cables**

| | Glass | Plastic |
|---|---|---|
| Construction | Thin glass strands bundled in stainless steel or PVC sheath | Single acrylic monofilament |
| Temperature Range | -40…260°C (-40…500°F) with stainless steel sheath. Special order up to 480°C (900°F). | -30…70°C (-20…158°F) |
| Durability | Very durable | Adequate for many applications |
| Continuous Flexing | Will quickly break glass fibers | Will work very well, coiled versions available |
| Light Source | Visible or infrared OK | Must use visible light |
| Range | Can be longer range because of larger diameter | Adequate for many applications |

Bifurcated cables are used for diffuse or retroreflective sensing modes. Standard diffuse sensing with fiber optic cables are similar to sensing with lensed photoelectric sensors.

Retroreflective sensing is possible with either reflectors or reflective tapes. Polarized retroreflective sensing is not possible. In some applications it will be necessary to reduce the sensitivity of the sensor to prevent diffuse detection of the target.

Glass fibers can be used with infrared or visible LEDs. Plastic fibers absorb infrared light and therefore are most efficient when used with visible red LEDs.

A wide selection of fiber optic cables is available and many special configurations can be obtained.

**Clear Object Detection**

Clear materials present a unique application challenge for photoelectric sensors. Most clear objects and films provide insufficient contrast to be reliably detected using general purpose retroreflective or polarized retroreflective sensors. Various forms of diffuse sensing do not offer a preferred solution because the exact location of the clear target cannot be detected.

Rockwell Automation/Allen-Bradley offers ClearSight™ photoelectric sensors that are specifically designed for clear object and clear film sensing applications. These modified polarized retroreflective sensors contain special optical assemblies designed to optimize the amount of contrast generated by clear objects and films. Special electronics and software features further enhance sensing reliability.

For detailed information about solving the challenges of clear object detection, refer to the white paper “Clear Object Detection Using Photoelectric Sensors.”

**45FVL/FSL Light Source Selector Guide for Color Contrast Sensing**

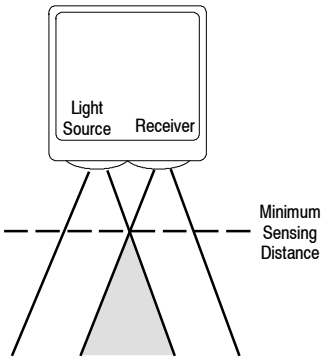
| Background \ Target | White | Yellow | Orange | Red | Green | Blue | Black |
|---|---|---|---|---|---|---|---|
| **White** | ❶ | B | B | B | R | R | R |
| **Yellow** | B | ❶ | G | G | R | R | R |
| **Orange** | B | G | ❶ | G | G | G | R |
| **Red** | B | G | G | ❶ | R | B | R |
| **Green** | R | R | G | R | ❶ | B | G |
| **Blue** | R | R | G | B | B | ❶ | B |
| **Black** | R | R | R | R | G | B | ❶ |

R = Red; B = Blue; G = Green

❶ 42QA ColorSight sensor suggested for shades of same color.

**Note**: White LED light source can be used selectively in place of red, blue and green.

**Figure 15**
**Blind Area**




## Photoelectric Sensor Specifications

### Light/Dark Operate Output

The terms ‘light operate‘ and ‘dark operate’ are used to describe the action of a sensor output when a target is present or absent.

A light operate output is ON (energized, logic level one) when the receiver can “see” sufficient light from the light source.

For transmitted beam and retroreflective sensing, a light operate output is ON when the target is absent and light can travel from the light source to the receiver. For diffuse sensing (all types), the output is ON when the target is present and reflecting light from the light source to the receiver.

A dark operate output is ON (energized, logic level one) when the receiver cannot “see” the light from the light source.

For transmitted beam and retroreflective sensing, a dark operate output is ON when the target is present and light from the light source is blocked and cannot reach the receiver. For diffuse sensing (all types), a dark operate output is ON when the target is absent.

### Maximum Sensing Distance

This specification refers to the sensing distance from:

- Sensor to reflector in retroreflective and polarized retroreflective sensors,
- From sensor to specified target in all types of diffuse sensors, and,
- Light source to receiver in transmitted beam sensors.

This sensing distance is guaranteed by the manufacturer. PHOTOSWITCH photoelectric sensors are conservatively rated; the actual available sensing distance will typically exceed this specification.

Note that this distance is specified at a margin of 1X, meaning that just enough light from the light source will be detected by the receiver to change the state of the output.

Most industrial environments will create contamination on the sensor lenses and reflectors or targets. Sensors should be applied at shorter distances to increase the margin to an acceptable value and enhance application reliability.

### Minimum Sensing Distance

Many retroreflective, polarized retroreflective, and diffuse (most types) sensors have a small “blind” area near the sensor (*Figure 15*). Reflectors, reflective tapes, or diffuse targets should be located further away from the sensor than this minimum sensing distance for reliable operation.

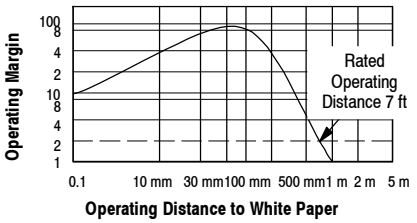
### Typical Response Curve

The catalog pages for most PHOTOSWITCH photoelectric sensors contain a curve that shows what the typical margin will be depending on sensing distance.

A margin of at least 2X is generally recommended for industrial environments.

*Figure 16* shows an example curve for a diffuse sensor. The maximum sensing range (margin=1X) of this sensor is 1 m (39.4 in.) to a specified white paper target. A margin of 4X can be achieved at approximately half that distance, or 500 mm (19.7 in.).

**Figure 16**
**Margin**




### Response Time

The response time of a sensor is the amount of time that elapses between the detection of a target and the change of state of the output device from ON to OFF or from OFF to ON. It is also the amount of time it takes for the output device to change state once the target is no longer detected by the sensor.

For most sensors, the response time is a single specification for both the ON time and OFF time. For other sensors, two different values may be given.

Response times are dependent on sensor design and choice of output device. Slower sensors usually offer longer sensing ranges. Very fast sensors typically have shorter sensing ranges. PHOTOSWITCH photoelectric sensors response times vary from 30 μs to 30 ms.

### Field of View

For most photoelectric sensors, the light beam from the light source and the area of detection in front of the receiver project away from the sensor in a conical shape. Field of view is a measurement (in degrees) of this conical area.

The Field of View is a useful specification to determine the available sensing area at a fixed distance away from a photoelectric sensor.

Refer to *Figure 17* for this example. The 42SRU-6002 retroreflective sensor has a 3° field of view. The figure shows that at a sensing distance of 3.0 m (10 ft) the detection area will be a circle that is approximately 168 mm (6.6 in.) diameter (56 mm (2.2 in.) per degree).

Sensors with a wide field of view typically have shorter sensing distances. However, a wider field of view can make alignment easier.

### Beam Patterns

Beam patterns are included for several lines of Allen-Bradley photoelectric sensors to help predict the performance of these sensors in a variety of applications. A beam pattern is defined as the sensing area for a photoelectric sensor. It is the pattern generated by comparing the response of the receiver to the emitted signal over the operating distance of the sensor.

All beam patterns are drawn in two dimensions and are assumed to be symmetrical in all planes about the optical axis of the sensor. The maximum operating margin is located at the optical axis and decreases towards the outer boundary of the beam pattern.

All beam patterns are generated under clean sensing conditions with optimal sensor alignment. The beam pattern represents the largest typical sensing area, and should not be considered exact. Dust, contamination, fog, etc. will decrease the sensing area and operating range of the sensor.

### Transmitted Beam Patterns

The beam pattern for a transmitted beam sensor represents the boundary where the receiver effectively receives the signal of the emitter, assuming there is no angular misalignment. Angular misalignment between the emitter and receiver will decrease the size of the sensing area. Beam patterns for transmitted beam sensors are useful for determining the minimum spacing required between adjacent transmitted beam sensor pairs to prevent optical crosstalk from one pair of sensors to the next.

### Retroreflective Beam Patterns

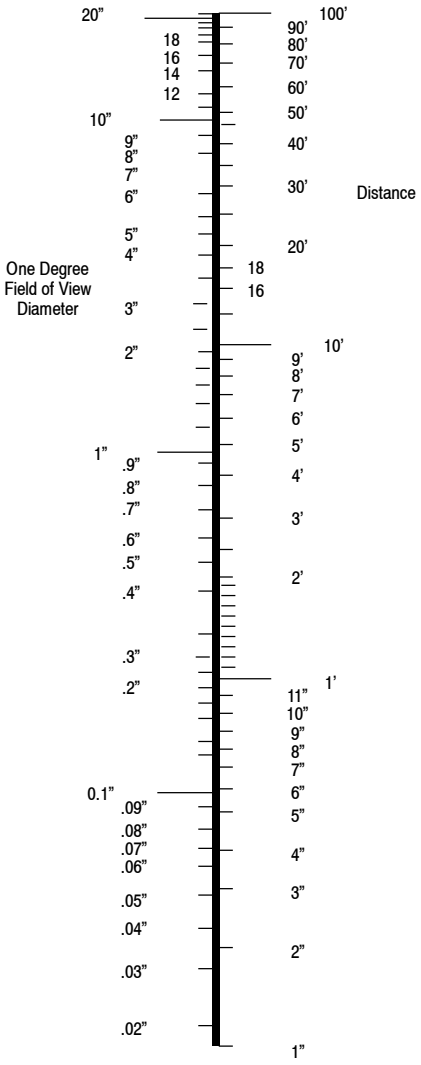
Beam patterns for retroreflective and polarized retroreflective sensors represent the boundary within which the sensor will respond to a retroreflective target as it passes by the sensors optics. The retroreflective target is held perpendicular to the sensor's optical axis while the beam diameter is plotted. The model 92-39 76 mm diameter retroreflective target is used to generate retroreflective beam patterns unless otherwise noted.

For reliable operation, the object to be sensed must be equal to or larger than the beam diameter indicated in the beam pattern. A smaller retroreflective target should be used for accurate detection of smaller objects.

### Diffuse, Sharp Cutoff, and Background Suppression Beam Patterns

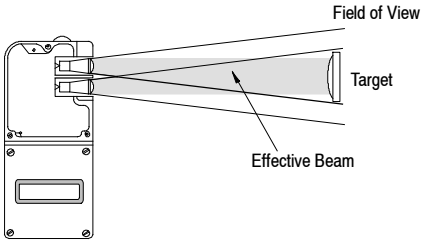
The beam pattern for a diffuse sensor represents the boundary within which the edge of a white reflective target that will be detected as it passes by the sensor. Diffuse beam patterns are generated using a 90% reflective sheet of 216 x 279 mm (8.5 x 11 in.) white paper held perpendicular to the sensor's optical axis. The sensing area will be smaller for materials that are less reflective, and larger for more reflective materials. Smaller objects may decrease the size of the beam pattern of some diffuse sensors at longer ranges. Diffuse targets with surfaces that are not perpendicular to the sensor's optical axis will also significantly decrease sensor response.

**Figure 17**
**Field of View Diameter vs. Distance**




It is important to note that the effective size of the beam of the retroreflective control is equal to the size of the retroreflective target. Additional reflective targets in the field of view will increase the excess gain and operating distance, if the field of view is bigger than the initial target as depicted in (*Figure 18*, on page 1-28).

**Figure 18**
**Retroreflective Sensors**



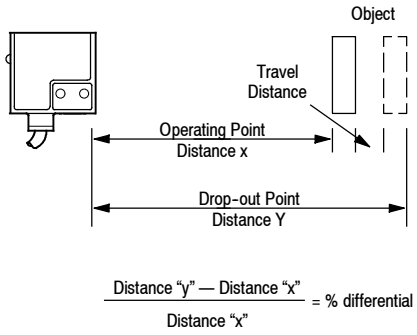

### Hysteresis

Photoelectric sensors exhibit hysteresis (or differential).

The hysteresis of a photoelectric sensor is the difference between the distance when a target can be detected as it moves towards the sensor, and the distance it has to move away from the sensor to no longer be detected.

An example is shown in *Figure 19*. As the target moves toward the sensor, it will be detected at distance X. As it then moves away from the sensor, it will still be detected until it gets to distance Y.

**Figure 19**
**Hysteresis**




$$\frac{\text{Distance "y"} - \text{Distance "x"}}{\text{Distance "x"}} = \%\ \text{differential}$$

The high hysteresis in most photoelectric sensors is useful for detecting large opaque objects in retroreflective, polarized retroreflective and transmitted beam applications. In diffuse applications a large difference in reflected light from target and background also allows the use of high hysteresis sensors.

Low hysteresis requires smaller changes in light level. The Series 10,000 and 42FT allow selection of low hysteresis for these applications.

## Aligning a Photoelectric Sensor

Proper alignment of the sensor will create a more rugged sensing solution that requires less maintenance.

### Retroreflective or Polarized Retroreflective

Aim the sensor at the reflector (or reflective tape). Slowly pan the sensor left until the reflector is no longer detected. Note this position, then slowly scan the sensor to the right and note when the reflector is no longer detected. Center the sensor between these two positions, then pan it up and down to center it in the vertical plane.

### Diffuse (all types)

Aim the sensor at the target. Pan the sensor up and down, left and right to center the beam on the target.

Reduce the sensitivity just until the target is no longer detected and note the position of the sensitivity adjustment.

Remove the target and increase the sensitivity until the background is detected. Adjust the sensitivity to the mid point between detection of the target and detection of the background.

### Transmitted Beam

Aim the receiver at the light source. Slowly pan the receiver left until the light source is no longer detected. Note this position, then slowly scan the receiver to the right and note when the reflector is no longer detected. Center the receiver between these two positions, then pan it up and down to center it in the vertical plane.

## Digital Output Devices

Once the sensor has detected the target, an output device switches the electrical power in the user's control circuit. The output is either ON or OFF, making the sensor a digital device.

There are many types of outputs available, each with different benefits and weaknesses. The types available with Allen-Bradley PHOTOSWITCH photoelectric sensors are described below, and summarized in *Table 3*.

### Electromechanical Relay

An electromechanical relay (or simply "relay") offers a reliable, positive means of switching electrical energy. Its major advantages are high switching current and electrical isolation from the sensor power source.

Because of the electrical isolation from the power source of the sensor, and due to the absence of leakage current, relays from multiple sensors can readily be connected in series and/or parallel.

Contact ratings will vary from 1…5 A at 120/240V AC 50/60 Hz resistive, depending on the sensor selected.

There are a number of different contact arrangements available:

- SPST—Single pole, single throw
- SPDT—Single pole, double throw
- DPDT—Double pole, double throw

Relays have a finite life span, typically measured in millions of operations. Inductive loads can shorten the life span considerably. Solid-state outputs should be considered for applications that require frequent switching by the sensor.

**Table 3**

| Output Type | Strengths | Weaknesses |
|---|---|---|
| Electromechanical Relay<br>*AC or DC switching* | • Output is electrically isolated from supply power<br>• Easy series and/or parallel connection of sensor outputs<br>• High switching current | • No short circuit protection possible<br>• Finite relay life |
| FET<br>*AC or DC switching* | • Very low leakage current<br>• Fast switching speed | • Low output current |
| Power MOSFET<br>*AC or DC switching* | • Very low leakage current<br>• Fast switching speed | • Moderately high output current |
| TRIAC<br>*AC switching only* | • High output current | • Relatively high leakage current<br>• Slow output switching |
| NPN or PNP Transistor<br>*DC switching only* | • Very low leakage current<br>• Fast switching speed | • No AC switching |

Response times of relays are typically 15…25 ms, much slower than most solid-state outputs.

### FET

The FET (Field Effect Transistor) is a solid-state device that provides for fast switching of AC or DC power and very low leakage current. Its switching current is limited. The FET output on the Series 4000B switches only 30 mA of current.

FET outputs can be connected in parallel like electromechanical relay contacts.

### Power MOSFET

A Power MOSFET (Metal Oxide Semiconductor Field Effect Transistor) provides the very low leakage and fast response time benefits of an FET with high switching current capacity.

The Power MOSFET used in Series 6000 and Series 9000 sensors can switch up to 300 mA of current.

### TRIAC

A TRIAC is a solid-state output device designed for AC switching only. TRIACs offer high switching current, making them suitable for connection to large contactors and solenoids.

TRIACs exhibit much higher leakage current than FETs and Power MOSFETs. Leakage current from TRIACs can exceed 1 mA, making them unsuitable as input devices for programmable controllers and other solid-state inputs. A zero crossing of the 50/60 Hz AC power cycle is required to activate a TRIAC, meaning that the minimum response time is 8.3 ms.

For most applications, Power MOSFETs provide better output characteristics.

### NPN/PNP Transistor

Transistors are the typical solid-state output device for low voltage DC sensors.

A sensor with an NPN transistor output device has a sinking output. The load must be connected between the sensor output and the **(+)** power connection.

A sensor with a PNP transistor output device has a sourcing output. The load must be connected between the sensor output and the **(-)** power connection.

Transistors exhibit very low leakage current (measured in μA) and relatively high switching current (typically 100 mA) for easy interface to most DC loads. Response times of sensors with transistor outputs can vary from 2 ms to as fast as 30 μs.

### Analog Output

Analog sensors provide an output that is proportional, or inversely proportional, to the quantity of light seen by the receiver.

Series 5000 analog output sensors provide a selectable voltage or current output that is proportional or inversely proportional to the amount of light detected by the receiver.

## Timing and Logic

Photoelectric sensors are somewhat unique among presence sensors because many offer timing or logic functions. These functions may be available in special versions of the sensors, or in plug-in modules.

### On Delay and Off Delay

On Delay and Off Delay are the most common timing modes.

An On Delay timer will delay the operation of an output after a target is detected.

An Off Delay timer will delay the operation of an output after the target is no longer detected.

The delay time of most sensors is adjustable from less than a second to 10 seconds or more.

Some high speed sensors (less than 1ms response time) such as the 42FB and 42FT contain a selectable 50 ms off delay time. This “pulse stretcher” is useful when it is necessary to slow down the OFF response time to allow a slower PLC or other machine logic to respond to the movement of materials in high speed applications.

### One-Shot

One-shot logic provides a single pulse output regardless of the speed that a target moves past the sensor. The length of the pulse is adjustable.

One-shot operation can provide different application solutions:

- In high speed operations—provides a pulse each time a target moves past the sensor that is sufficiently long to allow other slower logic to respond.
- In slower speed operations—provides a brief pulse each time a target moves past the sensor to trigger a solenoid or other impulse device.
- Provides a leading edge signal regardless of target length.
- Provides a trailing edge signal regardless of target length.

### Delayed One-Shot

Delayed one-shot logic adds an adjustable time delay before the one-shot output pulse occurs.

### Motion Detector

Motion detection logic provides the unique capability to detect the continuous movement of targets. The sensor will provide an output if it does not detect the motion of successive targets within the adjustable delay time.

Motion detector logic is useful to detect a jam or void in material handling applications.

# Notes

*RightSight DC model with short 18 mm base*

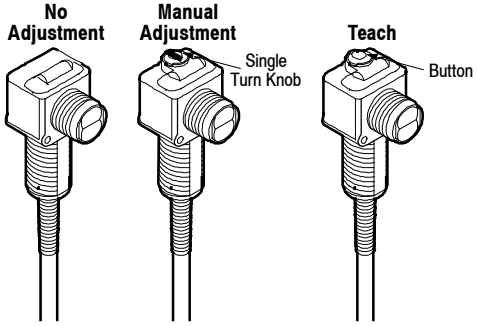
## Features

- Compact right angle housing
- Flexible 18 mm mounting options
- 1200 psi washdown rating
- Non-adjustable, adjustable and teach versions
- 360° visible LED indicators
- Reverse polarity protection
- Short-circuit protected outputs
- Fast 1 ms response time (DC)
- False pulse protection
- Variety of output types
- Laser models available (see page 1-108)

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| Operating Environment | NEMA 4X, 6P, IP67 (IEC 529); 1200 psi (8270 kPa) washdown, IP69K |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) ≤ 132V AC/DC<br>-25…+55° (-13…+131°) ≥ 132V AC/DC |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60068-2-6 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60068-2-27 |
| Relative Humidity | 5…95% (noncondensing) |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retroreflective, diffuse, background suppression, sharp cutoff, fixed focus, fiber optic, transmitted beam |
| Sensing Range | See Product Selection table on page 1-34 |
| Field of View | See Product Selection table on 1-34 |
| Light Source | Visible red LED (660 nm) or infrared LED (880 nm) |
| LED Indicators | See User Interface below |
| Adjustments | Sensitivity potentiometer, teach button, or fixed by cat. no. |
| **Electrical** | |
| Voltage | 10.8…30V DC, 21.6…264V AC |
| Current Consumption | 35 mA max (DC), 25 mA max (AC) |
| Sensor Protection | False pulse, reverse polarity, overload, short circuit |
| **Outputs** | |
| Response Time | 1 ms (4 ms for transmitted beam) DC models<br>8.3 ms (16.6 ms for transmitted beam) AC models |
| Output Type | PNP or NPN by cat. no., PNP and NPN, N-MOSFET |
| Output Mode | Complementary light or dark operate, light or dark operate by cat. no. |
| Output Current | 100 mA |
| Output Leakage Current | 0.1 mA max (DC); 0.4 mA max (AC) |
| **Mechanical** | |
| Housing Material | Mindel |
| Lens Material | Acrylic |
| Cover Material | Udel |
| Connection Types | 2 m cable, 4-pin DC micro (M12) QD, 4-pin pico (M8) QD |
| Supplied Accessories | 18 mm fastening nuts |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-39 |

## User Interface




| Color | State | Status—Nonteach Version | Status—Teach Version |
|---|---|---|---|
| Yellow | OFF | Output de-energized | Output de-energized |
| | ON | Output energized | Output energized |
| | Flashing | SCP active | NA |
| Orange | OFF | Margin < 2.5 | Normal operation |
| | ON | Margin > 2.5 | Teach mode active |
| | Flashing | Output SCP active (AC models only) | Teach mode active or output SCP active |
| Green | OFF | Sensor not powered, SCP active, output active | Sensor not powered |
| | ON | Sensor powered | Sensor powered |
| | Flashing | NA | Unstable margin condition or output SCP active |

**Note**: For DC models output and margin LEDs alternate flashing when SCP active.

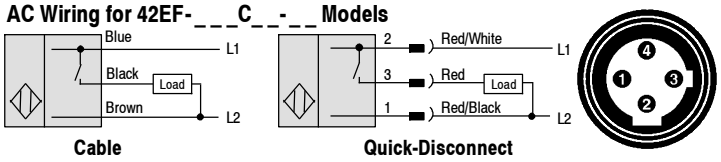
# 42EF RightSight™

## 18 mm Right Angle

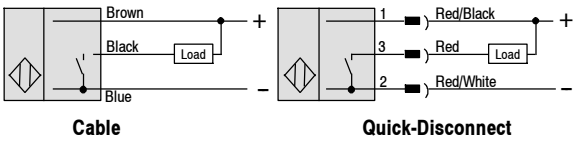
## Wiring Diagrams❶❷

### 21.6…264V AC/DC Sensors

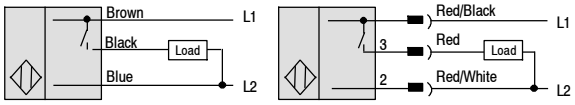
**AC Wiring for 42EF-___C__-__ Models**



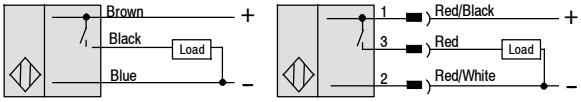

**DC Wiring for 42EF-___C__-__ Models**




**AC Wiring for 42EF-___F__-__ Models**

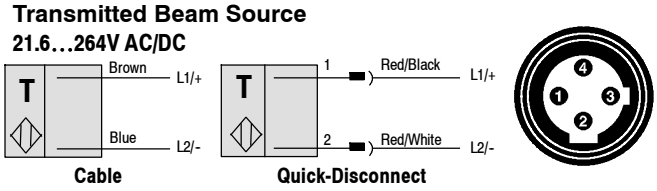



**DC Wiring for 42EF-___F__-__ Models**

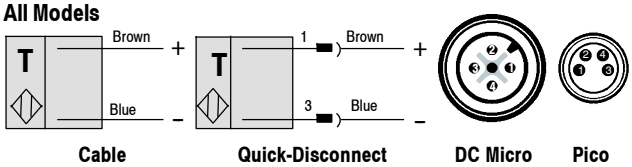



### Transmitted Beam Source

**21.6…264V AC/DC**

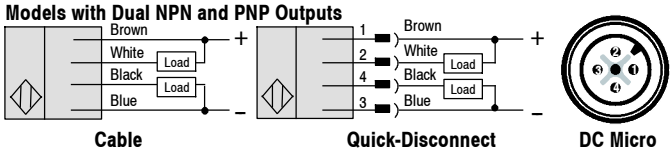



**All Models**

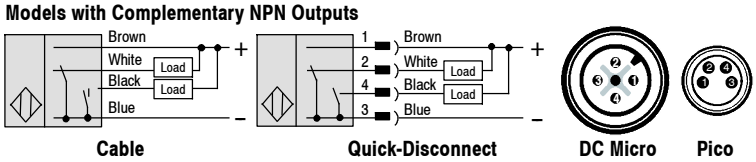



### 10.8…30V DC Sensors

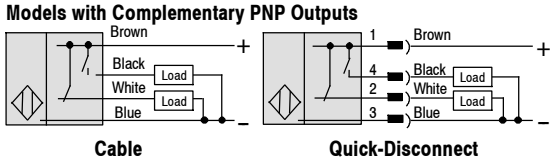
**Models with Dual NPN and PNP Outputs**




**Models with Complementary NPN Outputs**




**Models with Complementary PNP Outputs**

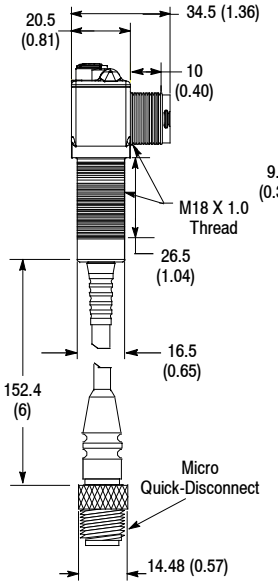


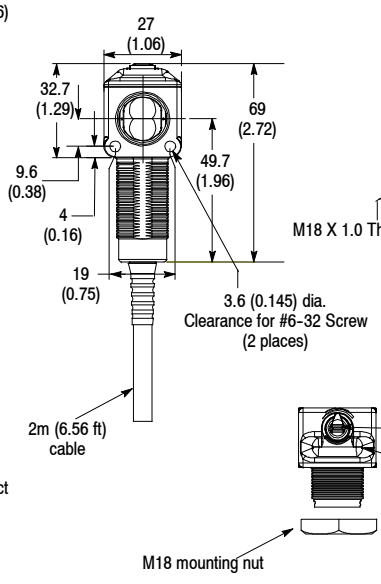

❶ For Rockwell Automation programmable controller compatible interface, refer to publication 42-2.0.

❷ All wire colors on quick-disconnect models refer to Rockwell Automation cordsets.

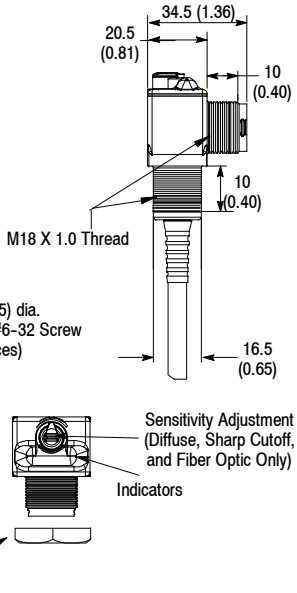
## Approximate Dimensions [mm (in.)]

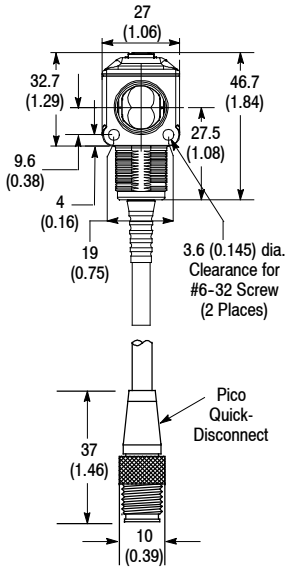
### AC/DC and DeviceNet Models



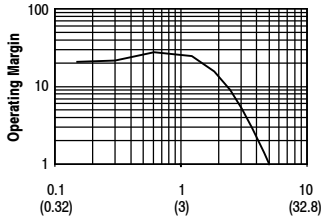

### DC Models



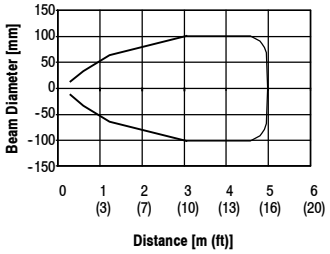




**Note**: All sensors supplied with one M18 mounting nut (Cat. No. 75012-097-01) except fiber optic models which come with two M18 mounting nuts (Cat. No. 75012-025-01).

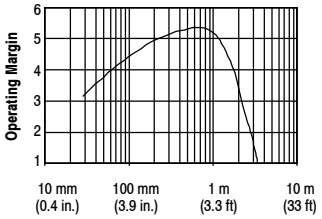
## Typical Response Curve — Retroreflective



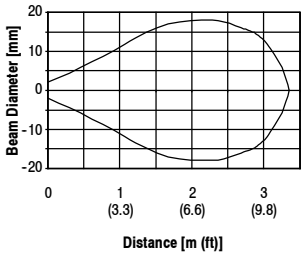

## Beam Pattern — Retroreflective



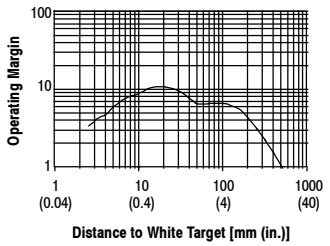

## Typical Response Curve — Polarized Retroreflective



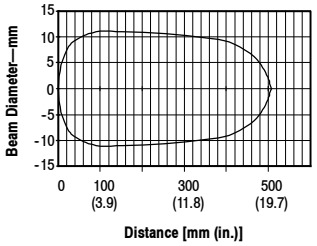

## Beam Pattern — Polarized Retroreflective



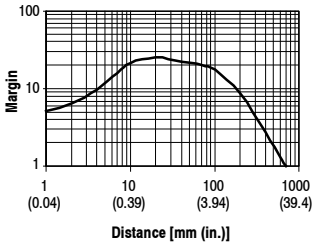

## Standard Diffuse—Nonteach



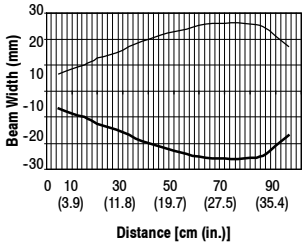

## Beam Diameter—mm — Standard Diffuse—Nonteach



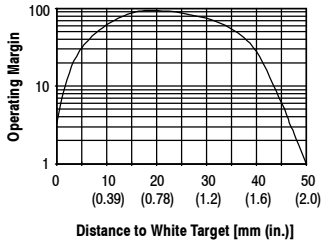

## Standard Diffuse—Teach



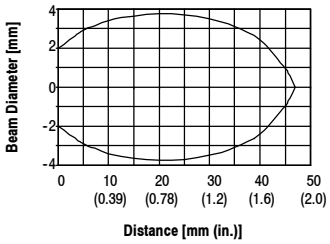

## Beam Width (mm) — Standard Diffuse—Teach




## Background Suppression 50 mm

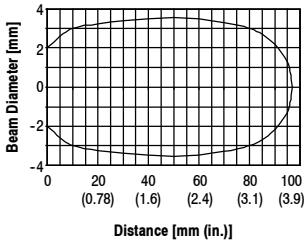



## 50 mm

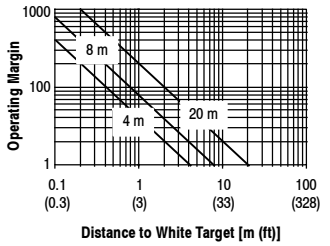



## Background Suppression 100 mm

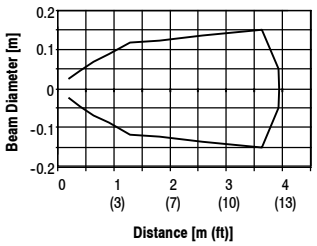
## 100 mm




## Transmitted Beam

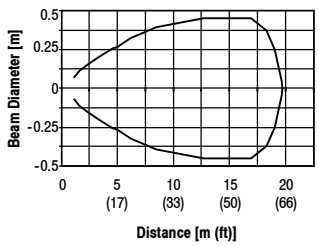



## 4 m Receiver Models

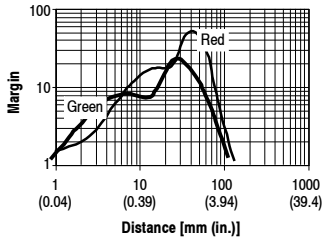



## Transmitted Beam

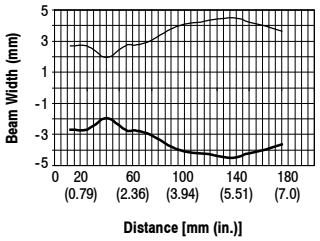
## 20 m Receiver Models



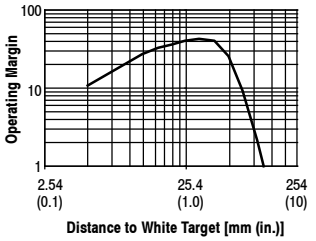

## Fixed Focus



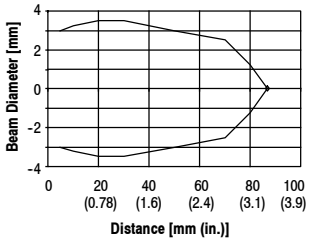

## Beam Width (mm) — Fixed Focus




## Sharp Cutoff Diffuse



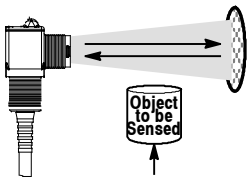
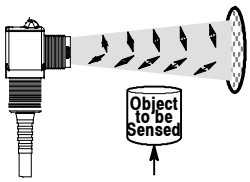

## Beam Diameter [mm] — Sharp Cutoff Diffuse



# 42EF RightSight™

## 18 mm Right Angle

### Product Selection

| Sensing Mode | Current @ Voltage | Sensing Distance | Adjustment Type | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 2.5° **Emitter LED:** Visible red 660 nm | 35 mA @ 10.8…30V DC | 25 mm…4.5 m (1 in…14.7 ft) | No Adjustment | Dark Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-U2KBB-A2 |
| | | | | | | 4-pin DC micro | **42EF-U2KBB-F4** |
| | | | | Light Operate | | 2 m 300V cable | 42EF-U2JBB-A2 |
| | | | | | | 4-pin DC micro | **42EF-U2JBB-F4** |
| | 15 mA @ 21.6…264V AC/DC | | | Dark Operate | N-MOSFET* 100 mA 8.3 ms | 2 m 300V cable | 42EF-U2SCB-A2 |
| | | | | | | 4-pin AC micro | 42EF-U2SCB-G4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-U2RCB-A2 |
| | | | | | | 4-pin AC micro | 42EF-U2RCB-G4 |
|  *Polarized Retroreflective* **Field of View:** 1.5° **Emitter LED:** Visible red 660 nm | 35 mA @ 10.8…30V DC | 25 mm…3 m (1 in…9.8 ft) | No Adjustment | Dark Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-P2KBB-A2 |
| | | | | | | 4-pin DC micro | **42EF-P2KBB-F4** |
| | | | | Light Operate | | 2 m 300V cable | 42EF-P2JBB-A2 |
| | | | | | | 4-pin DC micro | **42EF-P2JBB-F4** |
| | | | | Complementary Light and Dark Operate | NPN 100 mA 1 ms | 2 m 300V cable | 42EF-P2MNB-A2 |
| | | | | | | 4-pin DC micro | **42EF-P2MNB-F4** |
| | | | | | | 4-pin pico QD | 42EF-P2MNB-Y4 |
| | | | | | PNP 100 mA 1 ms | 2 m 300V cable | **42EF-P2MPB-A2** |
| | | | | | | 4-pin DC micro | **42EF-P2MPB-F4** |
| | | | | | | 4-pin pico QD | 42EF-P2MPB-Y4 |
| | 15 mA @ 21.6…264V AC/DC | | | Dark Operate | N-MOSFET❶ 100 mA 8.3 ms | 2 m 300V cable | 42EF-P2SCB-A2 |
| | | | | | | 4-pin AC micro | **42EF-P2SCB-G4** |
| | | | | Light Operate | | 2 m 300V cable | **42EF-P2RCB-A2** |
| | | | | | | 4-pin AC micro | **42EF-P2RCB-G4** |

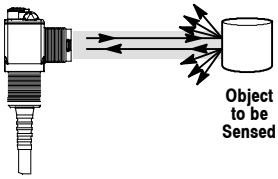
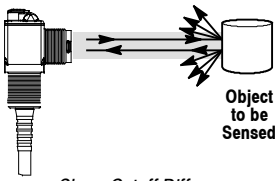
❶ P-MOSFET models are available. Refer to *www.ab.com/sensors*.

**ATTENTION**

P-MOSFET models have a lower in-rush current threshold for short-circuit protection than N-MOSFET. Therefore, they may be susceptible to false trigger of short-circuit protection due to induced noise.

**Refer to page 1-39 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Current @ Voltage | Sensing Distance | Adjustment Type | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Standard Diffuse* **Field of View**: 5° **Emitter LED**: Infrared 880 nm | 35 mA @ 10.8…30V DC | 3…500 mm (0.12…20 in.) | Single-Turn Knob | Dark Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-D1KBAK-A2 |
| | | | | | | 4-pin DC micro | 42EF-D1KBAK-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-D1JBAK-A2 |
| | | | | | | 4-pin DC micro | **42EF-D1JBAK-F4** |
| | 30 mA @ 10.8…30V DC | 3…700 mm (0.12…27.6 in.) | Teach Button | Light Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-D1JBCK-A2 |
| | | | | | | 4-pin DC micro | 42EF-D1JBCK-F4 |
| | | | | Dark Operate | | 4-pin pico QD | 42EF-D1KBCK-A2 |
| | | | | | | 2 m 300V cable | 42EF-D1KBCK-F4 |
| | 35 mA @ 10.8…30V DC | 3…500 mm (0.12…20 in.) | Single-Turn Knob | Comple-mentary Light and Dark Operate | NPN 100 mA 1 ms | 2 m 300V cable | 42EF-D1MNAK-A2 |
| | | | | | | 4-pin DC micro | 42EF-D1MNAK-F4 |
| | | | | | | 4-pin pico QD | 42EF-D1MNAK-Y4 |
| | | | | | PNP 100 mA 1 ms | 2 m 300V cable | **42EF-D1MPAK-A2** |
| | | | | | | 4-pin DC micro | **42EF-D1MPAK-F4** |
| | | | | | | 4-pin pico QD | 42EF-D1MPAK-Y4 |
| | 15 mA @ 21.6…264V AC/DC | | | Light Operate | N-MOSFET* 100 mA 8.3 ms | 2 m 300V cable | **42EF-D1RCAK-A2** |
| | | | | | | 4-pin AC micro | **42EF-D1RCAK-G4** |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-D1SCAK-A2 |
| | | | | | | 4-pin AC micro | 42EF-D1SCAK-G4 |
|  *Sharp Cutoff Diffuse* **Field of View**: 7° **Emitter LED**: Infrared 880 nm | 25 mA @ 10.8…30V DC | 3…130 mm (0.12…5 in.) | Single-Turn Knob | Dark Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-S1KBA-A2 |
| | | | | | | 4-pin DC micro | 42EF-S1KBA-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-S1JBA-A2 |
| | | | | | | 4-pin DC micro | 42EF-S1JBA-F4 |
| | | | | Complemen-tary Light and Dark Operate | PNP 100 mA 1 ms | 2 m 300V cable | 42EF-S1MPA-A2 |
| | | | | | | 4-pin DC micro | **42EF-S1MPA-F4** |
| | | | | | | 4-pin pico QD | 42EF-S1MPA-Y4 |
| | | | | | NPN 100 mA 1 ms | 2 m 300V cable | 42EF-S1MNA-A2 |
| | | | | | | 4-pin DC micro | 42EF-S1MNA-F4 |
| | | | | | | 4-pin pico QD | 42EF-S1MNA-Y4 |
| | 15 mA @ 21.6…264V AC/DC | | | Light Operate | N-MOSFET❶ 100 mA 8.3 ms | 2 m 300V cable | 42EF-S1RCA-A2 |
| | | | | | | 4-pin AC micro | 42EF-S1RCA-G4 |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-S1SCA-A2 |
| | | | | | | 4-pin AC micro | 42EF-S1SCA-G4 |

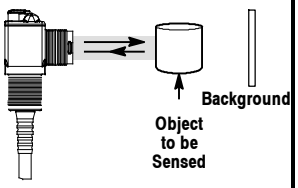
❶ P-MOSFET models are available. Refer to *www.ab.com/sensors*.

**ATTENTION**

P-MOSFET models have a lower in-rush current threshold for short-circuit protection than N-MOSFET. Therefore, they may be susceptible to false trigger of short-circuit protection due to induced noise.

**Refer to page 1-39 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Current @ Voltage | Sensing Distance | Adjustment Type | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Background Suppression* **Field of View**: 50 mm (2 in.): 20° 100 mm (3.9 in.): 8° **Emitter LED**: Infrared 880 nm | 35 mA @ 10.8…30V DC | 50 mm (1.97 in.) | No Adjustment | Dark Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-B1KBBC-A2 |
| | | | | | | 4-pin DC micro | 42EF-B1KBBC-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-B1JBBC-A2 |
| | | | | | | 4-pin DC micro | 42EF-B1JBBC-F4 |
| | | 100 mm (3.94 in.) | | Dark Operate | | 2 m 300V cable | 42EF-B1KBBE-A2 |
| | | | | | | 4-pin DC micro | 42EF-B1KBBE-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-B1JBBE-A2 |
| | | | | | | 4-pin DC micro | **42EF-B1JBBE-F4** |
| | | 3…50 mm (0.12…2 in.) | | Complementary Light and Dark Operate | NPN 100 mA 1 ms | 2 m 300V cable | 42EF-B1MNBC-A2 |
| | | | | | | 4-pin DC micro | 42EF-B1MNBC-F4 |
| | | | | | | 4-pin pico QD | 42EF-B1MNBC-Y4 |
| | | | | | PNP 100 mA 1 ms | 2 m 300V cable | 42EF-B1MPBC-A2 |
| | | | | | | 4-pin DC micro | **42EF-B1MPBC-F4** |
| | | | | | | 4-pin pico QD | 42EF-B1MPBC-Y4 |
| | | 3…100 mm (0.12…3.9 in.) | | | NPN 100 mA 1 ms | 2 m 300V cable | 42EF-B1MNBE-A2 |
| | | | | | | 4-pin DC micro | 42EF-B1MNBE-F4 |
| | | | | | | 4-pin pico QD | 42EF-B1MNBE-Y4 |
| | | | | | PNP 100 mA 1 ms | 2 m 300V cable | 42EF-B1MPBE-A2 |
| | | | | | | 4-pin DC micro | **42EF-B1MPBE-F4** |
| | | | | | | 4-pin pico QD | 42EF-B1MPBE-Y4 |
| | 15 mA @ 21.6…132V AC/DC | 3…50 mm (0.12…2 in.) | No Adjustment | Light Operate | PNP-FET 100 mA 8.3 ms | 2 m 300V cable | 42EF-B1RFBC-A2 |
| | | | | | | 4-pin AC micro | 42EF-B1RFBC-G4 |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-B1SFBC-A2 |
| | | | | | | 4-pin AC micro | 42EF-B1SFBC-G4 |
| | | 3…100 mm (0.12…3.9 in.) | | Light Operate | | 2 m 300V cable | 42EF-B1RFBE-A2 |
| | | | | | | 4-pin AC micro | 42EF-B1RFBE-G4 |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-B1SFBE-A2 |
| | | | | | | 4-pin AC micro | 42EF-B1SFBE-G4 |
| | 15 mA @ 21.6…264V AC/DC | 3…50 mm (0.12…2 in.) | | Light Operate | N-MOSFET❶ 100 mA 8.3 ms | 2 m 300V cable | 42EF-B1RCBC-A2 |
| | | | | | | 4-pin AC micro | **42EF-B1RCBC-G4** |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-B1SCBC-A2 |
| | | | | | | 4-pin AC micro | 42EF-B1SCBC-G4 |
| | | 3…100 mm (0.12…3.9 in.) | | Light Operate | | 2 m 300V cable | 42EF-B1RCBE-A2 |
| | | | | | | 4-pin AC micro | **42EF-B1RCBE-G4** |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-B1SCBE-A2 |
| | | | | | | 4-pin AC micro | 42EF-B1SCBE-G4 |

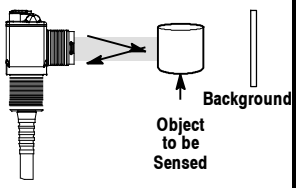
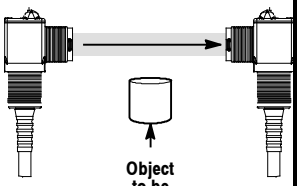
❶ P-MOSFET models are available. Refer to *www.ab.com/sensors*.

**ATTENTION**

P-MOSFET models have a lower in-rush current threshold for short-circuit protection than N-MOSFET. Therefore, they may be susceptible to false trigger of short-circuit protection due to induced noise.

**Refer to page 1-39 for cordsets and accessories.**

## Product Selection (continued)

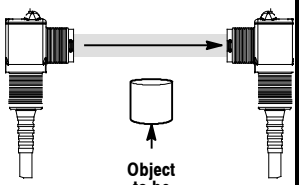
| Sensing Mode | Current @ Voltage | Sensing Distance | Adjustment Type | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Fixed Focus Diffuse*<br>**Spot Size**: 4 mm<br>**Emitter LED**: Visible red (660 nm) | 10.8…30V DC @ 30 mA max. | Red LED 43 mm (1.69 in.) | Teach Button | Light Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-F2JBC-A2 |
| | | | | | | 4-pin DC micro | 42EF-F2JBC-F4 |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-F2KBC-A2 |
| | | | | | | 4-pin DC micro | 42EF-F2KBC-F4 |
|  *Transmitted Beam*<br>**Field of View**: 7°<br>**Emitter LED**: Infrared 880nm | 10.8…30V DC 25 mA | Depends on Receiver | NA | NA | NA | 2 m 300V cable | 42EF-E1EZB-A2 |
| | | | | | | 4-pin DC micro | **42EF-E1EZB-F4** |
| | | | | | | 4-pin pico QD | 42EF-E1EZB-Y4 |
| | 21.6…264V AC/DC 15 mA | | | | | 2 m 300V cable | 42EF-E1QZB-A2 |
| | | | | | | 4-pin AC micro | **42EF-E1QZB-G4** |

**Refer to page 1-39 for cordsets and accessories.**

# 42EF RightSight™

## 18 mm Right Angle

### Product Selection for Receivers

| Sensing Mode | Current @ Voltage | Sensing Distance [m (ft)] | Adjustment Type | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Transmitted Beam* **Field of View**: 7° **Emitter LED**: Infrared 880nm (See Note 2.) | 25 mA @ 10.8…30V DC | 20 m (65.6 ft) | No Adjustment | Dark Operate | NPN and PNP 100 mA 4 ms | 2 m 300V cable | 42EF-R9KBB-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9KBB-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-R9JBB-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9JBB-F4 |
| | | 4 m (13.1 ft) | | Dark Operate | | 2 m 300V cable | 42EF-R9KBBV-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9KBBV-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-R9JBBV-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9JBBV-F4 |
| | | 8 m (26.25 ft) | | Dark Operate | | 2 m 300V cable | 42EF-R9KBBT-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9KBBT-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-R9JBBT-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9JBBT-F4 |
| | | 4 m (13 ft) | | Complementary Light and Dark Operate | NPN 100 mA 4 ms | 2 m 300V cable | 42EF-R9MNBV-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9MNBV-F4 |
| | | | | | | 4-pin DC pico | 42EF-R9MNBV-Y4 |
| | | | | | PNP 100 mA 4 ms | 2 m 300V cable | 42EF-R9MPBV-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9MPBV-F4 |
| | | | | | | 4-pin DC pico | 42EF-R9MPBV-Y4 |
| | | 8 m (26.25 ft) | | | NPN 100 mA 4 ms | 2 m 300V cable | 42EF-R9MNBT-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9MNBT-F4 |
| | | | | | | 4-pin DC pico | 42EF-R9MNBT-Y4 |
| | | | | | PNP 100 mA 4 ms | 2 m 300V cable | 42EF-R9MPBT-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9MPBT-F4 |
| | | | | | | 4-pin DC pico | 42EF-R9MPBT-Y4 |
| | | 20 m (65.6 ft) | | | NPN 100 mA 4 ms | 2 m 300V cable | 42EF-R9MNB-A2 |
| | | | | | | 4-pin DC micro | 42EF-R9MNB-F4 |
| | | | | | | 4-pin DC pico | 42EF-R9MNB-Y4 |
| | | | | | PNP 100 mA 4 ms | 2 m 300V cable | **42EF-R9MPB-A2** |
| | | | | | | 4-pin DC micro | **42EF-R9MPB-F4** |
| | | | | | | 4-pin DC pico | 42EF-R9MPB-Y4 |
| | 15 mA @ 21.6…264V AC/DC | 4 m (13 ft) | | Dark Operate | N-MOSFET❶ 100 mA 16.6 ms | 2 m 300V cable | 42EF-R9SCBV-A2 |
| | | | | | | 4-pin AC micro | 42EF-R9SCBV-G4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-R9RCBV-A2 |
| | | | | | | 4-pin AC micro | 42EF-R9RCBV-G4 |
| | | 8 m (26.25 ft) | | Dark Operate | N-MOSFET❶ 100 mA 16.6 ms | 2 m 300V cable | 42EF-R9SCBT-A2 |
| | | | | | | 4-pin AC micro | 42EF-R9SCBT-G4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-R9RCBT-A2 |
| | | | | | | 4-pin AC micro | 42EF-R9RCBT-G4 |
| | | 20 m (65.6 ft) | | Dark Operate | N-MOSFET❶ 100 mA 16.6 ms | 2 m 300V cable | 42EF-R9SCB-A2 |
| | | | | | | 4-pin AC micro | **42EF-R9SCB-G4** |
| | | | | Light Operate | | 2 m 300V cable | 42EF-R9RCB-A2 |
| | | | | | | 4-pin AC micro | 42EF-R9RCB-G4 |

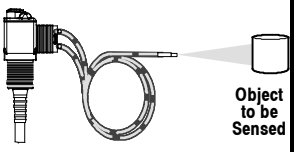
❶ P-MOSFET models are available. Refer to *www.ab.com/sensors*.

**ATTENTION**

P-MOSFET models have a lower in-rush current threshold for short-circuit protection than N-MOSFET. Therefore, they may be susceptible to false trigger of short-circuit protection due to induced noise.

**Refer to page 1-39 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Current @ Voltage | Sensing Distance | Adjustment Type | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Large Aperture Fiber Optic* (See Note 3.) **Field of View**: Depends on Glass Fiber Optic cable selected **Emitter LED**: Infrared 880nm | 35 mA @ 10.8…30V DC | Depends on Glass Fiber Optic cable selected | Single-Turn Knob | Dark Operate | NPN and PNP 100 mA 1 ms | 2 m 300V cable | 42EF-G1KBA-A2 |
| | | | | | | 4-pin DC micro | 42EF-G1KBA-F4 |
| | | | | Light Operate | | 2 m 300V cable | 42EF-G1JBA-A2 |
| | | | | | | 4-pin DC micro | 42EF-G1JBA-F4 |
| | | | | Complementary Light and Dark Operate | NPN 100 mA 1 ms | 2 m 300V cable | 42EF-G1MNA-A2 |
| | | | | | | 4-pin DC micro | 42EF-G1MNA-F4 |
| | | | | | | 4-pin pico | 42EF-G1MNA-Y4 |
| | | | | | PNP 100 mA 1 ms | 2 m 300V cable | 42EF-G1MPA-A2 |
| | | | | | | 4-pin DC micro | **42EF-G1MPA-F4** |
| | | | | | | 4-pin pico | 42EF-G1MPA-Y4 |
| | 15 mA @ 21.6…264V AC/DC | | | Light Operate | N-MOSFET❶ 100 mA 8.3 ms | 2 m 300V cable | 42EF-G1RCA-A2 |
| | | | | | | 4-pin AC micro | 42EF-G1RCA-G4 |
| | | | | Dark Operate | | 2 m 300V cable | 42EF-G1SCA-A2 |
| | | | | | | 4-pin AC micro | 42EF-G1SCA-G4 |

❶ P-MOSFET models are available. Refer to *www.ab.com/sensors*.

**ATTENTION**

P-MOSFET models have a lower in-rush current threshold for short-circuit protection than N-MOSFET. Therefore, they may be susceptible to false trigger of short-circuit protection due to induced noise.

**Note 1**: For color registration mark applications, refer to light source selection guide at *www.ab.com/sensors*.

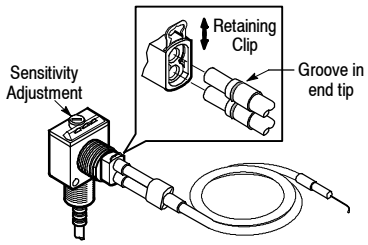
**Note 2**: For maximum performance, transmitted beam sources should be combined with matched operating voltage receivers, i.e., AC/DC source with AC/DC receiver or DC source with DC receiver. Reduced operating distance and margin will result from mixed operating voltage pairs.

**Note 3**: For use with glass fiber optic cables. See page 1-231 for more information.

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| DC Micro QD Cordset, Straight, 4-pin, 2 m | 889D-F4AC-2 | 76 mm (3 in.) Diameter Reflector | **92-39** | Apertures, 1 mm Slot | 60-2660 |
| AC Micro QD Cordset, Straight, 4-pin, 2 m | 889R-F4AEA-2 | 32 mm (1.25 in.) Diameter Reflector | **92-47** | Apertures, 2 mm Slot | 60-2661 |
| Pico QD Cordset, Straight, 4-pin, 2 m | 889P-F4AB-2 | Mounting Bracket Swivel/Tilt | 60-2649 | Apertures, 4 mm Slot | 60-2662 |
| | | | | Aperture Set | 60-2659 |
| Bifurcated Fiber Optic Cable—38 mm (1.5 in.) typical range | **43GR-TBB25SL** | Individual Fiber Optic Cable—457 mm (18 in.) typical range | **43GT-FAS25SL** | | |
| Bifurcated Fiber Optic Cable—21 mm (0.8 in.) typical range | 43GR-TFS10ML | Individual Fiber Optic Cable—152 mm (6 in.) typical range | 43GT-TFS10ML | | |

## Glass Fiber Optic Cables



# 42JS & 42JT VisiSight™

## 20 mm Rectangular

*42JS*

*42JS Adaptor*

*42JT*

## Description

The 42JS VisiSight™ family of photoelectric sensors features a full range of sensing modes in a miniature rectangular enclosure. The small housing combined with minimal adjustments; makes the 42JS VisiSight ideal for material handling applications where simplified installation and maintenance are required. A strong and visible light source is offered in all models for ease of alignment and a fast installation. The sensors can be mounted using the industry standard 25.4 mm hole spacing or using 18 mm hole mount when using the 60-AJS-18 snap-on adaptor.

The 42JT VisiSight models add flexibility by offering a tactile pushbutton that simplifies sensitivity and parameter setup. This makes the 42JT VisiSight a great solution for packaging and assembly applications that require some configuration in order to operate at optimal conditions. The 42JT offers unique "Auto PNP/NPN" output that continuously monitors how the load is connected and automatically configures the output for proper operation and output LED to indicate correct output status.

## Features

### 42JS VisiSight

- Visible red LED for ease of alignment
- Complementary light and dark operate outputs
- Linear sensitivity adjustment knob or no adjustment models
- Optional snap-on adaptor enables 18 mm mount and makes sensor replacement a snap
- IP67 rated enclosure

### 42JT VisiSight

- Class 1 "Eye Safe" red laser beam (for small object and contrast detection) and visible LED models
- Unique "Auto PNP/NPN" output reduces stocking cost and simplifies selection, installation, and maintenance
- Teach pushbutton for sensitivity and L.O./D.O. selection
- IP69K enclosure rating and ECOLAB certified to withstand food industry cleaning chemicals
- Laser etched markings for durability

## Available Models

| **42JS VisiSight** | **42JT VisiSight** |
|---|---|
| Polarized Retroreflective | Polarized Retroreflective |
| Standard Diffuse | Standard Diffuse |
| Fixed Background Suppression | Adjustable Background Suppression |
| Transmitted Beam | Transmitted Beam |
| | Clear Object |
| | Color Mark |

## General Specifications

| | |
|---|---|
| Certifications | cULus Listed and CE Marked for all applicable directives |
| **Environmental** | |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **User Interface** | |
| Indicator LEDs | Green LED, Yellow LED |
| **Electrical** | |
| Operating Voltage | 10…30V DC |
| Protection Type | False pulse, reverse polarity, overload, short circuit |
| **Outputs** | |
| Load Current | 100 mA max. |
| **Mechanical** | |
| Housing Material | ABS |
| Lens Material | PMMA |

## Specifications for 42JS VisiSight

| | |
|---|---|
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -20...+60° (-4...+140°) |
| **User Interface** | |
| Sensitivity Adjustment | Potentiometer or fixed by cat. no. |
| **Electrical** | |
| Current Consumption | 25mA max. |
| **Outputs** | |
| Output Type | PNP or NPN by cat. no. |
| Output Function | Complementary light and dark operate |
| **Mechanical** | |
| Connection Type | 2 m cable, 4-pin DC micro (M12) QD, 4-pin pico (M8) QD |

## Specifications for 42JT VisiSight

| | |
|---|---|
| **Environmental** | |
| Enclosure Type Rating | IP67 and IP69K |
| Operating Temperature [C (F)] | -20…+60° (-4…+140°) |
| **User Interface** | |
| Sensitivity Adjustment | Potentiometer or fixed by cat. no. |
| **Electrical** | |
| Current Consumption | 30 mA max. |
| **Outputs** | |
| Output Type | PNP or NPN by cat. no. |
| Output Function | Teachable light or dark operate |
| **Mechanical** | |
| Connection Type | 2 m cable, 4-pin DC micro (M12) QD on pigtail, 4-pin pico (M8) integral QD |





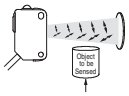
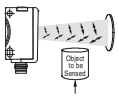
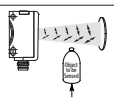
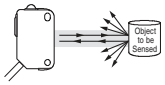
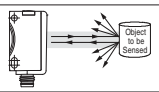
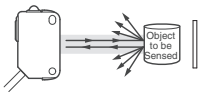
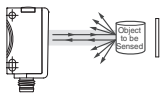
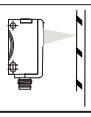
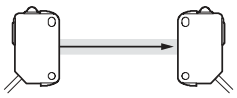
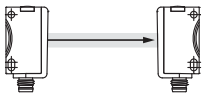
New

# 42JS & 42JT VisiSight™

## 20 mm Rectangular



### Product Selection

| Sensing Mode | | Light Source | Sensing Distance | Sensitivity Adjustment | Output Function | Output Type | Cat. No.‡ |
|---|---|---|---|---|---|---|---|
| Polarized Retroreflective | | | | | | | |
| 42JS |  | Visible red | 0.025…3.5 m (0.08…11.5 ft.)§ | No adjustment | Complementary light or dark operate | NPN | 42JS-P2MNB1-F4 |
| | | | | | | PNP | 42JS-P2MPB1-F4 |
| | | | | Adjustment knob | | NPN | 42JS-P2MNA2-F4 |
| | | | | | | PNP | 42JS-P2MPA2-F4 |
| 42JT |  | Visible red | 0.1…6 m (0.33…19.7 ft)♣ | Teach button | Teachable light or dark operate | Auto PNP or NPN | 42JT-P2LAT1-P4 |
| | | Class 1 laser | 0.05…13 m (0.16…42.7 ft)Δ | | | | 42JT-P8LAT1-P4 |
| Clear Object Detection | | | | | | | |
| 42JT |  | Visible red | 2 m (6.6 ft)Δ | Teach button | Teachable light or dark operate | Auto PNP or NPN | 42JT-C2LAT1-P4 |
| Diffuse | | | | | | | |
| 42JS |  | Visible red | 3…250 mm (0.12…9.84 in.) | Adjustment knob | Complementary light or dark operate | NPN | 42JS-D2MNA2-F4 |
| | | | | | | PNP | 42JS-D2MPA2-F4 |
| | | | 3…800 mm (0.12…31.5 in.) | | | NPN | 42JS-D2MNA1-F4 |
| | | | | | | PNP | 42JS-D2MPA1-F4 |
| 42JT |  | | | Teach button | Teachable light or dark operate | Auto PNP or NPN | 42JT-D2LAT1-P4 |
| | | Class 1 laser | 5…250 mm (0.20…9.84 in.) | | | | 42JT-D8LAT1-P4 |
| Background Suppression | | | | | | | |
| 42JS |  | Visible red | 6…55 mm (0.24…2.17 in.) | No adjustment | Complementary light and dark operate | NPN | 42JS-B2MNB1-F4 |
| | | | | | | PNP | 42JS-B2MPB1-F4 |
| | | | 2…130 mm (0.07…5.12 in.) | | | NPN | 42JS-B2MNB2-F4 |
| | | | | | | PNP | 42JS-B2MPB2-F4 |
| 42JT |  | | 1…180 mm (0.04…7.1 in.) | Teach button | Teachable light or dark operate | Auto PNP or NPN | 42JT-B2LAT1-P4 |
| | | | 3…400 mm (0.12…15.75 in.) | | | | 42JT-B2LAT2-P4 |
| | | Class 1 laser | 4…120 mm (0.16…4.72 in.) | | | | 42JT-B8LAT1-P4 |
| Color Mark | | | | | | | |
| 42JT |  | White LED | 12 mm (0.47 in.) ±2.5 mm | Teach button | Teachable light or dark operate | PNP or NPN (push pull) | 42JT-F5LET1-P4 |
| Transmitted Beam (emitter and receiver sold separately) | | | | | | | |
| 42JS |  | Visible red | 10 m (32.8 ft.) | No adjustment | NA (emitter) | NA | 42JS-E2EZB1-F4 |
| | | | | Adjustment knob | Complementary light or dark operate | NPN | 42JS-R9MNA1-F4 |
| | | | | | | PNP | 42JS-R9MPA1-F4 |
| | | Infrared | 10 m (32.8 ft.) | No adjustment | NA (emitter) | NA | 42JS-E1EZB1-F4 |
| | | | | Adjustment knob | Complementary light or dark operate | NPN | 42JS-R9MNA2-F4 |
| | | | | | | PNP | 42JS-R9MPA2-F4 |
| 42JT |  | Visible red | 13 m (42.65 ft) | No adjustment | NA (emitter) | NA | 42JT-E2EZB1-P4 |
| | | | | Teach Button | Teachable light or dark operate | Auto PNP or NPN | 42JT-R9LAT1-P4 |
| | | Class 1 laser | 18 m (59.05 ft) | No adjustment | NA (emitter) | NA | 42JT-E8EZB1-P4 |
| | | | | Teach button | Teachable light or dark operate | Auto PNP or NPN | 42JT-R8LAT1-P4 |
| Recommended DC micro (M12) quick-disconnect cordset, straight, 4-pin, 2 m | | | | | | | 889D-F4AC-2 |
| Recommended DC pico (M8) quick-disconnect cordset, straight, 4-pin, 2 m | | | | | | | 889P-F4AB-2 |

§ Sensing distance with 92-124 reflector.
♣ Sensing distance with 92-125 reflector.
Δ Sensing distance with 92-118 reflector.
‡ **42JS connection options**: The -F4 suffix describes a 4-pin DC micro (M12) QD connector on a 150 mm (6 in.) pigtail. For additional connection options, replace the -F4 suffix with:
-A2 for a 2 m cable without QD connection (for example, 42JS-P2MPB1-A2 ).
-Y4 for a 4-pin DC pico (M8) QD connection on a 150 mm (6 in.) pigtail (for example, 42JS-P2MPB1-Y4).
**42JT connection options**:The -P4 suffix describes a 4-pin DC pico (M8) integral QD connector. For additional connection options, replace the -P4 suffix with:
-A2 for a 2 m cable without QD connection (for example, 42JT-P2LAT1-A2 ).
-F4 for a 4-pin DC micro (M12) QD connection on a 150 mm (6 in.) pigtail (for example, 42JT-P2LAT1-F4).

New

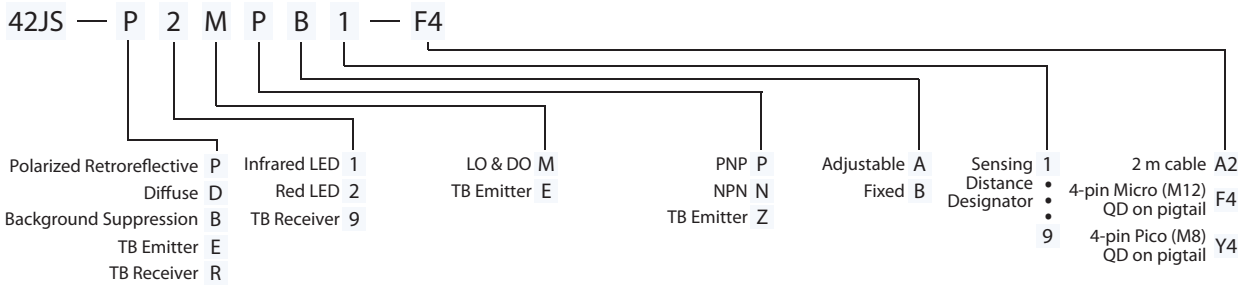
## Optical and Response Time Characteristics

| Sensing Mode | Polarized Retroreflective | Clear Object Detection | Diffuse | Background Suppression | Color Mark | Transmitted Beam |
|---|---|---|---|---|---|---|
| 42JS VisiSight—Visible red 645 nm | | | | | | |
| Field of View | 2.8° | — | 5.5° for 250 mm, 4° for 800 mm | 14° for 55 mm, 17° for 130 mm | — | 4° |
| Spot Size | 175 mm @ 3.5 m | — | 40 mm @ 250 mm, 60 mm @ 800 mm | 7.6 mm @ 55 mm, 11.5 mm @ 130 mm | — | 700 mm @ 10 m |
| Light Source | Visible red | — | Visible red | Visible red | — | Visible red and infrared |
| Response Time | 1 ms | — | 1 ms | 1 ms | — | 1 ms |
| 42JT VisiSight—Visible red 660 nm (except for color mark models) | | | | | | |
| Spot Size | 500 mm @ 6 m | 40 mm @ 1 m | 70 mm @ 800 mm | 15 mm @ 180 mm, 27 mm @ 400 mm | 1 x 4 mm @ 12 mm (white LED) | 1.1 m @ 13 m |
| Response Time | 0.5 ms | 0.5 ms | 0.5 ms | 0.5 ms | 50 µs | 0.5 ms |
| 42JT VisiSight—Class 1 laser 650 nm | | | | | | |
| Spot Size | 14 mm @ 13 m | — | 0.6 mm @ 250 mm | 1.3 mm @ 120 mm | — | 13 mm @ 18 m |
| Response Time | 0.25 ms | — | 0.333 ms | 0.5 ms | — | 0.25 ms |

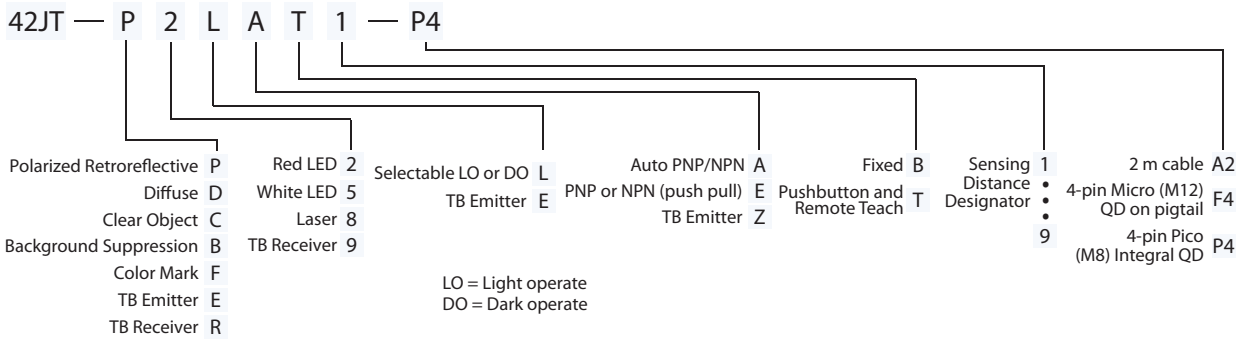
**Note**: For more information on spot size, refer to the typical response curves.

## Cat. No. Structure

### Product Family




### Product Family



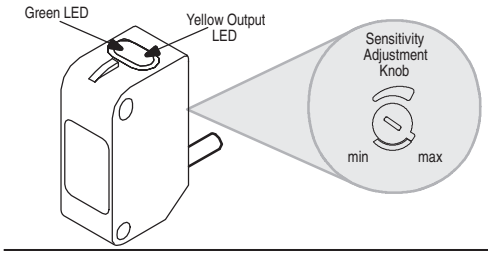

**The cat. no. structure is for reference only. Please do not use this to create a cat. no. as the result may be unavailable.**

# 42JS & 42JT VisiSight™

## 20 mm Rectangular



### 42JS User Interface

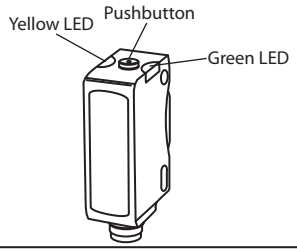



| LED Color | State | Status |
|---|---|---|
| Green | OFF | Power is Off |
| | ON | Power is On |
| | Flashing (6 Hz) | Unstable (0.5 < Margin < 2) |
| | Flashing (1.5 hz) | Output short-circuit protection active |
| Yellow | OFF | Output de-energized‡ |
| | ON | Output energized‡ |

‡ Black wire or pin 4 of connector.

### 42JT User Interface

The table below provides LED status in the RUN mode, i.e., during operation the sensor is always in RUN mode, except when being taught.



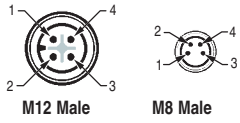

| LED Color | State | Status |
|---|---|---|
| Green | OFF | Power is Off |
| | ON | Power is On |
| | Flashing (6 Hz) | Unstable (0.5 < Margin < 2) |
| | Flashing (1.5 hz) | Output short-circuit protection active |
| Yellow§ | OFF | Output de-energized |
| | ON | Output energized |

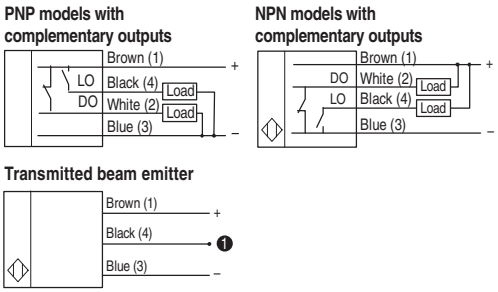
§ Except for color mark sensors: color mark sensors have PNP or NPN (push-pull) output. The above table shows LED status when output is connected as PNP. If connected as NPN, the yellow LED is ON when the output is de-energized and OFF when it is energized.

### Wiring Diagrams

Cable connections are shown in the following diagrams. Pin numbers correspond to an M12 or M8 male connector on the sensor.

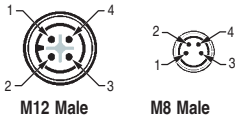
#### 42JS VisiSight

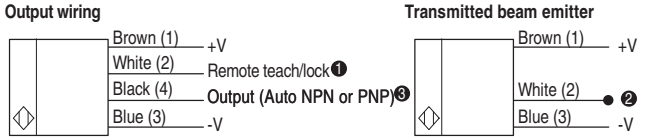



❶ For normal operation, black wire (pin 4) needs no connection. To disable light source, connect black wire (pin 4) to +V.

#### 42JT VisiSight




❶ **Normal operation:** no connection.
**Remote teach:** Refer to the Teach section.
**Push button lock:** connect to a -V. Refer to the Push Button Lock/Unlock section.

❷ For **Normal operation**, white wire (pin 2) needs no connection. To disable light source, connect white wire (pin 2) to +V.

❸ Output is PNP or NPN (push-pull) for color mark sensors.

### 42JT Push Button Lock/Unlock

The push button or remote teach (RT) can be used to prevent unauthorized users from changing teach settings.

To lock the push button: press and release the button three times within three seconds. Both LEDs flash synchronously for three seconds indicating that the push button is now locked.

To unlock the push button: press and release the button three times within three seconds. Both LEDs flash asynchronously for three seconds indicating that the push button is now unlocked.

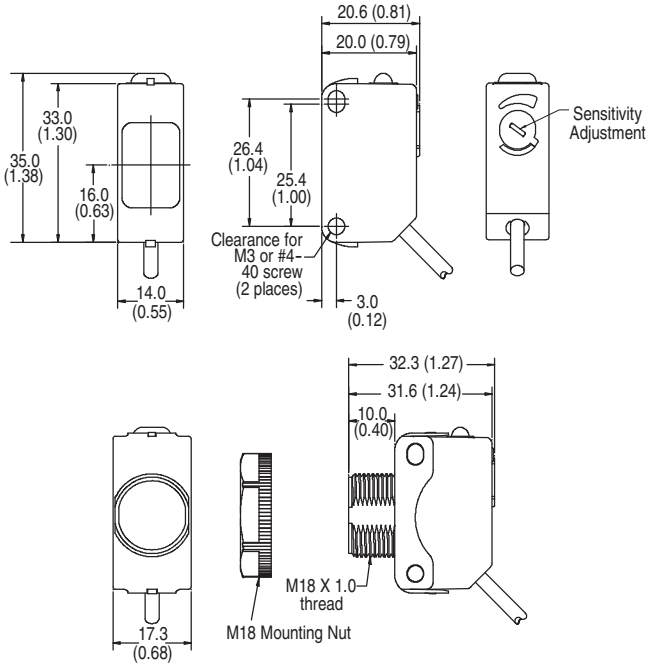
Permanent lock: The push button may be permanently locked by connecting the white wire (pin 2) to –V.

### 42JT Remote Teach (RT)

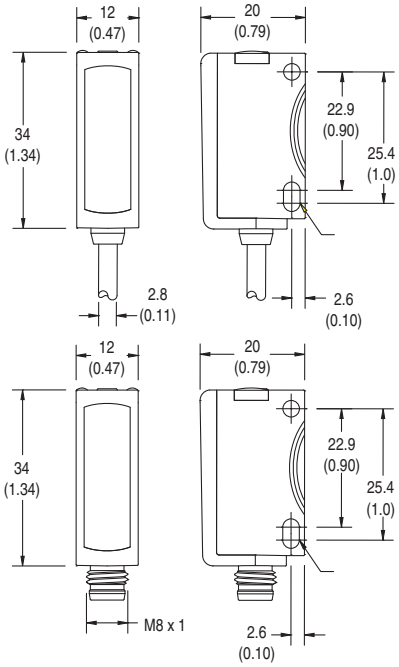
The sensor can be taught remotely via the white wire (pin 2). Connection to +V acts the same as the button being pressed and no connection is the same as the button not being pressed. The sensor can be taught by following the same teach/timing sequence as used in the push button teach (e.g., connect to the +V for more than three seconds to teach the “target,” disconnect from the +V; remove the target and connect to the +V for less than one second to teach the “no target” condition. All push button functions can also be carried out via RT.

## Approximate Dimensions [mm (in.)]

### 42JS VisiSight




### 42JT VisiSight




The 42JT mounting holes are located toward the rear end of the sensor while the 42JS mounting holes are located towards the front. Both sensors are compatible with the industry standard 25.4 mm mounting. The 42JT flexible mounting hole spacing ranges of 22.9…25.4 mm (0.9…1 in.), makes it compatible with the 24.1 mm (0.95 in.) hole spacing sensors.

Refer to www.ab.com/e-tools for 2D and 3D CAD drawings.

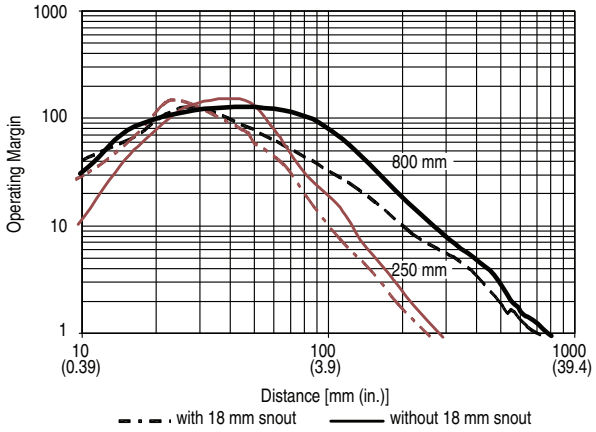
## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| DC Micro (M12) QD Cordset, Straight, 4-pin, 2 m | 889D-F4AC-2 | Reflector, Corner Cube, 76 mm (3 in.) diameter | 92-124 |
| DC Pico (M8) QD Cordset, Straight, 4-pin, 2 m | 889D-F4AB-2 | Reflector, Corner Cube, 84 mm (3.3 in.) diameter | 92-125 |
| DC Pico (M8) QD Cordset, Right Angle, 4-pin, 2 m | 889P-R4AB-2 | Reflector, Corner Cube, 32 mm (1.5 in.) diameter | 92-47 |
| Mounting Bracket, Stainless Steel, L-Shaped for 42JT and 42JS | 60-BJS-L1 | Reflector, Corner Cube, 100 x 100 mm ( 4 x 4 in.) | 92-108 |
| Mounting Bracket, Stainless Steel, L-Shaped for 42JS VisiSight | 60-BJS-L2 | Reflector, Corner Cube, 51 x 61 mm (2 x 2.5 in.) | 92-109 |
| Mounting Bracket, Stainless Steel | 60-BKTL-SS | Reflector, Micro Cube, 51 x 61 mm (2 x 2.5 in.) for laser and clear object models | 92-118 |
| Mounting Bracket, Stainless Steel, L-Shaped for 42JT and 42JS VisiSight | 60-BJT-L2 | Mounting Bracket, Plastic, swivel/tilt for 42JS VisiSight. | 60-2619 |
| Replacement Mounting Bracket, Stainless Steel, for replacing larger (50 x 50 mm) sensors. | 60-BJT-RCS | Protective Mounting Bracket, Stainless Steel, U-Shaped for 42JT and 42JS | 60-BJT-U1 |
| Replacement Mounting Bracket, Stainless Steel, for compatible sensors using holes towards the front with 42JT VisiSight. | 60-BJT-P2 | Protective Mounting Bracket, Stainless Steel, Horizontal and Vertical for 42JT and 42JS VisiSight | 60-BJT-H1 |

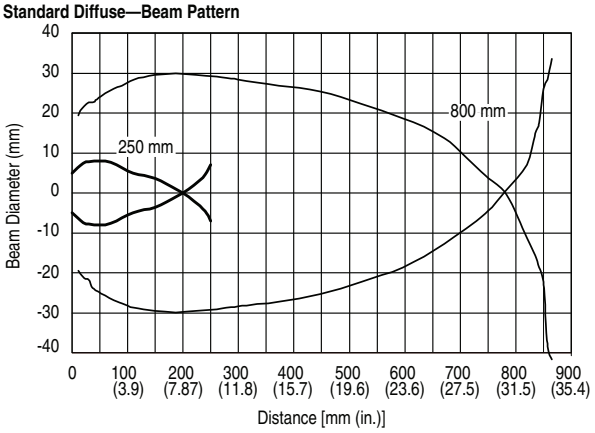
## Typical Response Curves

### 42JS VisiSight

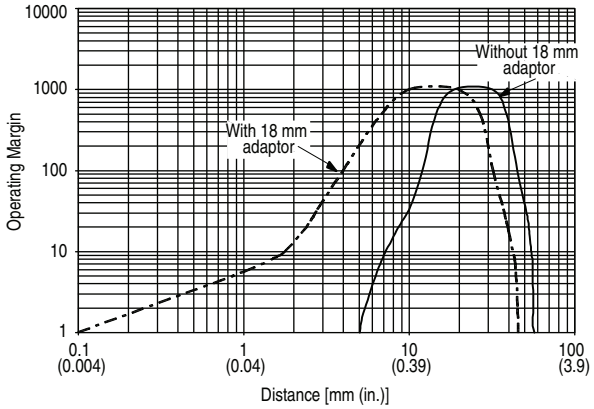
**Standard Diffuse**



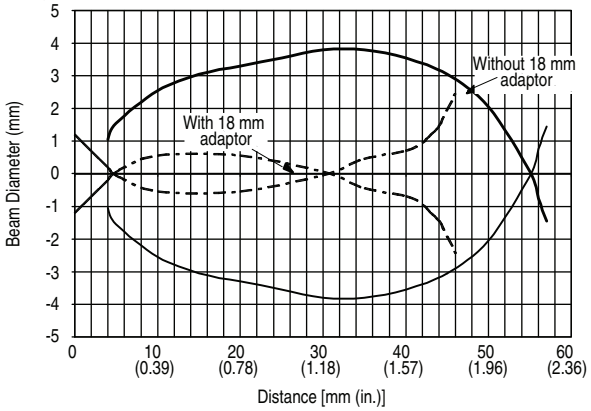

**Standard Diffuse—Beam Pattern**



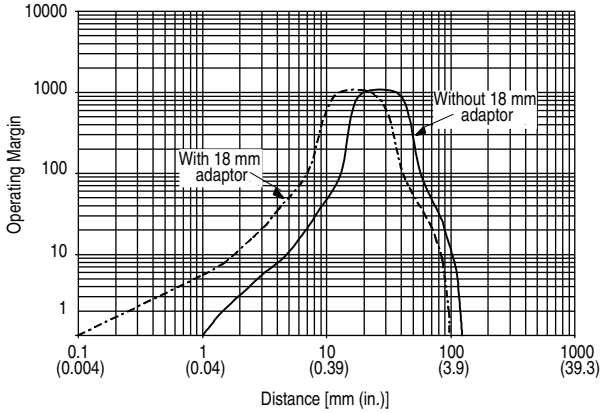

**Background Suppression (55 mm)**



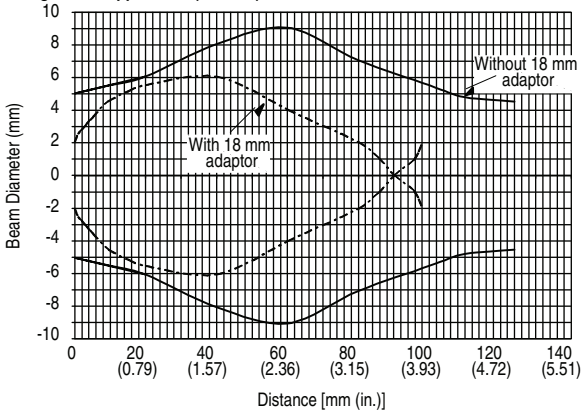

**Background Suppression (55 mm)—Beam Pattern**




**Background Suppression (130 mm)**

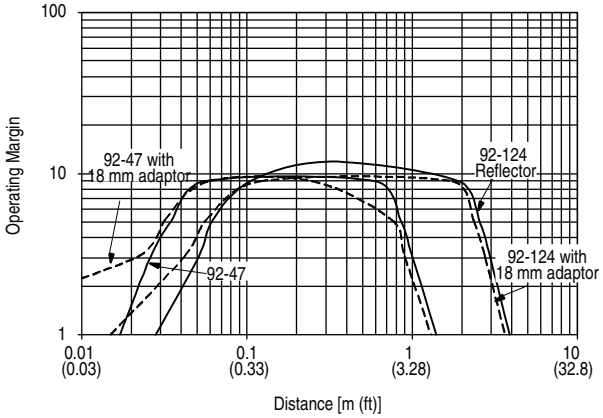



**Background Suppression (130 mm)—Beam Pattern**

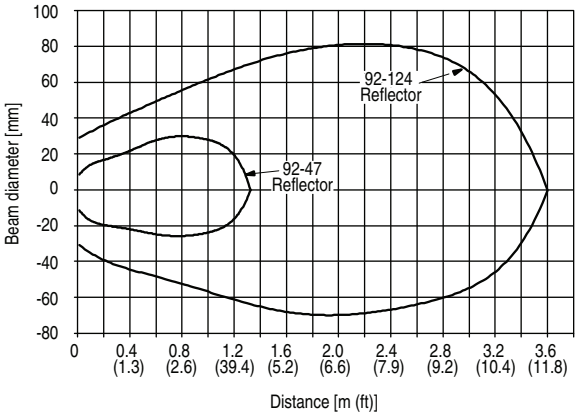


## 42JS VisiSight

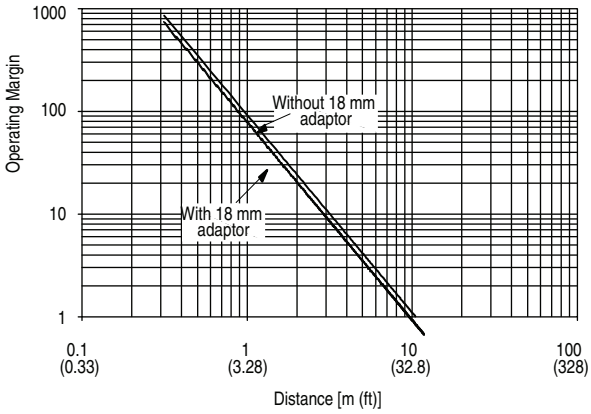
**Polarized Retroreflective**



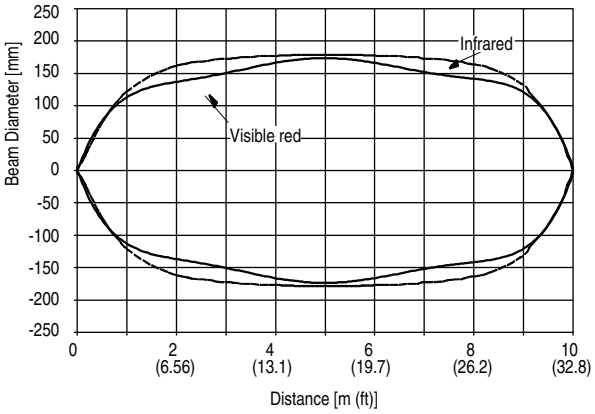

**Polarized Retroreflective—Beam Pattern**




**Transmitted Beam—Visible Red and Infrared**

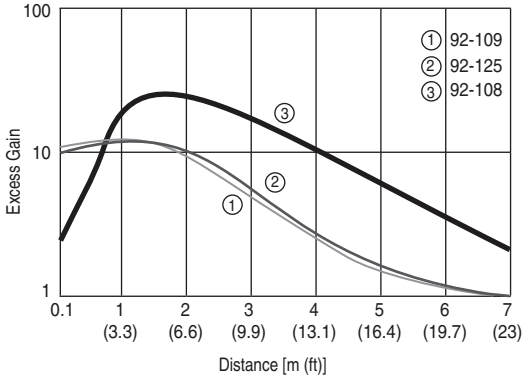



**Transmitted Beam—Beam Pattern**

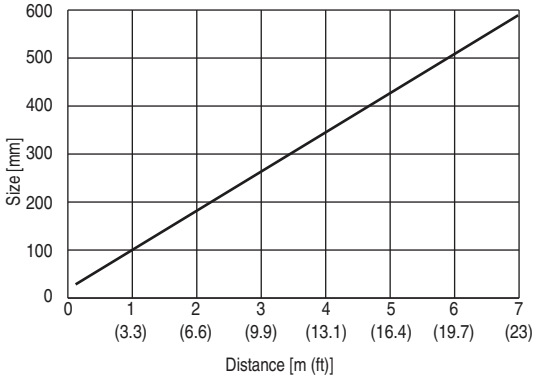


## 42JT VisiSight

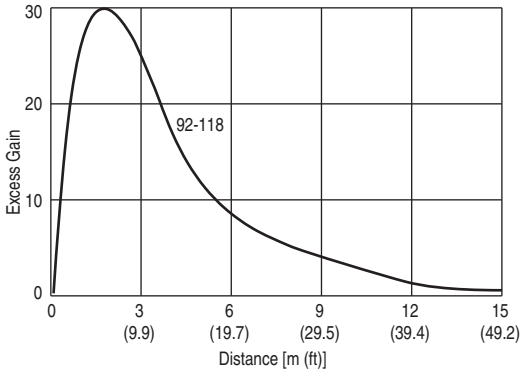
**Red Polarized Retroreflective (6 m)**



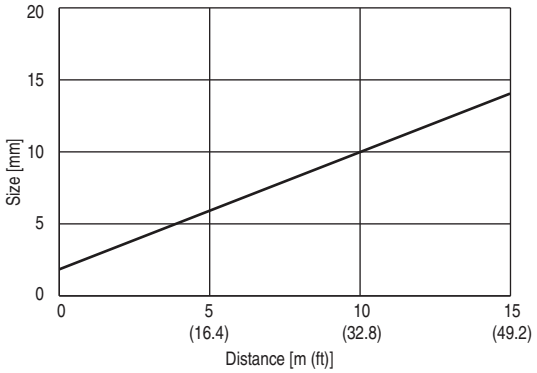

**Polarized Retroreflective Spot Size (6 m)**



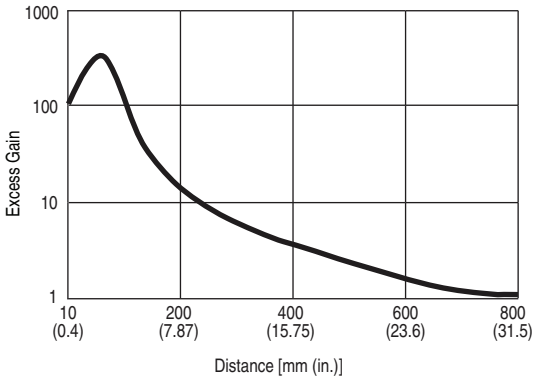

**Laser Polarized Retroreflective — Margin Curve (13 m)**




**Laser Polarized Retroreflective Spot Size (13 m)**

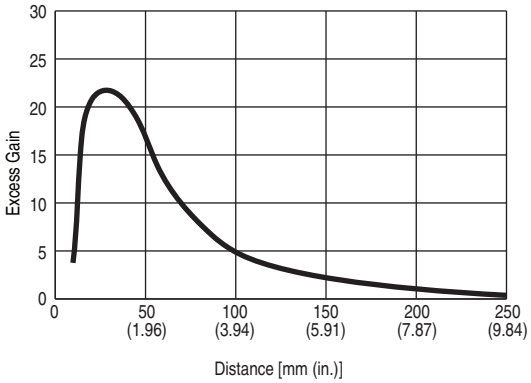



**Standard Diffuse (800 mm)**

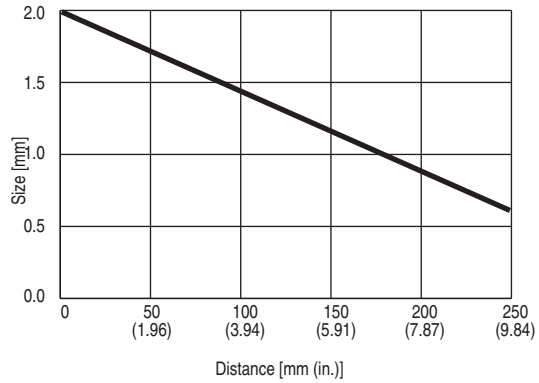



**Diffuse Spot Size (800 mm)**

**Laser Diffuse (250 mm)**

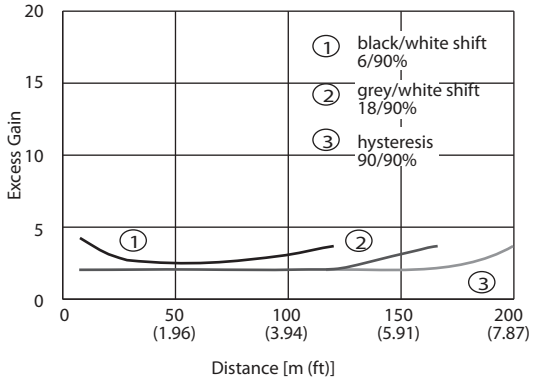



**Laser Diffuse Spot Size (250 mm)**

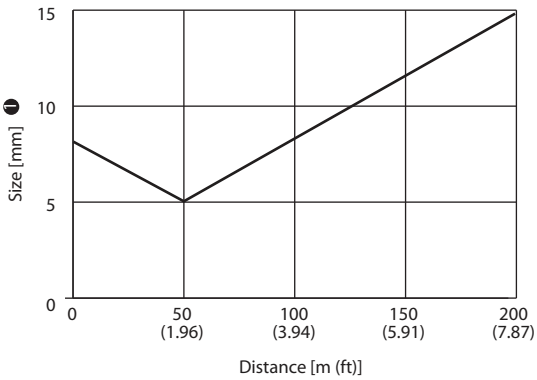


## 42JT VisiSight

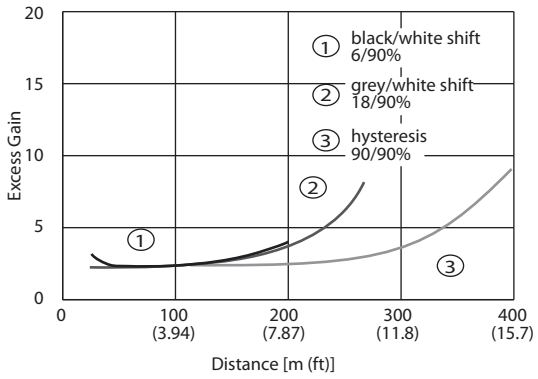
**Background Suppression (180 mm)**



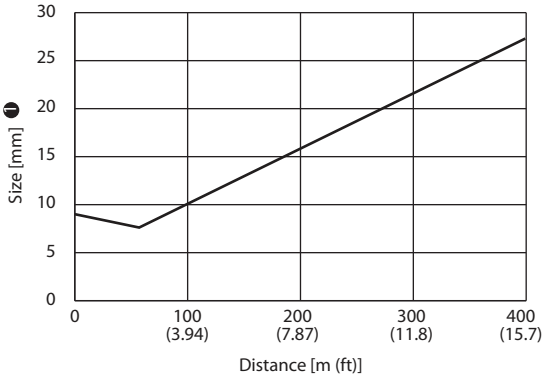

**Background Suppression (180 mm) — Spot Size**



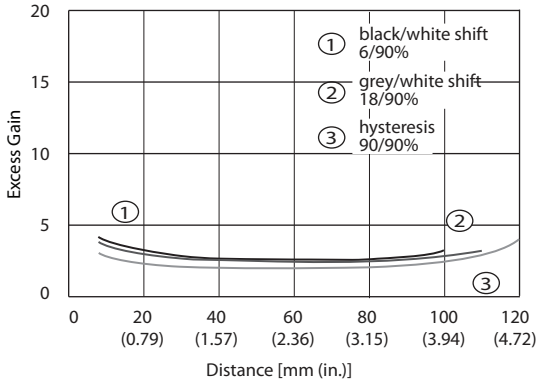

**Background Suppression (400 mm)**



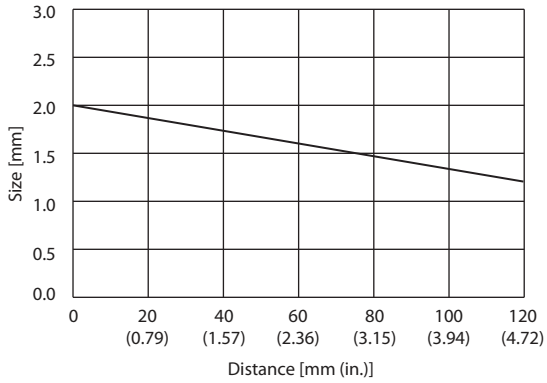

**Background Suppression (400 mm) — Spot Size**



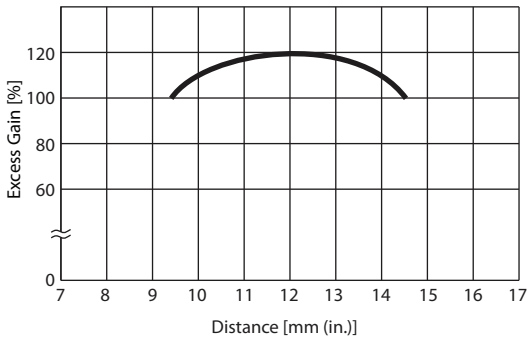

**Laser Background Suppression (120 mm)**




**Laser Background Suppression (120 mm) — Spot Size**



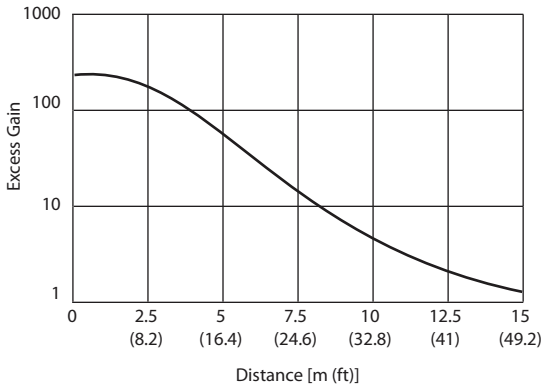

**Color Mark**



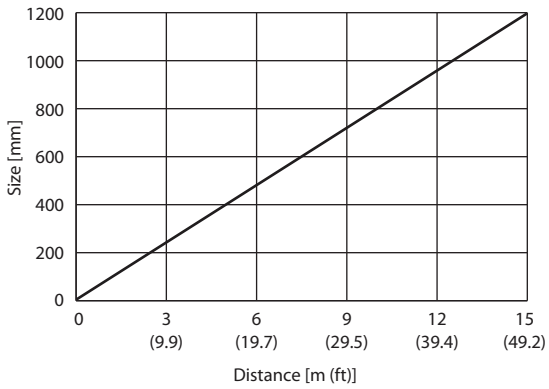

❶ The spot is square in shape with one side dimension per graph.

## 42JT VisiSight

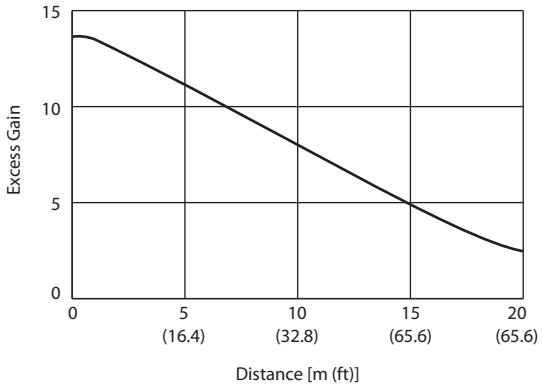
**Red Transmitted Beam (13 m)**



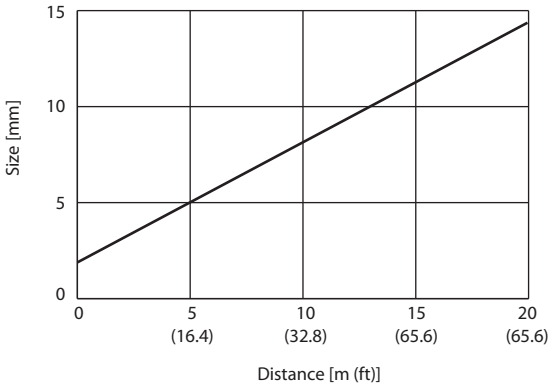

**Red Transmitted Beam (13 m) — Spot Size**



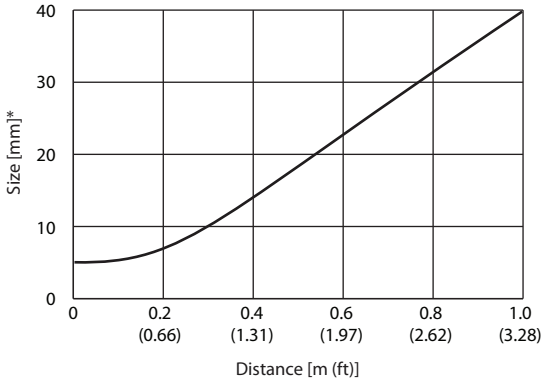

**Laser Transmitted Beam (18 m)**




**Laser Transmitted Beam (18 m) — Spot Size**




**Clear Object Spot Size**



# 42KL MiniSight™

## 18 mm Compact Rectangular

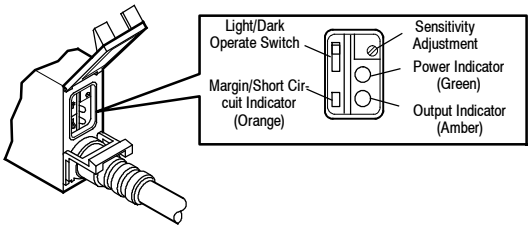
## Features

- Compact rectangular size with standard 18 mm mounting nose
- Visible indicators for power, output, and 2.5X margin/short circuit
- Short circuit protection in all versions, including two-wire universal voltage versions
- False pulse protection
- Switch selectable light or dark operation
- Access to sensor adjustments through captive cover that does not require tools for access
- Eight sensing modes available
- Rated to withstand high temperature 1200 psi washdowns
- 300 μs high speed DC versions
- No tools are required to attach fiber optic cables to either glass or plastic fiber optic sensors

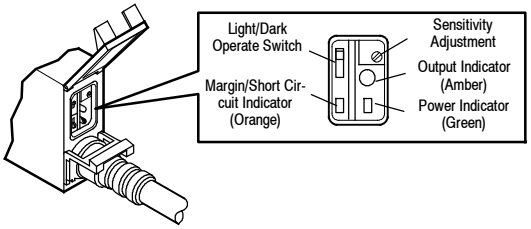
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL, CSA and CE Marked for all applicable directives |
| Operating Environment | NEMA 4X, 6P, IP67, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+70° (-4…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| **Optical** | |
| Sensing Modes | Retrotreflective, polarized retroreflective, diffuse, wide angle diffuse, fixed focus diffuse, transmitted beam, fiber optic |
| Sensing Range | See Product Selection table on page 1-45 |
| Field of View | See Product Selection table on page 1-45 |
| Light Source | Visible red LED (660 nm), infrared LED (880 nm) |
| LED Indicators | See User Interface below |
| Adjustments | Multi-turn potentiometer |
| **Electrical** | |
| Voltage | 10.8…30V DC, 21.6…250V AC/DC |
| Current Consumption | 30 mA max. (DC) |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | See Product Selection table on page 1-45 |
| Output Type | PNP and NPN (DC), MOSFET (AC/DC) |
| Output Mode | Light operate or dark operate selectable |
| Output Current | 100 mA @ 30V DC max |
| Output Leakage Current | 0.1 mA max (DC), 1.7 mA (AC/DC) |
| **Mechanical** | |
| Housing Material | Noryl 190X |
| Lens Material | Acrylic |
| Connection Types | 2 m cable (24 AWG), 4-pin DC micro (M12) QD, 3-pin AC micro (M12) |
| Supplied Accessories | 75012-097-01 18 mm locknut |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-47 |

## User Interface



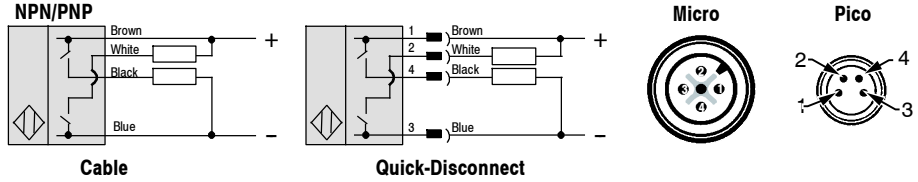

**NOTE:** The power indicator will turn off when the output indicator is on. The cat. no. for the Rear Snap Cover is 60-2679.



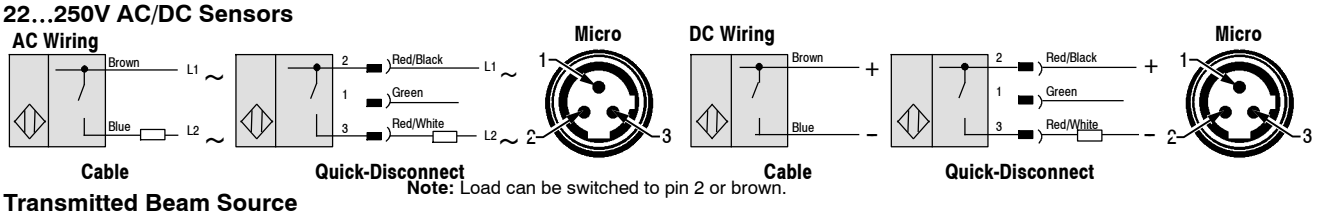

**NOTE:** The power indicator will turn off when the output indicator is on. The cat. no. for the Rear Snap Cover is 60-2679.

## Wiring Diagrams❶❷

### 11…30V DC Sensors




### 22…250V AC/DC Sensors



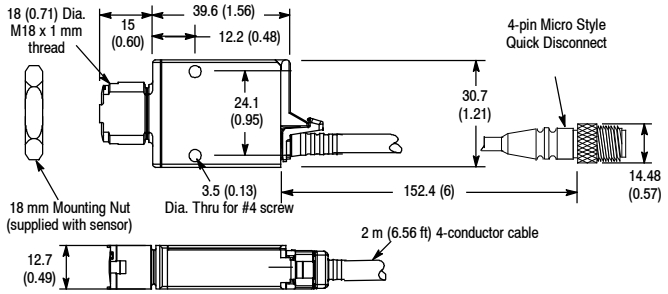

**Note:** Load can be switched to pin 2 or brown.

❶ For Rockwell Automation programmable controller compatible interface, refer to *PHOTOSWITCH® Photoelectric Sensors and Programmable Controller Interface Manual* at *www.ab.com/literature*.

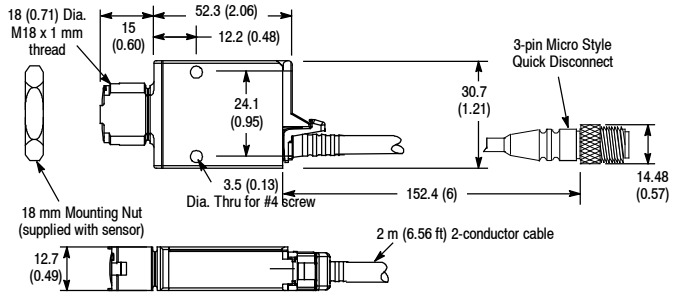
❷ Quick-disconnect wiring codes shown are valid for Rockwell Automation cables only.

## Approximate Dimensions [mm (in.)]

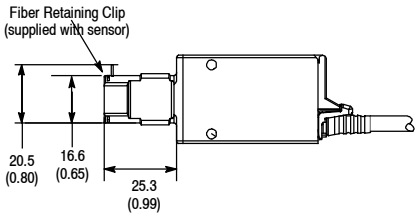
### DC Sensors



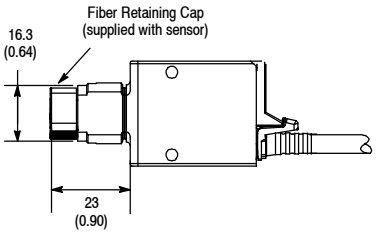

### AC/DC Sensors

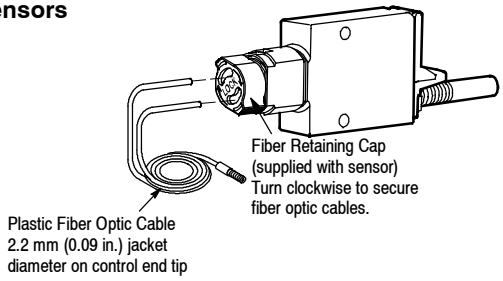


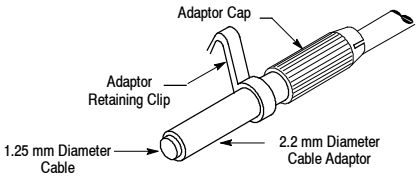

### Infrared Glass Fiber Optic Sensors




### Visible Red Plastic Fiber Optic Sensors



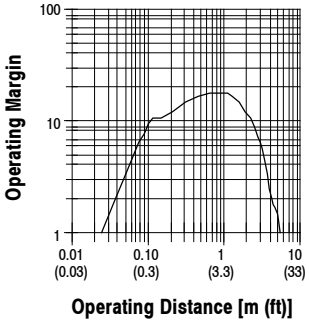




Special Glass Fiber Optic cables are also available with 2.2 mm (0.09 in.) diameter control end tips.

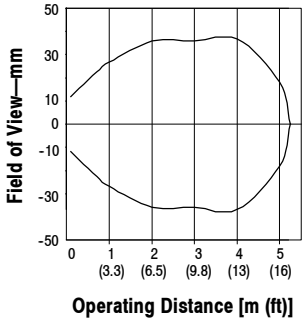
**NOTE:** Cat. No. 61-6731 adaptors are required for smaller fiber optic cables with jacket diameters of 1.25 mm (0.05 in.).

## Typical Response Curve

### Retroreflective

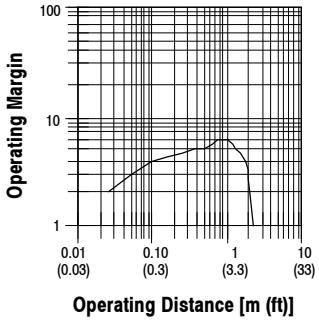



## Beam Pattern

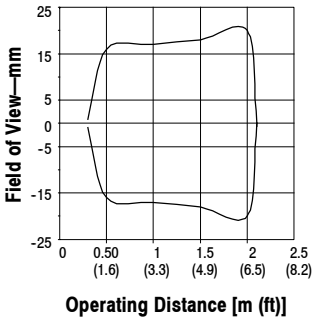



## Typical Response Curve

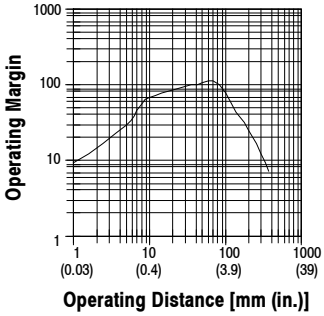
### Polarized Retroreflective

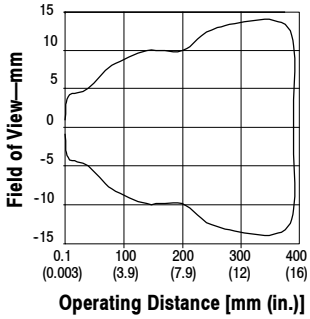



## Beam Pattern

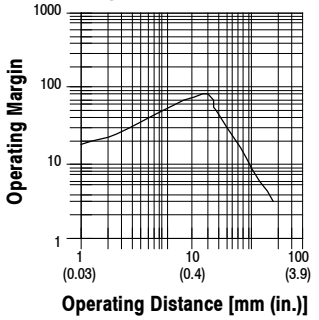


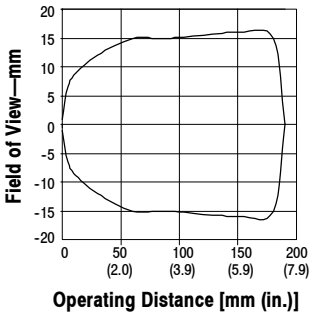

## Standard Diffuse



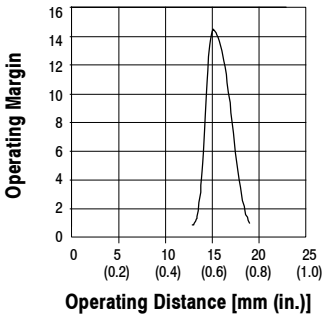

## Wide Angle Diffuse



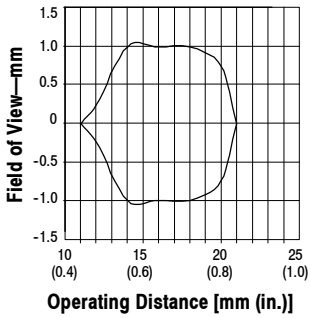




## Fixed Focus Diffuse

### 16 mm Red LED

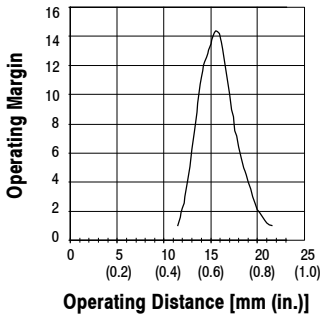



## 16 mm Red LED

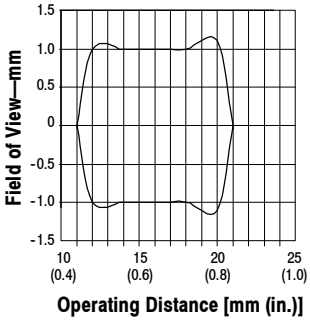



## Fixed Focus Diffuse

### 16 mm Green LED

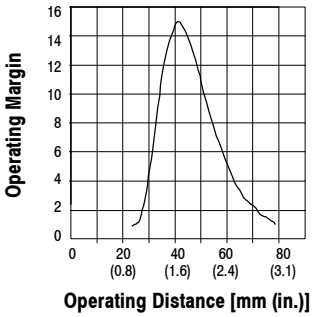



## 16 mm Green LED

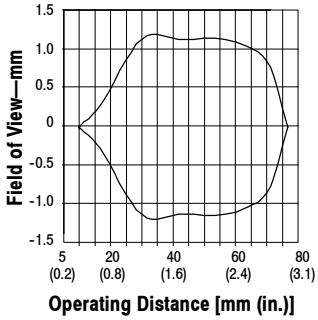



## Fixed Focus Diffuse

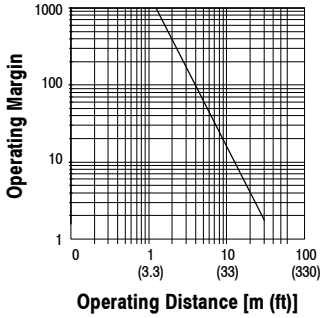
### 43 mm Red LED

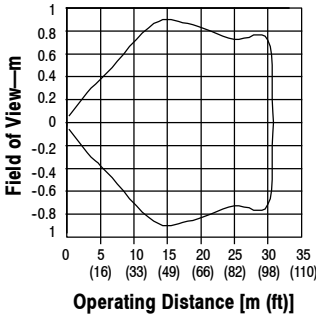



## 43 mm Red LED



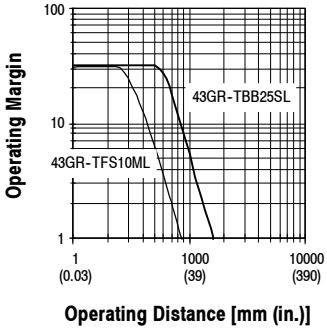

## Transmitted Beam



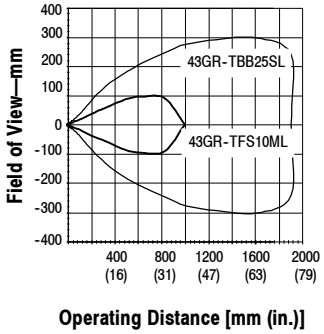



## Typical Response Curve

### Large Aperture Fiber Optic
**Retroreflective (using 3 in. dia. reflector)**

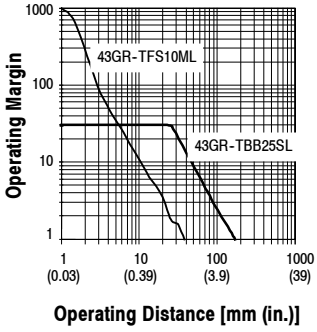



## Beam Pattern

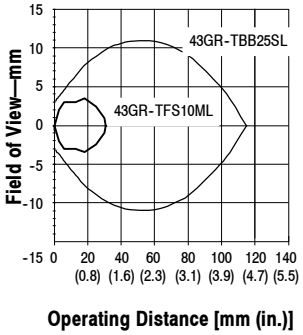



## Typical Response Curve

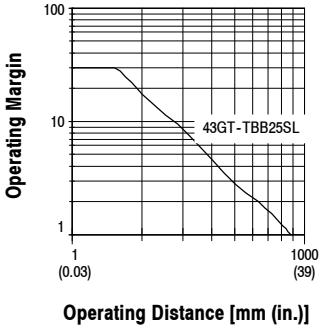
### Large Aperture Fiber Optic
**Diffuse**

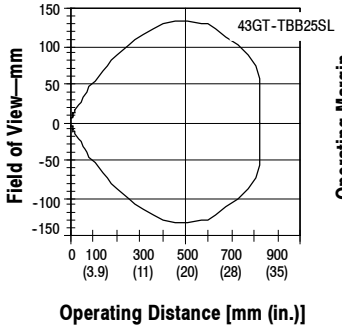



## Beam Pattern

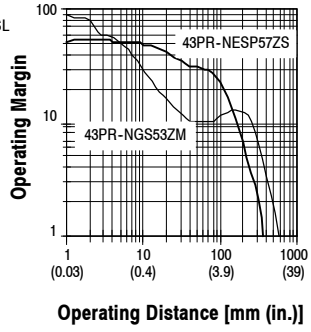


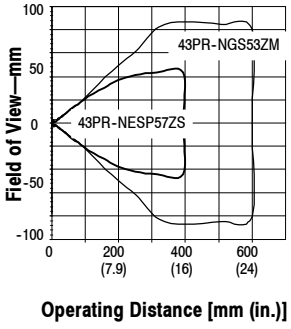

### Large Aperture Fiber Optic
**Transmitted Beam**



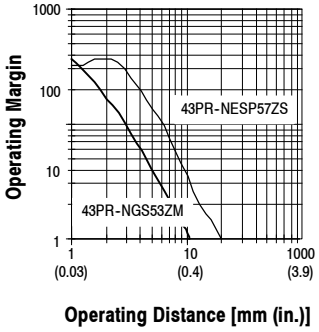



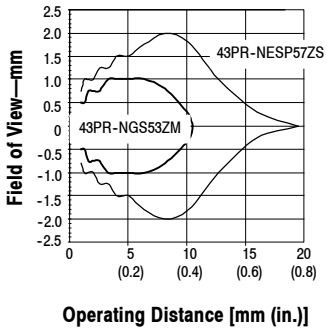

### Small Aperture Fiber Optic
**Retroreflective (using 3 in. dia. reflector)**



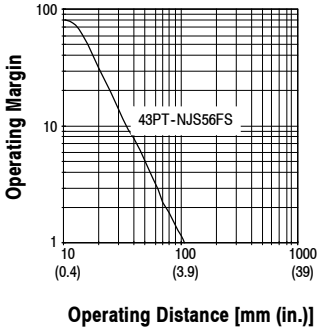



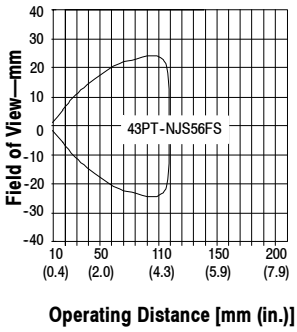

### Small Aperture Fiber Optic
**Diffuse**




### Small Aperture Fiber Optic
**Transmitted Beam**



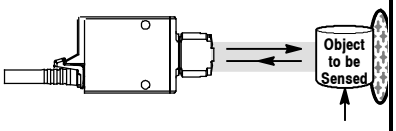
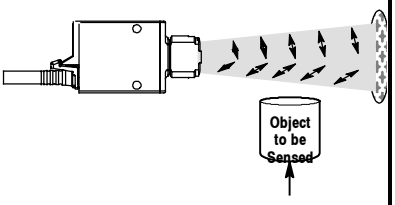
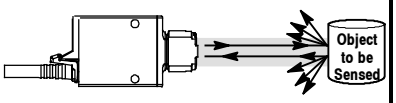
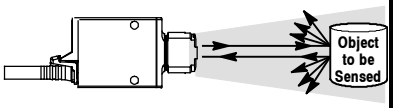






Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

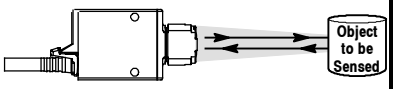
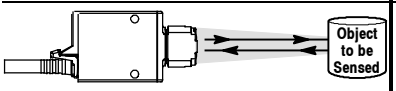
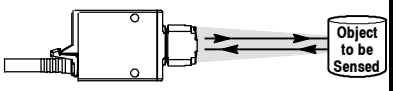
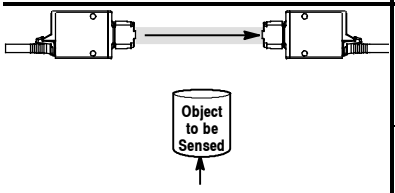
Allen-Bradley

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 10.8…30V DC 35 mA | 25 mm…5 m (0.98 in…16.4 ft) | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-U2LB-A2 |
| | | | | | 4-pin DC micro | **42KL-U2LB-F4** |
| | | | | | 4-pin pico QD | 42KL-U2LB-Y4 |
| | | 25 mm…2.5 m (0.98 in…8.2 ft) | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-U2LBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-U2LBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-U2LBQ-Y4 |
| | 21.6…250V AC/DC | 25 mm…5 m (0.98 in…16.4 ft) | | Power MOSFET 2-wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-U2TC-A2 |
| | | | | | 3-pin AC micro | **42KL-U2TC-G3** |
|  *Polarized Retroreflective* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 10.8…30V DC 35 mA | 25 mm…2 m (0.98 in…6.6 ft) | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-P2LB-A2 |
| | | | | | 4-pin DC micro | **42KL-P2LB-F4** |
| | | | | | 4-pin pico QD | 42KL-P2LB-Y4 |
| | | 25 mm…1 m (0.98 in…3.3 ft) | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-P2LBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-P2LBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-P2LBQ-Y4 |
| | 21.6…250V AC/DC | 25 mm…2 m (0.98 in…6.6 ft) | | Power MOSFET 2 wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-P2TC-A2 |
| | | | | | 3-pin AC micro | **42KL-P2TC-G3** |
|  *Standard Diffuse* **Field of View**: 5° **Emitter LED**: Infrared 880 nm | 10.8…30V DC 35 mA | 1…380 mm (0.04…15 in.) | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-D1LB-A2 |
| | | | | | 4-pin DC micro | **42KL-D1LB-F4** |
| | | | | | 4-pin pico QD | 42KL-D1LB-Y4 |
| | | 1…190 mm (0.04…7.5 in.) | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-D1LBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-D1LBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-D1LBQ-Y4 |
| | 21.6…250V AC/DC | 1…380 mm (0.04…15 in.) | | Power MOSFET 2 wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-D1TC-A2 |
| | | | | | 3-pin AC micro | **42KL-D1TC-G3** |
|  *Wide Angle Diffuse* **Field of View**: 18° **Emitter LED**: Infrared 880 nm | 10.8…30V DC 35 mA | 1…180 mm (0.04…7.0 in.) | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-W1LB-A2 |
| | | | | | 4-pin DC micro | **42KL-W1LB-F4** |
| | | | | | 4-pin pico QD | 42KL-W1LB-Y4 |
| | | 1…90 mm (0.04…3.5 in.) | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-W1LBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-W1LBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-W1LBQ-Y4 |
| | 21.6…250V AC/DC | | | Power MOSFET 2 wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-W1TC-A2 |
| | | | | | 3-pin AC micro | **42KL-W1TC-G3** |

**Refer to page 1-47 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Fixed Focus Diffuse* **Emitter LED**: Visible red (660 nm)❶ | 10.8…30V DC 35 mA | 16 mm (0.63 in.) | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-F2LBS-A2 |
| | | | | | 4-pin DC micro | **42KL-F2LBS-F4** |
| | | | | | 4-pin pico QD | 42KL-F2LBS-Y4 |
| | | | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-F2LBSQ-A2 |
| | | | | | 4-pin DC micro | 42KL-F2LBSQ-F4 |
| | | | | | 4-pin pico QD | 42KL-F2LBSQ-Y4 |
| | 21.6…250V AC/DC | | | Power MOSFET 2 wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-F2TCS-A2 |
| | | | | | 3-pin AC micro | 42KL-F2TCS-G3 |
|  *Fixed Focus Diffuse* **Emitter LED**: Visible green (525 nm)❶ | 10.8…30V DC 35 mA | 16 mm (0.63 in.) | | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-F3LBS-A2 |
| | | | | | 4-pin DC micro | 42KL-F3LBS-F4 |
| | | | | | 4-pin pico QD | 42KL-F3LBS-Y4 |
| | | | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-F3LBSQ-A2 |
| | | | | | 4-pin DC micro | 42KL-F3LBSQ-F4 |
| | | | | | 4-pin pico QD | 42KL-F3LBSQ-Y4 |
|  *Fixed Focus Diffuse* **Emitter LED**: Visible red (660 nm) | | 43 mm (1.7 in.) | | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-F2LBL-A2 |
| | | | | | 4-pin DC micro | **42KL-F2LBL-F4** |
| | | | | | 4-pin pico QD | 42KL-F2LBL-Y4 |
| | | | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-F2LBLQ-A2 |
| | | | | | 4-pin DC micro | 42KL-F2LBLQ-F4 |
| | | | | | 4-pin pico QD | 42KL-F2LBLQ-Y4 |
| | 21.6…250V AC/DC | | | Power MOSFET 2-wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-F2TCL-A2 |
| | | | | | 3-pin AC micro | **42KL-F2TCL-G3** |
|  *Transmitted Beam Light Source* **Field of View**: 7° **Emitter LED**: Infrared 880 nm | 10.8…30V DC 35 mA | 1…30 m (98 ft) | — | — | 2 m 300V cable | 42KL-E1EZB-A2 |
| | | | | | 4-pin DC micro | **42KL-E1EZB-F4** |
| | | | | | 4-pin pico QD | 42KL-E1EZB-Y4 |
| | 21.6…250V AC/DC 5 mA | | — | — | 2 m 300V cable | 42KL-E1QZB-A2 |
| | | | | | 3-pin AC micro | **42KL-E1QZB-G3** |
| | 10.8…30V DC 35 mA | 1…10 m (33 ft) | — | — | 2 m 300V cable | 42KL-E1EZBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-E1EZBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-E1EZBQ-Y4 |

❶ For color registration mark applications, refer to light source selection guide at *www.ab.com/sensors*.

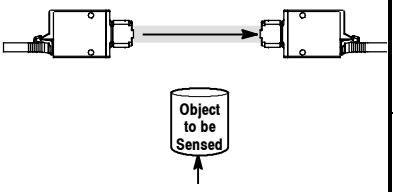
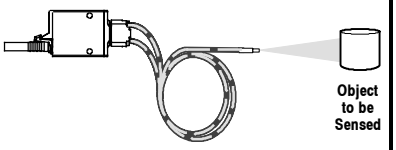
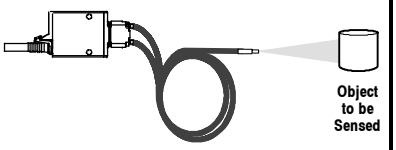
**Refer to page 1-47 for cordsets and accessories.**



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Transmitted Beam Receiver* **Field of View**: 7° **Emitter LED**: Infrared 880 nm | 10.8…30V DC 25 mA | 30 m (98 ft) | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-RLB-A2 |
| | | | | | 4-pin DC micro | **42KL-RLB-F4** |
| | | | | | 4-pin pico QD | 42KL-RLB-Y4 |
| | 21.6…250V AC/DC | | | Power MOSFET 2-wire 100 mA 16 ms | 2 m 300V cable | 42KL-RTC-A2 |
| | | | | | 3-pin AC micro | **42KL-RTC-G3** |
| | 10.8…30V DC 25 mA | 10 m (33 ft) | Light/Dark Selectable | NPN/PNP 100 mA 900 µs | 2 m 300V cable | 42KL-RLBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-RLBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-RLBQ-Y4 |
|  *Large Aperture Fiber Optic* **Field of View**: Depends on Fiber Optic cable selected **Emitter LED**: Infrared 880 nm | 10.8…30V DC 35 mA | Depends on Fiber Optic cable selected❷ | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-G1LB-A2 |
| | | | | | 4-pin DC micro | **42KL-G1LB-F4** |
| | | | | | 4-pin pico QD | 42KL-G1LB-Y4 |
| | | | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-G1LBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-G1LBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-G1LBQ-Y4 |
| | 21.6…250V AC/DC | | | Power MOSFET 2-wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-G1TC-A2 |
| | | | | | 3-pin AC micro | 42KL-G1TC-G3 |
|  *Small Aperture Plastic Fiber Optic* **Field of View**: Depends on Fiber Optic cable selected **Emitter LED**: Visible red 660nm | 10.8…30V DC 35 mA | Depends on Fiber Optic cable selected❷ | Light/Dark Selectable | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42KL-L2LB-A2 |
| | | | | | 4-pin DC micro | **42KL-L2LB-F4** |
| | | | | | 4-pin pico QD | 42KL-L2LB-Y4 |
| | | | | NPN/PNP 100 mA 300 µs | 2 m 300V cable | 42KL-L2LBQ-A2 |
| | | | | | 4-pin DC micro | 42KL-L2LBQ-F4 |
| | | | | | 4-pin pico QD | 42KL-L2LBQ-Y4 |
| | 21.6…250V AC/DC 15 mA | | | Power MOSFET 2-wire 100 mA 8.3 ms | 2 m 300V cable | 42KL-L2TC-A2 |
| | | | | | 3-pin AC micro | 42KL-L2TC-G3 |

❷ For fiber optic selection guide, see pages 1-231.

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| DC Micro QD Cordset, Straight, 4-pin, 2 m | 889D-F4AC-2 | Pico QD Cordset, Straight, 4-pin, 2 m | 889P-F4AB-2 | 32 mm (1.25 in.) Diameter Reflector | 92-47 |
| AC Micro QD Cordset, Straight, 3-pin, 2 m | 889R-F3AEA-2 | 76 mm (3 in.) Diameter Reflector | 92-39 | | |

### Transmitted Beam—Maximum Operating Distance with Apertures

| Aperture Slot Size | Maximum Range | | Cat. No. |
|---|---|---|---|
| | Standard Speed | High Speed | |
| 1 mm | 2.1 m (6.9 ft) | 0.7 m (2.3 ft) | 60-2673 |
| 2 mm | 10.5 m (34.5 ft) | 3.5 m (11.4 ft) | 60-2674 |
| 4 mm | 18.6 m (61.0 ft) | 6.1 m (20.1 ft) | 60-2675 |
| 1, 2, 4 mm kit | — | — | 60-2676 |

# 44R AccuSight™

## 18 mm Right Angle

## Features

- Narrow 27 mm deep housing
- 18 mm nose and through-hole mounting options
- LED indicators with 360° visibility
- No user adjustments required
- Multiple sensing modes
- Low voltage 24V DC operation
- Variety of connection types

## Specifications

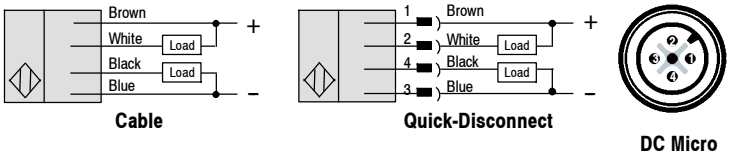
| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | NEMA 12, IP51 |
| Operating Temperature [C (F)] | 0…+50° (32…+122°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| **Optical** | |
| Sensing Modes | Diffuse, polarized retroreflective, wide angle, sharp cutoff |
| Sensing Range | See Product Selection table on page 1-51 |
| Field of View | See Product Selection table on page 1-51 |
| Light Source | Visible red LED (660 nm), infrared LED (880 nm) |
| LED Indicators | See User Interface below |
| Adjustments | None |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 35 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 10 ms |
| Output Type | PNP or NPN by cat. no., both PNP and NPN models |
| Output Mode | Light or dark operate by cat. no. |
| Output Current | 100 mA @ 30V DC max |
| Output Leakage Current | 0.1 mA max |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Connection Types | 2 m cable ( 24 AWG), 4-pin DC micro (M12) QD |
| Supplied Accessories | 75012-097-01 18 mm locknut |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-51 |

## User Interface

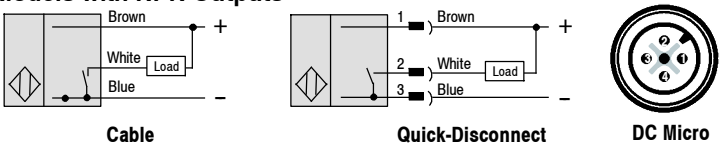
| Label | Color | State | Status |
|---|---|---|---|
| Output | Yellow | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |
| Margin | Red | OFF | Margin < 1.2 |
| | | ON | Margin > 1.2 |
| Power | Green | OFF | Sensor not powered |
| | | ON | Sensor powered |

## Wiring Diagrams[1]

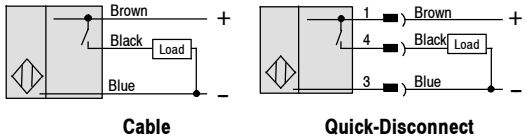
### Models with Dual NPN and PNP Outputs




### Models with NPN Outputs



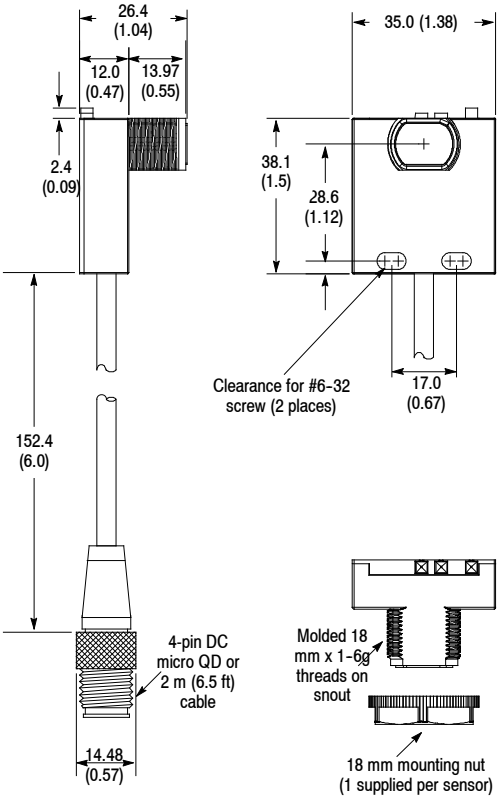

### Models with PNP Outputs



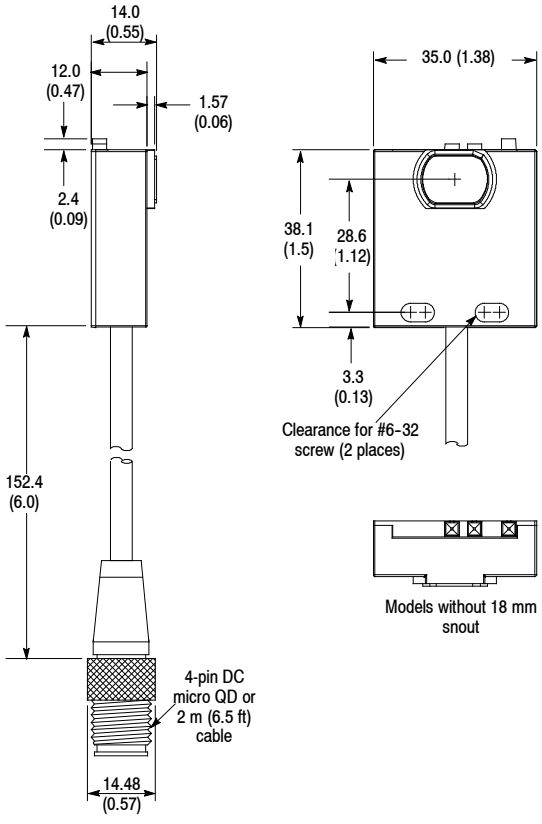

[1] All wire colors on quick-disconnect models refer to Rockwell Automation 889D cordsets.

## Approximate Dimensions [mm (in.)]

### Polarized Retroreflective and Standard Diffuse Models




### Wide Angle Diffuse Models



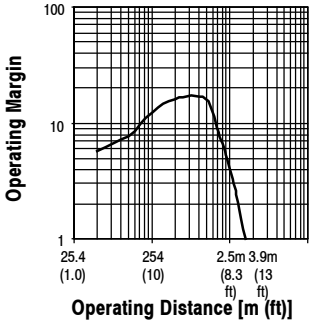

**Note**: All sensors except wide angle diffuse models are supplied with one M18 mounting nut (Cat. No. 75012-097-01).

# 44R AccuSight™

## 18 mm Right Angle

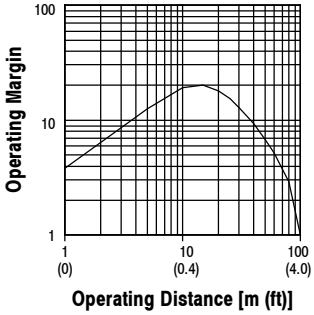
### Typical Response Curve

**Polarized Retroreflective**



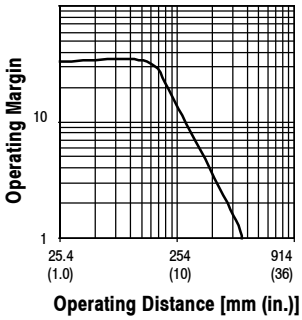

### Typical Response Curve

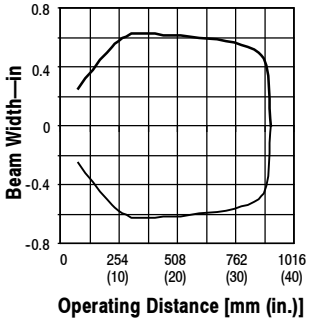
**Sharp Cutoff Diffuse**




### Beam Pattern

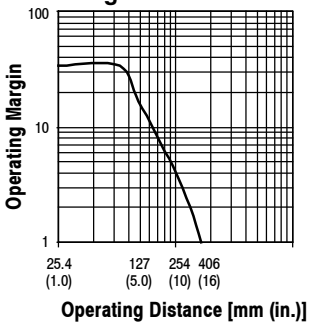
**Standard Diffuse**

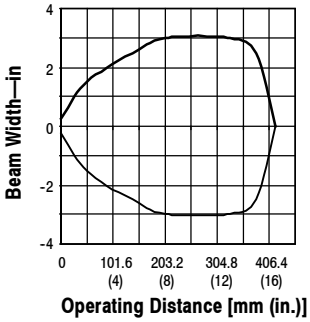


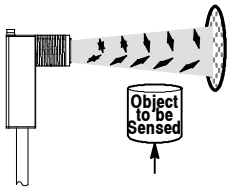
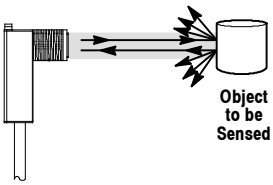
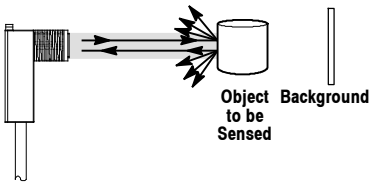
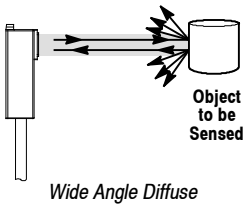

### Beam Pattern

**Wide Angle Diffuse**



## Product Selection

| Sensing Mode | Operating Voltage/ Current | Sensing Distance | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 10…30V DC 35 mA | 25 mm…1.5 m (1 in…4.9 ft) | Dark Operate | NPN and PNP 100 mA 10 ms | 2 m 300V cable | 44RSP-2KBE1-A2 |
| | | | | | 4-pin DC micro | 44RSP-2KBE1-F4 |
| | | 25 mm…3 m (1 in…9.8 ft) | Light Operate | | 2 m 300V cable | 44RSP-2JBE3-A2 |
| | | | | | 4-pin DC micro | 44RSP-2JBE3-F4 |
| | | | Dark Operate | | 2 m 300V cable | **44RSP-2KBE3-A2** |
| | | | | | 4-pin DC micro | **44RSP-2KBE3-F4** |
| | | | Light Operate | NPN/100 mA 10 ms | 2 m 300V cable | 44RSP-2JNE3-A2 |
| | | | | | 4-pin DC micro | 44RSP-2JNE3-F4 |
| | | | | | 3-pin Molex | 44RSP-2JNE3-Z6 |
| | | | | PNP/100 mA 10 ms | 2 m 300V cable | **44RSP-2JPE3-A2** |
| | | | | | 4-pin DC micro | 44RSP-2JPE3-F4 |
|  *Standard Diffuse* **Field of View**: 5° **Emitter LED**: Infrared 880 nm | 10…30V DC 35 mA | 3…380 mm (0.12…15 in.) | Light Operate | NPN/100 mA 10 ms | 2 m 300V cable | 44RSD-1JNC38-A2 |
| | | | | | 4-pin DC micro | 44RSD-1JNC38-F4 |
| | | | | PNP/100 mA 10 ms | 2 m 300V cable | 44RSD-1JPC38-A2 |
| | | | | | 4-pin DC micro | 44RSD-1JPC38-F4 |
|  *Sharp Cutoff Diffuse* **Field of View**: 5° **Emitter LED**: Infrared 880 nm | 10…30V DC 35 mA | 3…100 mm (0.12…4 in.) | Light Operate | NPN/100 mA 10 ms | 2 m 300V cable | 44RSS-1JNB1-A2 |
| | | | | | 4-pin DC micro | 44RSS-1JNB1-F4 |
|  *Wide Angle Diffuse* **Field of View**: Approx. 60° **Emitter LED**: Infrared 880 nm | 10…30V DC 35 mA | 3…200 mm (0.12…7.8 in.) | Light Operate | NPN/100 mA 10 ms | 2 m 300V cable | 44RSW-1JNC20-A2 |
| | | | | | 4-pin DC micro | 44RSW-1JNC20-F4 |
| | | | | PNP/100 mA 10 ms | 2 m 300V cable | 44RSW-1JPC20-A2 |
| | | | | | 4-pin DC micro | 44RSW-1JPC20-F4 |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| DC Micro QD Cordset, Straight, 4-pin, 2 m | 889D-F4AC-2 | Right Angle Mounting Bracket | 60-2657 |
| 76 mm (3 in.) Diameter Reflector | 92-39 | Mounting Screws (not supplied) | 2 x #6-32 |
| 32 mm (1.25 in.) Diameter Reflector | 92-47 | | |

# 42CA

## 18 mm Cylindrical

## Description

The 42CA 18 mm cylindrical family of general purpose photoelectric sensors is intended for light to medium duty industrial applications.

The 42CA family provides an indication if the sensor operation is unstable. An indicator flashes if the signal level is too close to the detection threshold. This helps for easy alignment of the sensor and forewarns against detection of a background.

## Features

- 18 mm industry standard enclosure
- Extended range high-speed models
- Patented ASIC design offers linear sensitivity adjustment, stability indication and excellent noise immunity
- Two LED indicators provide status of power, output, unstable operation and short-circuit protection
- Complementary light and dark

## Specifications

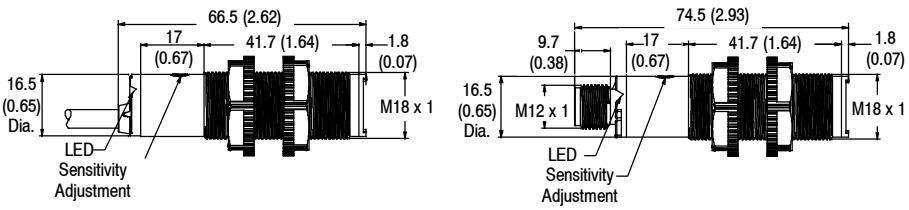
| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retroreflective, diffuse, background suppression, transmitted beam |
| Sensing Range | See Product Selection table on page 1-55 |
| Light Source | Visible red LED (660 nm) or infrared LED (880 nm) |
| LED Indicators | Green and yellow, see User Interface below |
| Adjustments | Sensitivity potentiometer on select models |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Reverse polarity, overload, short circuit |
| **Outputs** | |
| Response Time | See Product Selection table on page 1-55 |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Complementary light or dark operate, selectable light or dark operate for background suppression models |
| Output Current | 100 mA |
| Output Leakage Current | 10 µA max |
| **Mechanical** | |
| Housing Material | PBT |
| Lens Material | PMMA |
| Connection Types | 2 m cable, 4-pin DC micro (M12) QD |
| Supplied Accessories | 18 mm fastening nuts |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-56 |

## User Interface

| LED Color | State | Status |
|---|---|---|
| Yellow | OFF | Output de-energized❶ |
| | ON | Output energized❶ |
| Green | OFF | Power is OFF |
| | ON | Power is ON |
| | Flashing (6 Hertz) | Unstable (0.5 < Margin < 2) |
| | Flashing (1.5 Hertz) | Output short-circuit protection active |

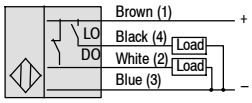
❶ Black wire or pin 4 of connector.

## Approximate Dimensions [mm (in.)]

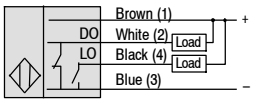


## Wiring Diagrams

### PNP Models with Complementary Outputs

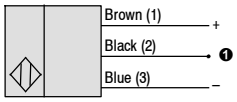



### NPN Models with Complementary Outputs



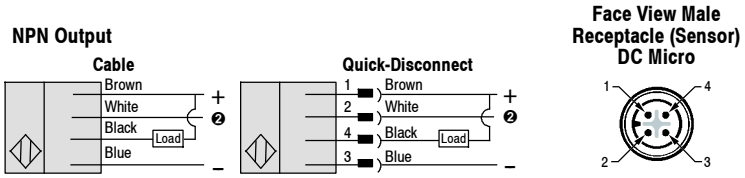
M12 Male

### Transmitted Beam Emitter

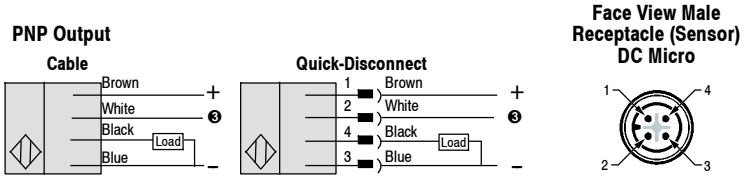



❶ For normal operation, black wire (pin 2) needs no connection. To disable light source, connect black wire (pin 2) to –V.

### Additional Wiring Options for Background Suppression and Transmitted Beam



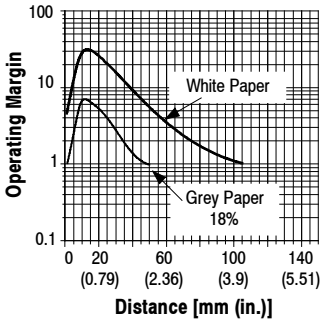

❷ Open circuit or tie white (2) and brown (1) conductors together for L.O. Tie white (2) and blue (3) conductors together for D.O.



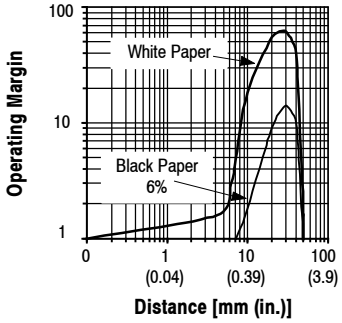

❸ Tie white (2) and brown (1) conductors together for L.O. Open circuit or tie white (2) and blue (3) conductors together for D.O.

## Typical Response Curves

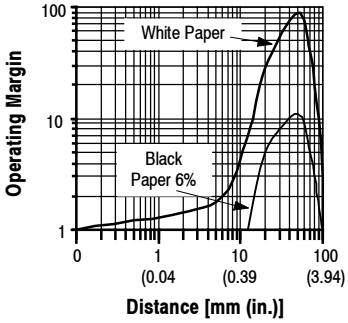
### Standard Diffuse [100 mm]




### Background Suppression [50 mm]



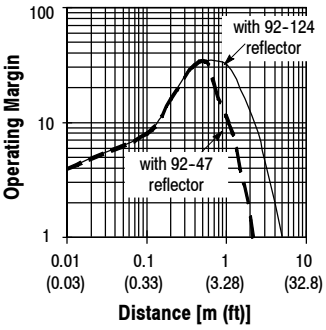

### Background Suppression [100 mm]



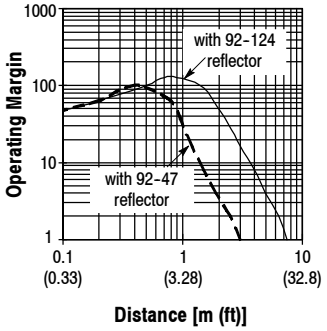
## Typical Response Curves (continued)

### Operating Margin

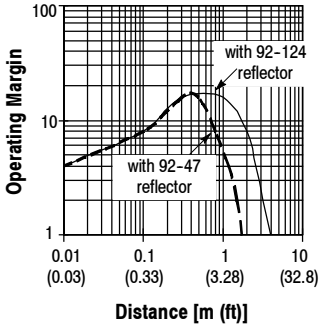
**Retroreflective [4.8 m]**




**Retroreflective [7.2 m]**

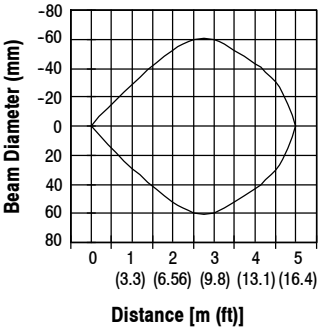



**Polarized Retroreflective [3.8 m]**

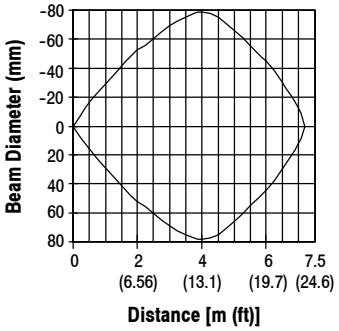



### Beam Pattern

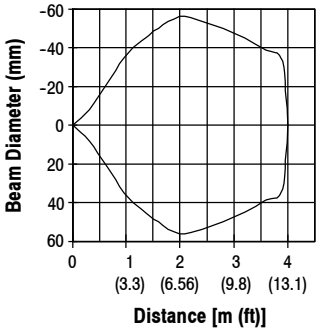
**Retroreflective [4.8 m]**




**Retroreflective [7.2 m]**

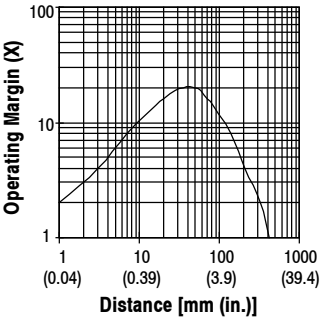



**Polarized Retroreflective [3.8 m]**

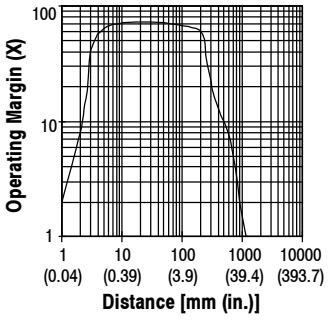



### Operating Margin

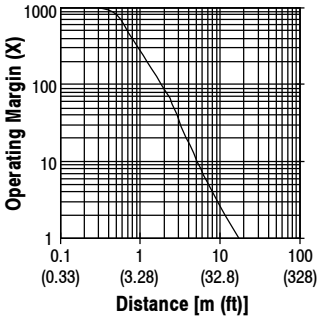
**Standard Diffuse [400 mm]**




**Standard Diffuse [1 m]**

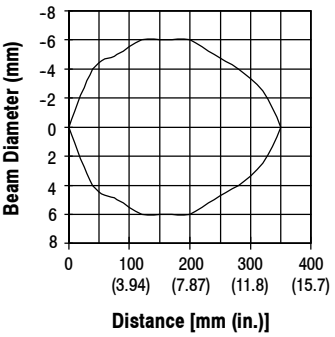



**Transmitted Beam [16 m]**

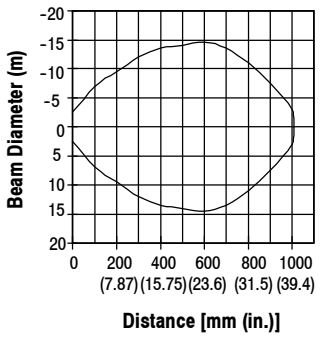



### Beam Pattern

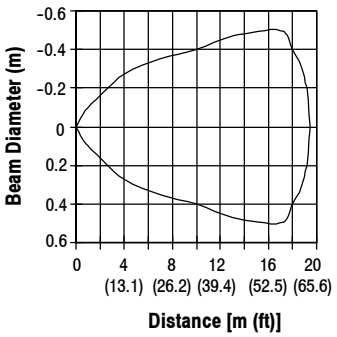
**Standard Diffuse [400 mm]**



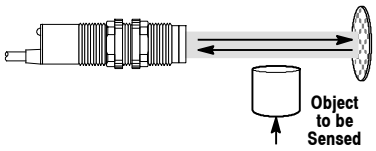
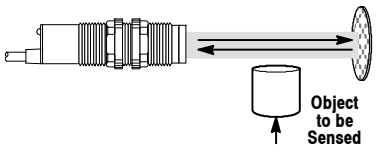
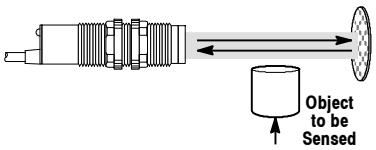
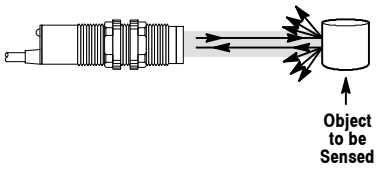
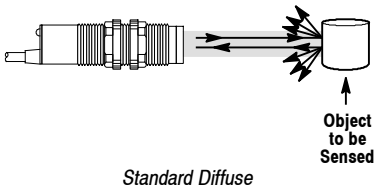
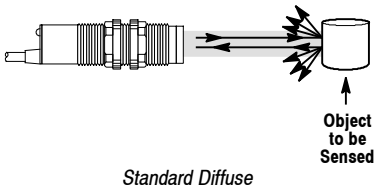

**Standard Diffuse [1 m]**




**Transmitted Beam [16 m]**

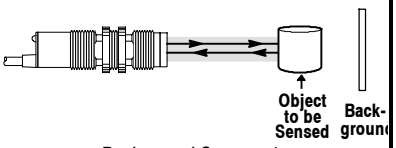
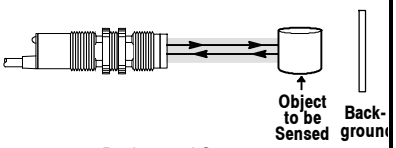
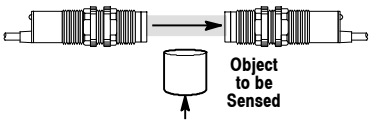


## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type/ Response Time | Sensitivity Adjust | Cat. No.❶ |
|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 1.2° **Emitter LED:** Visible red 660 nm | 10…30V DC 25 mA max. | 2 mm…4.8 m (0.08 in…15.7 ft) | Complementary light and dark operate | NPN 100 mA 1 ms | No adjustment | 42CA-U2MNB-D4 |
| | | | | PNP 100 mA 1 ms | No adjustment | 42CA-U2MPB-D4 |
|  *Retroreflective* **Field of View:** 1.2° **Emitter LED:** Visible red 660 nm | 10…30V DC 25 mA max. | 2 mm…7.2 m (0.08 in…23.6 ft) | Complementary light and dark operate | NPN 100 mA 0.5 ms | Single turn potentiometer | 42CA-U2MNA-D4 |
| | | | | PNP 100 mA 0.5 ms | Single turn potentiometer | 42CA-U2MPA-D4 |
|  *Polarized Retroreflective* **Field of View:** 1.3° **Emitter LED:** Visible red 660 nm | 10…30V DC 25 mA max. | 2 mm…3.8 m (0.08 in…12.5 ft) | Complementary light and dark operate | NPN 100 mA 1 ms | No adjustment | 42CA-P2MNB-D4 |
| | | | | PNP 100 mA 1 ms | No adjustment | 42CA-P2MPB-D4 |
|  *Standard Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 10…30V DC 30 mA max. | 0…100 mm (0…3.94 in.) | Complementary light and dark operate | NPN 100 mA 1 ms | Single turn potentiometer | 42CA-D1MNAE-D4❷ |
| | | | | PNP 100 mA 1 ms | Single turn potentiometer | 42CA-D1MPAE-D4❷ |
|  *Standard Diffuse* **Field of View:** 7.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 25 mA max. | 0…400 mm (0…15.7 in.) | Complementary light and dark operate | NPN 100 mA 1 ms | Single turn potentiometer | 42CA-D1MNAJ-D4 |
| | | | | PNP 100 mA 1 ms | Single turn potentiometer | 42CA-D1MPAJ-D4 |
|  *Standard Diffuse* **Field of View:** 5° **Emitter LED:** Infrared 880 nm | 10…30V DC 30 mA max. | 0…1000 mm (0…39.4 in.) | Complementary light and dark operate | NPN 100 mA 0.5 ms | Single turn potentiometer | 42CA-D1MNAL-D4 |
| | | | | PNP 100 mA 0.5 ms | Single turn potentiometer | 42CA-D1MPAL-D4 |

❶ Suffix –D4 denotes 4-pin DC micro connection type. For 2 m cable without QD replace suffix –D4 with –A2 (e.g. 42CA–P2MPB–A2).
❷ Refer to *www.ab.com/sensors* for updated information.

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type/ Response Time | Sensitivity Adjust | Cat. No.❶ |
|---|---|---|---|---|---|---|
|  *Background Suppression*<br>**Field of View:** 5.7°<br>**Emitter LED:** Visible red 660 nm | 10…30V DC 30 mA max. | 50 mm (1.97 in.) | Selectable light or dark operate | NPN 100 mA 0.5 ms | No adjustment | 42CA-B2LNBC-D4❷ |
| | | | | PNP 100 mA 0.5 ms | No adjustment | 42CA-B2LPBC-D4❷ |
|  *Background Suppression*<br>**Field of View:** 3.4°<br>**Emitter LED:** Visible red 660 nm | 10…30V DC 30 mA max. | 100 mm (3.94 in.) | Selectable light or dark operate | NPN 100 mA 0.5 ms | No adjustment | 42CA-B2LNBE-D4❷ |
| | | | | PNP 100 mA 0.5 ms | No adjustment | 42CA-B2LPBE-D4❷ |
|  *Transmitted Beam*<br>**Field of View:** 1.5°<br>**Emitter LED:** Infrared 880 nm | 10…30V DC 30 mA max. | 3 mm…16 m (0.12 in…52.5 ft) | NA infrared light source | NA | No adjustment | 42CA-E1EZB1-D4 |
| | 10…30V DC 25 mA max. | | Complementary light and dark operate | NPN 100 mA 1 ms | Single turn potentiometer | 42CA-R1MNA1-D4 |
| | | | | PNP 100 mA 1 ms | Single turn potentiometer | 42CA-R1MPA1-D4 |

❶ Suffix -D4 denotes 4-pin DC micro connection type. For 2 m cable without QD replace suffix -D4 with -A2 (e.g. 42CA-P2MPB-A2).
❷ Refer to *www.ab.com/sensors* for updated information.

## Cordsets and Accessories

| Cordset | | Accessories | | | |
|---|---|---|---|---|---|
| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
| DC Micro QD Cordset, 4-pin, 2 m | 889D-F4AC-2 | Mounting Bracket | 60-2657 | Reflector | 92-124 |
| Right Angle DC Micro QD Cordset, 4-pin, 2 m | 889D-R4AC-2 | Straight Mounting Bracket | 60-2656 | Reflector | 92-47 |
| | | Snap-Clamp Mounting Bracket | 871A-SCBP18 | | |
| | | Right Angle Mounting Bracket | 60-2654 | | |

## Description

The 42CS family of sensors offers a wide range of sensing modes in a smooth 316L stainless steel housing, ideal for food, beverage and pharmaceutical applications.

The innovative ferromagnetic teach feature makes the sensor easy to setup by simply placing a ferromagnetic metal object on a section of the sensor's housing to initiate the teach process. Its smooth and clean design minimizes the collection and accumulation of undesired particles allowing for a fast and easy clean up. There are also 18 mm threaded models available.

## Features

- Patented ferromagnetic teach for easy sensor programming
- Smooth barrel design minimizes the accumulation of undesired particles and allows for fast and easy clean up.
- Extended temperature operating range
- 18 mm stainless steel 316L enclosure with laser etched markings
- Background suppression models for improved detection of shiny objects
- Two teach modes: standard and precision
- Teach lockout feature prevents unauthorized users from changing the settings
- Input to disable light source on transmitted beam emitter
- IP69K, ECOLAB and Johnson Diversey rated

## Specifications

| | |
|---|---|
| Certifications | cULus and CE marked for all applicable directives |
| **Environmental** | |
| Operating Environment | IP69K rated, ECOLAB and Johnson Diversey certified |
| Operating Temperature [C (F)] | -25…+85° (-13…185°) |
| Vibration | 10…55Hz, 1 mm amplitude; meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 11 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| Ambient Light Immunity | 5000 Lux (Incandescent light) and 100000 Lux (Sunlight) |
| **Optical** | |
| Sensing Modes | Diffuse, background suppression, polarized retroreflective, clear object, and transmitted beam |
| Sensing Range | See product selection table |
| Light Source | Visible red (660 nm) or infrared (880 nm) |
| LED indicators | See user interface |
| Sensitivity Adjustments | Ferromagnetic teach |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 35 mA max |
| Sensor Protection | Short circuit, transient noise, reverse polarity and overload |
| **Outputs** | |
| Response Time | 1 ms (diffuse, polarized retroreflected, clear object),<br>1.25 ms (background suppression),<br>2 ms (transmitted beam) |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Complementary light and dark operate |
| Output Current | 100 mA |
| Output Leakage Current | 10 μA max. |
| **Mechanical** | |
| Housing Material | Stainless steel 316L |
| Lens Material | PMMA |
| Connector Material | PPS (grilamid) |
| Connection Types | 4-pin DC micro (M12) QD |
| Supplied Accessories | Stainless steel teach rod, mounting nuts (threaded models only) |
| Optional Accessories | Mounting brackets, cordsets, reflectors |

## User Interface

**LED Status**

| | | |
|---|---|---|
| Green | OFF | Teach function is locked |
| | ON | Teach function is enabled |
| | Flashing (8 Hz) | Short Circuit |
| Yellow | OFF | Output de-energized |
| | ON | Output energized ❶ |
| | Flashing (3 Hz) | Output energized (Margin < 2) ❶ |

❶ Pin 4 of Micro (M12) QD. L.O for diffuse, background suppression. D.O for polarized retroreflective and transmitted beam

# 42CS Cylindrical

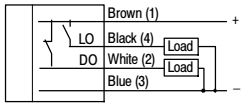
## Food and Beverage

## Wiring Diagrams

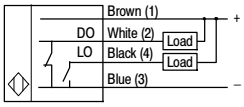
Pin numbers correspond to an M12 male connector on the sensor connected to an 889DS-F4AC-x cordset (featuring a stainless steel coupling nut).

### Diffuse and Background Suppression

#### PNP Models with Complementary Outputs

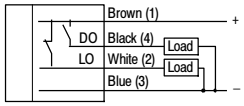



#### NPN Models with Complementary Outputs

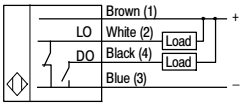



### Polarized Retroreflective, Clear Object and Transmitted Beam Receiver

#### PNP Models with Complementary Outputs

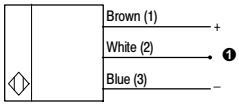



#### NPN Models with Complementary Outputs



M12 Male

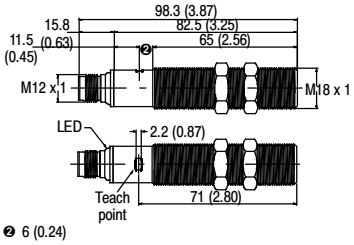
### Transmitted Beam Emitter




❶ For normal operation, white wire (pin 2) needs no connection. To disable light source, connect white wire (pin 2) to +V.

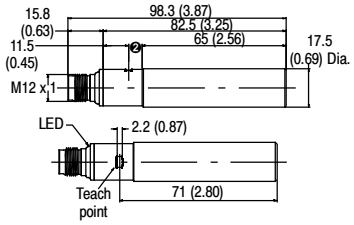
## Approximate Dimensions [mm (in.)]

### Threaded Barrel Models



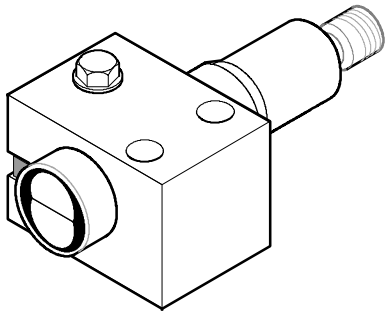

❷ 6 (0.24)

### Smooth Barrel Models



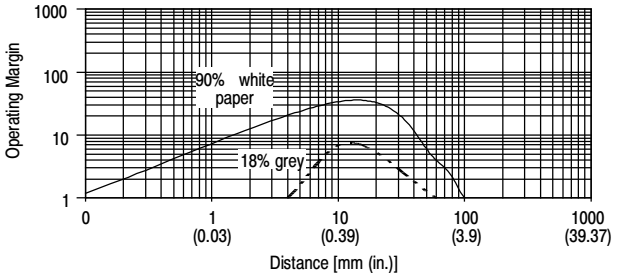

## Accessories

### 60-BCS-18B—Smooth Mounting Bracket

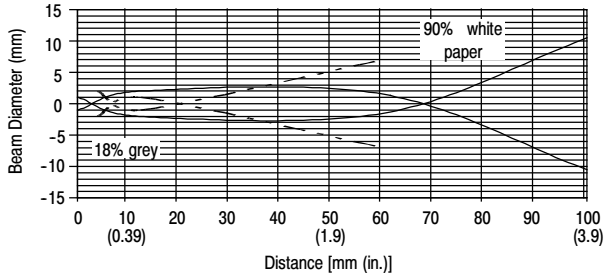


## Typical Response Curves

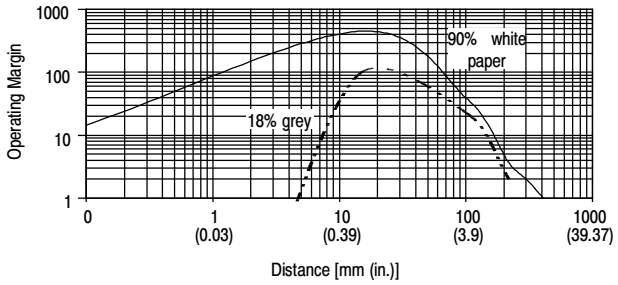
### Standard Diffuse (100 mm)



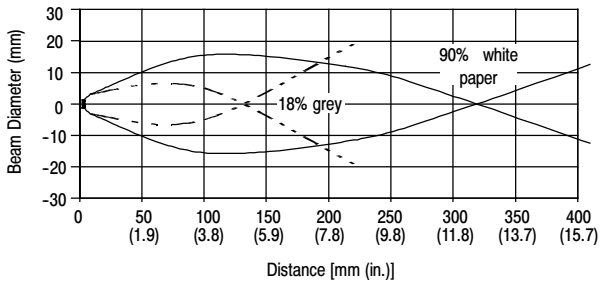

### Beam Pattern (100 mm)



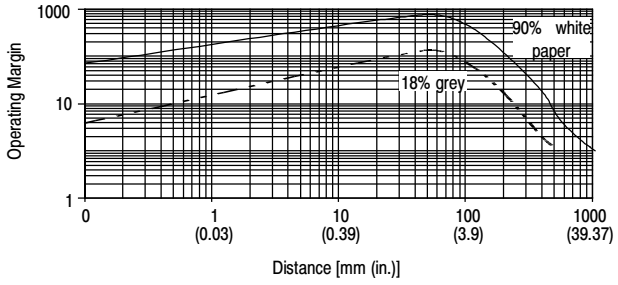
### Standard Diffuse (400 mm)



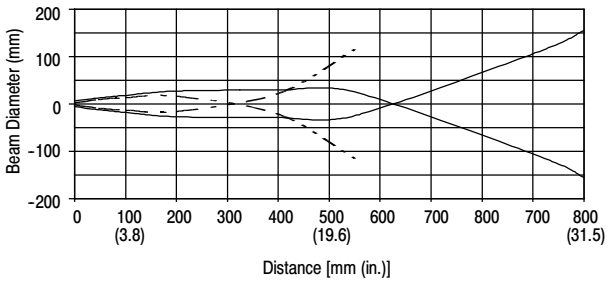

### Beam Pattern (400 mm)



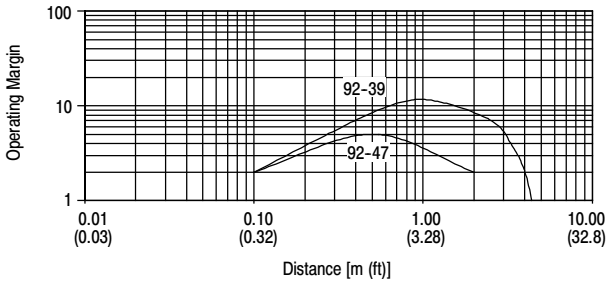

### Standard Diffuse (800 mm)



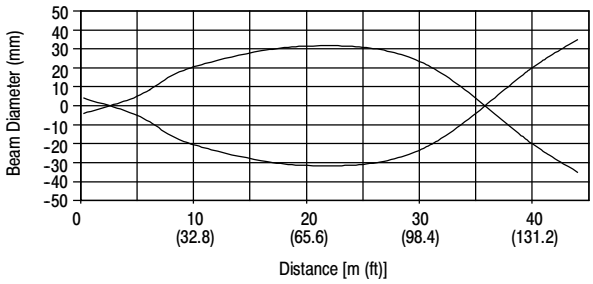

### Beam Pattern (800 mm)



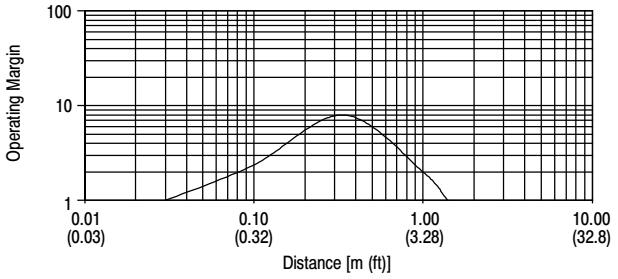

### Polarized Retroreflective (4 m)



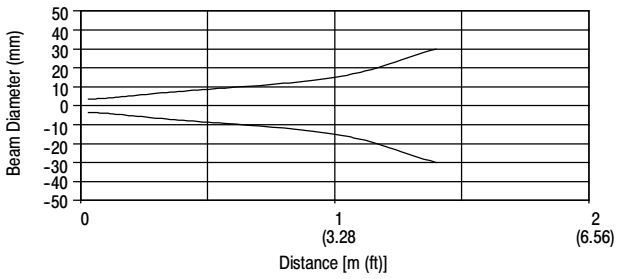

### Beam Pattern (4 m)



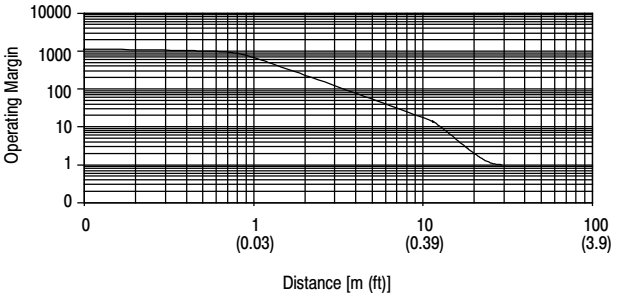

### Clear Object (1 m)



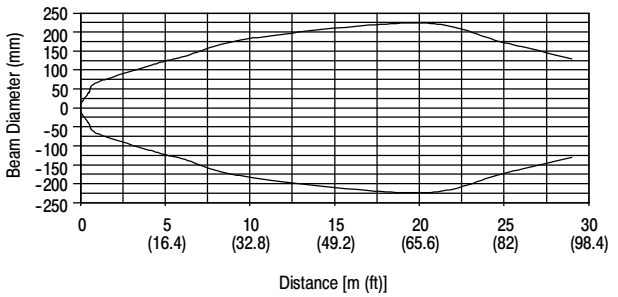

### Beam Pattern (1 m)




### Transmitted Beam (20 m)



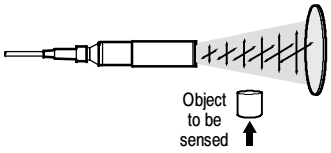
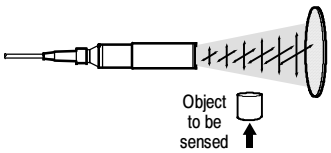
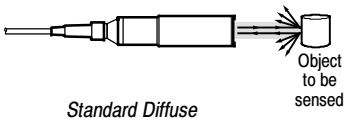
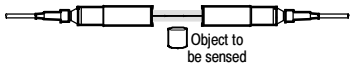

### Beam Pattern (20 m)



# 42CS Cylindrical

## Food and Beverage

## Product Selection

| Sensing Mode (max. range) | Sensing Distance | Output Energized | Output Type Capacity | Sensitivity Adjustment | Cat. No. ❶ |
|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Field of View:** 3° **Emitter LED:** Visible red 660 nm | 4 m (13.1 ft) | Complementary light and dark operate | NPN | No adjustment | 42CSS-P2MNB1-D4 |
| | | | PNP | | **42CSS-P2MPB1-D4** |
|  *Clear Object Detection* **Field of View:** 3° **Emitter LED:** Visible red 660 nm | 1 m (3.2 ft) | Complementary light and dark operate | NPN | Ferromagnetic Teach | 42CSS-C2MNA1-D4 |
| | | | PNP | | **42CSS-C2MPA1-D4** |
|  *Standard Diffuse* **Field of View:** 6° for 100 and 400 mm 8° for 800 mm **Emitter LED:** Visible red 660 nm | 100 mm (3.9 in.) | Complementary light and dark operate | NPN | Ferromagnetic Teach | 42CSS-D2MNA1-D4 |
| | | | PNP | | **42CSS-D2MPA1-D4** |
| | 400 mm (15.8 in.) | Complementary light and dark operate | NPN | Ferromagnetic Teach | 42CSS-D1MNA2-D4 |
| | | | PNP | | **42CSS-D1MPA2-D4** |
| | 800 mm (31.5 in.) | Complementary light and dark operate | NPN | Ferromagnetic Teach | 42CSS-D1MPNA3-D4 |
| | | | PNP | | **42CSS-D1MPA3-D4** |
| *Background Suppression* **Field of View:** 9° **Emitter LED:** Visible red 660 nm | 60…100 mm (2.4…3.9 in.) | Complementary light and dark operate | NPN | Ferromagnetic Teach | 42CSS-B2MNA1-D4 |
| | | | PNP | | **42CSS-B2MPA1-D4** |
|  *Transmitted Beam* **Field of View:** 4° **Emitter LED:** Infrared 880 nm | 20 m (65.6 ft) | NA Light Source | NA | No adjustment | **42CSS-E1EZB1-D4** |
| | | Complementary light and dark operate | NPN | | 42CSS-R9MNB1-D4 |
| | | | PNP | | **42CSS-R9MPB1-D4** |

**Note**: All sensor models are rated for 10…30V DC and can drive loads requiring up to 100 mA.

❶ The prefix 42CSS denotes smooth enclosure. For threaded models replace the 42CSS with 42CST (e.g., 42CST-P2MPB1-D4).

## Cordsets and Accessories

| Cordset/Patchcords | | Accessories | | | | | |
|---|---|---|---|---|---|---|---|
| **Description** | **Cat. No.** | **Description** | **Cat. No.** | **Description** | **Cat. No.** | **Description** | **Cat. No.** |
| DC Micro (M12) QD Cordset, 4-pin | 889DS-F4AC-❷ | Block Mounting Bracket for Smooth Barrel Housing | 60-BCS-18B | Right Angle Mounting Bracket for Threaded Models | 60-2657 | Reflector, 76 mm (3 in.) dia. with center mount hole | 92-39 |
| DC Micro (M12) QD Patchcord, 4-pin | 889D-F4ACDM-❸ | Straight Mounting Bracket for Threaded Models | 60-2656 | Stainless Steel Right Angle Mounting Bracket | 871A-BRS18 | Reflector, 32 mm (1.5 in.) dia. | 92-47 |
| | | | | | | Reflector, 76 mm (3 in.) dia. for clear object sensors | 92-90 |

❷ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❸ Replace symbol with 0M3 (1 ft), 1 (1 m) 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.

New

## Features

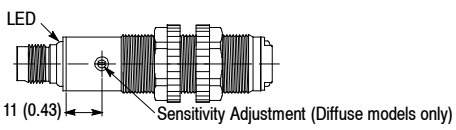
- 18 mm industry standard package
- Wide selection of sensing modes
- 30V DC operation
- NPN or PNP outputs
- Fast response time
- Variety of connection types
- Laser models available (see page 1-115)

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60068-2-6 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60068-2-27 |
| Relative Humidity | 5…95% |
| Ambient Light Immunity | Incandescent light 3000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retroreflective, diffuse, background suppression, transmitted beam |
| Sensing Range | See Product Selection table on page 1-60 |
| Field of View | See Product Selection table on page 1-60 |
| Light Source | Visible red LED (660 nm) or infrared LED (880 nm) |
| LED Indicators | Yellow LED for output indication |
| Adjustments | Sensitivity potentiometer (diffuse models only) |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Reverse polarity, overload, short circuit |
| **Outputs** | |
| Response Time | 2 ms (0.5 ms for background suppression) |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Complementary light operate or dark operate, selectable light operate or dark operate for background suppression models |
| Output Current | 100 mA |
| Output Leakage Current | 10 µA max |
| **Mechanical** | |
| Housing Material | Nickel-plated brass |
| Lens Material | PMMA/PC |
| Connection Types | 2 m cable, 4-pin DC micro (M12) QD |
| Supplied Accessories | 18 mm fastening nuts |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-61 |

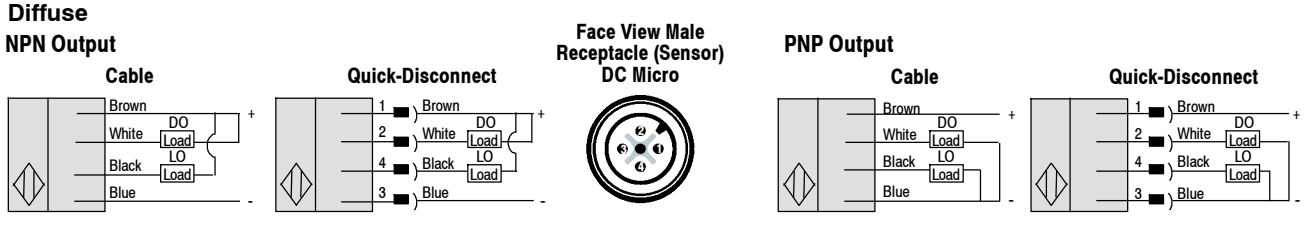
## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Output | Yellow | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |

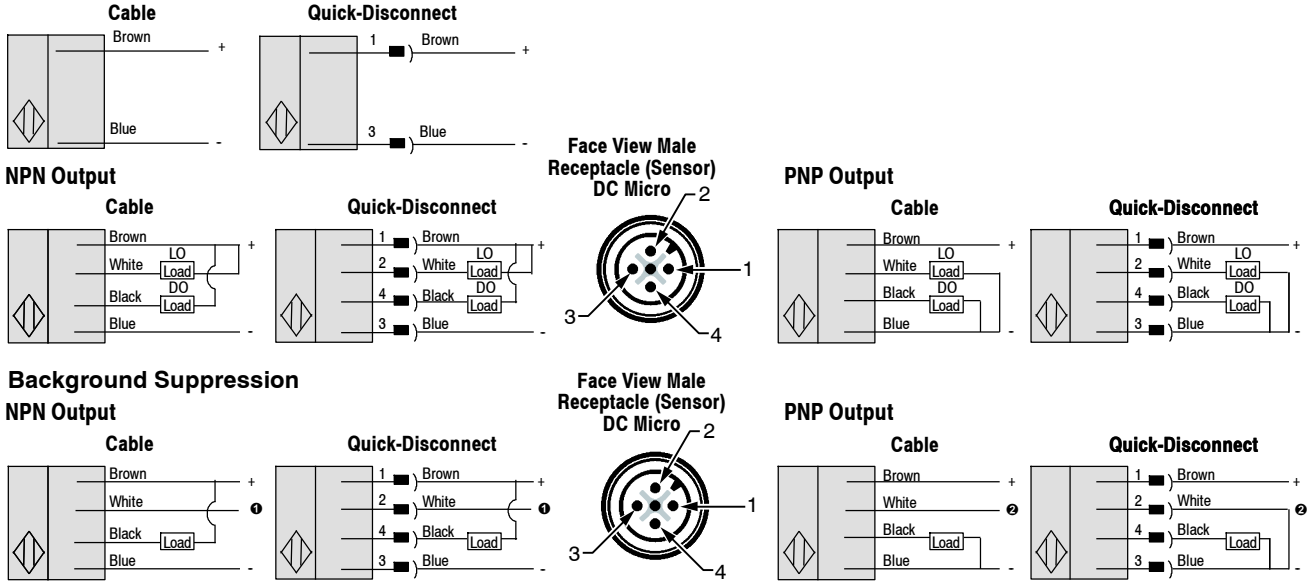


## Wiring Diagrams

### Diffuse




### Transmitted Beam, Retroreflective, Polarized Retroreflective

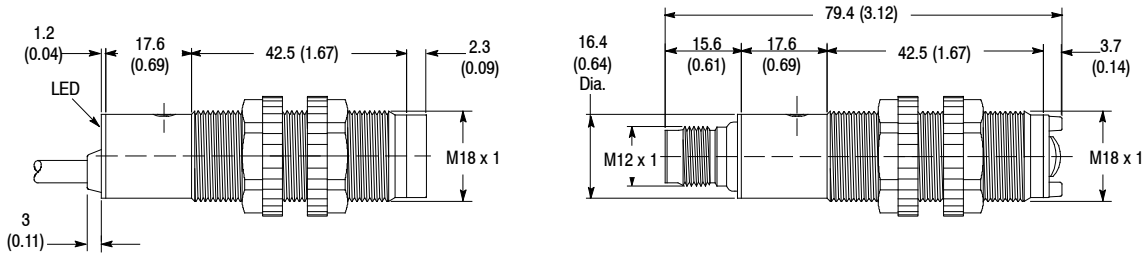



### Background Suppression



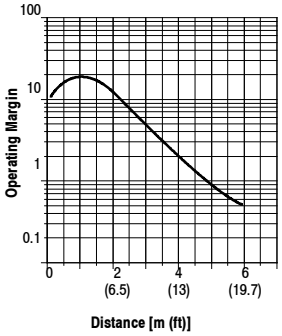

❶ Open circuit or tie white (2) and brown (1) conductors together for L.O. Tie white (2) and blue (3) conductors together for D.O.
❷ Tie white (2) and brown (1) conductors together for L.O. or tie white (2) and blue (3) conductors together for D.O.

## Approximate Dimensions [mm (in.)]

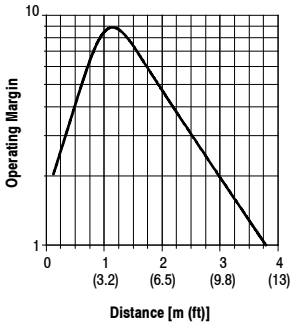


## Typical Response Curve

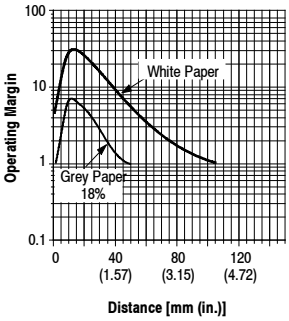
### Retroreflective



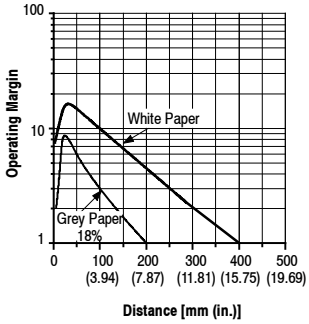

### Polarized Retroreflective



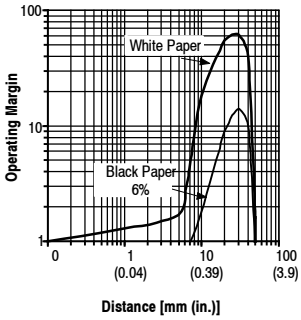

### Standard Diffuse 100 mm



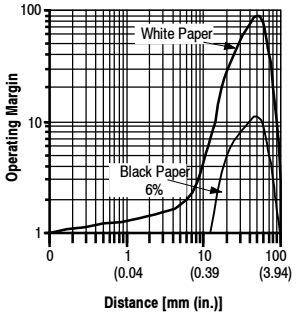

### Standard Diffuse 400 mm



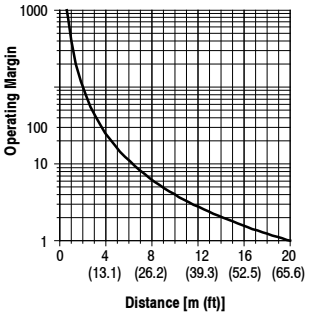

### Background Suppression 50 mm



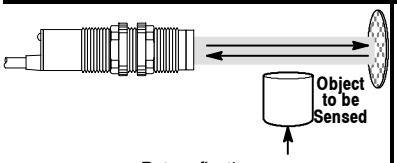
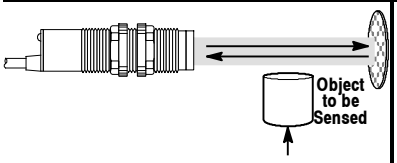
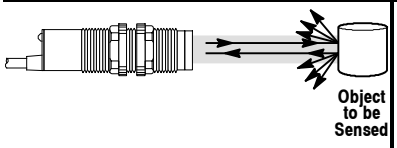
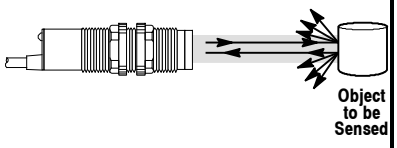
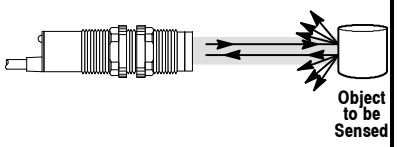

### Background Suppression 100 mm




### Transmitted Beam



## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance @ 1X Margin | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 1.9° **Emitter LED:** Infrared 880 nm | 10…30V DC 30 mA | 3 mm…4 m (0.12 in… 13.2 ft) | LO/DO Complementary | NPN 100 mA 4 ms | 2 m 300V cable | 42CM-U1MNB-A2 |
| | | | | | 4-pin DC micro | 42CM-U1MNB-D4 |
| | | | | PNP 100 mA 4 ms | 2 m 300V cable | 42CM-U1MPB-A2 |
| | | | | | 4-pin DC micro | **42CM-U1MPB-D4** |
|  *Polarized Retroreflective* **Field of View:** 1.8° **Emitter LED:** Visible red 660 nm | 10…30V DC 30 mA | 3 mm…3 m (0.12 in…9.9 ft) | LO/DO Complementary | NPN 100 mA 4 ms | 2 m 300V cable | 42CM-P2MNB-A2 |
| | | | | | 4-pin DC micro | 42CM-P2MNB-D4 |
| | | | | PNP 100 mA 4 ms | 2 m 300V cable | 42CM-P2MPB-A2 |
| | | | | | 4-pin DC micro | **42CM-P2MPB-D4** |
|  *Standard Diffuse* **Field of View:** 6.6° **Emitter LED:** Visible Red 660 nm | 10…30V DC 30 mA | 100 mm (3.9 in.) (Adjustable) | LO/DO Complementary | NPN 100 mA 2 ms | 2 m 300V cable | 42CM-D2MNAE-A2 |
| | | | | | 4-pin DC micro | 42CM-D2MNAE-D4 |
| | | | | PNP 100 mA 2 ms | 2 m 300V cable | 42CM-D2MPAE-A2 |
| | | | | | 4-pin DC micro | **42CM-D2MPAE-D4** |
|  *Standard Diffuse* **Field of View:** 6.6° **Emitter LED:** Infrared 880 nm | | 400 mm (13.6 in.) (Adjustable) | LO/DO Complementary | NPN 100 mA 2 ms | 2 m 300V cable | 42CM-D1MNAL-A2 |
| | | | | | 4-pin DC micro | 42CM-D1MNAL-D4 |
| | | | | PNP 100 mA 2 ms | 2 m 300V cable | 42CM-D1MPAL-A2 |
| | | | | | 4-pin DC micro | **42CM-D1MPAL-D4** |
|  *Background Suppression* **Field of View:** 50 mm = 5.7° 100 mm = 3.4° **Emitter LED:** Visible red 660 nm | 10…30V DC 30 mA | 50 mm (1.97 in.) | L.O./D.O. Selectable | NPN 100 mA 0.5 ms | 2 m 300V cable | 42CM-B2LNBC-A2 |
| | | | | | 4-pin DC micro | 42CM-B2LNBC-D4 |
| | | | | PNP 100 mA 0.5 ms | 2 m 300V cable | 42CM-B2LPBC-A2 |
| | | | | | 4-pin DC micro | **42CM-B2LPBC-D4** |
| | | 100 mm (3.9 in.) | | NPN 100 mA 0.5 ms | 2 m 300V cable | 42CM-B2LNBE-A2 |
| | | | | | 4-pin DC micro | 42CM-B2LNBE-D4 |
| | | | | PNP 100 mA 0.5 ms | 2 m 300V cable | 42CM-B2LPBE-A2 |
| | | | | | 4-pin DC micro | **42CM-B2LPBE-D4** |

**Refer to page 1-61 for cordsets and accessories.**



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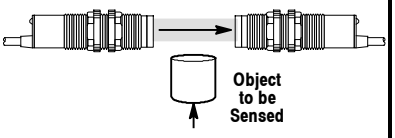
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Transmitted Beam* **Field of View**: 1.6° **Emitter LED**: Infrared 880 nm | 10…30V DC 25 mA | 3 mm…20 m (0.12 in… 65.6 ft) | NA Light Source | | 2 m 300V cable | 42CM-E1EZB-A2 |
| | | | | | 4-pin DC micro | **42CM-E1EZB-D4** |
| | | | L.O./D.O. Complementary | NPN 100 mA 2 ms | 2 m 300V cable | 42CM-R1MNB-A2 |
| | | | | | 4-pin DC micro | 42CM-R1MNB-D4 |
| | | | | PNP 100 mA 2 ms | 2 m 300V cable | 42CM-R1MPB-A2 |
| | | | | | 4-pin DC micro | **42CM-R1MPB-D4** |

## Cordsets and Accessories

| Cordset | | Accessories | | | |
|---|---|---|---|---|---|
| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
| DC Micro QD Cordset, 4-pin, 2 m | 889D-F4AC-2 | Mounting Brackets | 60-2657 | Reflectors | 92-39 |
| DC Micro QD Cordset, 4-pin, 2 m | 889D-F4AC-2 | Mounting Brackets | 60-2649 | Mounting Brackets | 60-2664 |
| | | Snap-Clamp Mounting Brackets | 871A-SCBP18 | | |

# 42CF

## 12 mm Metal Cylindrical

## Features

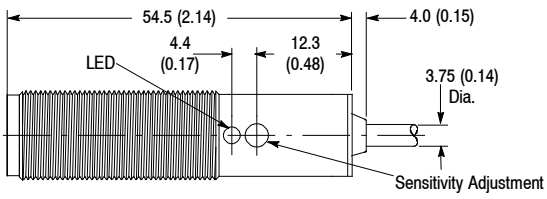
- 12 mm industry standard package
- Wide selection of sensing modes
- 30V DC operation
- NPN or PNP outputs
- Fast response time
- Variety of connection types
- Local teach button
- Accepts remote (diffuse and polarized retroreflective only) teach input

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60068-2-6 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60068-2-27 |
| Relative Humidity | 5....95% |
| Ambient Light Immunity | Incandescent light 3000 lux |
| **Optical** | |
| Sensing Modes | Polarized retroreflective, standard diffuse, transmitted beam |
| Sensing Range | See Product Selection table on page 1-64 |
| Field of View | See Product Selection table on page 1-64 |
| Light Source | Visible red LED (660 nm) or infrared LED (880 nm) |
| LED Indicators | Yellow LED for output indication |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Reverse polarity, overload, short circuit |
| **Outputs** | |
| Response Time | 2 ms (transmitted beam), 1.25 ms (diffuse and polarized retroreflective) |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Selectable light operate or dark operate |
| Output Current | 100 mA |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Nickel plated brass |
| Lens Material | Acrylic |
| Connection Types | 2 m cable, 4-pin DC micro (M12) QD |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-64 |

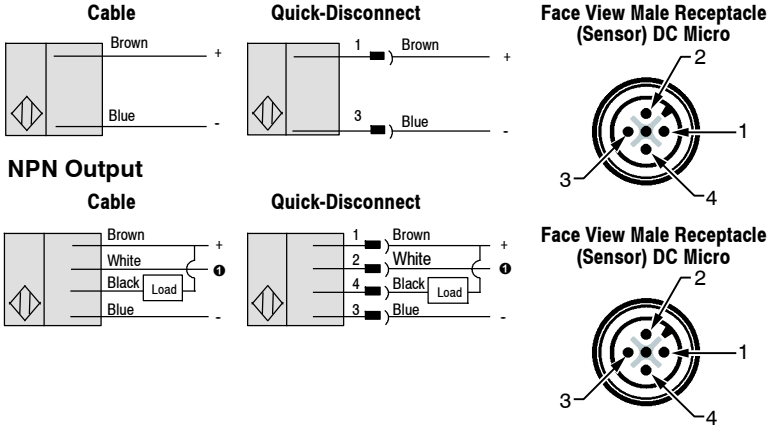
## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Output | Yellow | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |



## Wiring Diagrams

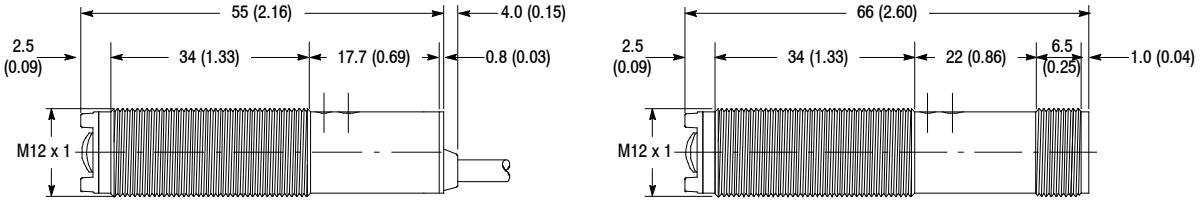
### Diffuse, Polarized Retroreflective and Transmitted Beam



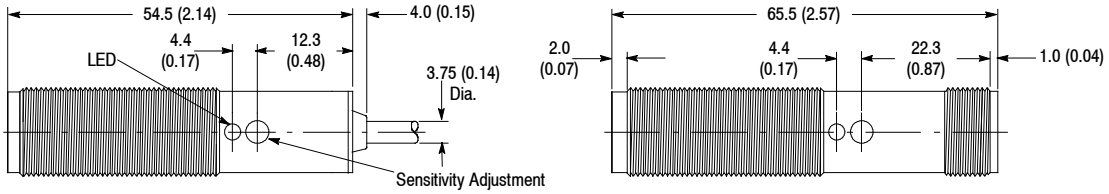

❶ **Polarized retroreflective**: Open circuit for dark operate. Connect white (2) and brown (1) together for light operate. Connect white (2) and blue (3) together for remote teach.
**Diffuse**: Open circuit for light operate. Connect white (2) and brown (1) together for dark operate. Connect white (2) and blue (3) together for remote teach.
**Transmitted beam**: Open circuit for dark operate. Connect white (2) and brown (1) together for light operate. Connect white (2) and blue (3) together for dark operate. This model does not have remote teach.

## Approximate Dimensions [mm (in.)]

### Diffuse and Polarized Retroreflective

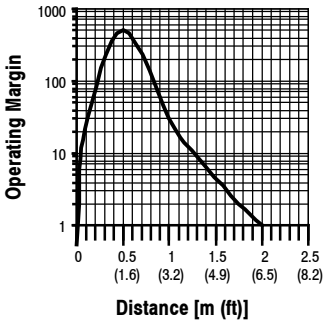



### Transmitted Beam

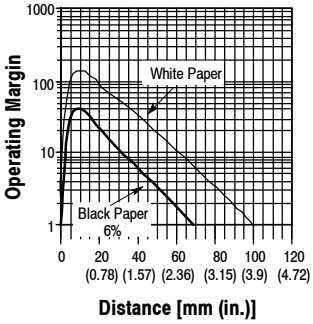



## Typical Response Curve

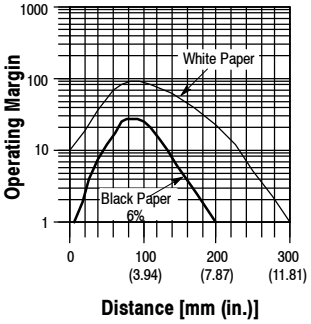
### Polarized Retroreflective



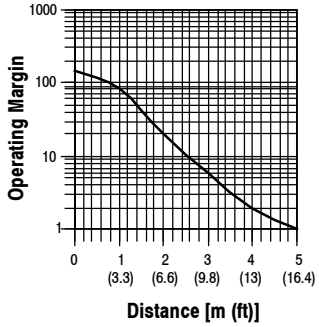

### Standard Diffuse 100 mm




### Standard Diffuse 300 mm



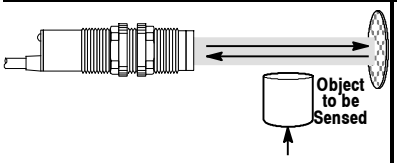
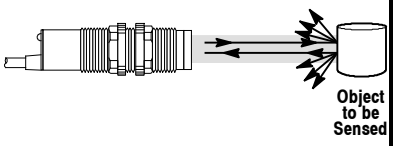
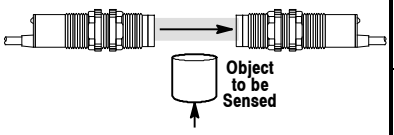

### Transmitted Beam



# 42CF

## 12 mm Metal Cylindrical

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance @ 1X Margin | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Field of View**: 2.3° **Emitter LED**: Visible red 660 nm | 10…30V DC 30 mA | 3 mm…2 m (0.12 in…6.5 ft) | L.O./D.O. Selectable | NPN 100 mA 1.25 ms | 2 m 300V cable | 42CF-P2LNA1-A2 |
| | | | | | 4-pin DC micro | 42CF-P2LNA1-D4 |
| | | | | PNP 100 mA 1.25 ms | 2 m 300V cable | 42CF-P2LPA1-A2 |
| | | | | | 4-pin DC micro | **42CF-P2LPA1-D4** |
|  *Standard Diffuse* **Field of View**: 11.4° (100 mm) 5.3° (300 mm) **Emitter LED**: Infrared 880 nm | 10…30V DC 30 mA | 0…100 mm (0…3.9 in.) (adjustable) | L.O./D.O. Selectable | NPN 100 mA 1.25 ms | 2 m 300V cable | 42CF-D1LNA1-A2 |
| | | | | | 4-pin DC micro | 42CF-D1LNA1-D4 |
| | | | | PNP 100 mA 1.25 ms | 2 m 300V cable | 42CF-D1LPA1-A2 |
| | | | | | 4-pin DC micro | **42CF-D1LPA1-D4** |
| | | 0…300 mm (0…12.2 in.) (adjustable) | | NPN 100 mA 1.25 ms | 2 m 300V cable | 42CF-D1LNA2-A2 |
| | | | | | 4-pin DC micro | 42CF-D1LNA2-D4 |
| | | | | PNP 100 mA 1.25 ms | 2 m 300V cable | 42CF-D1LPA2-A2 |
| | | | | | 4-pin DC micro | **42CF-D1LPA2-D4** |
|  *Transmitted Beam* **Field of View**: 1.4° **Emitter LED**: Infrared 880 nm | 10…30V DC 25 mA | 3 mm…4 m (0.12 in… 13.2 ft) | | — | 2 m 300V cable | 42CF-E1EZB-A2 |
| | | | | | 4-pin DC micro | **42CF-E1EZB-D4** |
| | 10…30V DC 20 mA | | L.O./D.O. Selectable | NPN 100 mA 2 ms | 2 m 300V cable | 42CF-R1LNB1-A2 |
| | | | | | 4-pin DC micro | 42CF-R1LNB1-D4 |
| | | | | PNP 100 mA 2 ms | 2 m 300V cable | 42CF-R1LPB1-A2 |
| | | | | | 4-pin DC micro | **42CF-R1LPB1-D4** |

## Cordsets and Accessories

| Cordset | | Accessories | | | |
|---|---|---|---|---|---|
| **Description** | **Cat. No.** | **Description** | **Cat. No.** | **Description** | **Cat. No.** |
| DC Micro QD Cordset, 4-pin, 2 m | 889D-F4AC-2 | Mounting Bracket | 871A-BRNR | Reflectors | 92-39 |
| | | Snap-Clamp Mounting Bracket | 871A-SCBP12 | | |



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Preferred availability cat. nos. are printed in **bold**.

## Features

- Wide selection of sensing modes
- Wide selection of operating modes
- Both DC and AC/DC operation
- Models with teach function
- Standard ON/OFF and timing versions
- Fast response time
- Variety of connection types
- Laser models available (see page 1-112)

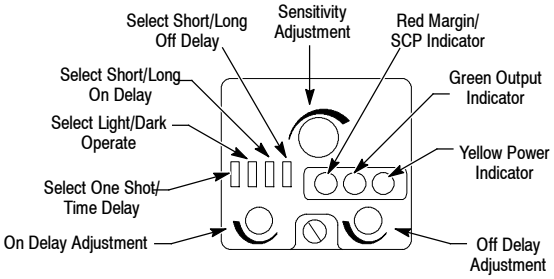
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Approved, CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4X, 6P, 12, 13, IP67 (IEC529) 1200 psi (8270 kPa) washdown, IP69K, ECOLAB certification on cable models |
| Operating Temperature [C (F)] | -34…+70° (-29…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retroreflective, diffuse, long range diffuse, fiber optic, extended range fiber optic, transmitted beam |
| Sensing Range | See Product Selection table on page 1-69 |
| Field of View | See Product Selection table on page 1-69 |
| Light Source | Visible red (660 nm), Infrared (880 nm) |
| LED Indicators | See User Interface table below |
| Adjustments | Single-turn potentiometer for sensitivity |
| **Electrical** | |
| Voltage | 10…30V DC , 40…264V AC/DC models (see Product Selection table on page 1-69) |
| Current Consumption | 30 mA max (DC models), 15 mA max (AC/DC models) |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 2 ms (DC models), 15 ms (AC/DC models), 2 ms (MOSFET models) |
| Output Type | PNP and NPN (DC models), SPDT relay (AC/DC models), MOSFET (AC/DC models) |
| Output Mode | Light operate or dark operate selectable |
| Output Current | 250 mA @ 30V DC (all models except 42GLP and 42GSP); 2 A @ 132 V AC (SPDT relay models), 1 A @ 264V AC (SPDT relay); 300 mA @ 264V AC (MOSFET models) |
| Output Leakage Current | 10 μA max (DC) , 1 mA (AC) |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Cover Material | Neoprene |
| Connection Types | 2 m (6.5 ft) cable, 4-pin DC micro QD, 4-pin DC mini QD, 5-pin DC micro QD |
| Supplied Accessories | 129-130 mounting kit |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-71 |

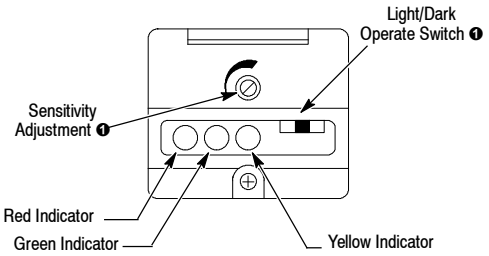
## User Interface—Standard Models (Refer to installation instructions for 42GLP and 42GSP versions)

| Label | Color | State | Status |
|---|---|---|---|
| Output | Green | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |
| Margin/SCP | Red | OFF | Margin < 2.5 |
| | | ON | Margin >2.5 |
| | | Flashing | Output SCP active |
| Power | Yellow | OFF | Sensor not powered |
| | | ON | Sensor powered |

### 42GTx Versions—Top View Detail




### 42GRx Versions—Top View Detail

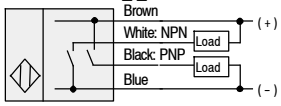



❶ Push button on 42GSP models.

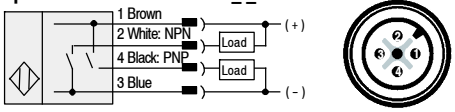
## Wiring Diagrams❶❷

### All Models Except Transmitted Beam Source

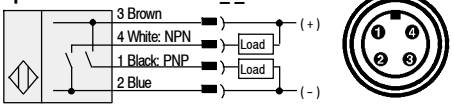
**Cable Model: 9_ _0**



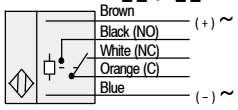

**4-pin DC Micro QD Model: 9_ _0-QD**




**4-pin DC Mini QD Model: 9_ _0-QD1**

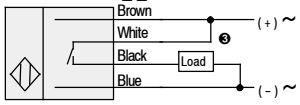



**Cable Model: 9_ _1, 9_ _2**

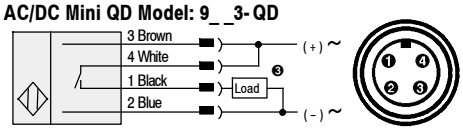



**5-pin AC/DC Mini QD Model: 9_ _1-QD, 9_ _2-QD**

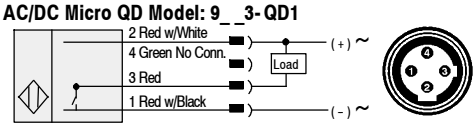
**Cable Model: 9_ _3**



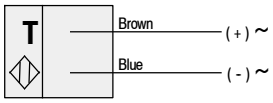

**AC/DC Mini QD Model: 9_ _3-QD**



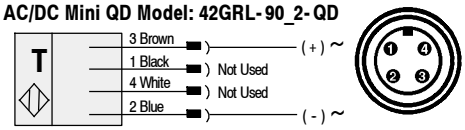

**AC/DC Micro QD Model: 9_ _3-QD1**



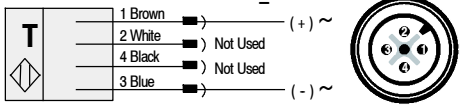

**Transmitted Beam Source**
**Cable Model: 42GRL-90_ _**



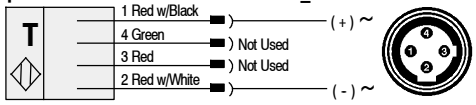

**AC/DC Mini QD Model: 42GRL-90_2-QD**




**DC Micro QD Model: 42GRL-90_0-QD**



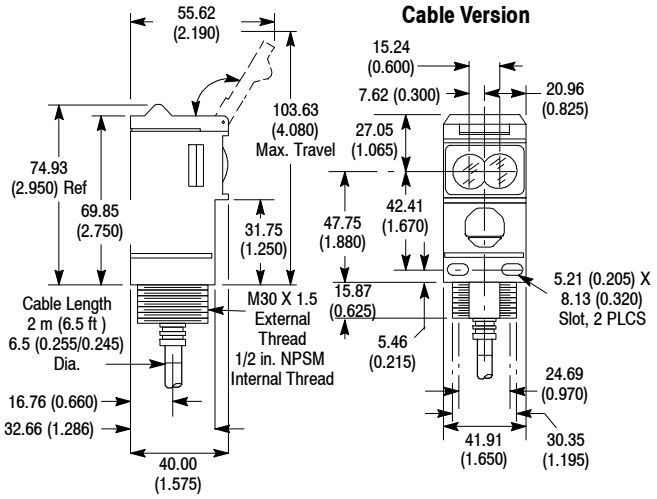

**4-pin DC Micro QD Model: 42GRL-90_3-QD1**



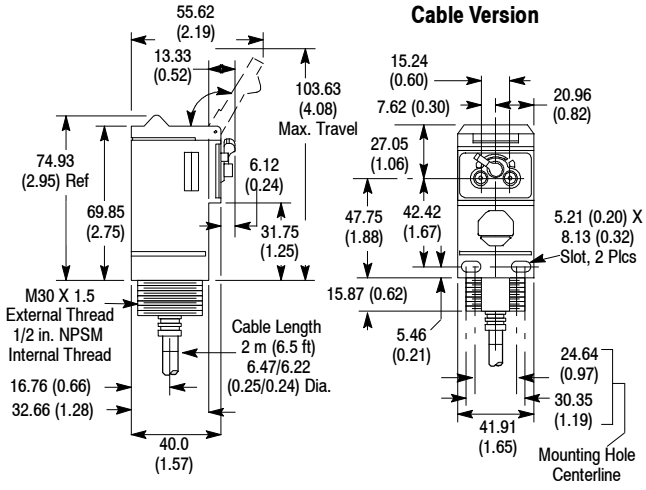

❶ For Allen-Bradley programmable controller compatible interface, refer to publication 42-2.0.
❷ Quick-disconnect wiring codes shown are valid for Allen-Bradley cables only.
❸ Load can be placed on either black or white wire to create sourcing or sinking respectively.

## Approximate Dimensions [mm (in.)]

### All Versions Except Fiber Optic




### Fiber Optic



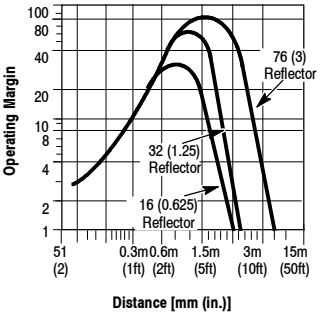

### Connector Version

### Thread Size

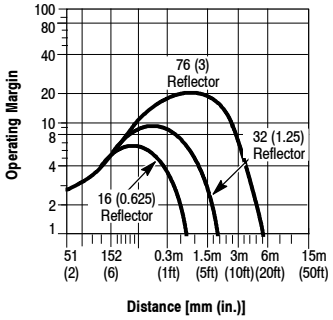
| | AC | DC |
|---|---|---|
| Micro Style | 1/2-20 UNF<br>2 Keyways | M12 x 1<br>1 Keyway |
| Mini Style | 7/8-16 UN<br>1 Keyway | |

## Typical Response Curve

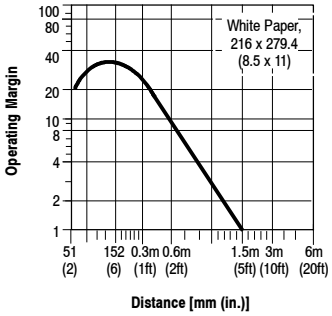
### Retroreflective



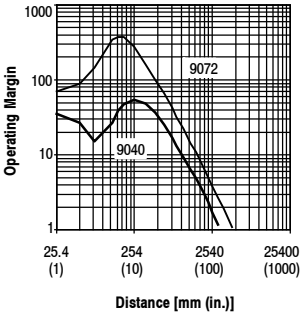

### Polarized Retroreflective



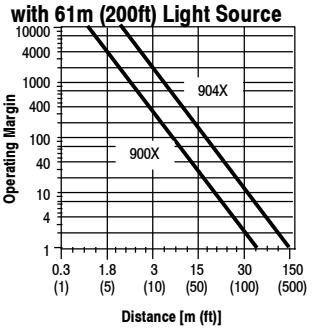

### Standard Diffuse



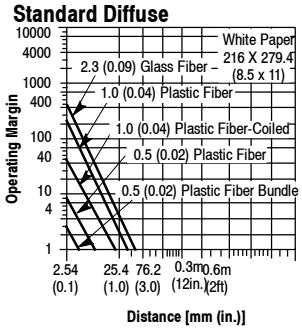

### Long Range Diffuse



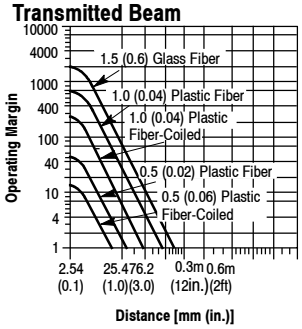

### Transmitted Beam with 61m (200ft) Light Source



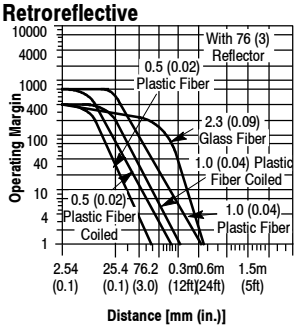

### Visible Red Fiber Optic Standard Diffuse



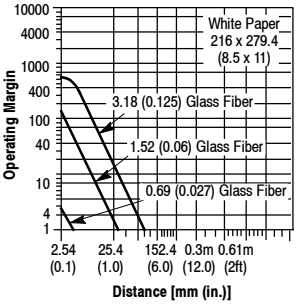

### Visible Red Fiber Optic Transmitted Beam



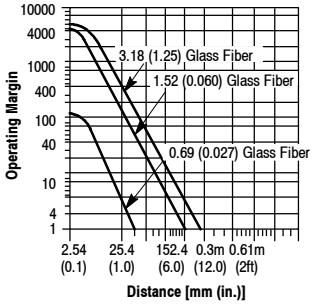

### Small Aperture Fiber Optic Retroreflective



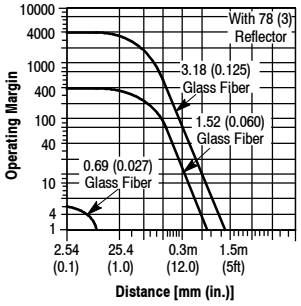

### Large Aperture Fiber Optic Standard Diffuse



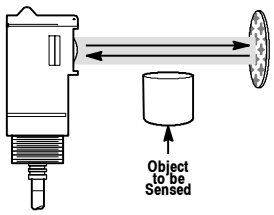

### Large Aperture Fiber Optic Transmitted Beam




### Large Aperture Fiber Optic Retroreflective

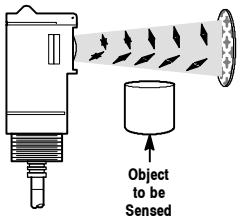
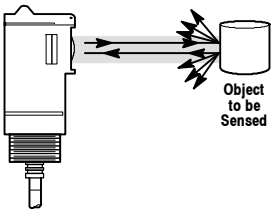
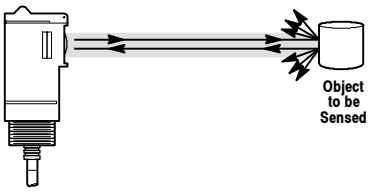



## Product Selection for On/Off and Timing Sensors

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 10…30V DC 30 mA | 50.8 mm… 9.14 m (2 in…30 ft) with 76 mm (3 in.) Reflector | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42G⊗U-9000 |
| | | | | | 4-pin DC micro | **42G⊗U-9000-QD** |
| | | | | | 4-pin mini | 42G⊗U-9000-QD1 |
| | 70…264V AC/DC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | **42G⊗U-9002** |
| | | | | | 5-pin mini | **42G⊗U-9002-QD** |
| | 70…264V DC/ 40…264V AC 50/6 0Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42G⊗U-9003 |
| | | | | | 2 m 600V cable | 42G⊗U-9003H |
| | | | | | 4-pin mini | **42G⊗U-9003-QD** |
| | | | | | 4-pin AC micro | 42G⊗U-9003-QD1 |

⊗ R for standard (i.e. 42GRU-9000); T for timing (i.e. 42GTU-9000)

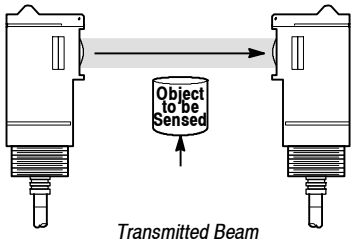
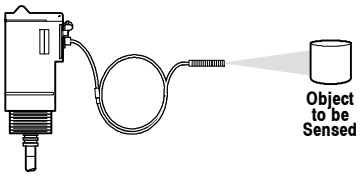
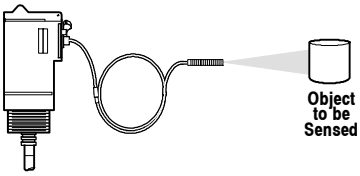
## Product Selection for On/Off and Timing Sensors

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 10…30V DC 30 mA | 50.8 mm… 4.87 m (2 in… 16 ft) with 76 mm (3 in.) Reflector | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42G⊗U-9200 |
| | | | | | 4-pin DC micro | **42G⊗U-9200-QD** |
| | | | | | 4-pin mini | 42G⊗U-9200-QD1 |
| | 70…264V DC/ 60…264V AC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42G⊗U-9202 |
| | | | | | 5-pin mini | **42G⊗U-9202-QD** |
| | 70…264V DC/ 40…264V AC 50/60 Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42G⊗U-9203 |
| | | | | | 2 m 600V cable | 42G⊗U-9203H |
| | | | | | 4-pin mini | **42G⊗U-9203-QD** |
| | | | | | 4-pin AC micro | 42G⊗U-9203-QD1 |
|  *Standard Diffuse* **Field of View**: 3.5° **Emitter LED**: Infrared 880 nm | 10…30V DC 30 mA | 50.8 mm… 1.52 m (2 in…5 ft) to White Paper | Linear pot. Light/Dark Selectable | NPN/PNP 100 mA 2 ms | 2 m 300V cable | 42GLP-9000 |
| | | | | | 4-pin DC micro | 42GLP-9000-QD |
| | | | Teach function Light/Dark Selectable | | 2 m 300V cable | 42GSP-9000 |
| | | | | | 4-pin DC micro | **42GSP-9000-QD** |
| | | | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42G⊗P-9000 |
| | | | | | 4-pin DC micro | **42G⊗P-9000-QD** |
| | | | | | 4-pin mini | 42G⊗P-9000-QD1 |
| | 70…264V DC/ 60…264V AC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | **42G⊗P-9002** |
| | | | | | 5-pin mini | **42G⊗P-9002-QD** |
| | 70…264V DC/ 40…264V AC 50/60 Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42G⊗P-9003 |
| | | | | | 2 m 600V cable | 42G⊗P-9003H |
| | | | | | 4-pin mini | **42G⊗P-9003-QD** |
| | | | | | 4-pin AC micro | 42G⊗P-9003-QD1 |
|  *Long Range Diffuse* **Field of View**: 6.5° **Emitter LED**: Infrared 880 nm | 10…30V DC 30 mA | 50.8 mm… 3.04 m (2 in…10 ft) | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42GRP-9040 |
| | | | | | 4-pin DC micro | **42GRP-9040-QD** |
| | | | | | 4-pin mini | 42GRP-9040-QD1 |
| | 70…264V AC/DC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42GRP-9042 |
| | | | | | 5-pin mini | **42GRP-9042-QD** |
| | 70…264V DC/ 40…264V AC 50/60 Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42GRP-9043 |
| | | | | | 2 m 600V cable | 42GRP-9043H |
| | | | | | 4-pin mini | 42GRP-9043-QD |
| | | | | | 4-pin AC micro | 42GRP-9043-QD1 |
| | 10…40V DC 30 mA | 50.8 mm…4.2 m (2 in…14ft) | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42GRP-9070 |
| | | | | | 4-pin DC micro | 42GRP-9070-QD |
| | 70…264V AC/DC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | **42GRP-9072** |
| | | | | | 3 m 300V cable | 42GRP-9072-3 |
| | | | | | 5-pin mini | 42GRP-9072-QD |

⊗ R for standard (i.e. 42GRU-9000); T for timing (i.e. 42GTU-9000)

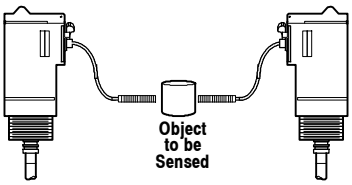
**Refer to page 1-71 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Transmitted Beam* **Field of View**: 1.5° **Emitter LED**: Infrared 880 nm | 10…264V AC/DC 50/60 Hz 15 mA | 25.4 mm…61 m (1 in…200 ft) | NA Light Source | | 2 m 300V cable | **42GRL-9000** |
| | | | | | 2 m 600V cable | 42GRL-9000H |
| | | | | | 4-pin DC micro | **42GRL-9000-QD** |
| | | | | | 4-pin mini | 42GRL-9002-QD |
| | | 25.4 mm… 152 m (1 in…500 ft) | | | 2 m 300V cable | 42GRL-9040 |
| | | | | | 4-pin DC micro | 42GRL-9040-QD |
| | | | | | 4-pin mini | 42GRL-9042-QD |
| | | | | | 4-pin AC micro | 42GRL-9043-QD1 |
| | 10…30V DC 25 mA | Depends on Light Source | Receiver Light or Dark Output Selectable | NPN and PNP 250 mA 5 ms | 2 m -300V cable | 42G⊗R-9000 |
| | | | | | 4-pin DC micro | **42G⊗R-9000-QD** |
| | | | | | 4-pin mini | 42G⊗R-9000-QD1 |
| | 70…264V AC/DC, 50/60 Hz 10 mA | | | SPDT EM Relay 2 A/132V AC, 1 A/264V AC 1 A/150V DC 23 ms | 2 m 300V cable | **42G⊗R-9002** |
| | | | | | 5-pin mini | 42G⊗R-9002-QD |
| | 70…264V DC, 40…264V AC 50/60 Hz 10 mA | | | Solid State Isolated N.O. 300 mA 15 ms | 2 m 300V cable | 42GRR-9003 |
| | | | | | 2 m 600V cable | 42GRR-9003H |
| | | | | | 4-pin mini | **42GRR-9003-QD** |
| | | | | | 4-pin AC micro | 42GRR-9003-QD1 |
|  *Small Aperture Red Fiber Optic* **Emitter LED**: Visible red 660 nm | 10…30V DC 30 mA | Depends on Fiber Optic cable | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42G⊗F-9100 |
| | | | | | 4-pin DC micro | **42G⊗F-9100-QD** |
| | 70…264V AC/DC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC, 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42G⊗F-9102 |
| | | | | | 5-pin mini | 42G⊗F-9102-QD |
| | 70…264V DC/ 40…264V AC 50/60 Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42G⊗F-9103 |
| | | | | | 4-pin mini | 42G⊗F-9103-QD |
| | | | | | 4-pin AC micro | 42G⊗F-9103-QD1 |
|  *Large Aperture Fiber Optic* **Emitter LED**: Infrared 880 nm | 10…30V DC 30 mA | Depends on Fiber Optic cable | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42G⊗F-9000 |
| | | | | | 4-pin DC micro | **42G⊗F-9000-QD** |
| | 70…264V AC/DC, 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC, 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42G⊗F-9002 |
| | | | | | 5-pin mini | **42G⊗F-9002-QD** |
| | 70…264V DC/ 40…264V AC 50/60 Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42G⊗F-9003 |
| | | | | | 2 m 600V cable | 42G⊗F-9003H |
| | | | | | 4-pin mini | 42G⊗F-9003-QD |
| | | | | | 4-pin AC micro | 42G⊗F-9003-QD1 |

⊗ R for standard (i.e. 42GRU-9000); T for timing (i.e. 42GTU-9000)

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Extended Range Large Aperture Fiber Optic* **Emitter LED**: Infrared 880 nm | 10…264V AC/DC, 56/60 Hz 15 mA | See table below. | NA Light Source | | 2 m 300V cable | 42GRLF-9040 |
| | | | | | 4-pin DC micro | 42GRLF-9040-QD |
| | 10…40V DC 30 mA | See table below. | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42GRRF-9000 |
| | | | | | 4-pin DC micro | 42GRRF-9000-QD |
| | 70…264V AC/DC, 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC, 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42GRRF-9002 |
| | | | | | 5-pin mini | 42GRRF-9002-QD |

## Typical Sensing Distance—Extended Range Infrared Fiber Optic

| Sensing Mode | Sensor | Fiber Optic Cable | Range Extender | Sensing Distance (1X margin.) |
|---|---|---|---|---|
| Transmitted Beam | 42GRLF-9040 with individual fiber optic cable | 43GT-FAS25SL Individual Fiber Optic Cable, smooth tip | none | 914 mm (36 in.) |
| | | 43GT-TBB25SL Individual Fiber Optic Cable, with 5/16 inch threaded tip | | |
| | | 43GT-FAS25SL Individual Fiber Optic Cable, smooth tip | 60-1844 | 6 m (20 ft) |
| | | | 60-2559 | 12 m (40 ft) |
| | | 43GT-TBB25SL Individual Fiber Optic Cable, with 5/16 inch threaded tip | 60-2323 | 6 m (20 ft) |
| | | | 60-2738 | 12 m (40 ft) |
| | 42GRLF-9040 with bifurcated fiber optic cable | 43GR-FAS25SL Bifurcated Fiber Optic Cable, smooth tip | none | 1.2 m (48 in.) |
| | | 43GR-TBB25SL Bifurcated Fiber Optic Cable, with 5/16 inch threaded tip | | |
| | | 43GR-FAS25SL Bifurcated Fiber Optic Cable, with smooth tip | 60-1844 | 7.6 m (25 ft) |
| | | | 60-2559 | 15.2 m (50 ft) |
| | | 43GR-TBB25SL Bifurcated Fiber Optic Cable, with 5/16 inch threaded tip | 60-2323 | 7.6 m (25 ft) |
| | | | 60-2738 | 15.2 m (50 ft) |

1. Sensing ranges are for fiber optic cables shown. Range will vary with other fiber optic cable types.
2. When using individual fiber optic cable, second port must be blocked with the provided plug (60-2744).
3. Receiver Sensor (42GRRF) requires only individual fiber optic cable.

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| 1.8 m (6 ft) 4-pin, Mini QD Cordset | 889N-F4AF-6F | 32 mm (1.25 in.) Diameter Reflector | 92-47 |
| 1.8 m (6 ft) 5-pin, Mini QD Cordset | 889N-F5AF-6F | Range Extender | 60-1844 |
| 2 m (6.5 ft) 4-pin, DC Micro QD Cordset | 889D-F4AC-2 | Range Extender | 60-2559 |
| 2 m (6.5 ft) 4-pin, AC Micro QD Cordset | 889R-F4AEA-2 | Range Extender | 60-2738 |
| 76 mm (3 in.) Diameter Reflector | 92-39 | Replacement Plug | 60-2744 |

# 44B Adjustable Background and Foreground Suppression

## 50 mm Rectangular

## Features

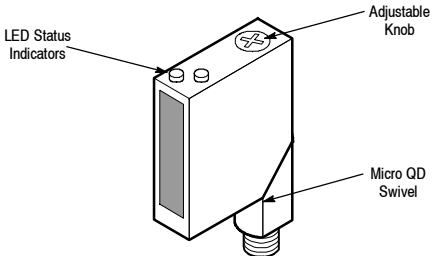
- Adjustable background and foreground suppression models
- Power, output, and stability status indicators
- Micro QD connection with 90° swivel
- Low voltage 24V DC operation
- Protected from miswiring
- Dual NPN and PNP outputs
- Fast 1 ms response time

## Specifications

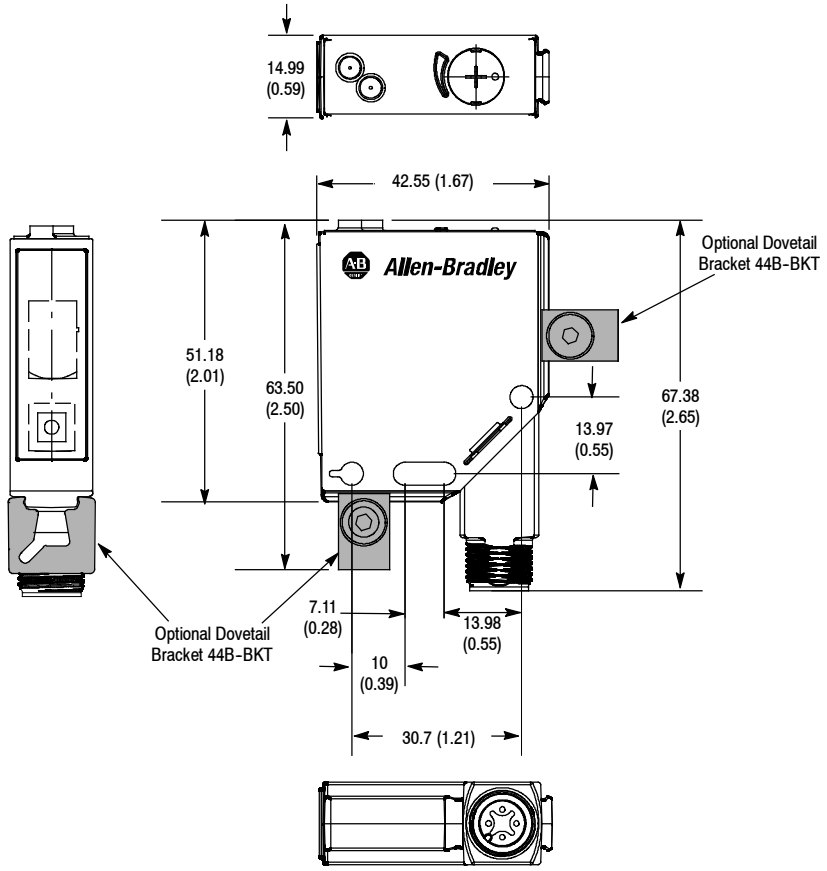
| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4X, 6P, 12, 13, IP67 |
| Operating Temperature [C (F)] | 0…+70° (32…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 947-5-2 |
| Relative Humidity | 5…95% |
| **Optical** | |
| Sensing modes | Background suppresion or foreground suppression |
| Sensing Range | 20…300 mm (0.78…11.8 in.) adjustable for background suppression<br>20…200 mm (0.78…7.8 in.) adjustable for foreground suppression |
| Spot Size | See Product Selection table on page 1-74 |
| Light Source | Infrared LED (880 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | 6-turn adjustment knob |
| **Electrical** | |
| Voltage | 20…30V DC |
| Current Consumption | 22 mA max |
| Sensor Protection | False pulse, reverse polarity, overload, output short circuit |
| **Outputs** | |
| Response Time | 1 ms max |
| Output Type | PNP and NPN |
| Output Mode | Light or dark operate by cat. no. |
| Output Current | 100 mA |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Acrylic |
| Lens Material | Acrylic |
| Connection Types | 4-pin DC micro (M12) QD |
| Supplied Accessories | None |
| Optional Accessories | See mounting brackets and cordsets on page 1-73 |

## User Interface Panel

| Color | State | Status |
|---|---|---|
| Green | OFF | Sensor not powered, SCP active |
| | ON | Sensor powered |
| | Flashing | Unstable margin |
| Orange | OFF | Output not activated |
| | ON | Output activated |

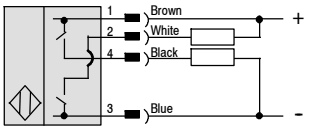


## Approximate Dimensions [mm (in.)]



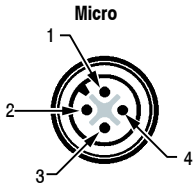

## Wiring Diagram

**NPN/PNP**

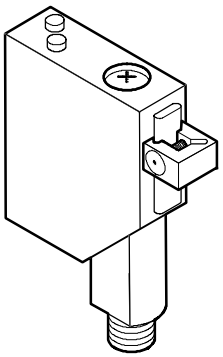



**Quick-Disconnect**

**Micro**




**Dovetail Bracket (Optional)**
**44B-BKT**



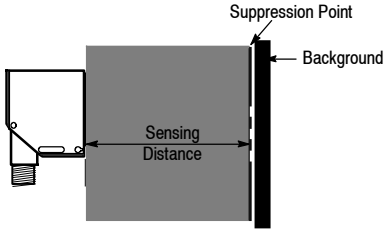
## Cordsets & Accessories

| Description | Cat. No. |
|---|---|
| 2 m (6.5 ft) 4-pin, DC Micro QD Cordset | 889D-F4AC-2 |
| Dovetail Bracket | 44B-BKT |
| Mounting Bracket | 60-BKTL-SS |

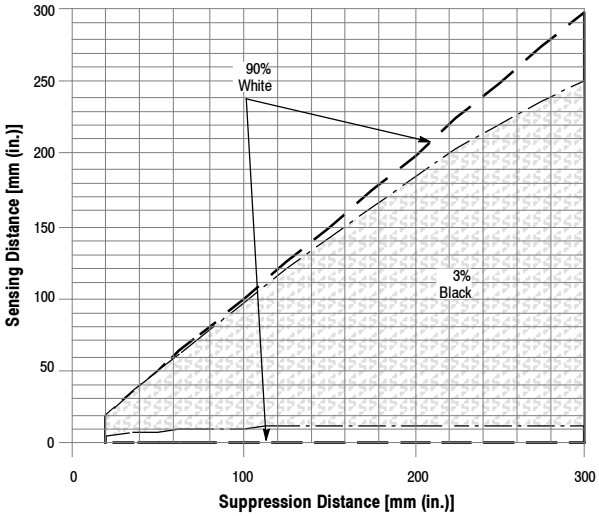
# 44B Adjustable Background and Foreground Suppression

## 50 mm Rectangular

### Typical Response Curve

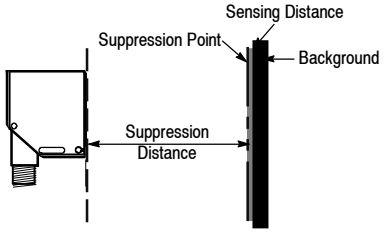



**Background Suppression**

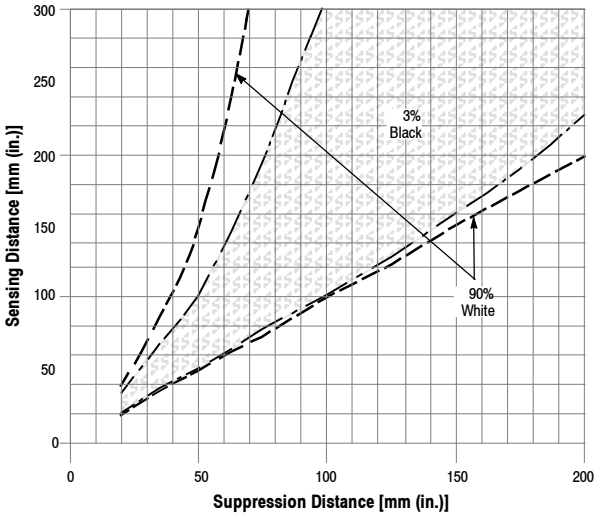



**Example**: With a suppression point set at 200 mm, the sensing distance will be between the sensor face and just under 200 mm for 90% white reflective targets and between 12 mm and 185mm for 3% black reflective targets.

### Typical Response Curve

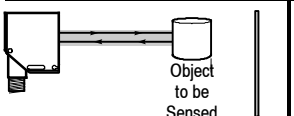
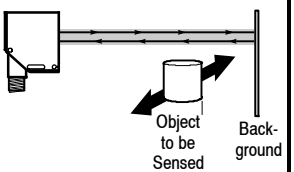



**Foreground Suppression**




**Example**: With a suppression point set at 50 mm, the sensing distance will be between just over 50 mm and 150 mm for 90% white reflective targets and between just over 50 mm and 100 mm for 3% black reflective targets.

### Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance (Adjustable) | LED Source | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Background Suppression* ❶ 20 mm spot size @ 300 mm | 20…30V DC 22 mA | 20…300 mm (0.78…11.8 in) | Infrared 880 nm | Light Operate | PNP and NPN 100 mA 1 ms | 4-pin DC micro | **44BSB-1JBA1-D4** |
| | | | | Dark Operate | | | 44BSB-1KBA1-D4 |
|  *Foreground Suppression* ❷ 15 mm spot size @ 200 mm | | 20…200 mm (0.78…7.9 in) | | Dark Operate | | | 44BSN-1KBA1-D4 |
| | | | | Light Operate | | | 44BSN-1JBA1-D4 |

❶ Detection by presence of reflected light from the target.

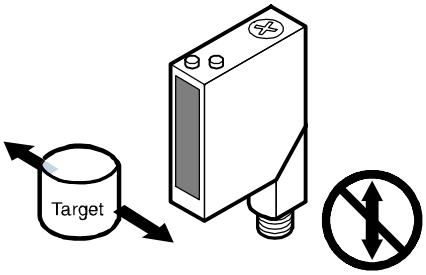
❷ Detection by absence of reflected light from the background.

# 44B Adjustable Background and Foreground Suppression

## 50 mm Rectangular

## Application Notes

1. Due to the detection method used by these sensors, it is important that the sensor be mounted in such a way as to ensure that the target passes in an orientation perpendicular to the sensor's lenses.

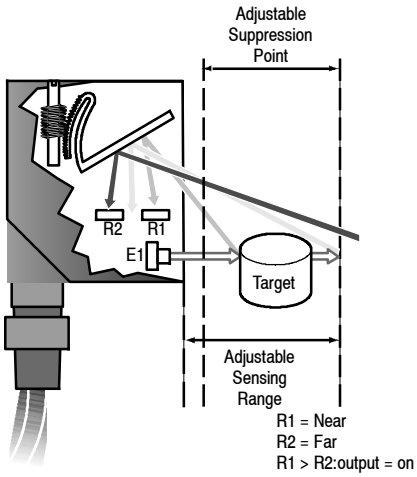



2. For installations with a fixed background up to 300 mm from the 44BSB sensor, set the suppression point to just before the background. If no background is present, set the suppression point to just beyond the target to be sensed so that adequate margin is achieved.
3. Avoid installing the 44BSB sensor directly perpendicular to a mirror-like background. This can cause a false output. If this occurs, use a nonreflective background or angle the sensor or background to minimize this condition.
4. The performance curves for the 44BSN and 44BSB are based on a 90% white and 3% black reflective paper. Use the table below to compare reflectivity levels of various industrial targets.

| Target | Typical Relative Reflectivity |
|---|---|
| Polished aluminum | 500 |
| White paper (reference) | 100 |
| White typing paper | 90 |
| Cardboard | 40 |
| Cut lumber | 20 |
| Black paper | 10 |
| Neoprene | 5 |
| Tire rubber | 4 |
| Black felt | 2 |

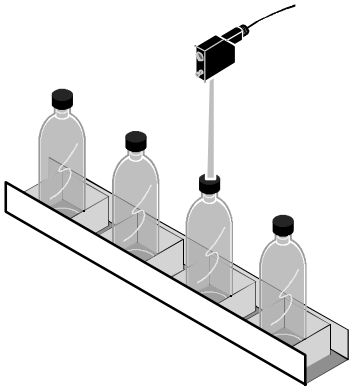
5. For foreground suppression dark operate model (44BSN-1KBA1-D4), the output turns on when a target is detected. For light operate model (44BSN-1JBA1-D4), the output turns off when a target is detected.
6. For background suppression light operate model (44BSB-1JBA1-D4), the output turns on when a target is detected. For dark operate model (44BSB-1KBA1-D4), the output turns off when the target is detected.

**Operation of Adjustable Background Suppression**

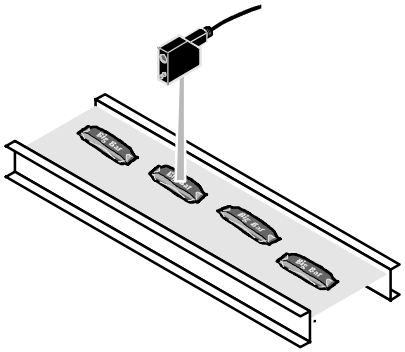



## Application Examples

**Background Suppression**



**Foreground Suppression**



# 42BT Long Range Background Suppression

## Slim Flatpack

## Features

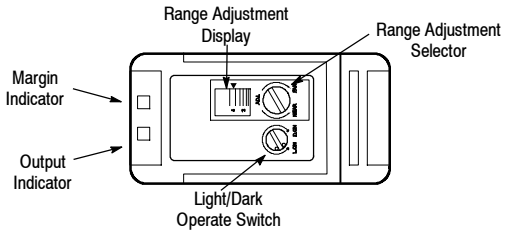
- Long range background suppression diffuse sensing mode
- Adjustable range settings
- Slim flatpack housing design
- Highly visible LED Indicators
- Pico QD and 2 m cable versions
- Both NPN and PNP outputs
- Short-circuit protected outputs
- Fast 2 ms response time

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | IP65 |
| Operating Temperature [C (F)] | -5…+55° (+23…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 35…85% |
| Ambient Light Immunity | Incandescent light: 3000 lux, sunlight immunity: 10000 lux |
| **Optical** | |
| Sensing Modes | Background suppression |
| Sensing Range | 1 m or 2 m by cat. no. |
| Field of View | See Product Selection table on page 1-77 |
| Light Source | Visible red LED (650 nm), infrared LED (880 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | 5-turn sensitivity potentiometer |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 30 mA |
| Sensor Protection | Short circuit |
| **Outputs** | |
| Response Time | 2 ms max |
| Output Type | PNP and NPN |
| Output Mode | Light operate or dark operate selectable |
| Output Current | 100 mA @ 24V DC |
| Output Leakage Current | 0.1 mA max |
| **Mechanical** | |
| Housing Material | Polyarilate |
| Lens Material | Polyarilate |
| Connection Types | 2 m cable, 4-pin pico (M8) QD on 6-inch pigtail |
| Supplied Accessories | Screwdriver |
| Optional Accessories | See mounting brackets and cordsets on page 1-77 |

## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Margin | Green | OFF | Margin < 2.5 |
| | | ON | Margin > 2.5 |
| Status | Red | OFF | Output not activated |
| | | ON | Output activated |

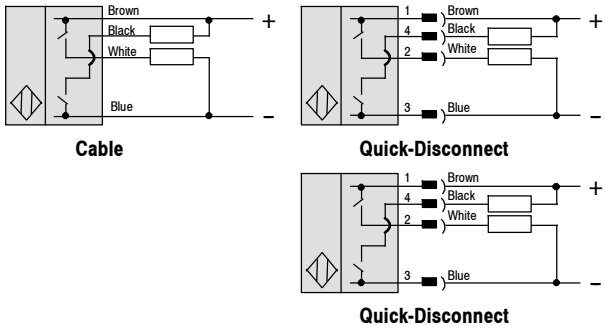


# 42BT Long Range Background Suppression

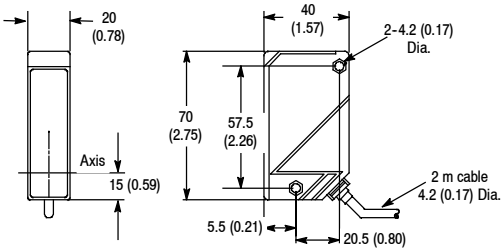
## Slim Flatpack

## Wiring Diagrams

NPN/PNP

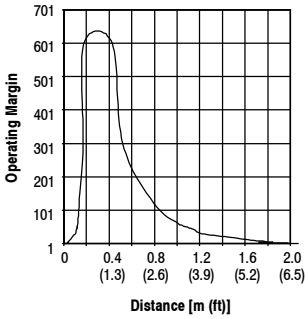



## Approximate Dimensions [mm (in.)]



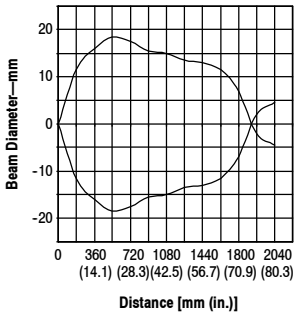

## Typical Response Curve

**42BT-B1LBSN**



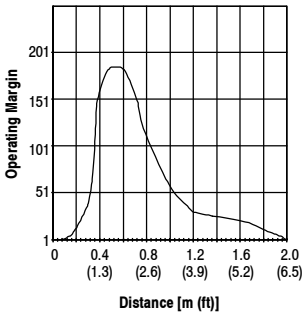

## Beam Pattern

**42BT-B1LBSN**



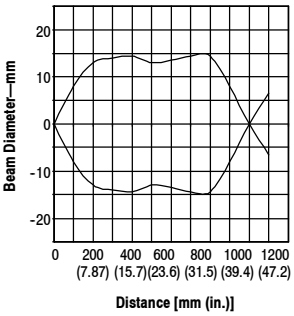

## Typical Response Curve

**42BT-B2LBSL**

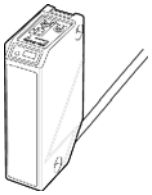
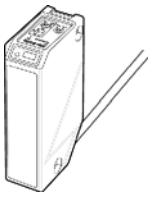



## Beam Pattern

**42BT-B2LBSL**




## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | LED Source | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Background Suppression* **Field of View:** 1.7° | 12…24V DC ±10% 30 mA | 0.2…1 m (0.66…3.3 ft) | Visible Red 650 nm | L.O./D.O. selectable | PNP and NPN 2 ms (max) | 2 m 300V cable | 42BT-B2LBSL-A2 |
| | | | | | | 4-pin DC micro | **42BT-B2LBSL-F4** |
| | | | | | | 4-pin DC pico | 42BT-B2LBSL-Y4 |
|  *Background Suppression* **Field of View:** 2.8° | | 0.2…2 m (0.66…6.4 ft) | Infrared 880 nm | | | 2 m 300V cable | 42BT-B1LBSN-A2 |
| | | | | | | 4-pin DC micro | **42BT-B1LBSN-F4** |
| | | | | | | 4-pin DC pico | 42BT-B1LBSN-Y4 |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| 2 m (6.5 ft) 4-pin, DC Micro QD Cordset | 889D-F4AC-2 | Vertical Mounting Bracket | 61-6738 |
| 2 m (6.5 ft) 4-pin, Pico QD Cordset | 889P-F4AB-2 | Horizontal Mounting Bracket | 61-6739 |

# 42BC Long Range Background Suppression

## Slim Housing

## Features

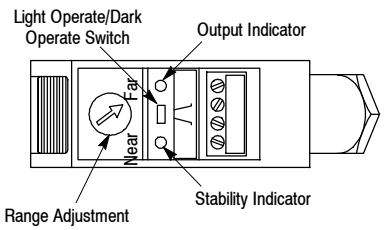
- Long range background suppression diffuse sensing mode
- Adjustable range settings
- Slim housing style
- Highly visible LED Indicators
- Screw terminal connections
- Both NPN and PNP outputs (DC)
- SPST relay output (AC)
- Short-circuit protected outputs

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, 12, 13, IP65 |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% |
| Ambient Light Immunity | Incandescent light: 3000 lux, sunlight immunity: 10000 lux |
| **Optical** | |
| Sensing Modes | Background suppression |
| Sensing Range | 1 m or 2 m by cat. no. |
| Field of View | See Product Selection table on page 1-80 |
| Light Source | Infrared LED (880 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 12…24V DC, 24…240V DC |
| Current Consumption | 30 mA |
| Sensor Protection | Short circuit for DC models, reverse polarity, false pulse, transient |
| **Outputs** | |
| Response Time | 20 ms max (DC models), 30 ms max (AC models) |
| Output Type | PNP and NPN, SPDT N.O. relay (AC models) |
| Output Mode | Light operate or dark operate selectable |
| Output Current | 100 mA @ 24V DC, 3 A @ 240V AC |
| Output Leakage Current | 0.5 mA max |
| **Mechanical** | |
| Housing Material | Polycarbonate |
| Lens Material | Polycarbonate |
| Cover Material | Acrylic |
| Connection Types | Screw terminal, 16 AWG (1.3 $mm^2$) |
| Supplied Accessories | Right angle mounting bracket |
| Optional Accessories | See mounting brackets and cordsets on page 1-80 |

## User Interface Panel

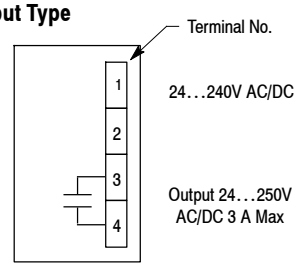
| Label | Color | State | Status |
|---|---|---|---|
| Margin | Green | OFF | 0.8>margin<1.2 |
| | | ON | 0.8<margin>1.2 |
| Output | Red | OFF | Output not activated |
| | | ON | Output activated |



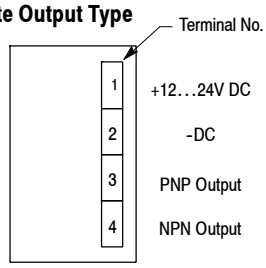
## Wiring Diagrams

### Terminal Version

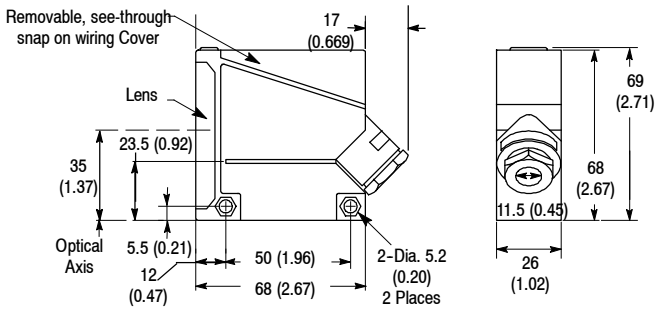
**Relay Output Type**




**Solid-State Output Type**



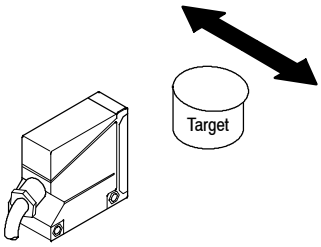

## Approximate Dimensions [mm (in.)]




### Detection Direction

Due to the detection method, the sensor must be positioned such that the target passes in the direction illustrated.

Motion in up/down direction cannot be detected.




### Minimum Sensing Distances

Near Setting

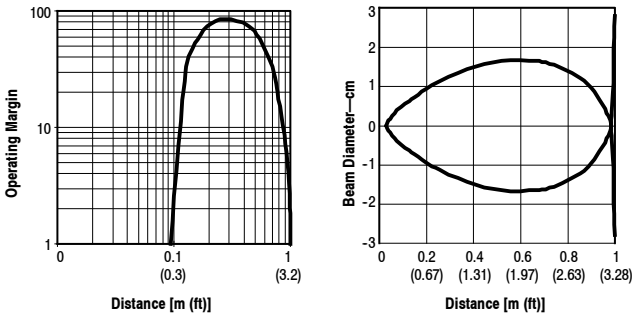
2.5% black 8 cm (3.15 in.) at 2X margin
100% white 3 cm (1.18 in.) at 2X margin

Far Setting

2.5% black 20 cm (7.9 in.) at 2X margin
100% white 4 cm (1.57 in.) at 2X margin

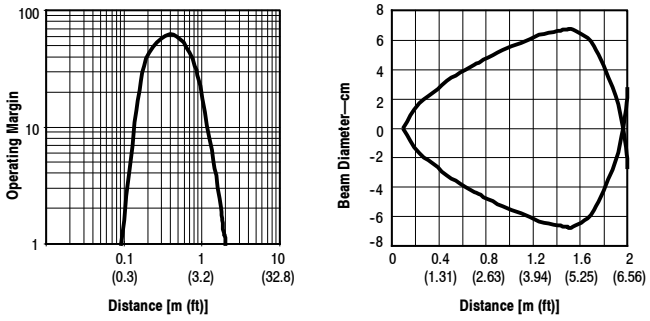
## Typical Response Curve Beam Pattern

**1 m Background Suppression**




## Typical Response Curve Beam Pattern

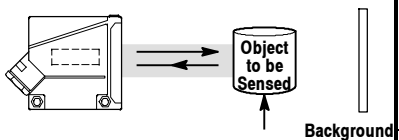
**2 m Background Suppression**



# 42BC Long Range Background Suppression

## Slim Housing

### Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Background Suppression*<br>**Field of View:** 3.5°<br>**Minimum Sensing Distance:** 30 mm (1.2 in.)<br>**Emitter LED:** Infrared 880 nm | 12…24V DC ±10%<br>30 mA | 1 m (3.3 ft) | Light/Dark Selectable | NPN/PNP<br>100 mA<br>20 ms | Screw terminals accepts up to (2) 16 AWG (1.3 mm sq.) conductors | 42BC-B1LBAL-T4 |
| | | 2 m (6.6 ft) | | | | **42BC-B1LBAN-T4** |
| | 24…240V AC/DC ±10%<br>30 mA (DC)<br>15 mA (AC) | 1 m (3.3 ft) | | S.P.S.T. N.O. Relay<br>3 A (250V AC, 750V AC)<br>3 A (30V DC, 90 W)<br>30 ms | | **42BC-B1CRAL-T4** |
| | | 2 m (6.6 ft) | | | | **42BC-B1CRAN-T4** |

### Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| DC Micro QD Cordset, Straight, 4-pin, 2 m | 889D-F4AC-2 |
| Receptacle, 4-pin DC Micro QD | 888D-M4AC1-0M3 |
| Mounting Bracket | 60-2637 |
| Replacement Cover | 60-2669 |
| Receptacle, 4-pin Mini QD | 60-2668 |

# 42BA Short Range Background Suppression

## Compact Housing

## Features

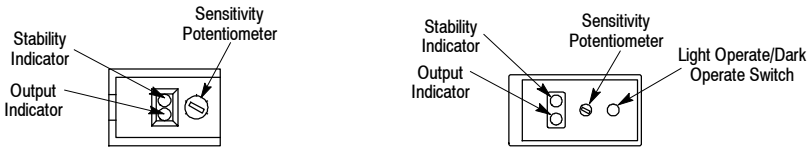
- Short-range background suppression diffuse sensing mode
- Adjustable range settings
- Compact housing style
- Highly visible LED indicators
- NPN or PNP output models
- Diagnostic output
- Short-circuit protected outputs
- 2 m cable connection

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, 4, 6P, 12, 13, IP67 (IEC 529) |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% |
| **Optical** | |
| Sensing Mode | Background suppression |
| Sensing Range | See Product Selection table on page 1-83 |
| Field of View | See Product Selection table on page 1-83 |
| Light Source | Visible red LED (700 nm), infrared LED (880 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 33 mA max |
| Sensor Protection | Short circuit, reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | 350 µs |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light operate or dark operate selectable |
| Output Current | 100 mA max @ 24V DC |
| Output Leakage Current | 1 µA max |
| **Mechanical** | |
| Housing Material | Polyarylate (30 mm and 50 mm models)<br>ABS resin (100 mm and 200 mm models) |
| Lens Material | Polyarylate (30 mm and 50 mm models) |
| | Polysulfone (100 mm and 200 mm models) |
| Connection Types | 2 m cable |
| Supplied Accessories | 60-2636 mounting bracket |

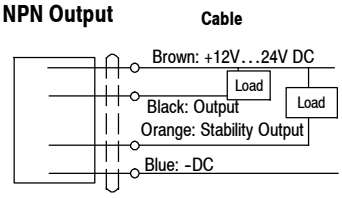
## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| STB | Green | OFF | 0.8>margin<1.2 |
| | | ON | 0.8<margin>1.2 |
| OUT | Red | OFF | Output not activated |
| | | ON | Output activated |

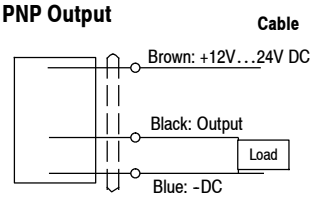



## Wiring Diagrams

**NPN Output**




**PNP Output**



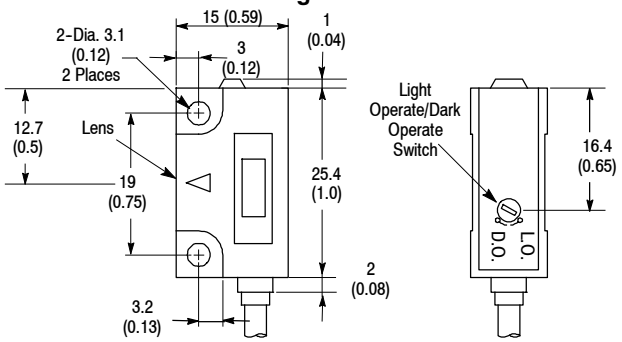

**Note**: Details regarding connection of Rockwell Automation 42BA photoelectric sensors to Rockwell Automation Programmable Controllers can be found in "PHOTOSWITCH® Photoelectric Sensors and Programmable Controller Interface Manual" on *www.ab.com/Literature*.

# 42BA Short Range Background Suppression

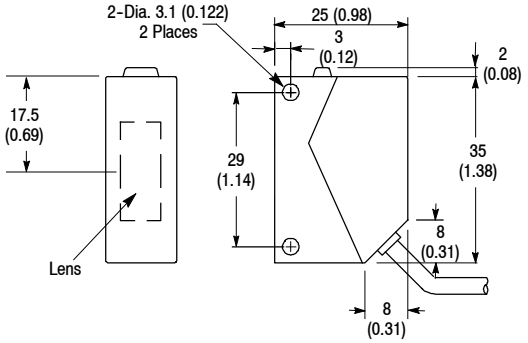
## Compact Housing

### Approximate Dimensions [mm (in.)]

**30 mm and 50 mm Sensing Distance Versions**



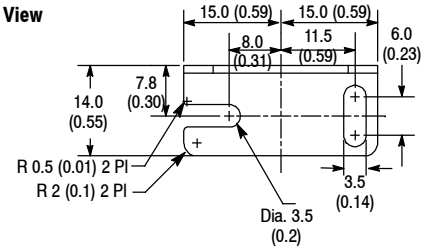

**100 mm and 200 mm Sensing Distance Versions**



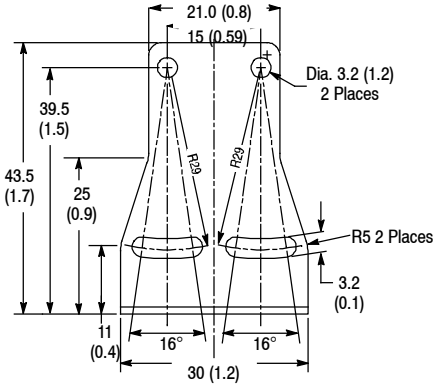

**Stainless Steel Mounting Bracket—60-2636**

Stainless steel mounting bracket and hardware supplied with all 42BA sensors.

**Bottom View**



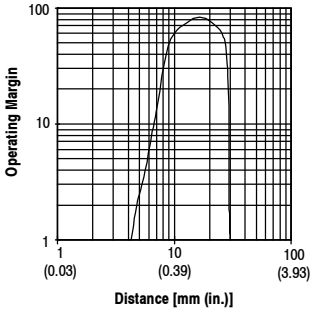

**Side View**

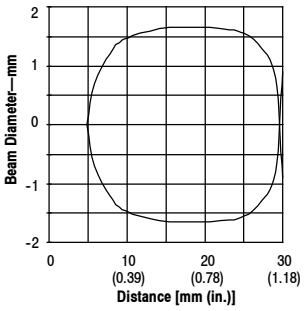



**Note:** Replacement mounting assemblies and reflectors available on page 1-293.

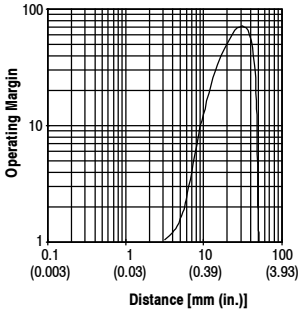
### Typical Response Curve — Beam Pattern

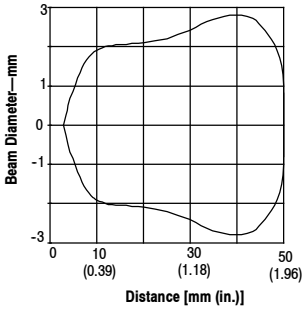
**30 mm**



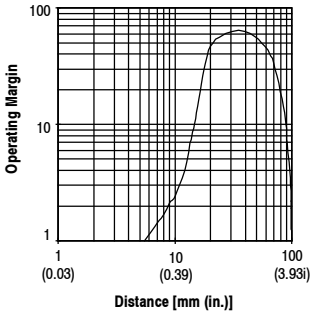



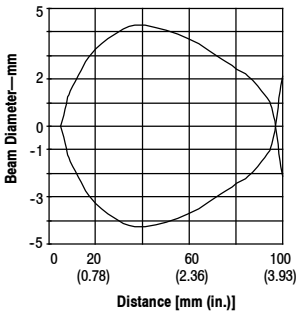

**50 mm**



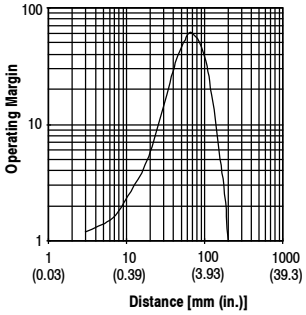



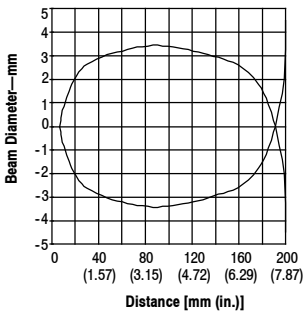

**100 mm**



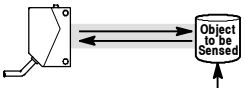




**200 mm**



## Product Selection

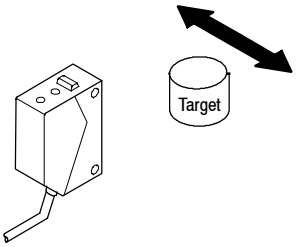
| Sensing Mode | Operating Voltage Supply Current | Sensing Distance [mm (in.)] | Field of View | Output Energized | LED Source | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  | 12…24V DC ±10% 27 mA | 10…30 (0.39…1.2) | 9° | Light/Dark Selectable | Visible red 700 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | 2 m 500V cable | **42BA-S2LNAA-A2** |
| | 12…24V DC ±10% 30 mA | | | | | PNP Output: 100 mA, 350 µs | | 42BA-S2LPAA-A2 |
| | 12…24V DC ±10% 27 mA | 10…50 (0.39…2.0) | | | | NPN Output: 100 mA, Stability: 50 mA 350 µs | | **42BA-S2LNAC-A2** |
| | 12…24V DC ±10% 30 mA | | | | | PNP Output: 100 mA, 350 µs | | 42BA-S2LPAC-A2 |
| | | 10…100 (0.39…3.9) | | | | NPN Output: 100 mA Stability: 50 mA 350 µs | | **42BA-S2LNAE-A2** |
| | 12…24V DC ±10% 33 mA | | | | | PNP Output: 100 mA 350 µs | | 42BA-S2LPAE-A2 |
| | 12…24V DC ±10% 30 mA | 10…200 (0.39…7.9) | 5° | | Infrared 880 nm | NPN Output: 100 mA Stability: 50 mA 350 µs | | **42BA-S1LNAG-A2** |
| | 12…24V DC ±10% 33 mA | | | | | PNP Output: 100 mA 350 µs | | 42BA-S1LPAG-A2 |

**Operating Distance with White Paper**

| Min Sensitivity [mm (in.)] | Max Sensitivity [mm (in.)] | Cat. No. |
|---|---|---|
| 12…25 (0.47…0.98) | 2…30 (0.078…1.18) | 42BA-S2LNAA-A2<br>42BA-S2LPAA-A2 |
| 9.5…39 (0.37…1.54) | 2.7…50 (0.106…1.97) | 42BA-S2LNAC-A2<br>42BA-S2LPAC-A2 |
| 17…75 (0.67…2.95) | 6…100 (0.24…3.94) | 42BA-S2LNAE-A2<br>42BA-S2LPAE-A2 |
| 25…160 (0.98…6.29) | 1…200 (0.039…7.87) | 42BA-S1LNAG-A2<br>42BA-S1LPAG-A2 |

### Detection Direction

Due to the detection method, the sensor must be positioned such that the target passes in the horizontal direction illustrated.




Motion in the vertical direction cannot be reliably detected.

# 42KA

## Ultra-Miniature Flat Pack

## Features

- Subminiature package style
- Three sensing modes
- Models with and without sensitivity adjustment
- Highly visible LED Indicators
- NPN or PNP output models
- 2 m cable connection

## Specifications

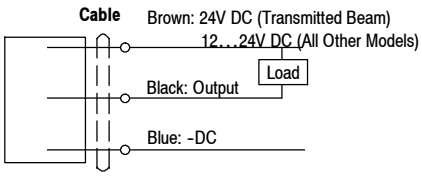
| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Approved, and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, IP40 |
| Operating Temperature [C(F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60068-2-6 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60068-2-27 |
| Relative Humidity | 5…85% |
| **Optical** | |
| Sensing Modes | Diffuse, sharp cutoff, transmitted beam |
| Sensing Range | See Product Selection table on page 1-91 |
| Field of View | See Product Selection table on page 1-91 |
| Light Source | Visible red LED (660 nm) |
| LED Indicators | See User Interface below |
| Adjustments | See Product Selection table on page 1-91 |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Reverse polarity for standard diffuse without adjustment, transient noise |
| **Outputs** | |
| Response Time | 500 µS |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | See Product Selection table on page 1-91 |
| Output Current | 80 mA @ 24V DC |
| Output Leakage Current | 0.5 mA max |
| **Mechanical** | |
| Housing Material | Polyester |
| Lens Material | Polycarbonate |
| Connection Types | 2 m cable |

## User Interface Panel

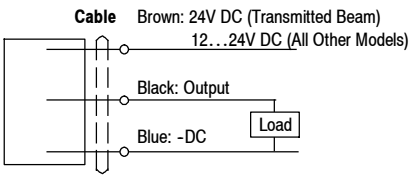
| Label | Color | State | Status |
|---|---|---|---|
| STB | Green | OFF | 0.8<margin<1.2 |
| | | ON | 0.8>margin>1.2 |
| OUT | Red | OFF | Output not activated |
| | | ON | Output activated |

## Wiring Diagrams

**NPN Output**



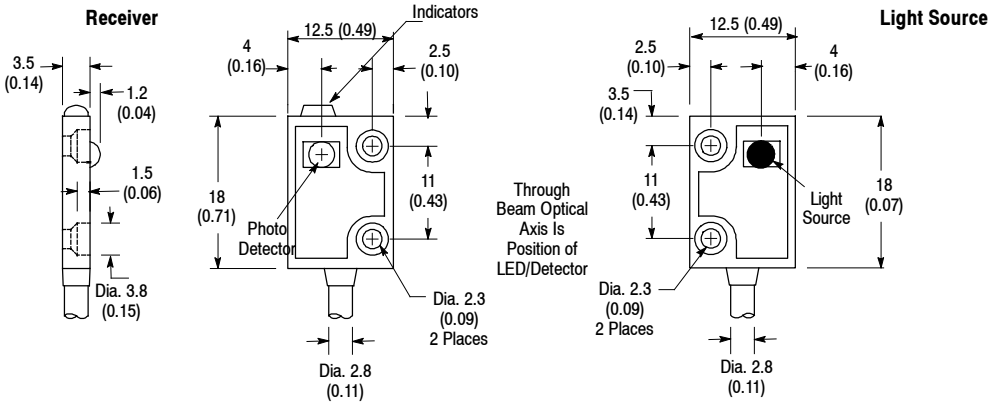

**PNP Output**



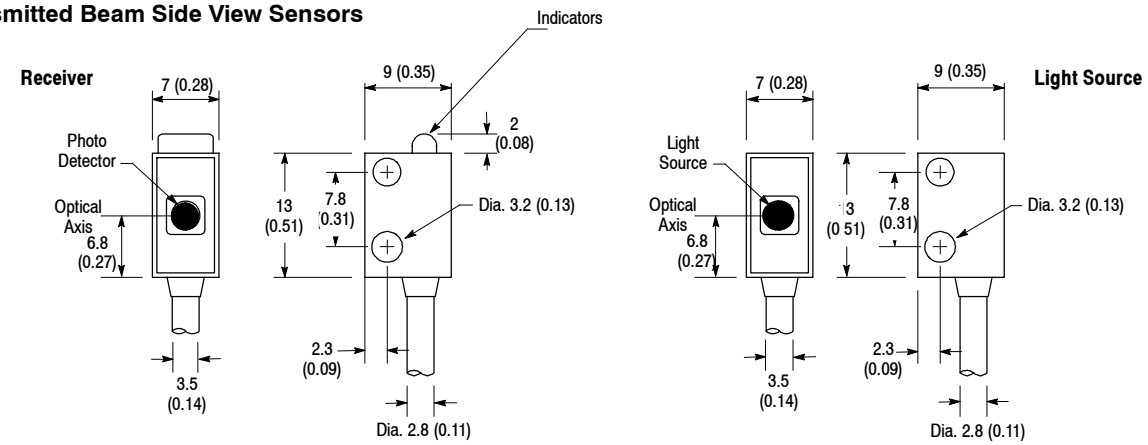

**Note:** Details regarding connection of Rockwell Automation Bulletin 42KA photoelectric sensors to Rockwell Automation Programmable Controllers can be found in publication 42-2.0.

## Approximate Dimensions [mm (in.)]

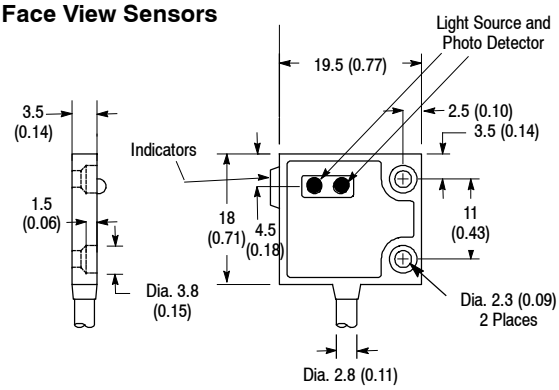
### Transmitted Beam Face View Sensors



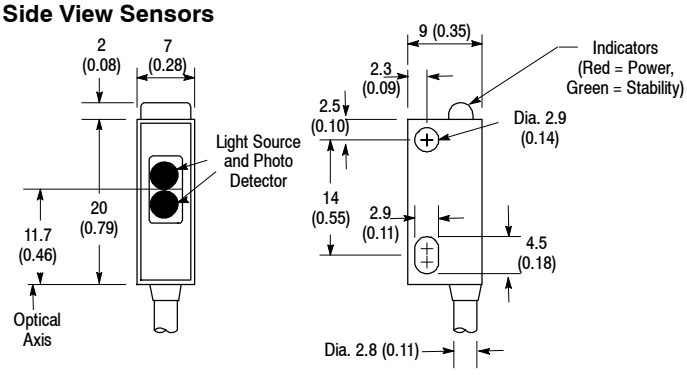

### Transmitted Beam Side View Sensors




### Face View Sensors

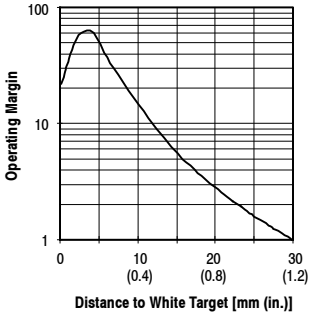



### Side View Sensors

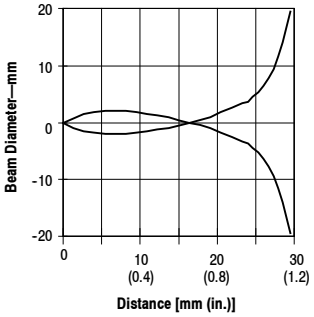


## Typical Response Curve

### Standard Diffuse—30 mm

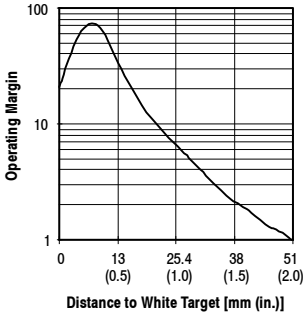



## Beam Pattern

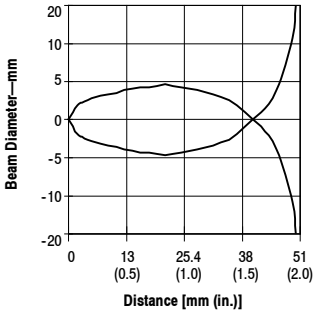



## Typical Response Curve

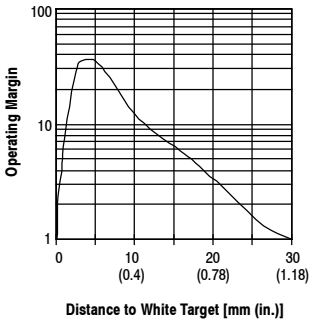
### Standard Diffuse—50 mm

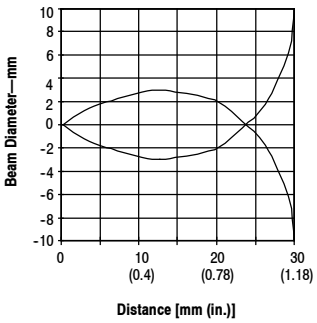



## Beam Pattern

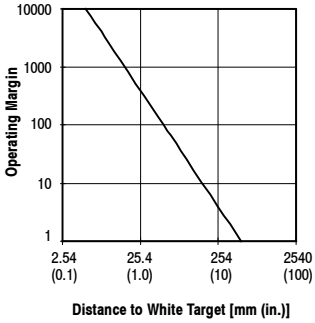


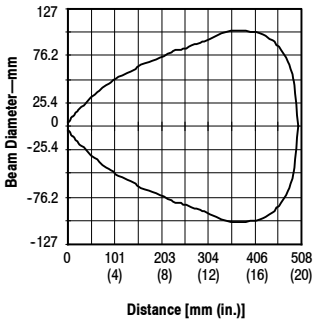

### Sharp Cutoff Diffuse




### Transmitted Beam



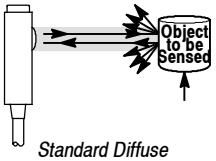
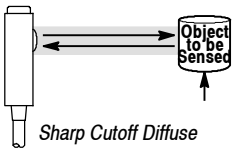
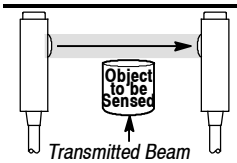
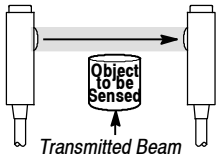
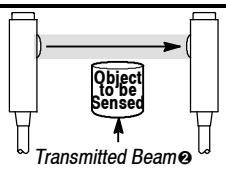
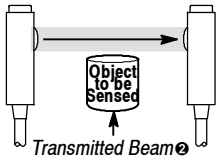






Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energ. | Output Type Capacity Response Time | Face or Side View ❶ | Sensitiv. Adjust. | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  *Standard Diffuse*<br>**Field of View:** 18°<br>**Emitter LED:** Visible red 660 nm<br>**Face or Side View:** Face View | 12…24V DC ±10%<br>20 mA | 3…50 mm (0.12…2.0 in.) | Light | NPN<br>80 mA<br>0.5 ms | Face | No | 2 m 500V cable | 42KA-D2JNHC-A2 |
| | 12…24V DC ±10%<br>29 mA | | | PNP<br>80 mA<br>0.5 ms | | | | 42KA-D2JPHC-A2 |
| | 12…24V DC ±10%<br>27 mA | | | NPN<br>80 mA<br>0.5 ms | Face | Yes | | **42KA-D2JNFC-A2** |
| | 12…24V DC ±10%<br>29 mA | | | PNP<br>80 mA<br>0.5 ms | | | | **42KA-D2JPFC-A2** |
|  *Sharp Cutoff Diffuse*<br>**Field of View:** 18°<br>**Emitter LED:** Red 660 nm | 12…24V DC ±10%<br>27 mA | 3…30 mm (0.12…1.2 in.) | Light Operate | NPN<br>80 mA<br>0.5 ms | Side | Yes | 2 m 500V cable | 42KA-S2JNSA-A2 |
| | 12…24V DC ±10%<br>29 mA | | | PNP<br>80 mA<br>0.5 ms | | | | **42KA-S2JPSA-A2** |
|  *Transmitted Beam*<br>**ld of View:** 40°<br>**itter LED:** Red 660 nm | 24V DC ±10%<br>Source: 15 mA<br>Receiver: 15 mA | 3…500 mm (0.12…19.7 in.) | Dark | NPN<br>80 mA<br>0.5 ms | Face | No | 2 m 500V cable | 42KA-T2KNHK-A2 |
|  *Transmitted Beam*<br>**Field of View:** 50°<br>**Emitter LED:** Red 660 nm | | | | | Side | | | 42KA-T2KNTK-A2 |
| | 24V DC ±10%<br>Source: 15 mA<br>Receiver: 22 mA | | | | Face | Yes | | 42KA-T2KNFK-A2 |
|  *Transmitted Beam❷*<br>**Field of View:** 40°<br>**Emitter LED:** Red 660 nm | 24V DC ±10%<br>Source: 15 mA<br>Receiver: 17 mA | | | PNP<br>80 mA<br>0.5 ms | Face | No | | **42KA-T2KPHK-A2** |
|  *Transmitted Beam❷*<br>**Field of View:** 50°<br>**Emitter LED:** Red 660 nm | | | | | Side | | | 42KA-T2KPTK-A2 |
| | 24V DC ±10%<br>Source: 15 mA<br>Receiver: 24 mA | | | | Face | Yes | | **42KA-T2KPFK-A2** |

❶ See page 1-89 for detailed dimensions.

❷ Both a light source (emitter) and receiver are included in the package. To identify the light source, replace the "T" in the cat. no. with "E." To identify the receiver, replace the "T" in the cat. no. with "R." Example: 42KA-**T**2KNHK-A2 contains one 42KA-**E**2KNHK-A2 light source and one 42KA-**R**2KNHK-A2 receiver. Light sources and receivers are not available separately.

# 42KB

## Micro Rectangular

## Features

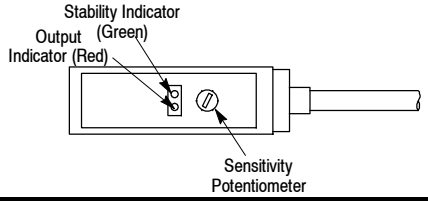
- Compact rectangular package
- Four sensing modes
- Sensitivity adjustment
- Selectable light/dark operate
- Highly visible LED Indicators
- NPN or PNP output models
- 2 m cable or pico connections

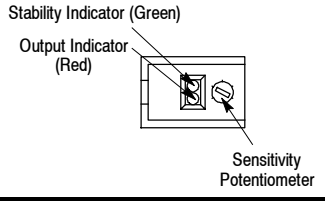
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, 4, 6, 12, 13; IP67 (IEC 60529) |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% |
| **Optical** | |
| Sensing Mode | Retroreflective, diffuse, sharp cutoff diffuse, transmitted beam |
| Sensing Range | See Product Selection table on page 1-95 |
| Field of View | See Product Selection table on page 1-95 |
| Light Source | Visible red LED (660 nm), infrared LED (880 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Short circuit (NPN models only), reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | 350 µs |
| Output Type | PNP or NPN by cat. no., stability output for NPN models only |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 24V DC |
| Output Leakage Current | 0.5 mA max |
| **Mechanical** | |
| Housing Material | Polyarylate |
| Lens Material | Acrylic, polycarbonate, polyarylate by cat. no. |
| Connection Types | 2 m cable, 3-pin DC pico (M8) QD |
| Supplied Accessories | Mounting bracket, adhesive apertures (transmitted beam models), screwdriver, reflector (retroreflective models) |
| Optional Accessories | See mounting brackets and cordsets on page 1-97 |

## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| STB | Green | OFF | 0.8<margin<1.2 |
| | | ON | 0.8>margin>1.2 |
| OUT | Red | OFF | Output not activated |
| | | ON | Output activated |

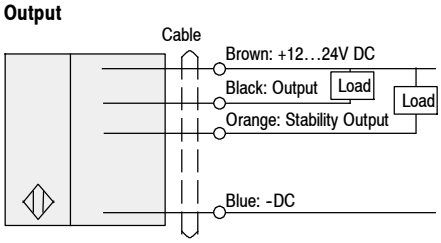


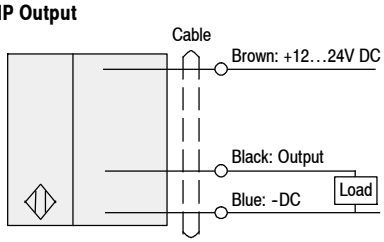
## Wiring Diagrams

### Cable

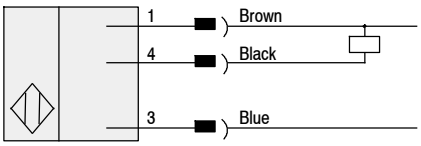
**NPN Output**

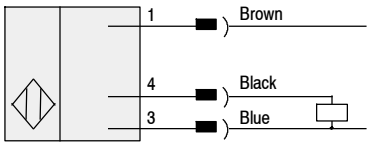



**PNP Output**




### Quick-Disconnect



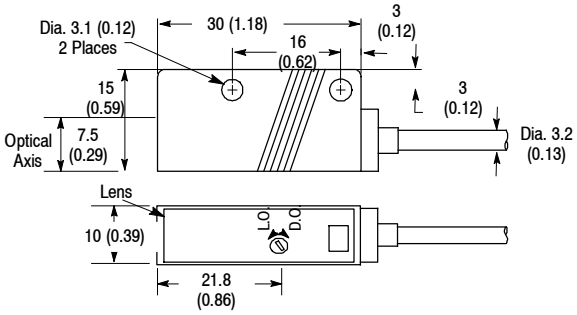




**Pico**

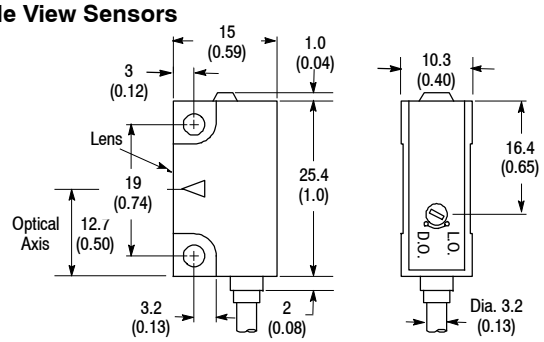
**Note**: Details regarding connection of Rockwell Automation Bulletin 42KB photoelectric sensors to Rockwell Automation Programmable Controllers can be found in "PHOTOSWITCH® Photoelectric Sensors and Programmable Controller Interface Manual" on *www.ab.com/literature*.

## Approximate Dimensions [mm (in.)]

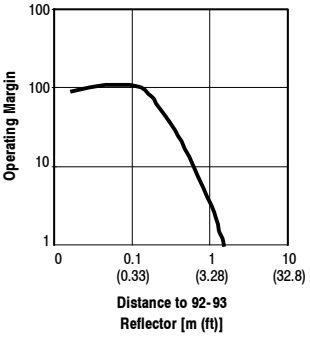
### End View Sensors



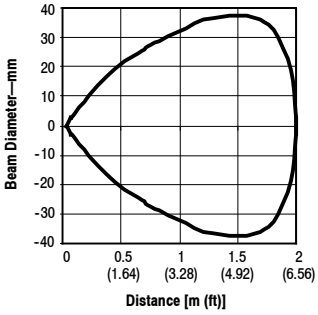

### Side View Sensors



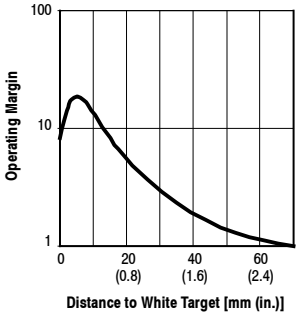
## Typical Response Curve — Retroreflective



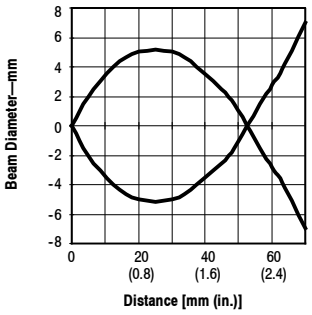

## Beam Pattern — Retroreflective



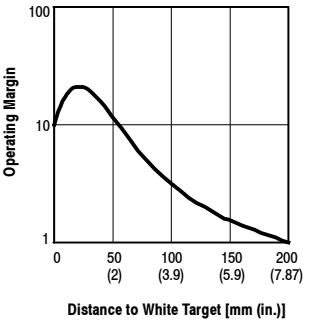

## Typical Response Curve — Standard Diffuse—70 mm



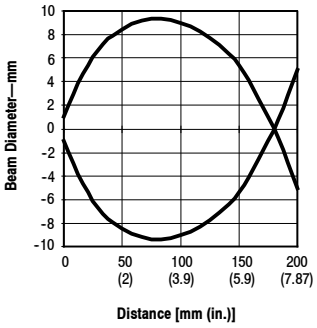

## Beam Pattern — Standard Diffuse—70 mm



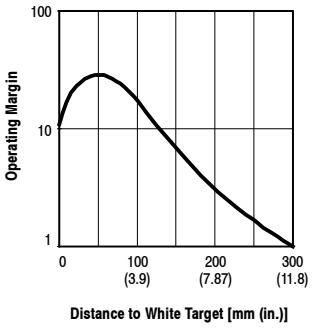

## Typical Response Curve — Standard Diffuse—200 mm



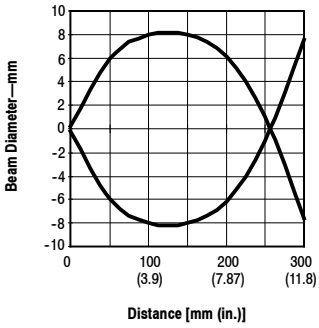

## Beam Pattern — Standard Diffuse—200 mm



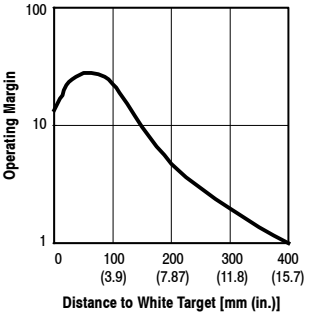

## Typical Response Curve — Standard Diffuse—300 mm



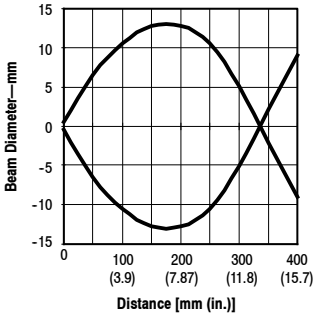

## Beam Pattern — Standard Diffuse—300 mm




## Typical Response Curve — Standard Diffuse—400 mm




## Beam Pattern — Standard Diffuse—400 mm



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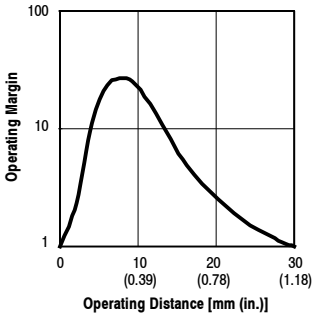
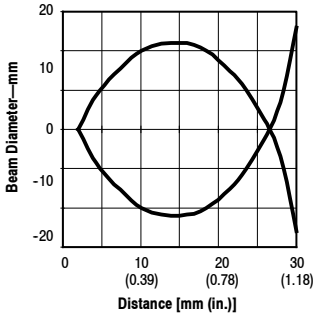
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Typical Response Curve Beam Pattern

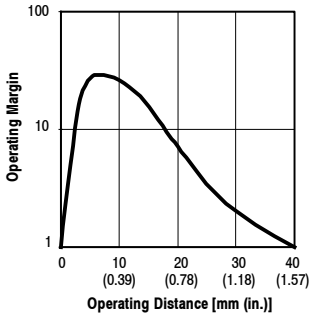
### Sharp Cutoff Diffuse—30 mm

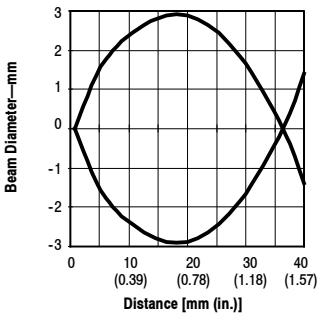


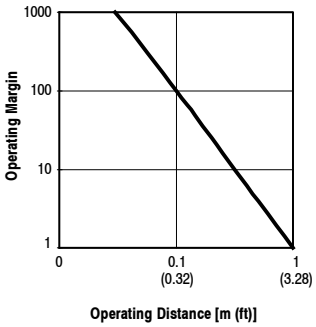

## Typical Response Curve Beam Pattern

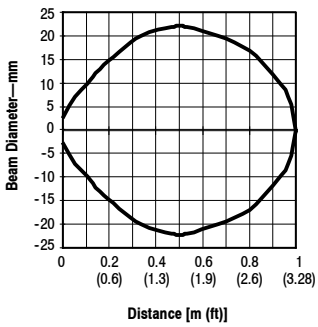
### Sharp Cutoff Diffuse—40 mm



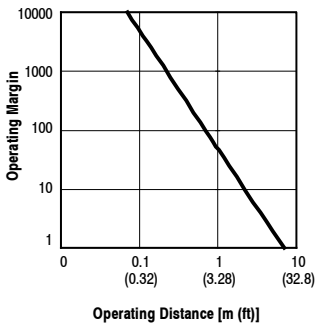



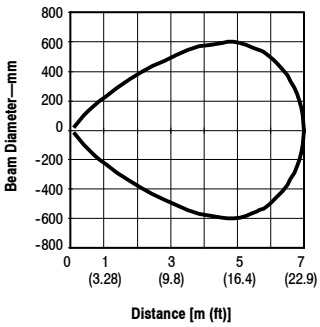

### Transmitted Beam—1 m



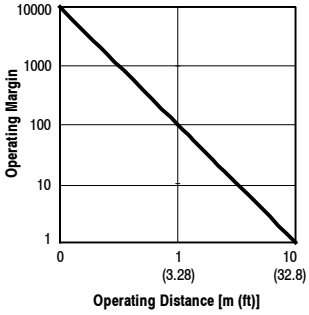



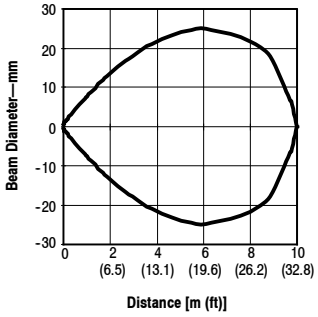

### Transmitted Beam—7 m



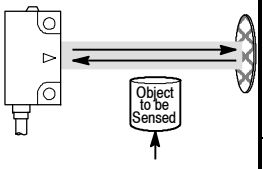




### Transmitted Beam—10 m



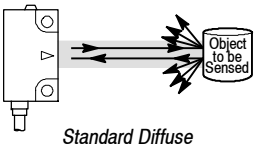
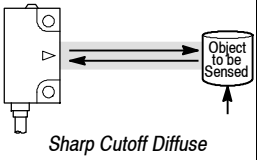

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | LED Source | Output Type Capacity Response Time | End or Side View❶ | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 5° **Emitter LED:** Visible red 660 nm | 12…24V DC ±10% 20 mA | 3 mm… 2 m (0.12 in… 6.6 ft) | Light/Dark Selectable | — | NPN Output: 100 mA Stability: 50 mA 350 µs | Side | 2 m 500V cable | **42KB-U2LNSN-A2** |
| | | | | | | | 3-pin pico | 42KB-U2LNSN-Y3 |
| | 12…24V DC ±10% 25 mA | | | | PNP Output: 100 mA 350 µs | | 2 m 500V cable | 42KB-U2LPSN-A2 |
| | | | | | | | 3-pin pico | 42KB-U2LPSN-Y3 |



**Refer to page 1-97 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance [mm (in.)] | Output Energized | LED Source | Output Type Capacity Response Time | End or Side View❶ | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  *Standard Diffuse* **Field of View**: 50 mm Infrared sensors: 20°; All others: 12° **Emitter LED**: See Product Selection | 12…24V DC ±10% 25 mA | 3…70 (0.12…2.8) | Light/Dark Selectable | IR 950 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | End | 2 m 500V cable | 42KB-D1LNED-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LNED-Y3 |
| | | | | | | Side | 2 m 500V cable | 42KB-D1LNSD-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LNSD-Y3 |
| | 12…24V DC ±10% 28 mA | | | | PNP Output: 100 mA 350 µs | End | 2 m 500V cable | 42KB-D1LPED-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LPED-Y3 |
| | | | | | | Side | 2 m 500V cable | **42KB-D1LPSD-A2** |
| | | | | | | | 3-pin pico | 42KB-D1LPSD-Y3 |
| | 12…24V DC ±10% 22 mA | 3…200 (0.12…7.9) | | IR 900 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | End | 2 m 500V cable | 42KB-D1LNEG-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LNEG-Y3 |
| | 12…24V DC ±10% 25 mA | | | | PNP Output: 100 mA 350 µs | | 2 m 500V cable | 42KB-D1LPEG-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LPEG-Y3 |
| | 12…24V DC ±10% 20 mA | 3…300 (0.12…11.8) | | Red 700 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | | 2 m 500V cable | 42KB-D2LNEH-A2 |
| | | | | | | | 3-pin pico | 42KB-D2LNEH-Y3 |
| | 12…24V DC ±10% 25 mA | | | | PNP Output: 100 mA 350 µs | | 2 m 500V cable | 42KB-D2LPEH-A2 |
| | | | | | | | 3-pin pico | 42KB-D2LPEH-Y3 |
| | 12…24V DC ±10% 22 mA | | | IR 900 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | Side | 2 m 500V cable | 42KB-D1LNSH-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LNSH-Y3 |
| | 12…24V DC ±10% 25 mA | | | | PNP Output: 100 mA 350 µs | | 2 m 500V cable | 42KB-D1LPSH-A2 |
| | | | | | | | 3-pin pico | 42KB-D1LPSH-Y3 |
| | 12…24V DC ±10% 20 mA | 3…400 (0.12…15.8) | | Red 700 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | | 2 m 500V cable | 42KB-D2LNSG-A2 |
| | | | | | | | 3-pin pico | 42KB-D2LNSG-Y3 |
| | 12…24V DC ±10% 25 mA | | | | PNP Output: 100 mA 350 µs | | 2 m 500V cable | 42KB-D2LPSG-A2 |
| | | | | | | | 3-pin pico | 42KB-D2LPSG-Y3 |
|  *Sharp Cutoff Diffuse* **Field of View**: Infrared sensors: 15°; Visible red sensors: 20° **Emitter LED**: Infrared 900 nm or Visible red 660 nm (See Product Selection) | 12…24V DC ±10% 20 mA | 3…30 (0.12…1.2) | Light/Dark Selectable | Red 660 nm | NPN Output: 100 mA Stability: 50 mA 350 µs | Side | 2 m 500V cable | 42KB-S2LNSA-A2 |
| | | | | | | | 3-pin pico | 42KB-S2LNSA-Y3 |
| | 12…24V DC ±10% 22 mA | 3…40 (0.12…1.6) | | IR 900 nm | | | 2 m 500V cable | 42KB-S1LNSB-A2 |
| | | | | | | | 3-pin pico | 42KB-S1LNSB-Y3 |
| | 12…24V DC ±10% 25 mA | 3…30 (0.12…1.2) | | Red 660 nm | PNP Output: 100 mA 350 µs | | 2 m 500V cable | **42KB-S2LPSA-A2** |
| | | | | | | | 3-pin pico | 42KB-S2LPSA-Y3 |
| | | 3…40 (0.12…1.6) | | IR 900 nm | | | 2 m 500V cable | 42KB-S1LPSB-A2 |
| | | | | | | | 3-pin pico | 42KB-S1LPSB-Y3 |

❶ See page 1-93 for detailed dimensions.

**Refer to page 1-97 for cordsets and accessories.**



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Preferred availability cat. nos. are printed in **bold**.

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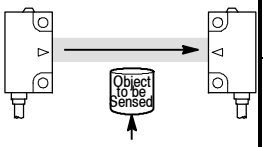
## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | LED Source | Output Type Capacity Response Time | End or Side View❶ | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  *Transmitted Beam❹* **Field of View**: 1 m sensors: 50°; All others: 24° **Emitter LED**: Infrared 880 nm or Visible red 700 nm (See Product Selection) | 12…24V DC ±10% Source: 23 mA Receiver: 18 mA | 3 mm…1 m (0.12 in…3.2 ft) | Light/Dark Selectable | IR 880 nm | NPN Output: 100 mA, Stability: 50 mA 350 µs | End | 2 m 500V cable | 42KB-T1LNEL-A2❷ |
| | | | | | | | 3-pin pico | 42KB-T1LNEL-Y3 |
| | | | | | | Side | 2 m 500V cable | 42KB-T1LNSL-A2 ❷❸ |
| | | | | | | | 3-pin pico | 42KB-T1LNSL-Y3 |
| | | 3 mm…7 m (0.12 in…23 ft) | | | | End | 2 m 500V cable | 42KB-T1LNEQ-A2 |
| | | | | | | | 3-pin pico | 42KB-T1LNEQ-Y3 |
| | | | | | | Side | 2 m 500V cable | 42KB-T1LNSQ-A2❸ |
| | | | | | | | 3-pin pico | 42KB-T1LNSQ-Y3 |
| | 12…24V DC ±10% Source: 20 mA Receiver: 18 mA | 3 mm…10 m (0.12 in…32.8 ft) | | Red 700 nm | | | 2 m 500V cable | 42KB-T2LNSR-A2❸ |
| | | | | | | | 3-pin pico | 42KB-T2LNSR-Y3 |
| | 12…24V DC ±10% Source: 23 mA Receiver: 21 mA | 3 mm…1 m (0.12 in…3.2 ft) | | IR 880 nm | PNP Output: 100 mA 350 µs | End | 2 m 500V cable | 42KB-T1LPEL-A2❷ |
| | | | | | | | 3-pin pico | 42KB-T1LPEL-Y3 |
| | | | | | | Side | 2 m 500V cable | **42KB-T1LPSL-A2❷❸** |
| | | | | | | | 3-pin pico | 42KB-T1LPSL-Y3 |
| | | 3 mm…7 m (0.12 in…23 ft) | | | | End | 2 m 500V cable | 42KB-T1LPEQ-A2 |
| | | | | | | | 3-pin pico | 42KB-T1LPEQ-Y3 |
| | | | | | | Side | 2 m 500V cable | **42KB-T1LPSQ-A2❸** |
| | | | | | | | 3-pin pico | **42KB-T1LPSQ-Y3** |
| | 12…24V DC ±10% Source: 20 mA Receiver: 21 mA | 3 mm…10 m (0.12 in…32.8 ft) | | Red 700 nm | PNP Output: 100 mA 350 µs | Side | 2 m 500V cable | 42KB-T2LPSR-A2❸ |
| | | | | | | | 3-pin pico | 42KB-T2LPSR-Y3 |

❶ See page 1-93 for detailed dimensions.

❷ Adhesive 1 mm apertures are included with these sensors.

❸ Optional metal apertures are available for these sensors under Accessories .

❹ Both a light source (emitter) and receiver are included in the package. To identify the light source, replace the "T" in the cat. no. with "E." To identify the receiver, replace the "T" in the cat. no. with "R." Example: 42KB-**T**2KNHK-A2 contains one 42KB-**E**2KNHK-A2 light source and one 42KB-**R**2KNHK-A2 receiver. Light sources and receivers are not available separately.

## Maximum Operating Distance with Apertures

| Aperture Cat. No. | | | | Sensor Cat. No. | |
|---|---|---|---|---|---|
| 61-6726 | 61-6727 | 61-6728 | 61-6729 | | |
| 100 mm (3.93 in.) | 300 mm (11.8 in.) | 400 mm (15.7 in.) | 300 mm (11.8 in.) | 42KB-T1LNSL-A2 | 42KB-T1LPSL-A2 |
| 400 mm (1.57 in.) | 1 m (39.3 in.) | 3 m (9.8 ft) | 2 m (6.56 ft) | 42KB-T2LNSR-A2 | 42KB-T2LPSR-A2 |
| 300 mm (11.8 in.) | 1 m (39.3 in.) | 2.5 m (8.2 ft) | 1.7 m (5.6 ft) | 42KB-T1LNSQ-A2 | 42KB-T1LPSQ-A2 |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| Pico QD Cordset, 3-pin 2 m | 889P-F3AB-2 | Aperture, 2 mm (10 pcs) | 61-6727 |
| End View Bracket (included) | 60-2632 | Aperture, 3 mm (10 pcs) | 61-6728 |
| Side View Bracket (included) | 60-2633 | Aperture, 1 x 5 mm (10 pcs) | 61-6729 |
| Aperture, 1 mm (10 pcs) | 61-6726 | Reflectors (included) | 92-93 |

# 42KC

## Miniature Rectangular

## Features

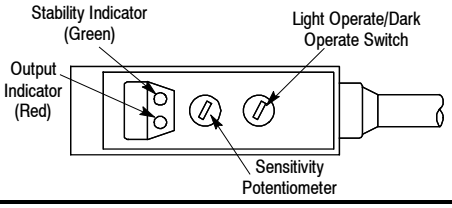
- Compact rectangular package
- Three sensing modes
- Diagnostic output
- Sensitivity adjustment
- Selectable light/dark operate
- Highly visible LED indicators
- NPN or PNP output models
- 2 m cable or pico connections

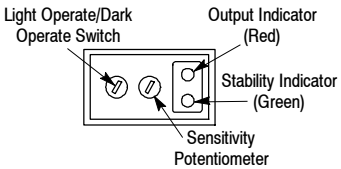
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, 4X, 6P, 12, 13; IP67 |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% |
| **Optical** | |
| Sensing Mode | Polarized retroreflective, diffuse, transmitted beam |
| Sensing Range | See Product Selection table on page 1-101 |
| Field of View | See Product Selection table on page 1-101 |
| Light Source | Visible red LED (700 nm) |
| LED Indicators | See User Interface Panel below |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 35 mA max |
| Sensor Protection | Short circuit (NPN models only), reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | 350 µS |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 24V DC |
| Output Leakage Current | 0.5 mA max |
| **Mechanical** | |
| Housing Material | Polyarylate |
| Lens Material | Acrylic |
| Connection Types | 2 m cable, 4-pin DC pico (M8) QD |
| Supplied Accessories | Mounting bracket, screwdriver, reflector (retroreflective models) |
| Optional Accessories | See mounting brackets and cordsets on page 1-101 |

## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| STB | Green | OFF | 0.8<margin<1.2 |
| | | ON | 0.8>margin>1.2 |
| OUT | Red | OFF | Output not activated |
| | | ON | Output activated |



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Preferred availability cat. nos. are printed in **bold**.

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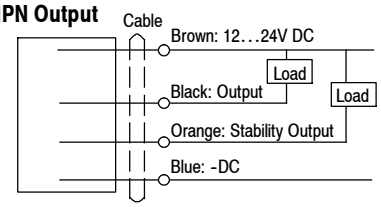
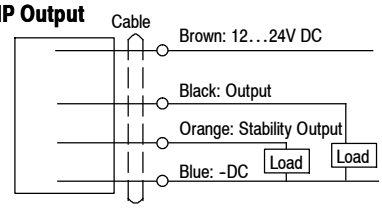
## Wiring Diagrams

### Cable Version

**NPN Output**



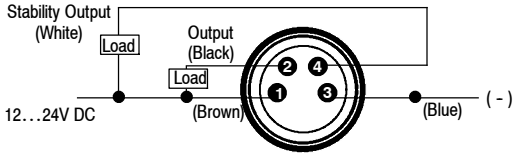

**PNP Output**




### Pico Quick-Disconnect Version

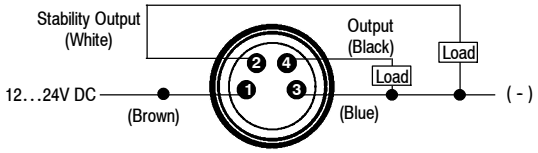
**NPN Output**

**Face View Male Receptacle (Sensor)**




**PNP Output**

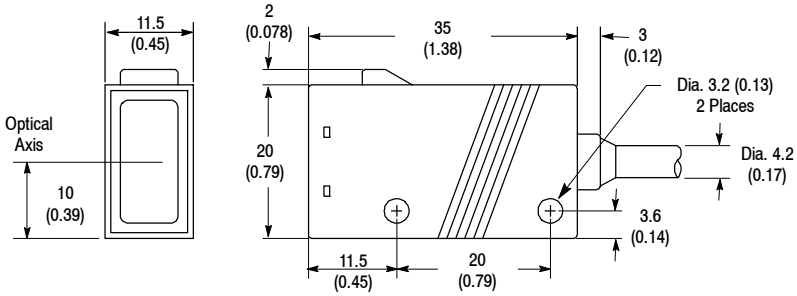
**Face View Male Receptacle (Sensor)**



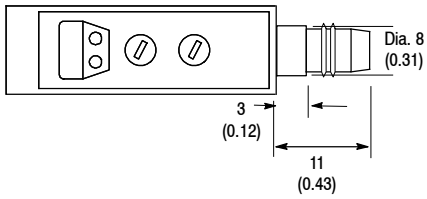

**Note:** Details regarding connection of Rockwell Automation Bulletin 42KC photoelectric sensors to Rockwell Automation Programmable Controllers can be found in publication 42-2.0.

## Approximate Dimensions [mm (in.)]

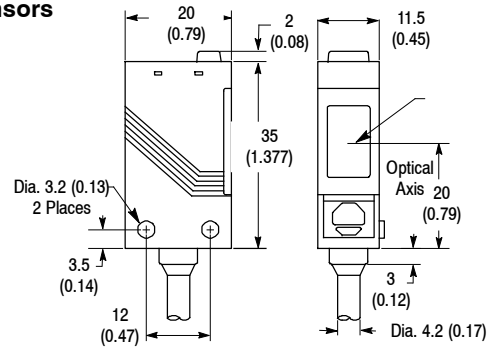
### End View Sensors
**Cable Version**



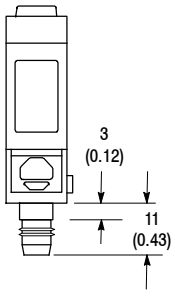

### End View Sensors
**Pico Quick-Disconnect Version**




### Side View Sensors
**Cable Version**

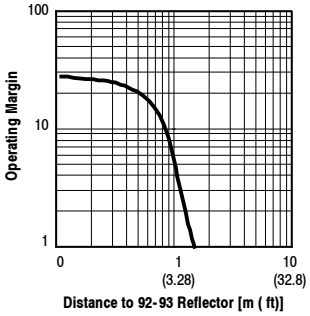



### Side View Sensors
**Pico Quick-Disconnect Version**

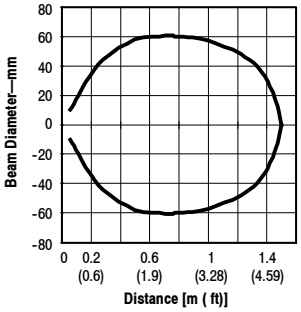


## Typical Response Curve

### Polarized Retroreflective

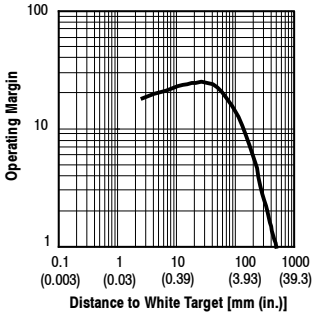



## Beam Pattern

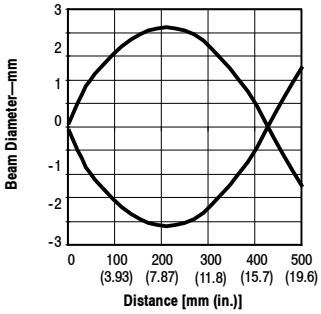



## Typical Response Curve

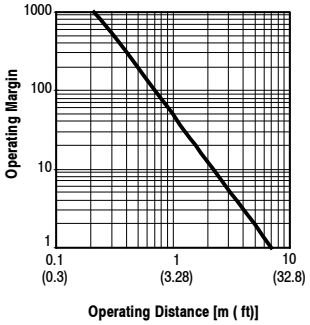
### Standard Diffuse

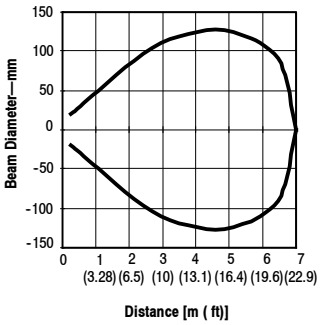



## Beam Pattern

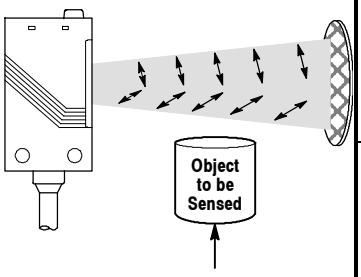
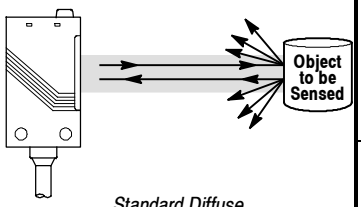
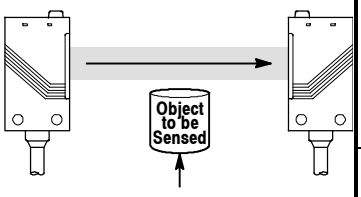



### Transmitted Beam



## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | End or Side View❶ | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Field of View**: 8° **Emitter LED**: Visible red 700 nm | 12…24V DC ±10% 30 mA | 50 mm… 1.5 m (1.9 in… 4.9 ft) | Light/Dark Selectable | NPN Output: 100 mA Stability: 50 mA 0.5 ms | End | 2 m 500V cable | 42KC-P2LNEM-A2 |
| | | | | | | 4-pin pico | 42KC-P2LNEM-P4 |
| | | | | | Side | 2 m 500V cable | 42KC-P2LNSM-A2 |
| | | | | | | 4-pin pico | 42KC-P2LNSM-P4 |
| | 12…24V DC ±10% 35 mA | | | PNP Output: 100 mA Stability: 50 mA 0.5 ms | End | 2 m 500V cable | 42KC-P2LPEM-A2 |
| | | | | | | 4-pin pico | **42KC-P2LPEM-P4** |
| | | | | | Side | 2 m 500V cable | 42KC-P2LPSM-A2 |
| | | | | | | 4-pin pico | **42KC-P2LPSM-P4** |
| | 5V DC ± 10% 25 mA | | | NPN Output: 100 mA Stability: 50 mA 0.5 ms | Side | 2 m 500V cable | 42KC-P2YNSM-A2 |
| | | | | | | 4-pin pico | 42KC-P2YNSM-P4 |
|  *Standard Diffuse* **Field of View**: 7° **Emitter LED**: Visible red 700 nm | 12…24V DC ±10% 30 mA | 3…500 mm (0.12… 19.7 in.) | Light/Dark Selectable | NPN Output: 100 mA Stability: 50 mA 0.5 ms | End | 2 m 500V cable | 42KC-D2LNEK-A2 |
| | | | | | | 4-pin pico | 42KC-D2LNEK-P4 |
| | | | | | Side | 2 m 500V cable | 42KC-D2LNSK-A2 |
| | | | | | | 4-pin pico | 42KC-D2LNSK-P4 |
| | 12…24V DC ±10% 35 mA | | | PNP Output: 100 mA Stability: 50 mA 0.5 ms | End | 2 m 500V cable | 42KC-D2LPEK-A2 |
| | | | | | | 4-pin pico | **42KC-D2LPEK-P4** |
| | | | | | Side | 2 m 500V cable | 42KC-D2LPSK-A2 |
| | | | | | | 4-pin pico | **42KC-D2LPSK-P4** |
|  *Transmitted Beam*❷ **Field of View**: 10° **Emitter LED**: Visible red 700 nm | 12…24V DC ±10% Source: 20 mA Receiver: 20 mA | 50 mm… 7 m (1.9 in… 23.0 ft) | Light/Dark Selectable | NPN Output: 100 mA Stability: 50 mA 0.5 ms | End | 2 m 500V cable | 42KC-T2LNGP-A2 |
| | | | | | | 4-pin pico | 42KC-T2LNGP-P4 |
| | | | | | Side | 2 m 500V cable | 42KC-T2LNTP-A2 |
| | | | | | | 4-pin pico | 42KC-T2LNTP-P4 |
| | 12…24V DC ±10% Source: 20 mA Receiver: 25 mA | | | PNP Output: 100 mA Stability: 50 mA 0.5 ms | End | 2 m 500V cable | 42KC-T2LPGP-A2 |
| | | | | | | 4-pin pico | **42KC-T2LPGP-P4** |
| | | | | | Side | 2 m 500V cable | 42KC-T2LPTP-A2 |
| | | | | | | 4-pin pico | 42KC-T2LPTP-P4 |

❶ See page 1-99 for detailed dimensions.

❷ Both a light source (emitter) and receiver are included in the package. To identify the light source, replace the "T" in the cat. no. with "E." To identify the receiver, replace the "T" in the cat. no. with "R." Example: 42KC-**T**2LNGP-A2 contains one 42KC-**E**2LNGP-A2 light source and one 42KC-**R**2LNGP-A2 receiver. Light sources and receivers are not available separately.

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| Pico QD Cordset, 4-pin 2 m | 889P-F4AB-2 |
| End View Bracket | 60-2634 |
| Side View Bracket | 60-2635 |
| Reflectors (included) | 92-93 |

Obsolete

Obsolete

Obsolete

Obsolete

Obsolete

Obsolete

# LaserSight™ RightSight™

## 18 mm Right Angle

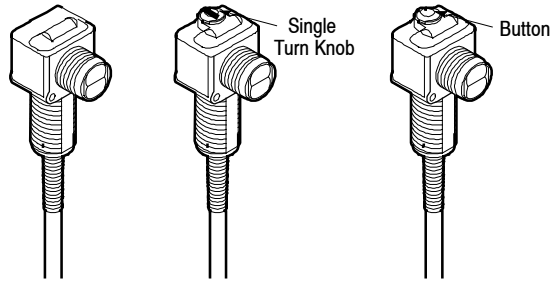
## Features

- Class 1 eye safe visible laser
- Models with teach function
- Compact right angle housing
- Flexible 18 mm mounting options
- 360° visible LED indicators
- Reverse polarity protection
- Short-circuit protected outputs
- 1 ms response time
- False pulse protection
- NPN and PNP outputs

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | IP54 (IEC 60529) |
| Operating Temperature [C (F)] | -10…+40° (14…+104°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| **Optical** | |
| Sensing Modes | Polarized retroreflective, diffuse, transmitted beam |
| Sensing Range | See Product Selection table on page 1-111 |
| Field of View | See Product Selection table on page 1-111 |
| Light Source | Class 1 visible red laser (660 nm) |
| LED Indicators | See User Interface below |
| **Electrical** | |
| Voltage | 24V DC ± 10% |
| Current Consumption | 30 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 1 ms (4 ms for transmitted beam) |
| Output Type | PNP and NPN |
| Output Mode | Light or dark operate by cat. no. |
| Output Current | 100 mA @ 24V DC max |
| Output Leakage Current | 0.1 mA max |
| **Mechanical** | |
| Housing Material | Mindel |
| Lens Material | Acrylic |
| Connection Types | 2 m cable (24 AWG), 4-pin DC micro (M12) QD |
| Supplied Accessories | 18 mm mounting nut |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-111 |

No Adjustment | Manual Adjustment | Teach



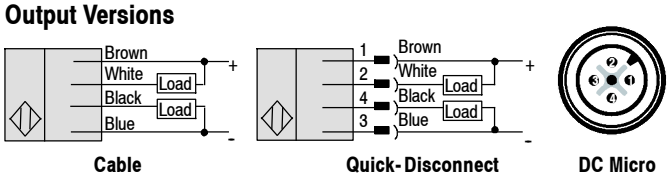

## User Interface

| LED Color | State | Status—Teachable and Adjustable Versions | Status—Transmitted Beam Receiver |
|---|---|---|---|
| Yellow | OFF | Output de-energized | |
| | ON | Output energized | |
| | Flashing | NA | Output SCP active |
| Orange | OFF | Normal operation | Margin < 2.5x |
| | ON | Teach mode active | Margin > 2.5x |
| | Flashing | Output SCP active<br>Teach mode active | NA |
| Green | OFF | Sensor not powered | Sensor not powered, output on, or SCP active |
| | ON | Sensor powered | |
| | Flashing | Unstable margin condition (0.7x…2.0x) or output SCP active | NA |

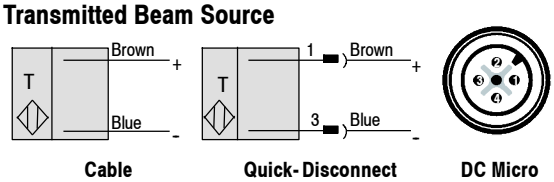
**Note:** For laser models, output and margin LEDs flash simultaneously when SCP active.

## Wiring Diagrams❶❷

### Output Versions



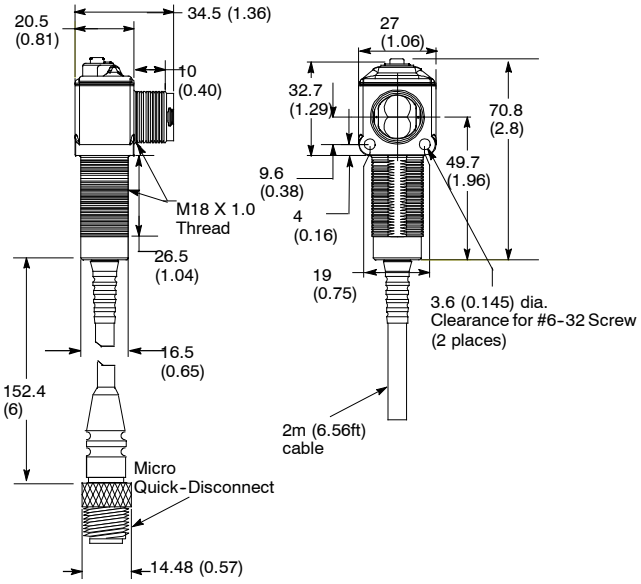

### Transmitted Beam Source



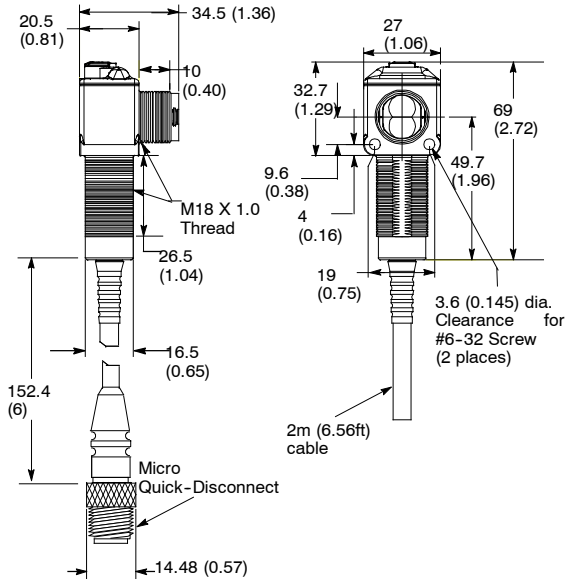

❶ For Rockwell Automation programmable controller compatible interface, refer to publication 42-2.0.
❷ All wire colors on quick-disconnect models refer to Rockwell Automation 889D cordsets.

## Approximate Dimensions [mm (in.)]

### Teach Function Models



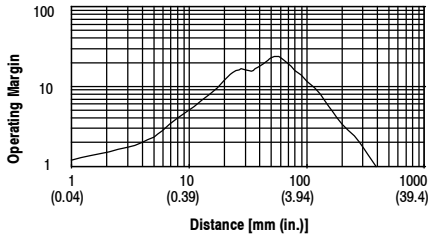

### Adjustable Models



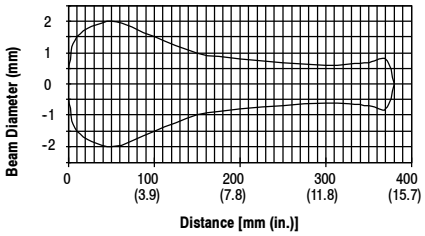

**Note**: All sensors supplied with one M18 mounting nut (Cat. No. 75012-097-01).

## Typical Response Curve

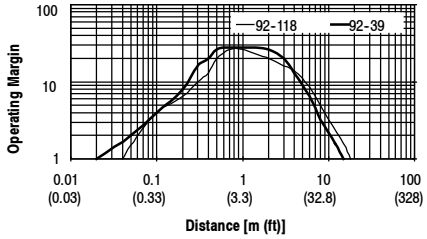
### Standard Diffuse—Margin



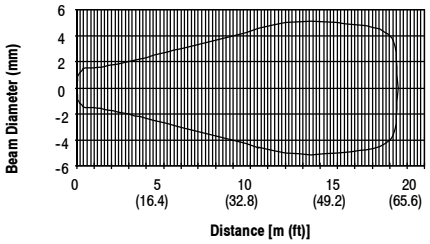

### Standard Diffuse—Beam Pattern



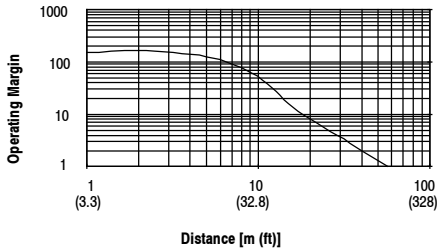

### Polarized Retroreflective—Margin




### Polarized Retroreflective—Beam Pattern




### Transmitted Beam—Margin

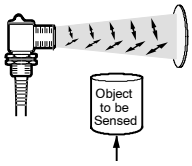
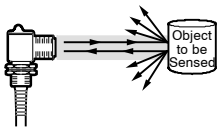
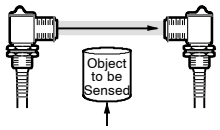



### Typical Spot Size

| Model | Distance | 300 mm | 15 m | 40 m |
|---|---|---|---|---|
| Polarized Retroreflective ❶ | Spot Size | 2 x 3.5 | 16 x 20 mm | — |
| Diffuse | | 2 x 3.5 | — | — |
| Transmitted Beam ❶ | | 2 x 3.5 | 16 x 20 mm | 50 mm x 70 m |

❶ Actual spot size may be smaller.

## Product Selection

| Sensing Mode | Supply Voltage | Sensing Distance [mm (in.)] | Adjustment Type | Output Energized | Output Type/ Rating/ Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* | 24V DC ±10% | 0.05…15 m (0.16…49.2 ft) | Teach Button | Dark Operate | NPN and PNP/ 100 mA/ 1 ms max. | 2 m 300V cable | 42EF-P8KBC-A2 |
| | | | | | | 4-pin DC micro QD | **42EF-P8KBC-F4** |
|  *Standard Diffuse* | | 300 (11.8) | Single-Turn Knob | Light Operate | NPN and PNP/ 100 mA/ 1 ms max. | 2 m 300V cable | 42EF-D8JBA-A2 |
| | | | | | | 4-pin DC micro QD | 42EF-D8JBA-F4 |
| | | 300 (11.8) | Teach Button | Light Operate | NPN and PNP/ 100 mA/ 1 ms max. | 2 m 300V cable | 42EF-D8JBC-A2 |
| | | | | | | 4-pin DC micro QD | 42EF-D8JBC-F4 |
|  *Transmitted Beam* | | Light Source | NA | NA | NA | 2 m 300V cable | 42EF-E8EZB-A2 |
| | | | | | | 4-pin DC micro QD | **42EF-E8EZB-F4** |
| | | 0.015…40 m (0.05…131.2 ft) | No Adjustment | Dark Operate | NPN and PNP/ 100 mA/ 4 ms max. | 2 m 300V cable | 42EF-R7KBB-A2 |
| | | | | | | 4-pin DC micro QD | **42EF-R7KBB-F4** |

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 2 m (6.5 ft) 4-pin, DC Micro QD Cordset | 889D-F4AC-2 |
| Microcube reflector for polarized retroreflective laser sensors | 92-118 |
| Swivel/Tilt bracket allows ±10° vertical and 360° rotation adjustment | 60-2649 |
| Right Angle Bracket | 60-2677 |

# LaserSight™ 9000

## Class II Laser Sensor

## Features

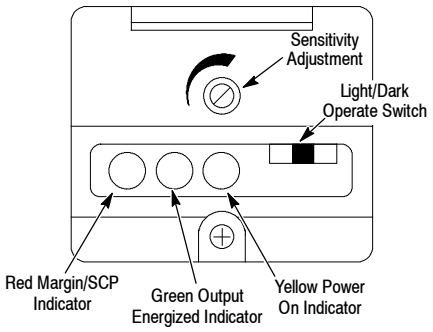
- Class II laser light source
- Long range polarized retroreflective and transmitted beam sensing modes
- Visible red beam for easy alignment
- Robust 30 mm housing
- Both NPN and PNP outputs (DC)
- SPDT relay output (AC)
- Selectable light/dark operate
- Micro, mini QD, 2 m cable connections

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Approved, CE Marked for all applicable directives |
| Operating Environment | NEMA 3,4X,6P,12,13; IP67(IEC529) 1200 psi (8270 kPa) washdown, IP69K |
| Operating Temperature [C (F)] | -10…+40° (14…+104°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Polarized retroreflective and transmitted beam |
| Sensing Range | See Product Selection table on page 1-114 |
| Field of View | See Product Selection table on page 1-114 |
| Light Source | Class 2 laser |
| LED Indicators | See User Interface Panel below |
| Adjustments | Single-turn potentiometer for sensitivity |
| **Electrical** | |
| Voltage | 10…30V DC , 110…132V AC models, 10…264 V AC/DC models |
| Current Consumption | 45 mA max (DC models), 10 mA max (AC/DC models), 70 mA max AC models |
| Sensor Protection | Overload (DC only), short circuit (DC only), reverse polarity, false pulse |
| **Outputs** | |
| Response Time | See Product Selection table on page 1-114 |
| Output Type | PNP and NPN (DC only), EM relay |
| Output Mode | Light operate or dark operate selectable |
| Output Current | See Product Selection table on page 1-114 |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Cover Material | Neoprene |
| Connection Types | 2 m 300V AC cable, 4-pin DC micro QD, 4-pin DC mini QD, 5-pin DC micro QD |
| Supplied Accessories | 129-130 mounting kit |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-114 |

## User Interface Panel

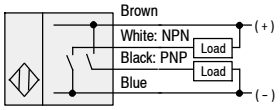
| Label | Color | State | Status |
|---|---|---|---|
| Margin/ SCP | Red | OFF | Margin < 2.5 |
| | | ON | Margin > 2.5 |
| | | Flashing | Output SCP active |
| Output | Green | OFF | Output not activated |
| | | ON | Output activated |
| Power | Yellow | OFF | Sensor not powered |
| | | ON | Sensor powered |



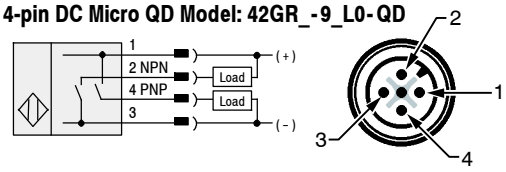
## Wiring Diagrams

### DC Models

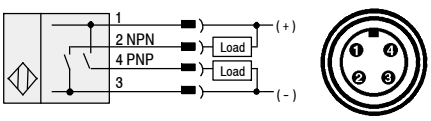
**Cable Model: 42GR_-9_L0**




**4-pin DC Micro QD Model: 42GR_-9_L0-QD**

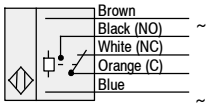



**4-pin DC Mini QD Model: 42GR_-9_L0-QD1**

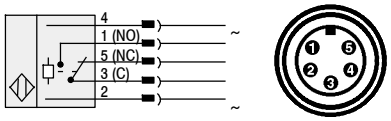



### AC Models

**Cable Model: 42GR_-9_L2**

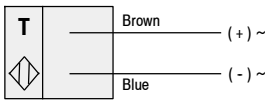



**5-pin AC Mini QD Model: 42GR_-9_L2-QD**

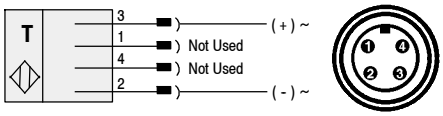



### Transmitted Beam Source

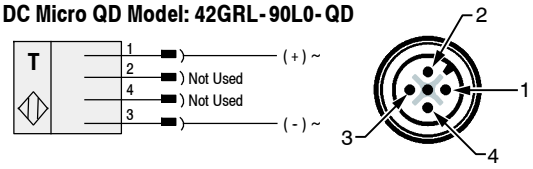
**Cable Model: 42GRL-90L0**




**AC/DC Mini QD Model: 42GRL-90L2-QD**

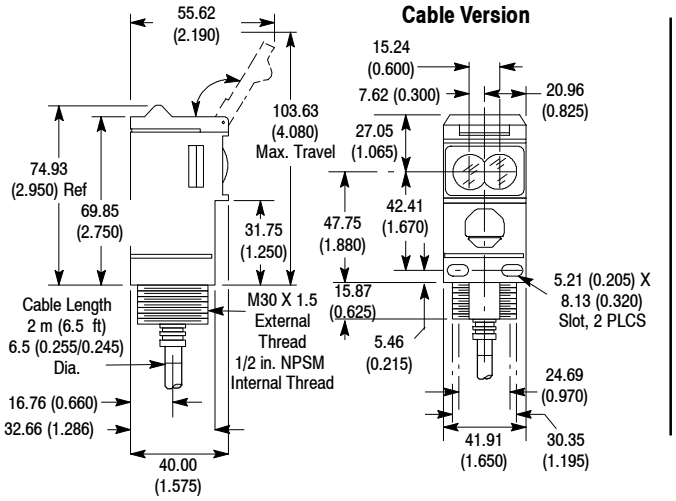


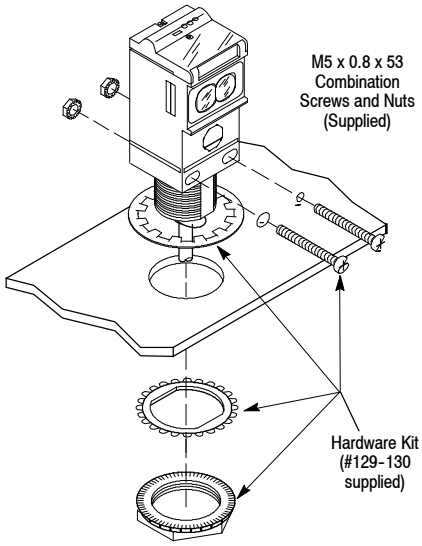

**DC Micro QD Model: 42GRL-90L0-QD**




## Approximate Dimensions [mm (in.)]

### All Versions




### Connector Version

### Thread Size

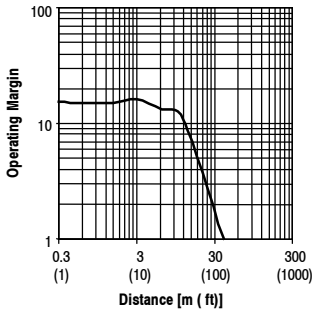
| | |
|---|---|
| Micro Style | M12 x 1<br>1 Keyway |
| Mini Style | 7/8-16 UN<br>1 Keyway |

# LaserSight™ 9000

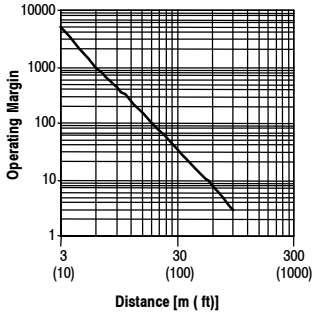
## Class II Laser Sensor

## Typical Response Curve

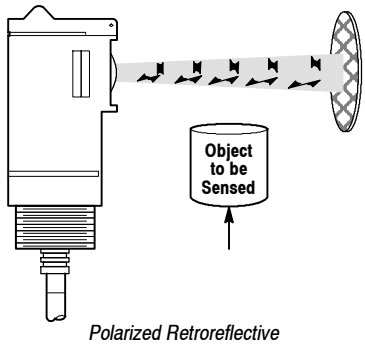
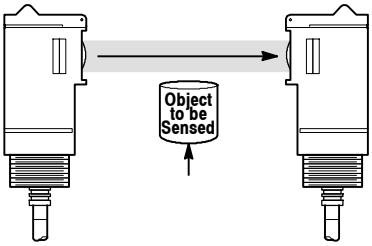
### Polarized Retroreflective




### Transmitted Beam




## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type/ Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Spot Size:** 19 mm (3/4 in.) @ 40 m (130 ft) **Emitter LED:** Visible Laser, 650 nm | 10…30V DC 45 mA | 0.3…40 m (1…130 ft) | Selectable Light/Dark Operate | PNP/250 mA NPN/250 mA 500 ms | 2 m 300V cable | 42GRU-92L0 |
| | | | | | 4-pin DC micro | **42GRU-92L0-QD** |
| | | | | | 4-pin DC mini | 42GRU-92L0-QD1 |
| | 110…132V AC 70 mA | | | SPDT EM Relay 2 A/132V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42GRU-92L2 |
| | | | | | 5-pin mini | **42GRU-92L2-QD** |
|  *Transmitted Beam* **Emitter LED:** Visible Laser, 650 nm | 10…264V AC/DC 10 mA | 300 m (1000 ft) | NA Light Source | | 2 m 300V cable | 42GRL-90L0 ❶ |
| | | | | | 4-pin micro | 42GRL-90L0-QD❶ |
| | | | | | 4-pin mini | **42GRL-90L2-QD❶** |
| | 10…40V DC 25 mA | 5…300 m (16…1000 ft) | Selectable Light/Dark Operate | PNP/250 mA NPN/250 mA 5 ms max. | 2 m 300V cable | 42GRR-90L0 |
| | | | | | 4-pin micro | 42GRR-90L0-QD |
| | | | | | 4-pin mini | 42GRR-90L0-QD1 |
| | 70…264V AC/DC 10 mA | | | SPDT EM Relay 2 A/132V AC 1 A/264V AC 1 A/150V DC 23 ms | 2 m 300V cable | 42GRR-90L2 |
| | | | | | 5-pin mini | **42GRR-90L2-QD** |

❶ Temperature rating -10…+40°C for 24V DC operation. Reduce by 5°C for 120V AC and 10°C for 220V AC operation.

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 1.8 m (6 ft) 4-pin mini QD cordset | 889N-F4AF-6F |
| 1.8 m (6 ft) 5-pin mini QD cordset | 889N-F5AF-6F |
| 2 m (6.5 ft) 4-pin DC micro QD cordset | 889D-F4AC-2 |
| Tilt/Swivel Bracket | 60-2439 |
| Microcube reflector | 92-118 |

## Features

- Class 1 laser
- Small spot size—0.1 mm @ 100 mm sensing distance
- Metal housing for heavy duty industrial applications
- 18 mm industry standard package
- Three sensing modes
- 30V DC operation
- NPN or PNP outputs
- Fast response time—less than 0.7 ms
- 2 m cable or micro QD connector

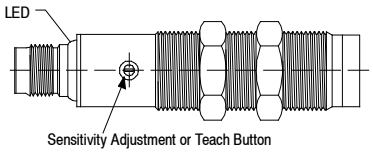
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -10…+55° (+14…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60068-2-6 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60068-2-27 |
| Relative Humidity | 15…95% |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Polarized retroreflective, diffuse, and transmitted beam |
| Sensing Range | See Product Selection table on page 1-118 |
| Light Source | Class 1 laser 650 nm |
| LED Indicators | See User Interface Panel below |
| Adjustments | Sensitivity potentiometer or teach button |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 25 mA max |
| Sensor Protection | Reverse polarity, overload, short circuit |
| **Outputs** | |
| Response Time | 0.5 ms (transmitted beam), 0.7 ms (diffuse, polarized retroreflective) |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Complementary light or dark operate |
| Output Current | 100 mA |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Nickel-plated brass |
| Lens Material | Glass |
| Connection Types | 2 m cable, 4-pin DC micro (M12) QD |
| Supplied Accessories | 18 mm fastening nuts (871C-N3) |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-118 |

## User Interface Panel

| LED Color | State | Status | LO Output | DO Output |
|---|---|---|---|---|
| Yellow | OFF | Dark condition | OFF | ON |
| | Flashing ❶ | Light condition (excess gain < 2) | ON | OFF |
| | ON | Light condition (excess gain > 2) | ON | OFF |
| Green | ON | Power On | — | — |

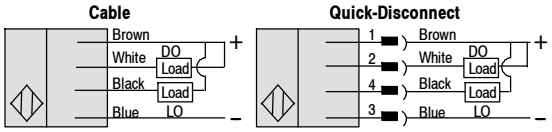
❶ Transmitted beam receivers do not have a “Flashing” (low margin) state.



## Wiring Diagrams

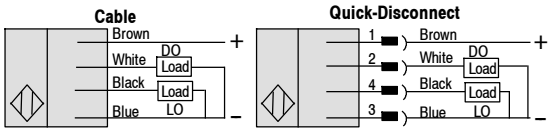
### Diffuse

**NPN Output**



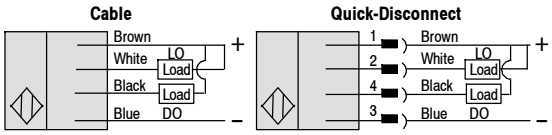

**Face View Male Receptacle (Sensor) DC Micro**

**PNP Output**

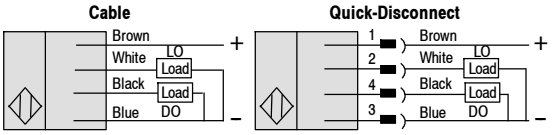



### Transmitted Beam, Polarized Retroreflective

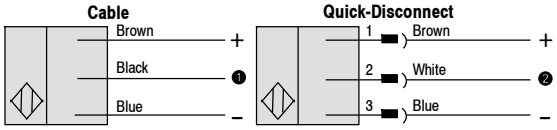
**NPN Output**




**PNP Output**



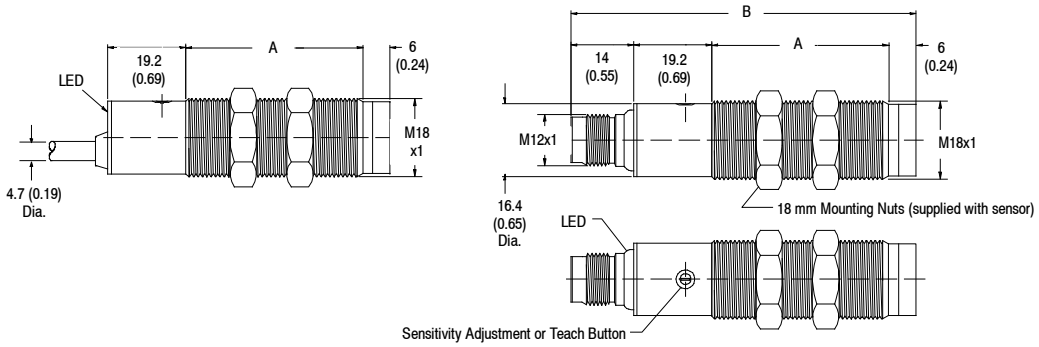

### Laser Transmitted Beam Emitter (Standard LED)




❶ Black open circuit to enable laser. Tie black to blue/V- to disable laser.
❷ Pin 2/white open circuit to enable laser. Tie pin 2/white to blue/V- to disable laser.

## Approximate Dimensions [mm (in.)]

| Dimension | Laser Receiver [mm (in.)] | Other Laser Models [mm (in.)] |
|---|---|---|
| A | 42.7 (1.68) | 57.5 (2.26) |
| B | 82.8 (3.26) | 97.7 (3.85) |



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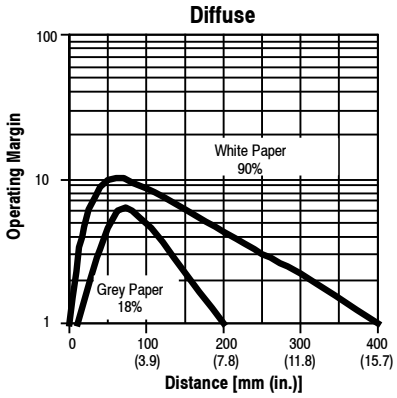
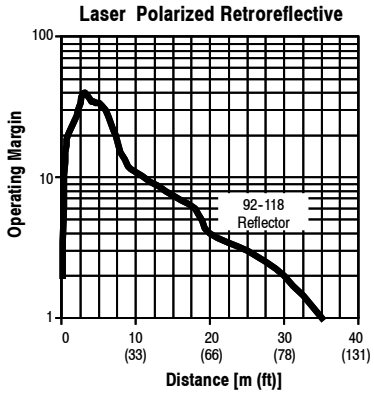
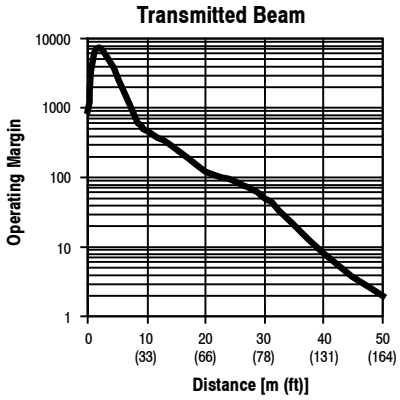
Allen-Bradley

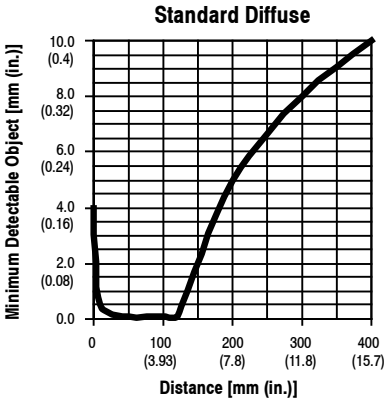
## Typical Response Curve

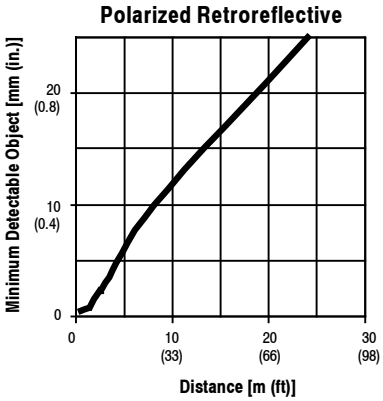



## Minimum Detectable Object

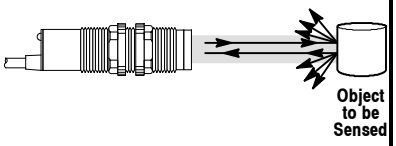
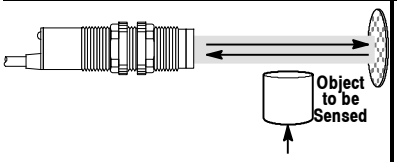
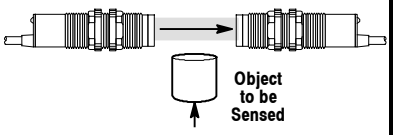


# 42CM LaserSight™

## 18 mm Metal Cylindrical, Class 1 Laser Sensor

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance @ 2X Margin | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Standard Diffuse* **Emitter**: Class 1—Visible laser 650 nm | 10…30V DC 25 mA | 3…300 mm (0.12…11.8 in.) (Teachable) | L.O./D.O. Complementary | NPN 100 mA 0.7 ms | 2 m 300V cable | 42CM-D8MNA-A2 |
| | | | | | 4-pin DC micro | 42CM-D8MNA-D4 |
| | | | | PNP 100 mA 0.7 ms | 2 m 300V cable | 42CM-D8MPA-A2 |
| | | | | | 4-pin DC micro | **42CM-D8MPA-D4** |
|  *Polarized Retroreflective* **Emitter**: Class 1—Visible laser 650 nm | 10…30V DC 25 mA | 3 mm…30 m (0.12 in…78 ft) (Teachable) | L.O./D.O. Complementary | NPN 100 mA 0.7 ms | 2 m 300V cable | 42CM-P8MNB-A2 |
| | | | | | 4-pin DC micro | 42CM-P8MNB-D4 |
| | | | | PNP 100 mA 0.7 ms | 2 m 300V cable | 42CM-P8MPB-A2 |
| | | | | | 4-pin DC micro | **42CM-P8MPB-D4** |
|  *Transmitted Beam* **Emitter**: Class 1—Visible laser 650 nm | 10…30V DC 25 mA | 3 mm…50 m (0.12 in…164 ft) (Adjustable) | NA Light Source | | 2 m 300V cable | 42CM-E8EZB-A2 |
| | | | | | 4-pin DC micro | **42CM-E8EZB-D4** |
| | | | L.O./D.O. Complementary | NPN 100 mA 0.5 ms | 2 m 300V cable | 42CM-R8MNB-A2 |
| | | | | | 4-pin DC micro | 42CM-R8MNB-D4 |
| | | | | PNP 100 mA 0.5 ms | 2 m 300V cable | 42CM-R8MPB-A2 |
| | | | | | 4-pin DC micro | **42CM-R8MPB-D4** |

## Cordsets and Accessories

| Cordset | | Accessories | | | |
|---|---|---|---|---|---|
| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
| DC micro QD cordset, 4-pin, 2 m | 889D-F4AC-2 | Mounting bracket | 60-2657 | Micro cube reflector | 92-118 |
| 18 mm fastening nuts | 871C-N3 | Swivel/tilt bracket | 60-2649 | | |



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## Description

The 45MLD is a Class 2 laser sensor designed for packaging, material handling and semiconductor industries. Offering a 300 mm (11.8 in.) adjustable sensing range, the 45MLD provides background suppression by triangulation, establishing a fixed focal point and suppressing anything beyond the focal point. The rotatable lens also allows the user to adjust the laser beam spot size at the focal point down to 0.5 mm (0.02 in.) for accurate sensing of small targets such as gap, chip and crack detection in semiconductor and packaging applications. Target presence status is provided through a discrete NPN or PNP output.

## Features

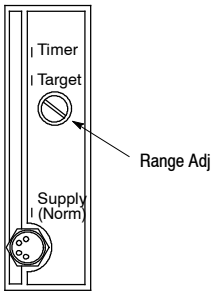
- Class 2 laser
- Fast response time
- Rotatable focus lens allows adjustment of laser spot to 0.5 mm (0.01 in.)
- 50…300 mm (1.96…11.8 in.) sensing distance
- Background suppression
- IP65

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP65 |
| Operating Temperature [C (F)] | 0…+50° (32…+122°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Laser background suppression |
| Sensing Range | 50…300 mm (1.96…11.8 in.) |
| Light Source | Class 2 laser |
| LED Indicators | See User Interface Panel below |
| Adjustments | Optical spot size adjustment knob, 30-turn range adjustment screw |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 35 mA max |
| Sensor Protection | Overload, short circuit |
| **Outputs** | |
| Response Time | 200 μS |
| Output Type | PNP or NPN selectable |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA @ 30V DC max |
| **Mechanical** | |
| Housing Material | Polyamide |
| Lens Material | PMMA |
| Connection Types | 4-pin pico (M8) QD |
| Optional Accessories | See mounting brackets and cordsets on page 1-120 |

## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Target | Green | OFF | No target present |
| | | ON | Target present |
| Timer | Red | OFF | 40 ms pulse OFF |
| | | ON | 40 ms pulse ON |
| Supply (Norm) | | ON | Normal wiring Brn = (+), Blu = (-) |
| | | OFF | Reverse wiring Brn = (-), Blue = (+) |

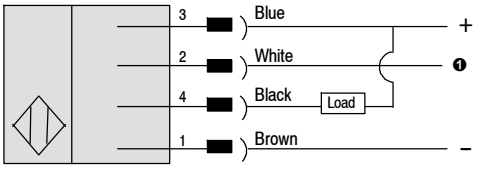


# 45MLD

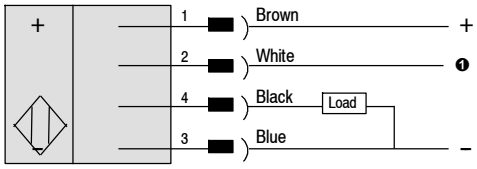
## Laser Diffuse Sensor

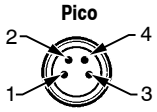
## Wiring Diagrams

### NPN (Light Operate)

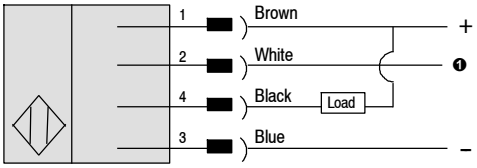



### PNP (Light Operate)

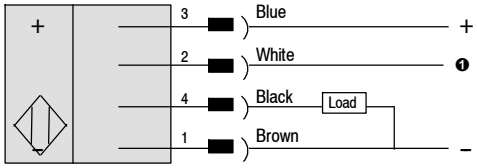


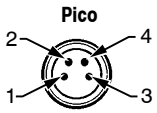




### NPN (Dark Operate)



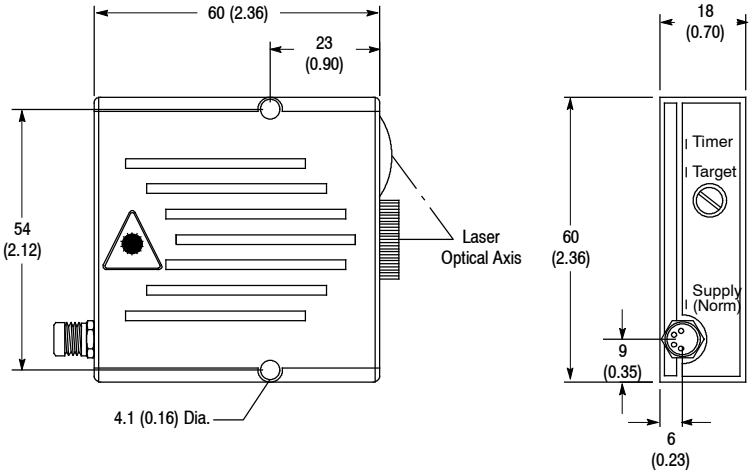

### PNP (Dark Operate)




❶ 40 ms pulse stretcher ON = Connect **white wire** to (+) positive terminal.
40 ms pulse stretcher OFF = Open circuit or connect **white wire** to (-) negative terminal.

## Approximate Dimensions [mm (in.)]




## Product Selection

| Operating Voltage Supply Current | Sensing Distance [mm (in.)] | Output Energized | Output Type Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|
| 10…30V DC 35 mA | 50…300 (1.9…11.8) | L.O./D.O. Selectable | NPN or PNP 200 µs | 4-pin DC Pico QD | **45MLD-8LEA1-P4** |

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 2 m (6.5 ft) 4-pin, DC Pico QD Cordset | 889P-F4AB-2 |
| Mounting Bracket | 60-2677 |

# 45LMS Laser Measurement

## Description

The 45LMS family of long distance laser sensors is available in a variety of measuring ranges. The 8 m diffuse and 50 m retroreflective models use a Class 1 visible red laser and the 15 m diffuse models use a Class 2 visible red laser. The discrete and analog outputs can be easily set using the five-step rotary switch and the push button. Potential applications include object position (analog output) and object detection (background suppression with discrete output).

This sensor utilizes the Time of Flight (ToF) principle and has a relatively small beam spot even at 50 m away. The sensor is completely self-contained and does not require any external control devices which add cost and require additional mounting space.

The 45LMS is easily set up by mounting the sensor such that the target is within the operating range of the sensor and teaching in the appropriate set-points required for the application. All sensors in this family have one discrete output with one analog output. The discrete output can be wired for either light operate (L.O.) or dark operate (D.O.) and the analog output is automatically scaled between the selected set-points with either a positive or negative slope.

The 45LMS is an excellent solution for long range detection and measurement applications including: distance measurement, verifying material position, stack level, thickness measurement, roll diameter, positioning fixtures, error proofing inspection, long standoff distance, level monitoring, crane crash protection and other difficult applications that exceed the capabilities of standard diffuse or background suppression photosensors.

## Features

- Eye Safe Class 1 or Class 2 laser (by model)
- Sensing ranges of 8 m (26 ft), 15 m (49 ft) or 50 m (164 ft), dependent on model
- One discrete output (1 x NPN/PNP) and one analog output (1 x 4…20 mA)
- Easy setup of switch points or analog scaling using programming buttons
- IP65 enclosure
- Self-contained sensor

## Available Models

Diffuse

Retroreflective

## General Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL, cULus, and CE Marked for all applicable directives |
| Enclosure Type Rating | IP65 |
| Operating Temperature [C (F)] | -30…50° (-22…122°) |
| Storage Temperature [C (F)] | -30…70° (-22…158°) |
| Vibration | 10…55 Hz, 0.5 mm amplitude, meets or exceeds IEC 60068-2-6 |
| Shock | 30 g with 11 ms pulse duration, meets or exceeds IEC 60068-2-27 |
| **Optical** | |
| Absolute Accuracy | ± 25 mm (± 0.98 in.) |
| Repeatability | < 5 mm (0.20 in.) |
| Angle Deviation | ± 2° max. |
| Temperature Drift | ? 0.25 mm/K |
| Indicator LEDs | Green: Power<br>Yellow: Output switching states<br>Green/Yellow Flashing 2.5 Hz: Teach indication<br>Green/Yellow Flashing 8.0 Hz: Teach error |
| **Electrical** | |
| Operating Voltage | 10…30V DC (18…30V DC when operating in IO-Link mode) |
| Current Consumption | ?70 mA @ 24V DC |
| Protection Type | Short circuit, reverse polarity (for NPN/PNP output); Short circuit, overload protected (for 4…20 mA analog output) |
| **Communication Interface** | |
| Interface | IO-Link V1.0 |
| Typical Cycle Time | 2.3 ms |
| Baud Rate | COM 2 (38.4 kBaud) |
| Serial Data Size | 16 bit |
| **Outputs** | |
| Response Time | 10 ms |
| Output Type | 1 PNP/NPN (Push-Pull) output; 1 analog output 4…20 mA |
| Output Function | Light or dark operation for discrete output |
| Output Current | 30V DC max./100 mA max. |
| **Mechanical** | |
| Housing Material | Plastic ABS |
| Lens Material | Plastic pane |
| Connection Type | 4-pin DC micro (M12) QD, 90° rotateable |



New

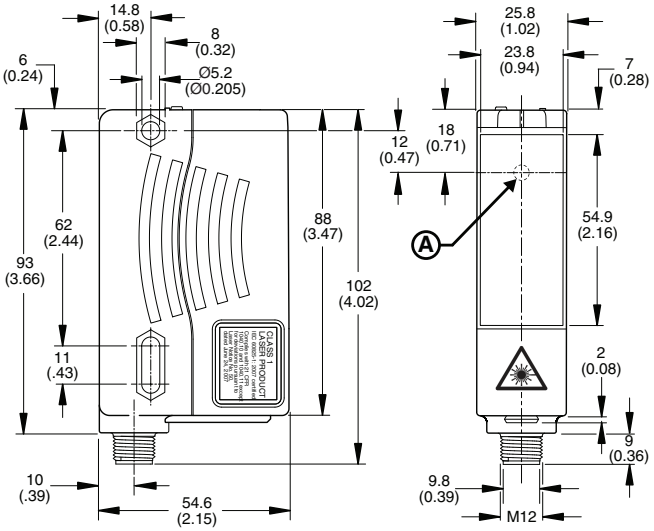
# 45LMS Laser Measurement



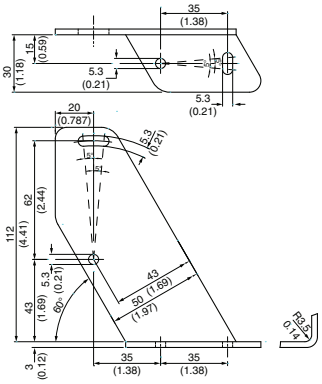
## Product Selection

| Sensing Mode | Light Source | Sensing Distance | Measuring Rate | Spot Size | Cat. No. |
|---|---|---|---|---|---|
| Diffuse | Class 1 laser, visible red 660 nm | 0.2…8 m (0.66…26.25 ft) | 7.8 m (25.59 ft) | < 10 mm (0.39 in.) at a distance of 8 m (26 ft) at 20°C (68°F) | 45LMS-D8LGC1-D4 |
| Diffuse | Class 2 laser, visible red 660 nm | 0.2…15 m (0.66…49.21 ft) | 14.8 m (48.55 ft) | < 15 mm (0.59 in.) at a distance of 15 m (49 ft) at 20°C (68°F) | 45LMS-D8LGC2-D4 |
| Retroreflective | Class 1 laser, visible red 660 nm | 0.2…50 m (0.66…164.04 ft) | 49.8 m (163.38 ft) | < 50 mm (2 in.) at a distance of 50 m (164 ft) at 20°C (68°F) | 45LMS-U8LGC3-D4 |

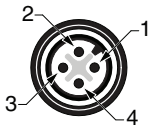
## Approximate Dimensions [mm (in.)]



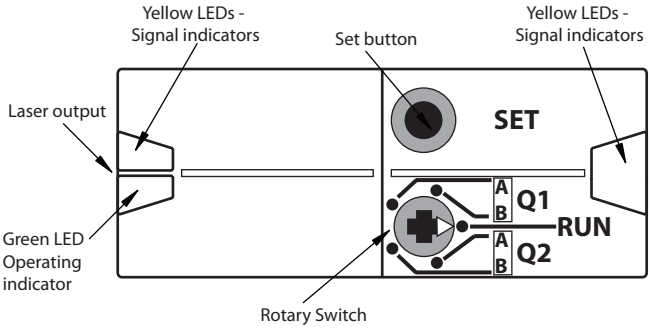

## Mounting Bracket 45LMS-BKT1



## Wiring Diagrams




## Controls and Indicators




## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 2 m (6.5 ft) 4-pin, DC Micro QD Cordset, Straight | 889D-F4AC-2 |
| 2 m (6.5 ft) 4-pin, DC Micro QD Cordset, Right Angle | 889D-R4AC-2 |
| Mounting Bracket | 45LMS-BKT1 |

## Description

The 45CPD sensor is a Class 1 infrared laser sensor that provides long distance sensing with both analog and discrete outputs. It is set up using the Teach-In buttons on the top of the sensor and can be programmed for several modes depending on the application: object detection (single or dual output), object position (analog output), object detection (background suppression), or object detection (reflector mode).

This sensor utilizes the time of flight principle and has a relatively small beam spot for applications typical for this sensing range (up to 6 m). The sensor is completely self contained in an IP67 enclosure and does not require any external control devices which add cost and require additional mounting space.

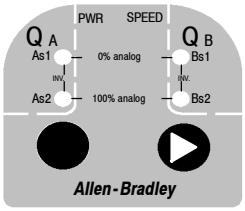
For convenience purposes, the 45CPD utilizes a visible red Class 2 laser for alignment purposes during the set up of the sensor in an application. The Class 2 laser is automatically shut down when the sensor is placed in normal operation and the Class 1 “eye safe” laser is used.

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -20…+50° (-4…+122°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| **Optical** | |
| Sensing Range | 0.2…6 m (0.7…19.7 ft) |
| Spot Size | 4 x 7 mm @ 2 m (0.16 x 0.28 in. @ 6.5 ft<br>4x 12 mm @ 6 m (0.16 x 0.47 in. @19.7 ft |
| Linearity Tolerance | ±40 mm (1.57 in.) |
| Repeatability | Fast/slow: ±15/±10 mm (±0.6/±0.4 in.) |
| Hysteresis | 30 mm (1.2 in.) fixed |
| Temperature Drift | 1.3mm/°C |
| Light Source | Sensing beam: Class 1 laser (905 nm)<br>Alignment beam: Class 2 visible red laser (650 nm) |
| LED Indicators | See Features on page 1-122 |
| **Electrical** | |
| Voltage | 18…30V DC |
| Current Consumption | 125 mA max @ 24V DC |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | Fast/slow: 13 ms/30 ms |
| Output Type | Discrete: Two PNP outputs, analog output: 4…20 mA current |
| Output Mode | Light or dark operate for discrete outputs |
| Output Current | 100 mA max for discrete output, 500W max impedance for analog |
| **Mechanical** | |
| Housing Material | Plastic—ABS |
| Lens Material | PMMA |
| Connection Types | 5-pin DC micro (M12) QD |
| Supplied Accessories | None |
| Optional Accessories | See mounting brackets and cordsets on page 1-122 |

The 45CPD can be easily set up by mounting the sensor such that the target is within the operating range of the sensor, and teaching in the appropriate set points required for the application. The sensor can be set with any combination of one or two discrete PNP outputs and 4…20 mA analog output. The discrete outputs can be set for Light Operate (L.O.) or Dark Operate (D.O.) and the analog output is automatically scaled between the taught set points with either a positive or negative slope.

The 45CPD is an excellent solution for long range detection and measurement applications including: distance measurement, verifying material position, stack level, thickness measurement, roll diameter, web winding/unwinding, positioning fixtures, error proofing, inspection, long standoff distance (hot or limited space), level monitoring, and box width measurement.

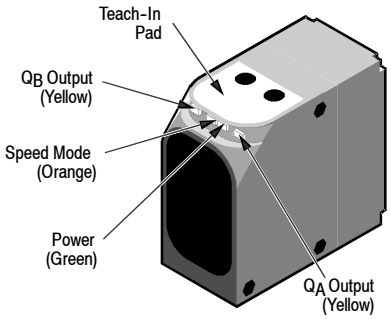


# 45CPD

## Analog and Discrete Output

### Features

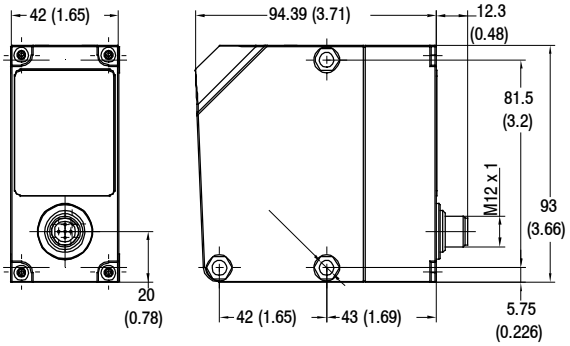
- Eye Safe Class 1 laser for operation
- Visible red Class 2 laser for set-up
- Six meter sensing range
- Two discrete outputs (PNP) and analog output (4…20 mA)
- Easy set-up using teach-in buttons IP67 enclosure
- Self-contained sensor




### Product Selection

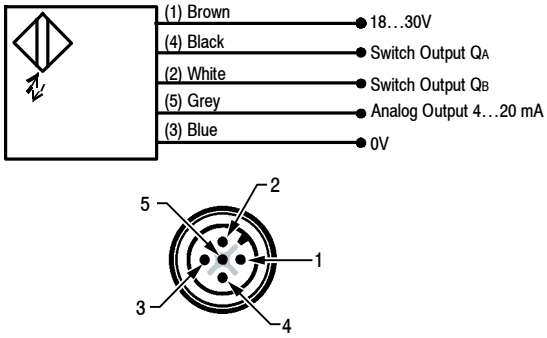
| Sensing Range [mm (in.)] | Measuring Range [mm (in.)] | Spot Size | Cat. No. |
|---|---|---|---|
| 200…6000 (7.87…236.22) | 5800 (228.35) | 4 x 7 mm @ 2 m (0.16 x 0.28 in. @ 6.5 ft) | **45CPD-8LTB1-D5** |

### Approximate Dimensions [mm (in.)]




### Wiring Diagrams

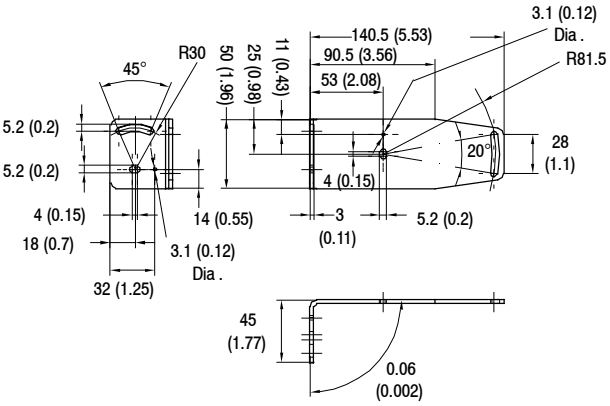
**45CPD-8LTB1-D5**




### Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 2 m (6.5 ft) 5-pin, DC Micro QD Cordset | 889D-F5AC-2 |
| Mounting Bracket | 45CPD-BKT1 |

**Mounting Bracket 45CPD-BKT1**



# 45BPD Laser Sensor

## Analog and Discrete Output

## Description

The 45BPD analog output sensor is a Class 2 visible red laser sensor that provides sensing with both an analog and discrete output. It is set up using the Teach-In buttons and LED indicators on the top of the sensor.

This sensor utilizes the triangulation principle for precise measurement and the visible red beam spot is useful for alignment in small part detection and measurement applications. The sensor is completely self contained in an IP67 enclosure and does not require any external control devices which add cost and require additional mounting space.

The 45BPD can be easily set up by mounting the sensor such that the target is within the operating range of the sensor and teaching in the appropriate set points required for the application. The sensor can be set with both a discrete PNP output and a 4…20 mA analog output. The discrete output can be set for normally open (N.O.) or normally closed (N.C.) operation and the analog output is automatically scaled between the taught set points with either a positive or negative slope.

The 45BPD is an excellent solution for several noncontact measurement applications including: distance measurement, part profiling, thickness measurement, error proofing, inspection, verifying material position, hole depth, warpage, and positioning.

## Features

- Noncontact measurement
- Visible red Class 2 laser
- Analog and discrete outputs
- Scalable analog output (4…20 mA)

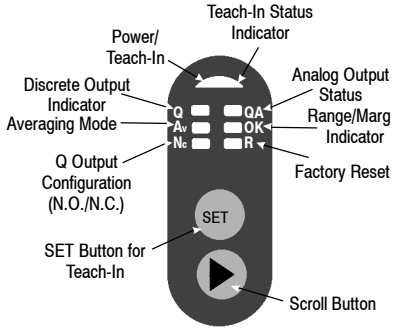
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -10…+45° (14…+140°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| **Optical** | |
| Sensing Range | See Product Selection table on page 1-124 |
| Linearity | < 0.25 % of measuring range |
| Resolution | < 0.1% of measuring range |
| Temperature Drift | < 0.02%/°C |
| Light Source | Class 2 visible red laser (650 nm) |
| LED Indicators | See User Interface below |
| **Electrical** | |
| Voltage | 18…28V DC |
| Current Consumption | 40 mA max @ 24V DC |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | Speed mode: 0.4 ms (applicable with synchronously switched laser and target) |
| Output Type | Discrete: PNP, analog output: 4…20 mA current |
| Output Mode | Normally open or normally close for discrete output |
| Output Current | 100 mA max for discrete output, 500Ω max impedance for analog |
| **Mechanical** | |
| Housing Material | Plastic — ABS |
| Lens Material | PMMA |
| Connection Types | 4-pin DC micro (M12) QD, 270° rotatable connector |
| Supplied Accessories | None |
| Optional Accessories | See mounting brackets and cordsets on page 1-124 |

## Features (cont.)

- Configurable discrete output (N.O./N.C.)
- IP67 enclosure
- 270° rotatable connector
- Set point adjustment via push buttons
- Self-contained sensor
- Laser-disable control
- Teach-in lock out
- Averaging and speed mode

## User Interface



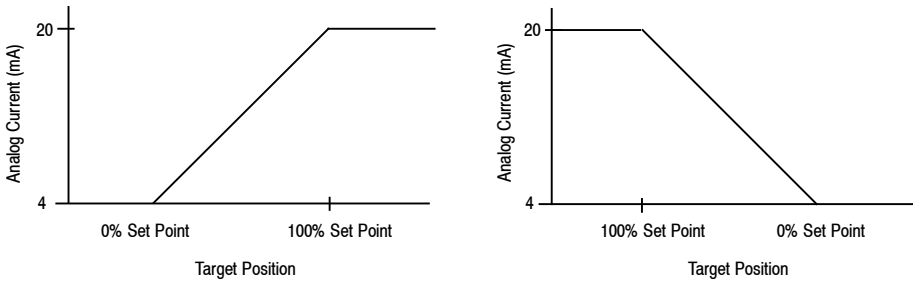
# 45BPD Laser Sensor

## Analog and Discrete Output

## Product Selection

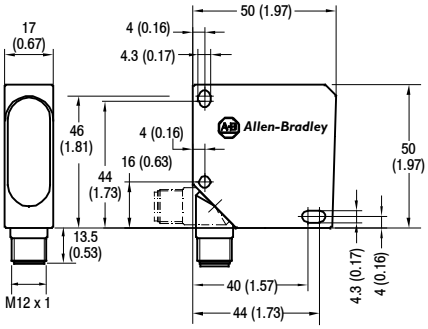
| Sensing Range [mm (in.)] | Measuring Range [mm (in.)] | Spot Size | Cat. No. |
|---|---|---|---|
| 30…100 (1.18…3.93) | 70 (2.75) | 1.5 x 3 mm/1.5 x 3.25 mm (0.06 x 0.12 in./0.06 x 0.13) | 45BPD-8LTB1-D5 |
| 80…300 (3.14…11.8) | 220 (8.66) | 1.5 x .53 mm/2.0 x 4.5 mm (0.06 x 0.14 in./0.08 x 0.18) | **45BPD-8LTB2-D5** |

## Analog Output

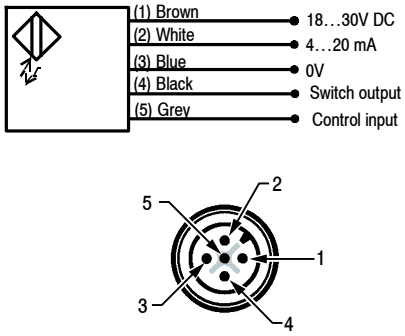



## Approximate Dimensions [mm (in.)]

*Dimensions are not intended to be used for installation purposes.*



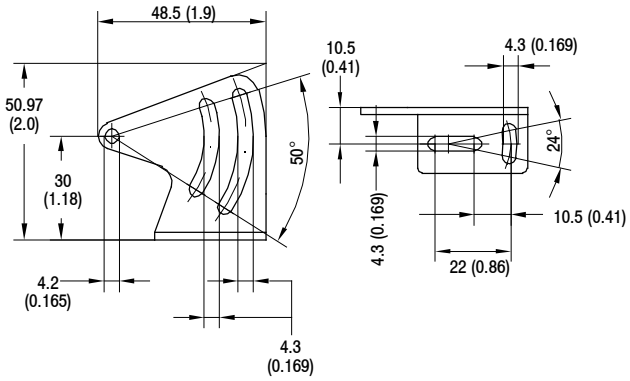

## Wiring Diagrams



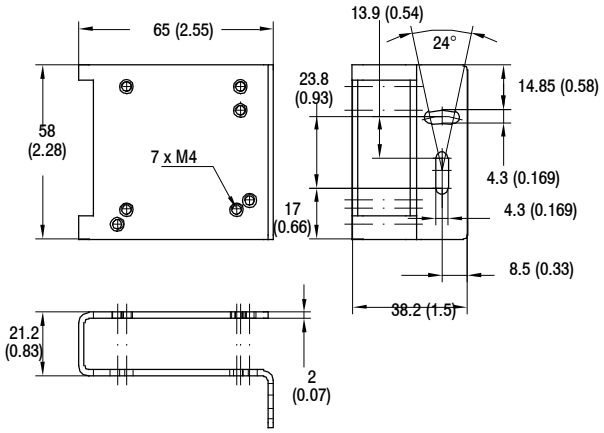

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| 2 m (6.5 ft) micro QD cordset | 889D-F5AC-2 | Mounting brackets | 45BPD-BKT1 | Protective mounting bracket | 45BPD-BKT2 |

### Mounting Bracket 45BPD-BKT1




### Protective Mounting Bracket 45BPD-BKT2



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Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Description

The 45BRD analog output sensor is a Class 2 visible red laser sensor that provides exceptional resolution at an economical cost. This sensor utilizes the triangulation principle for precise measurement and has a small beam spot for small part detection and measurement. The sensor is completely self-contained in an IP67 enclosure and does not require any external control devices which add cost and require additional mounting space.

The 45BRD can be easily set up by mounting the sensor such that the target is within the operating range of the sensor. There are no additional adjustments for the sensor and the 0…10V output is scaled linearly over the range of the sensor [45…85 mm (1.77…3.35 in.)].

The 45BRD is an excellent solution for precision noncontact measurement applications including: distance measurement, part profiling, thickness measurement, hole depth, warpage, and positioning.

## Features

- Visible red Class 2 laser
- 20 μm resolution
- 40 mm measuring range
- 0…10V DC analog output
- IP67 enclosure
- 270° rotatable connector
- No user adjustments
- Contamination indicator
- Self-contained sensor

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | 0…+45° (32…+113°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| **Optical** | |
| Sensing Range | 45…85 mm (1.77…3.35 in.) |
| Spot Size | < 0.8 mm (0.03 in.) beam spot @ 65 mm (2.56 in.) |
| Measuring Range | 40 mm (1.57 in.) |
| Linearity | < 1 % |
| Resolution | 20 μm |
| Temperature Drift | 18 μm/°C |
| Light Source | Class 2 visible red laser (670 nm) |
| LED Indicators | Green: power, red : lens contamination |
| **Electrical** | |
| Voltage | 18…28V DC |
| Current Consumption | 35 mA max @ 24V DC |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | 30 ms |
| Output Type | Analog output 0…10V DC |
| Output Current | 3 mA max |
| **Mechanical** | |
| Housing Material | Plastic — ABS |
| Lens Material | PMMA |
| Connection Types | 4-pin DC micro (M12) QD, 270° rotatable connector |
| Supplied Accessories | None |
| Optional Accessories | See mounting brackets and cordsets on page 1-126 |

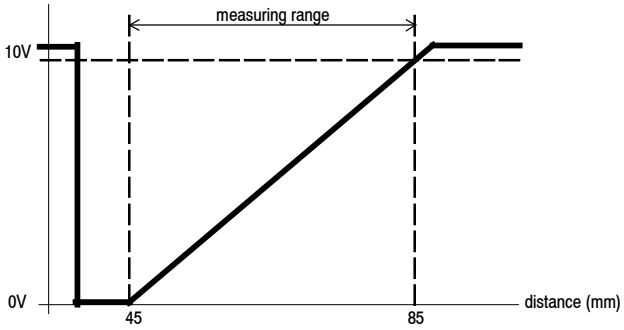
# 45BRD Laser Sensor

## Analog Output

## Product Selection

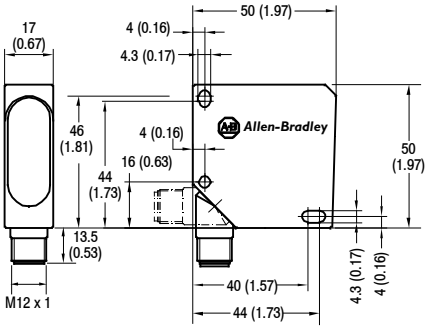
| Sensing Range [mm (in.)] | Measuring Range [mm (in.)] | Spot Size | Cat. No. |
|---|---|---|---|
| 45…85 (1.77…3.35) | 40 (1.57) | <0.8 mm @ 65 mm | 45BRD-8JKB1-D4 |

## Analog Output

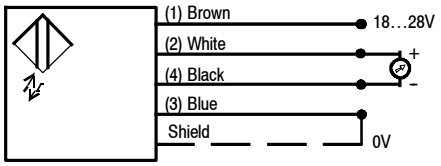



## Approximate Dimensions [mm (in.)]

*Dimensions are not intended to be used for installation purposes.*



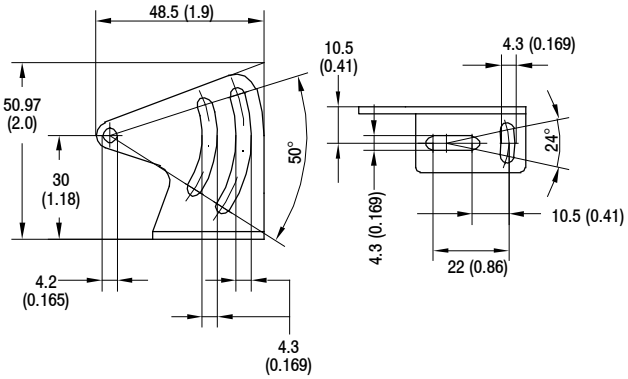

## Wiring Diagrams



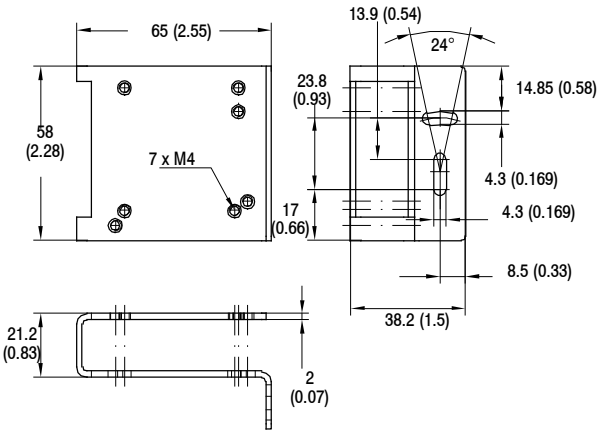
## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| 2 m (6.5 ft) Micro QD Cordset | **889D-F4EC-2** | Mounting brackets | 45BPD-BKT1 | Protective mounting bracket | 45BPD-BKT2 |

### Mounting Bracket 45BPD-BKT1




### Protective Mounting Bracket 45BPD-BKT2



## Description

The 42CRC Color Registration Control is a specialized photoelectric sensor designed to detect registration marks by sensing the difference in greyscale response between the mark and background.

The sensor automatically adjusts the sensitivity, compensating for variations in background colors and lens contamination.

Switch selectable red or green light sources provide capability to sense a wide range of marks and background colors, including difficult pastels.

## Features

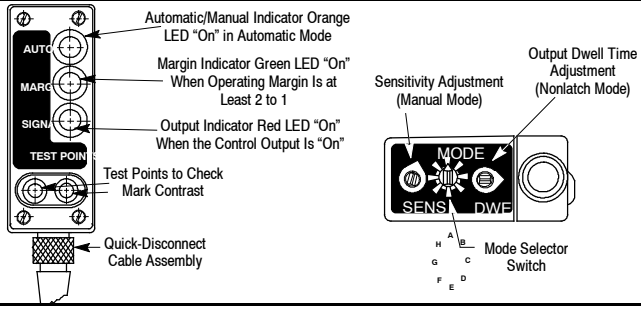
- Automatic or manual sensitivity adjustment
- Selectable red or green light source
- Selectable lens position
- Fast 250 μs response time
- Separate diagnostic output
- Adjustable pulse-stretcher
- Selectable latching output with reset
- Selectable gated input operation
- Selectable NPN or PNP output
- 5-pin micro QD connection

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | NEMA 3,4,12,13; IP66 (IEC 529) |
| Operating Temperature [C(F)] | 0…+70° (32…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| **Optical** | |
| Sensing Modes | Fixed focus color registration |
| Sensing Range | 12.7 mm |
| Field Depth | ± 2 mm |
| Light Source | Visible red LED (630 nm) or visible green (570 nm) selectable |
| LED Indicators | See User Interface Panel below |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 70 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 250 μs |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Leading edge or trailing edge of a light or dark mark |
| Output Current | 100 mA @ 30V DC |
| Output Leakage Current | 1 μA max |
| **Mechanical** | |
| Housing Material | Anodized and epoxy coated aluminum |
| Lens Material | Glass |
| Connection Types | 5-pin DC micro (M12) QD |
| Optional Accessories | See mounting brackets and cordsets on page 1-129 |

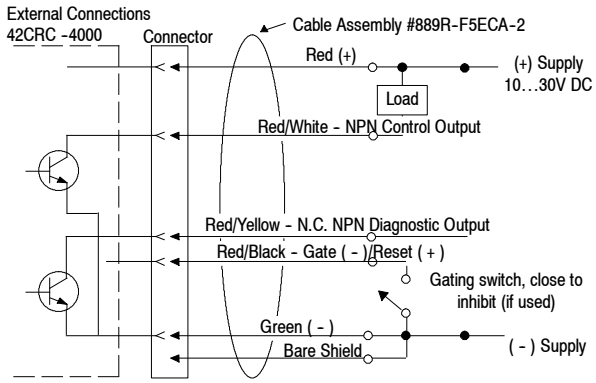
## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Margin | Green | OFF | Margin < 2X |
| | | ON | Margin > 2X |
| Auto | Orange | OFF | Sensor in manual configuration mode |
| | | ON | Sensor in automatic configuration mode |
| Signal | Red | OFF | Sensor output activated |
| | | ON | Sensor output de-activated |

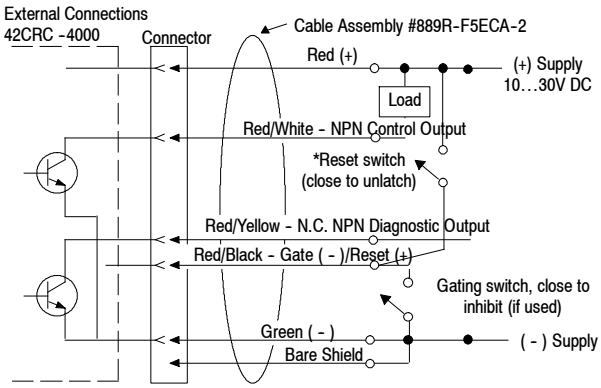


## Wiring Diagrams

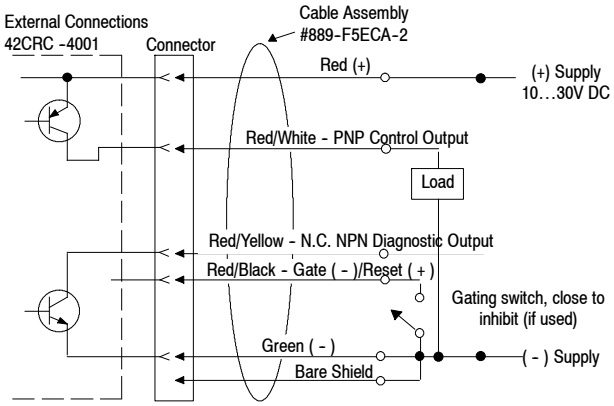
**NPN Output 42CRC-4000**
**Non-Latched Output—Function Switch Positions**
**"E" Through "H" with or without External Gating**



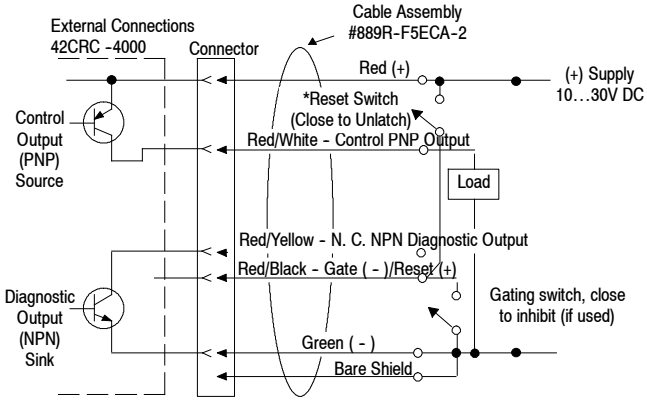

**NPN Output 42CRC-4000**
**Latched Output—Function Switch Positions**
**"A" Through "D" with or without External Gating**




**PNP Output 42CRC-4001**
**Non-Latched Output—Function Switch Positions**
**"E" Through "H" with or without External Gating**



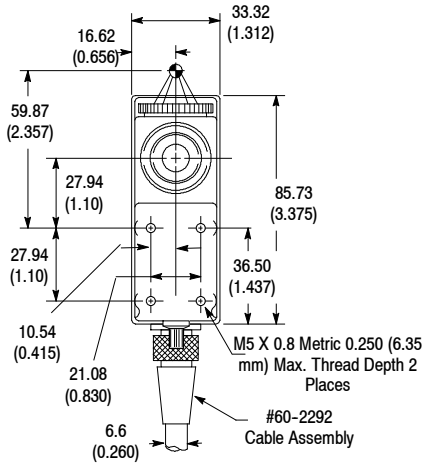

**PNP Output 42CRC-4001**
**Latched Output—Function Switch Positions**
**"A" Through "D" with or without External Gating**

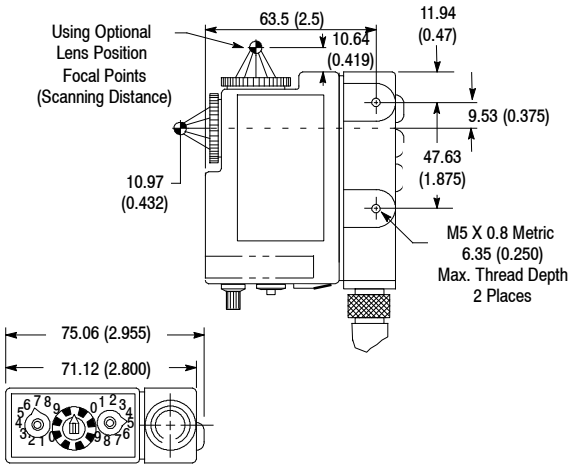



**ATTENTION**

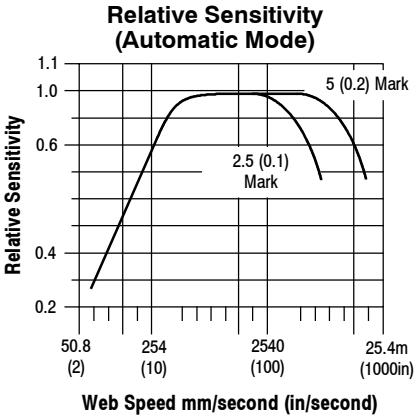
Do not close the reset and gating switches simultaneously.

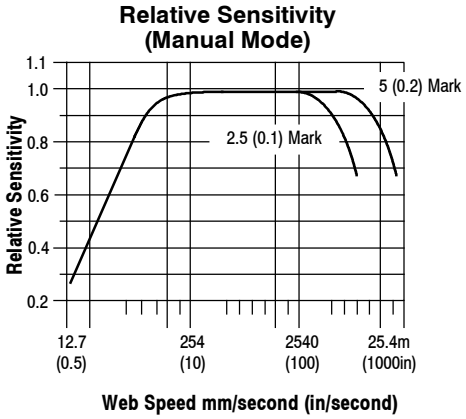
## Approximate Dimensions [mm (in.)]



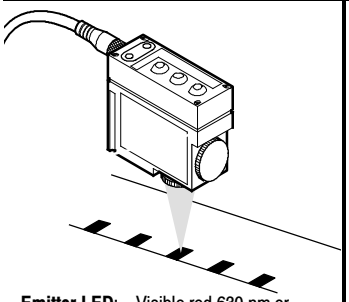




## Typical Response Curve




## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Output Energized | Output Type Capacity Response Time | Diagnostic Output | Focal Point | Depth of Field | Min Web Velocity | Cat. No. |
|---|---|---|---|---|---|---|---|---|
|  **Emitter LED**: Visible red 630 nm or visible green 570 nm (selectable) | 10…30V DC 70 mA max | Leading Edge or Trailing Edge of a Light or Dark Mark | NPN 100 mA at 30V DC 250 µs | NPN 30 mA at 30V DC | 12.7 mm (0.5 in.) | ±2 mm (0.08 in.) | 51 mm/sec (2 in./sec) | 42CRC-4000 |
| | | | PNP 100 mA at 30V DC 250 µs | | | | | 42CRC-4001 |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| 5-pin AC Micro QD Cordset | 889R-F5ECA-2 | Lens | 61-6312 | Cover | 61-6333 |

Obsolete

Obsolete

## ColorSight™ 9000

### Self-Teach Color Recognition

Obsolete

Obsolete

# 45CLR ColorSight™

## Color Sensor

## Description

The 45CLR ColorSight is a self-contained color detection sensor with three output channels, allowing for the concurrent sensing of three different colors. The colors to be sensed are taught quickly and easily with the touch of a button on the sensor or through remote teach.

Models are also available with RS-485 communications with the capability of matching up to five colors and communicate true RGB values for remote processing of additional colors.

The 45CLR ColorSight can be set up to detect:

- A single color per channel with adjustable tolerance
- Scan an area of various colors on the same surface
- Detect multiple individual colors per channel

This sensor offers a wide sensing range tolerance for reliable sensing when target distance varies from the taught settings.

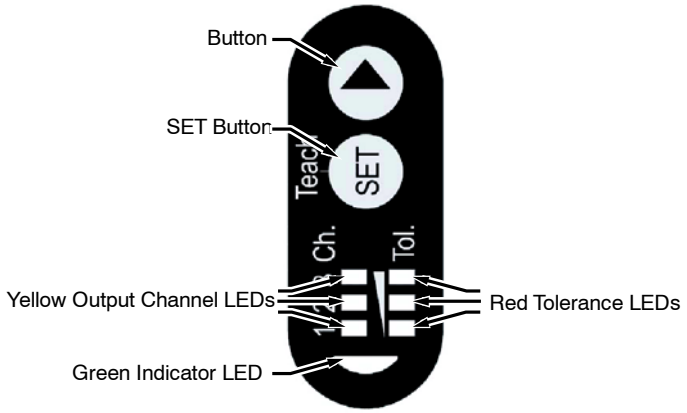
## Features

- Wide sensing range tolerance
- Three channel color matching (3 outputs)
- Gating input (also known as inhibiting input)
- Adjustable tolerance for high precision to general color matching
- Pulse stretching capability (50 ms off delay)
- Teach colors via push buttons
- External teach capability (1 output)
- Teach button lockout
- 270° rotatable connector
- Compact size IP67 enclosure

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C(F)] | -10…+55° (14…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| **Optical** | |
| Sensing Mode | True color (diffuse) |
| Sensing Range | See Product Selection table on page 1-135 |
| Light Source | White LED |
| LED Indicators | See User Interface below |
| Adjustments | Push buttons |
| **Electrical** | |
| Voltage | 18…28V DC |
| Current Consumption | 40 mA max @ 24V DC |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | 1 ms on each channel, 2 ms for channel 3 in remote teach |
| Output Type | Discrete: 3 PNP outputs<br>RS485 models: 1 PNP or 1 NPN output by cat. no. |
| Output Mode | Light operate |
| Output Current | 100 mA @ 30V DC max |
| Output Leakage Current | 0.1 mA max |
| **Mechanical** | |
| Housing Material | ABS |
| Lens Material | PMMA |
| Connection Types | 8-pin DC micro (M12) QD |
| Supplied Accessories | None |
| Optional Accessories | See mounting brackets and cordsets on page 1-136 |

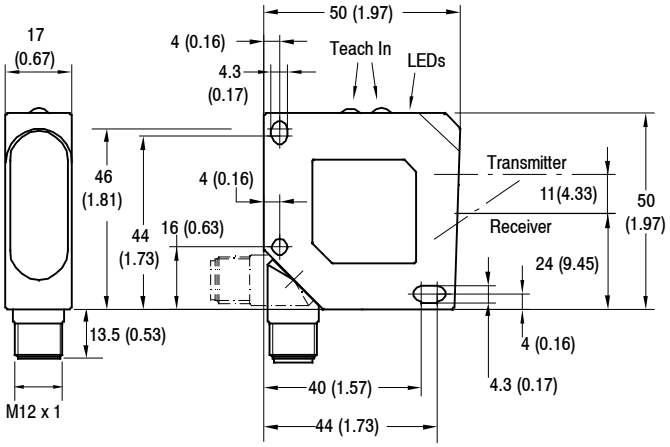
## User Interface



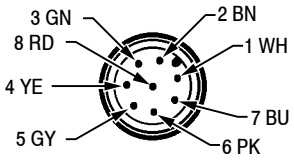
## Product Selection

| Sensing Range [mm (in.)] | Sensing Range Tolerance | Spot Size [mm (in.)] | Output Type | Cat. No. |
|---|---|---|---|---|
| 12…32 (0.47…1.26) | ±6 mm (0.24 in.) | 4 (0.16) @ 22 (0.86) | 3 PNP | **45CLR-5JPC1-D8** |
| 15…30 (0.59…1.18) | ±5 mm (0.20 in.) | 2 x 2 (0.07 x 0.07) @ 22 (0.86) | 3 PNP | 45CLR-5JPC2-D8 |
| 18…22 (0.70…0.86) | ±2 mm (0.08 in.) | 5 x 1 (0.19) @ 22 (0.86) | 3 PNP | 45CLR-5JPC3-D8 |
| 12…32 (0.47…1.26) | ±6 mm (0.24 in.) | 4 (0.16) @ 22 (0.86) | RS-485, 1 PNP | 45CLR-5LPS1-D8 |
| 12…32 (0.47…1.26) | ±6 mm (0.24 in.) | 4 (0.16) @ 22 (0.86) | RS-485, 1 NPN | 45CLR-5LNS1-D8 |
| 15…30 (0.59…1.18) | ±5 mm (0.20 in.) | 2 x 2 (0.07 x 0.07) @ 22 (0.86) | RS-485, 1 PNP | 45CLR-5LPS2-D8 |
| 15…30 (0.59…1.18) | ±5 mm (0.20 in.) | 2 x 2 (0.07 x 0.07) @ 22 (0.86) | RS-485, 1 NPN | 45CLR-5LNS2-D8 |
| 18…22 (0.70…0.86) | ±2 mm (0.08 in.) | 5 x 1 (0.19) @ 22 (0.86) | RS-485, 1 PNP | 45CLR-5LPS3-D8 |
| 18…22 (0.70…0.86) | ±2 mm (0.08 in.) | 5 x 1 (0.19) @ 22 (0.86) | RS-485, 1 NPN | 45CLR-5LNS3-D8 |

## Approximate Dimensions [mm (in.)]



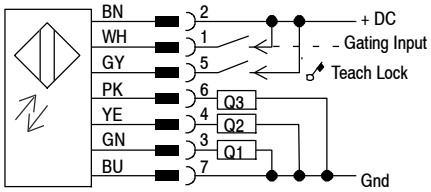

## Pinout and Color Codes



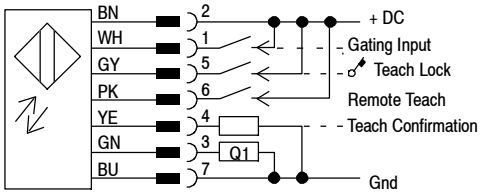

*M12 Male*

| Pin | Color | Connection |
|---|---|---|
| 1 | White | Gate Input |
| 2 | Brown | V+ 12…28V DC |
| 3 | Green | OUT 1 |
| 4 | Yellow | OUT 2/Teach Confirmation |
| 5 | Grey | Teach Button Lock |
| 6 | Pink | OUT 3/Remote Teach |
| 7 | Blue | V- 0V DC |
| 8 | Red | Not Connected |

## Wiring Diagrams

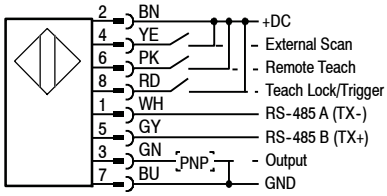



### Remote Teach




The control input (pin 5) can be used to lock the ColorSight push buttons by connecting it to the +DC (18…28V DC). When working with the sensor in remote teach, we recommend the use of push button lockout to prevent accidental tampering of the configuration.

### RS-485 Models




**Note:** For NPN output models one terminal of the load should be connected to Pin 3 (output) and the other terminal of the load should be connected to +DC.

**ATTENTION**

Pin 1 and pin 5 are the RS 485 interface connections and must not be connected to the power supply. This can permanently damage the sensor.

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| DC Micro Style QD Cordset, 8-Pin | 889D-F8AB-2 |
| Mounting Bracket | 45BPD-BKT1 |
| Mounting Bracket | 45BPD-BKT2 |
| Communications Cable (RS-485) for MicroLogix | 1763-NC01 |

# 45CRM Contrast Sensor

## Description

The 45CRM is a photoelectric contrast sensor that reliably detects registration marks on a web. This sensor features red, green, and blue (RGB) emitter LEDs. During the teach process the sensor determines which of the emitter LEDs maximizes the contrast between the registration mark and the web (background). The teach process is completed using a simple rotary switch.

The extremely fast response time enables the control system to precisely align web material within the machine, for example, lining up labels on a web with the cutting blade of the equipment prior to the label being placed on a bottle.

## Features

- Three emitter LEDs (red, green, and blue)
- A 40 µs response time
- Three simple setup methods: dynamic teach, static teach, or IO-Link configurable
- Adjustable-position micro (M12) quick-disconnect (QD) for mounting flexibility

## General Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL, cULus, and CE Marked for all applicable directives |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -20...60° (-4…140°) |
| Storage Temperature [C (F)] | -40...75° (-40…167°) |
| Vibration | 10…55 Hz, 0.5 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 11 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| **Optical** | |
| Sensing Distance | 11 mm ± 2 mm |
| Angle Deviation | ± 3° max. |
| Light Source | 3 LEDs (red, green, blue) |
| **Electrical** | |
| Operating Voltage | 10...30 V DC (18…30V DC when operating in IO-Link® mode) |
| Current Consumption | ≤ 60 mA @ 24V DC |
| Protection Type | Short circuit, reverse polarity |
| **Communication Interface** | |
| Interface | IO-Link V1.0 |
| Baud Rate | COM 2 (38.4 kBaud) |
| **Outputs** | |
| Response Time | 40 µs |
| Sensitivity Adjustment | Rotary switch |
| Output Type | 2 x PNP/NPN (Push-Pull) complementary outputs |
| Output Mode | Light or dark operation |
| Output Leakage Current, Max. | ≤ 100 µA per output |
| Discrete Output Rating | 30V DC max./100 mA max. |
| **Mechanical** | |
| Housing Material | Die-cast zinc, nickel-plated |
| Lens Material | PMMA plastic, clear |
| Connection Type | M12, 4-pin , 90° rotateable |

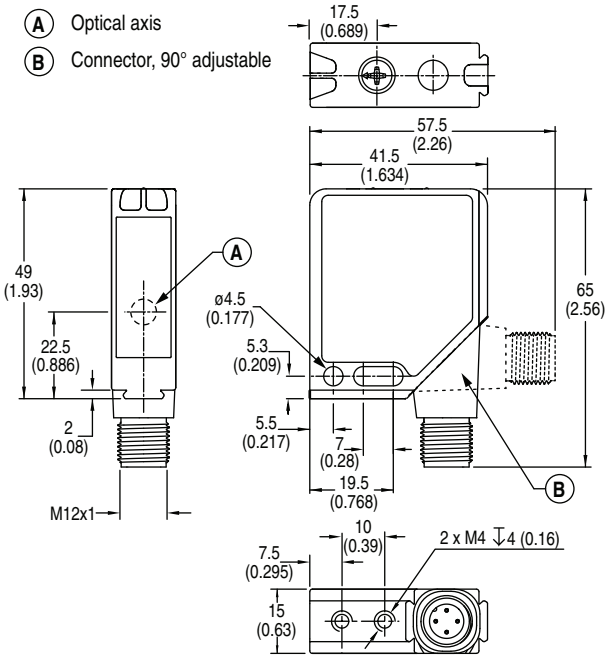
# 45CRM Contrast Sensor



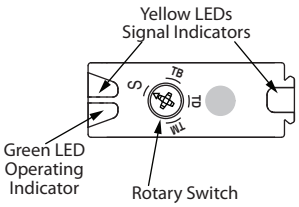
## Product Selection

| Description | Spot Size [mm (in.)] | Cat. No. |
|---|---|---|
| Parallel beam | 1 x 3 (0.04 x 0.12) | 45CRM-4LHT1-D4 |
| Perpendicular beam | 3 x 1 (0.12 x 0.04) | 45CRM-4LHT2-D4 |

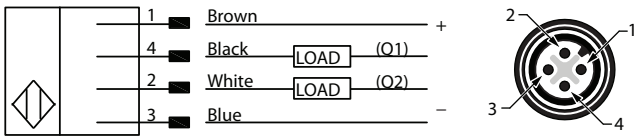
## Approximate Dimensions [mm (in.)]




## Controls and Indicators



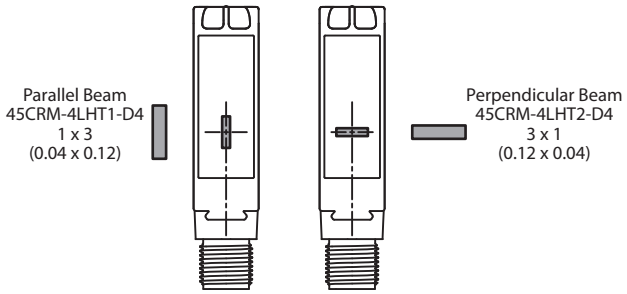

## Wiring Diagrams



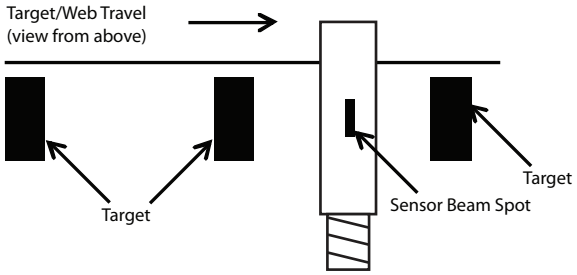

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| DC micro QD cordset, straight, 4-pin, 2 m (6.5 ft) | 889D-F4AC-2 |
| Mounting Bracket | 45CRM-BRK1-ADAPT |

## Light Spot Orientation [mm (in.)]

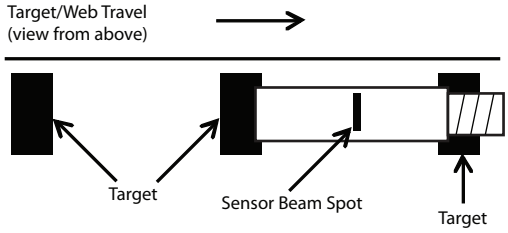



**Parallel Orientation**



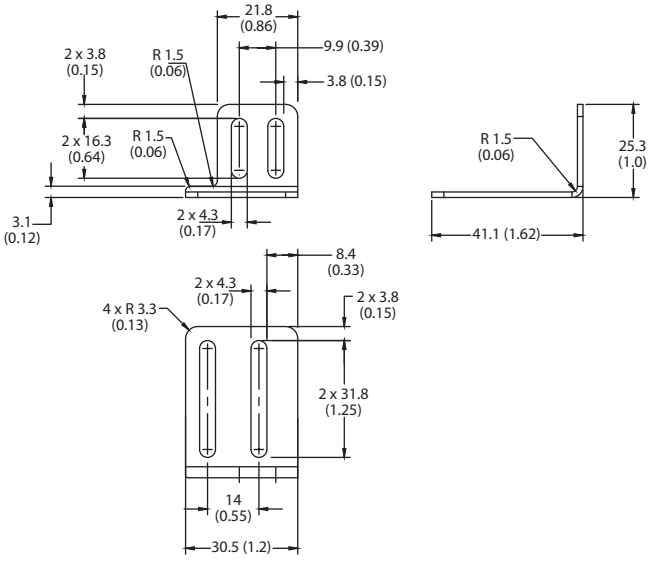

Select the 45CRM-4LHT1-D4 (parallel beam) when the sensor will be mounted perpendicular to the web travel.

**Perpendicular Orientation**




Select the 45CRM-4LHT2-D4 (perpendicular beam) when the sensor will be mounted parallel to the web travel.

## Mounting Bracket 45CRM-BRK1-ADAPT [mm (in.)]

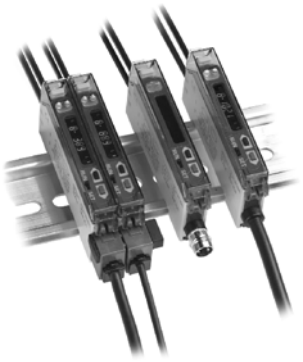





Allen-Bradley

# 45FVL Visible Red, Blue, Green or White Plastic Fiber Optic

## Self-Teach with Digital Display



## Features

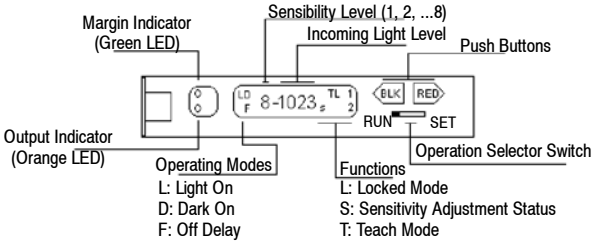
- Choose from, red, green, blue, white light source
- Self-teach capability
- Manual or automatic sensitivity adjustment
- Back-lit LCD display
- Selectable 40 ms off delay output timer
- DIN Rail mountable
- “Power-Bus” option
- Dual channel interference protection
- Reverse polarity, false pulse and transient noise protection (500V)

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | CE Marked for all applicable directives |
| Operating Environment | NEMA 1; IP40 |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 50 g , 3 directions, 3 times |
| Relative Humidity | 35…85% |
| Ambient Light Immunity | Incandescent light 10,000 lux max |
| **Optical** | |
| Sensing Mode | Diffuse or transmitted beam depends on fiber optic cable selected |
| Light Source | Red LED (660 nm), green LED (525 nm), blue LED (470 nm), white LED |
| LED Indicators | See User Interface Panel below |
| Adjustments | Push buttons |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 50 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | Channel 1 = 600 µs, channel 2 = 700 µs |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 30V DC max |
| Output Leakage Current | 0.5 mA max |
| **Mechanical** | |
| Housing Material | ABS resin |
| Connection Types | 4-pin DC pico (M8) QD, power bus cables |
| Supplied Accessories | 60-2638 mounting assembly |
| Optional Accessories | See mounting bracket and cordsets on page 1-138 |

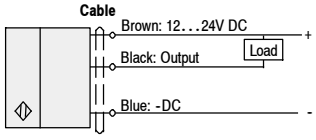
## User Interface Panel

| LED | State | Condition |
|---|---|---|
| Green | OFF<br>ON | Unstable light signal<br>Stable light signal |
| Orange | OFF<br>ON | Output OFF<br>Output ON |

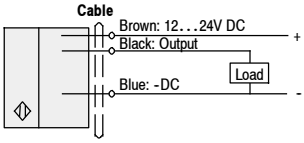



## Wiring Diagrams

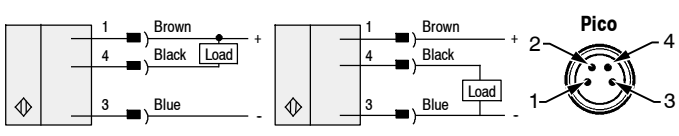
**Cable**
**NPN Output**




**Cable**
**PNP Output**



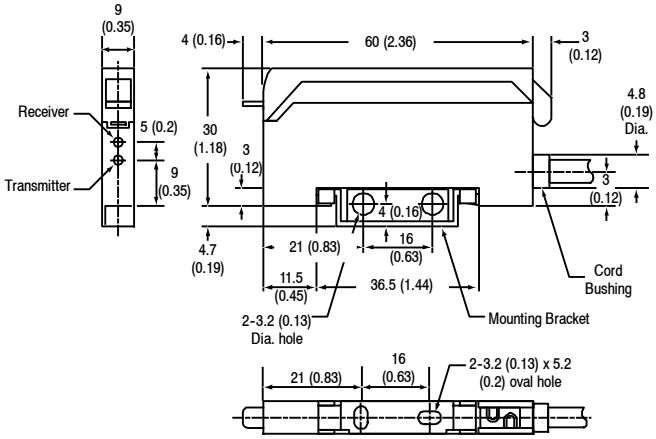

**Quick-Disconnect**



# 45FVL Visible Red, Blue, Green or White Plastic Fiber Optic

## Self-Teach with Digital Display

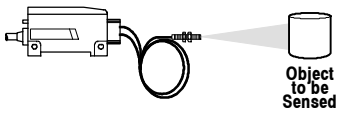
### Approximate Dimensions [mm (in.)]




### Typical Plastic Fiber Optic Cable Selection

| LED | Sensing Mode | Plastic Fiber Diameter [mm (in.)] | Typical Fiber Model | Typical Range |
|---|---|---|---|---|
| Red | Diffuse (Bifurcated Fiber) | 1 (0.040) | 43PR-NES57ZS | Refer to the Fiber Optic section on page 1-231. |
| | | 0.5 (0.020) | 43PR-NJS53ZM | |
| | Transmitted Beam (Individual Fiber) | 1 (0.040) | 43PT-NJS56FS | |
| | | 0.5 (0.020) | 43PT-NBS52FM | |
| Green | Diffuse (Bifurcated Fiber) | 1 (0.040) | 43PR-NES57ZS | |
| | Transmitted Beam (Individual Fiber) | | 43PT-NJS56FS | |
| Blue | Diffuse (Bifurcated Fiber) | | 43PR-NES57ZS | |
| | Transmitted Beam (Individual Fiber) | | 43PT-NJS56FS | |
| White | Diffuse (Bifurcated Fiber) | | 43PR-NES57ZS | |
| | Transmitted Beam (Individual Fiber) | | 43PT-NJS56FS | |

### Product Selection

| Sensing Mode | Operating Voltage | Response Time | Output Characteristics | | LED | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | Type | Max Load Current | | Cable | Pico | Power Bus (QD required) |
|   **Field of View:** Refer to Plastic Fiber Optic section page 1-270 **Emitter LED:** Visible red 660 nm, Visible green 565 nm or Visible blue 470 nm Visible white **Indicators:** Orange: Output Green: Stability | 12…24V DC ±10% | 600 µs | PNP | Output: 100 ma | Red | **45FVL-2LHE-A2** | **45FVL-2LHE-P4** | 45FVL-2LHE-C4 ❶ |
| | | | | | Green | 45FVL-3LHE-A2 | 45FVL-3LHE-P4 | 45FVL-3LHE-C4 ❶ |
| | | | | | Blue | 45FVL-6LHE-A2 | 45FVL-6LHE-P4 | 45FVL-6LHE-C4 ❶ |
| | | | | | White | **45FVL-5LHE-A2** | 45FVL-5LHE-P4 | 45FVL-5LHE-C4 ❶ |
| | | | NPN | | Red | 45FVL-2LGE-A2 | 45FVL-2LGE-P4 | 45FVL-2LGE-C4 ❶ |
| | | | | | Green | 45FVL-3LGE-A2 | 45FVL-3LGE-P4 | 45FVL-3LGE-C4 ❶ |
| | | | | | Blue | 45FVL-6LGE-A2 | 45FVL-6LGE-P4 | 45FVL-6LGE-C4 ❶ |
| | | | | | White | 45FVL-5LGE-A2 | 45FVL-5LGE-P4 | 45FVL-5LGE-C4 ❶ |

❶ PowerBus master/3 conductor QD = 45F-A3C-A2. PowerBus slave/1 conductor QD = 45F-A1C-A2

### Cordsets and Accessories

| Description | Cat./Page No. | Description | Cat./Page No. |
|---|---|---|---|
| Pico QD Cordset, Straight, 4-pin, 2 m | 889P-F4AB-2 | PowerBus master/3 conductor QD | 45F-A3C-A2 |
| Fiber Optic Cables | 1-231 | PowerBus slave/1 conductor QD | 45F-A1C-A2 |
| **Fiber Optic Adaptor Replacements** | | **PowerBus caps** | |
| 1.25…2.2 mm O.D. | 61-6731 | Male | 45F-AMC |
| 1.00…2.2 mm O.D. | 61-6742 | Female | 45F-AFC |
| Mounting Assembly | 60-2638 | | |



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

# 45FSL Visible Red or White Plastic Fiber Optic

## General Purpose DIN Style

## Features

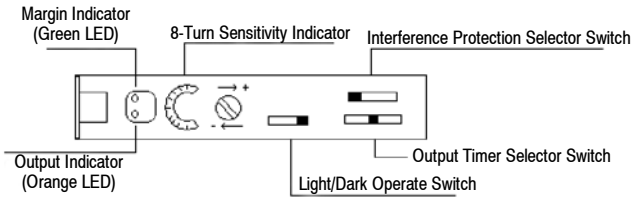
- Choose from red or white light source
- Dual LED indicators
- Manual sensitivity adjustment
- Selectable 40 ms on/off delay output timer
- DIN Rail mountable
- "Power-Bus" option
- A 4/8 sensor cross-talk protection
- Reverse polarity, false pulse and transient noise protection (500V)

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | CE Marked for all applicable directives |
| Operating Environment | NEMA 1; IP40 |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 10 g , 3 directions, 3 times |
| Relative Humidity | 35…85% |
| Ambient Light Immunity | Incandescent light 10,000 lux max |
| **Optical** | |
| Sensing Mode | Diffuse or transmitted beam depends on fiber optic cable selected |
| Light Source | Visible red LED (660 nm), visible white LED |
| LED Indicators | See User Interface Panel below |
| Adjustments | 8-turn sensitivity potentiometer |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 40 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 30 µs, 250 µs, 500 µs |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 30V DC max<br>50 mA stability output @ 30V DC max |
| Output Leakage Current | 0.5 mA max |
| **Mechanical** | |
| Housing Material | ABS resin |
| Connection Types | 2 m conductor cable (24 AWG), 4-pin DC pico QD, power bus cables |
| Supplied Accessories | 60-2638 mounting assembly |
| Optional Accessories | See mounting bracket and cordsets on page 1-140 |

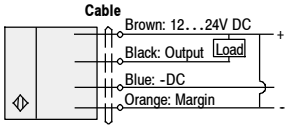
## User Interface Panel

| LED | State | Condition |
|---|---|---|
| Green | OFF<br>ON | Unstable light signal<br>Stable light signal |
| Orange | OFF<br>ON | Output OFF<br>Output ON |

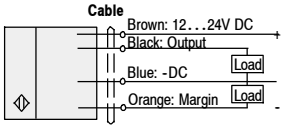



## Wiring Diagrams

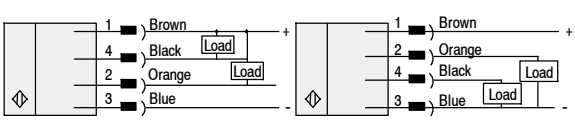
**Cable**
**NPN Output**




**Cable**
**PNP Output**




**Quick-Disconnect**

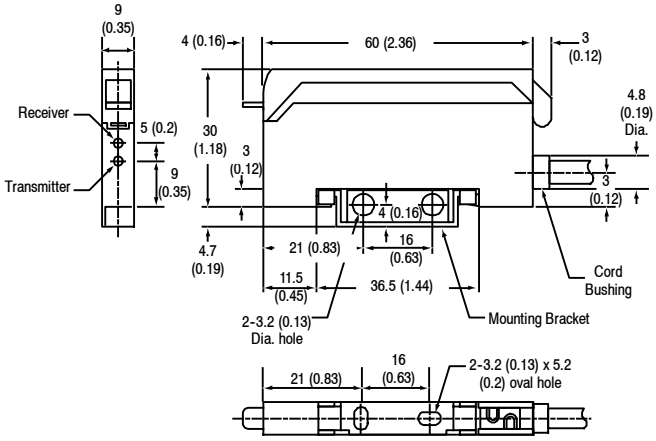



**Note**: Details regarding connection of Rockwell Automation 45FSL photoelectric sensors to Rockwell Automation Programmable Controllers can be found in "PHOTOSWITCH® Photoelectric Sensors and Programmable Controller Interface Manual" on *www.ab.com/literature*.

# 45FSL Visible Red or White Plastic Fiber Optic

## General Purpose DIN Style

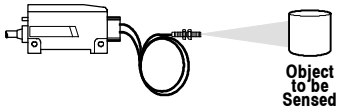
### Approximate Dimensions [mm (in.)]




### Typical Plastic Fiber Optic Cable Selection

| LED | Sensing Mode | Plastic Fiber Diameter [mm (in.)] | Typical Fiber Model | Typical Range |
|---|---|---|---|---|
| Red | Diffuse (Bifurcated Fiber) | 1 (0.040) | 43PR-NES57ZS | Refer to the Fiber Optic section on page 1-231. |
| | | 0.5 (0.020) | 43PR-NJS53ZM | |
| | Transmitted Beam (Individual Fiber) | 1 (0.040) | 43PT-NJS56FS | |
| | | 0.5 (0.020) | 43PT-NBS52FM | |
| White | Diffuse (Bifurcated Fiber) | 1 (0.040) | 43PR-NES57ZS | |
| | Transmitted Beam (Individual Fiber) | | 43PT-NJS56FS | |

### Product Selection

| Sensing Mode | Operating Voltage | Response Time | Output Characteristics | | LED | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | Type | Max Load Current | | Cable | Pico | Power Bus (QD required) |
|  Object to be Sensed<br>**Field of View:** Refer to Plastic Fiber Optic section page 1-270<br>**Emitter LED:** Visible red 660 nm, Visible white<br>**Indicators:** Orange: Output, Green: Stability | 12…24V DC ±10% | Selectable 250 µs or 500 µs | PNP | Output: 100 ma Stability: 50 ma | Red | **45FSL-2LHE-A2** | **45FSL-2LHE-P4** | 45FSL-2LHE-C4 ❶ |
| | | | | | White | 45FSL-5LHE-A2 | 45FSL-5LHE-P4 | 45FSL-5LHE-C4 ❶ |
| | | | NPN | | Red | **45FSL-2LGE-A2** | 45FSL-2LGE-P4 | 45FSL-2LGE-C4 ❶ |
| | | | | | White | 45FSL-5LGE-A2 | 45FSL-5LGE-P4 | 45FSL-5LGE-C4 ❶ |
| | | 30 µs | PNP | | Red | **45FSL-2LWE-A2** | 45FSL-2LWE-P4 | 45FSL-2LWE-C4 ❶ |
| | | | | | White | 45FSL-5LWE-A2 | 45FSL-5LWE-P4 | 45FSL-5LWE-C4 ❶ |
| | | | NPN | | Red | 45FSL-2LVE-A2 | 45FSL-2LVE-P4 | 45FSL-2LVE-C4 ❶ |
| | | | | | White | 45FSL-5LVE-A2 | 45FSL-5LVE-P4 | 45FSL-5LVE-C4 ❶ |

❶ PowerBus master/4 conductor QD = 45F-A4C-A2
PowerBus slave/2 conductor QD = 45F-A2C-A2

### Cordsets and Accessories

| Description | Cat./Page No. | Description | Cat./Page No. |
|---|---|---|---|
| Pico QD Cordset, Straight, 4-pin, 2 m | 889P-F4AB-2 | PowerBus master/4 conductor QD | 45F-A4C-A2 |
| Fiber Optic Cables | 1-231 | PowerBus slave/2 conductor QD | 45F-A2C-A2 |
| **Fiber Optic Adaptor Replacements** | | **PowerBus caps** | |
| 1.25…2.2 mm O.D. | 61-6731 | Male | 45F-AMC |
| 1.00…2.2 mm O.D. | 61-6742 | Female | 45F-AFC |
| Mounting Assembly | 60-2638 | | |

# 42FT Visible Red or Green Plastic Fiber Optic

## Self-Teach

## Description

The 42FT is a compact, DIN Rail mount fiber optic photoelectric sensor with sophisticated part detection, diagnostic, and self-teach capabilities.

Five LED indicators provide diagnostic and alignment information. A dynamic diagnostic output signals when margin levels are below a predetermined threshold for seven successive detections.

The self-teach capability allows the Bulletin 42FT to determine an optimum sensitivity and hysteresis setting for a specific application. The remote lockout feature can be used to help prevent unauthorized changes to these adjustments. A switch selectable 50 ms off-delay ("pulse stretcher") is useful in high speed applications where the output pulse must be lengthened to allow time for the machine logic to respond.

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, 4X, 12, 13; IP66 (IEC 529) |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% |
| **Optical** | |
| Sensing Mode | Fiber optic |
| Light Source | Red or green |
| LED Indicators | See User Interface Panel on page 1-142 |
| Adjustments | Local teach and remote self teach |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 60 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 500 µS |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 24V DC max |
| **Mechanical** | |
| Housing Material | ABS resin |
| Connection Types | 2 m conductor cable |
| Supplied Accessories | 60-2638 mounting assembly, fiber optic adaptor |
| Optional Accessories | See mounting bracket and cordsets on page 1-143 |

## Features

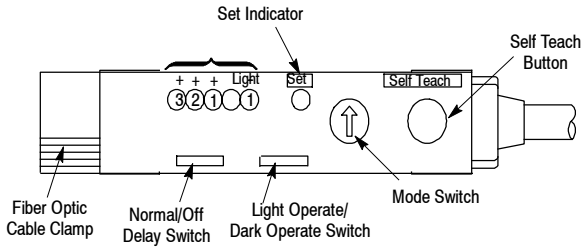
- Choose from red or green light source
- Local and remote self-teach operation
- Supports 1.5 mm and 1.25 mm plastic fiber optic cables
- Fast 500 µs response time
- Selectable pulse-stretcher
- Selectable hysteresis
- Selectable light/dark operate
- Dual "RUN" modes to prevent crosstalk with other sensors
- Both NPN and PNP outputs

# 42FT Visible Red or Green Plastic Fiber Optic

## Self-Teach

### User Interface Panel

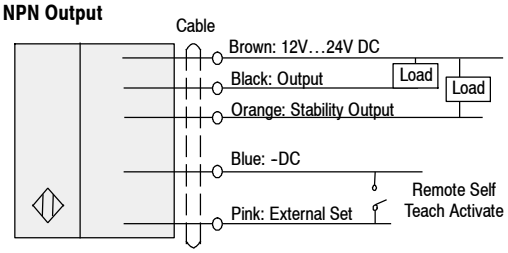
| Label | Color | State | Status |
|---|---|---|---|
| Set | Green | OFF | Sensor not powered |
| | | ON | Sensor powered, configuration verified |
| | | Flashing | Self-teach mode active |
| -1... +3 | | ON | 0.8X...1.6X margin |
| Light | Red | OFF | 1X margin, output not activated |
| | | ON | 1X margin, output activated |



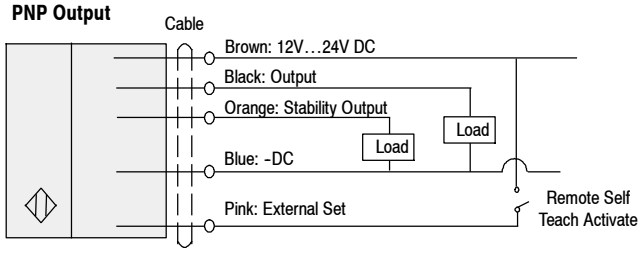

### Wiring Diagrams

**Cable**

**NPN Output**



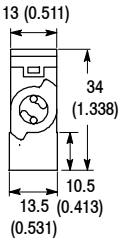

**PNP Output**



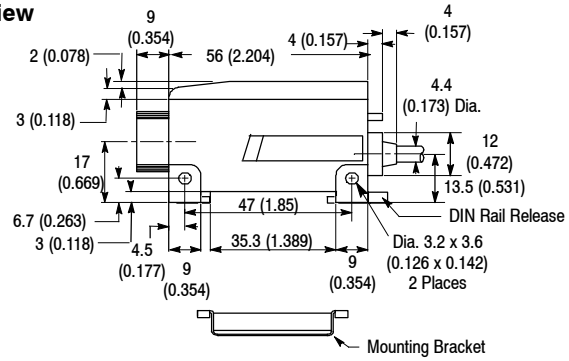

**Note:** Details regarding connection of Allen-Bradley Bulletin 42FT photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0. Refer to *www.ab.com/literature* for more information.

### Approximate Dimensions [mm (in.)]

**End View**



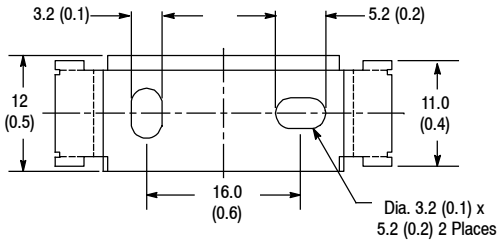

**Side View**



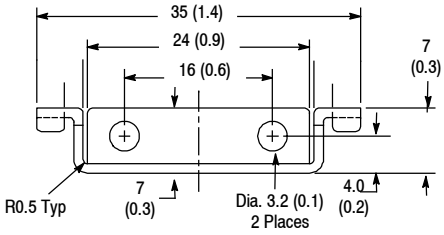

**Mounting Assembly—60-2638**

Stainless steel mounting bracket for installing the 42FT without a DIN Rail.

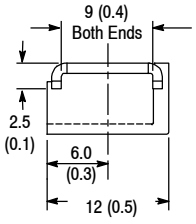
**Top View**




**Side View**

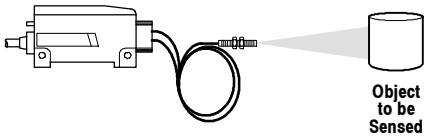



**End View**



# 42FT Visible Red or Green Plastic Fiber Optic

**Self-Teach**

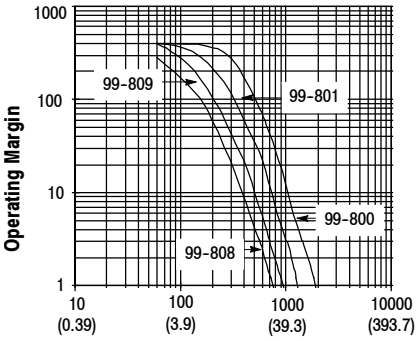



## QD Cordsets and Accessories

| Description | Cat./Page No. |
|---|---|
| Fiber Optic Cables | 1-231 |
| Mounting Assemblies | 1-293 |
| Fiber Optic Cable Adaptors | 61-6731 |
| 76 mm (3 in.) Diameter with Center Mount Hole | 92-39 |
| 32 mm (1.25 in.) Diameter with Center Mount Hole | 92-47 |

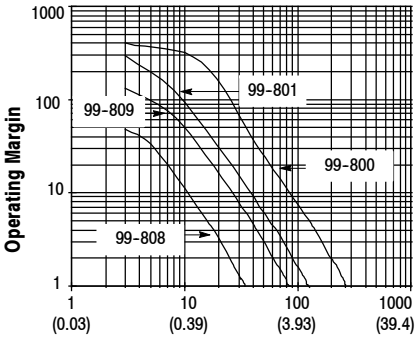
## Typical Response Curves for Visible Red LED

**Retroreflective**



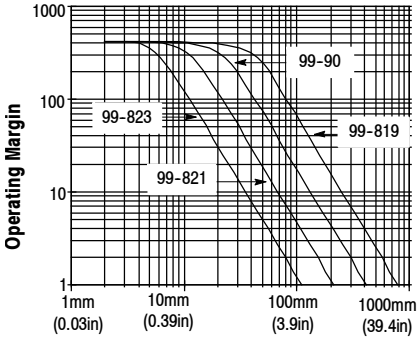

**Distance to 76 mm Reflector Model 92-39 [mm (in.)]**

**Diffuse**




**Distance to White Target [mm (in.)]**

**Transmitted Beam**




**Operating Distance [mm (in.)]**

## Product Selection

| Operating Voltage Supply Current | Max Sensing Distance @ 1X Margin | Output Energized | Emitter LED | Output Type Capacity Response Time | Max Leakage Current | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
| 12…24V DC ±10% 60 mA | Depends on Fiber Optic Cable Selected | Light/Dark Selectable | Red 660 nm | PNP Output: 100 mA Stability: 50 mA 500 µs | 0.5 mA | 2 m 500V cable | **42FT-F2LPA-A2** |
| | | | Green 565 nm | | | 2 m 500V cable | 42FT-F3LPA-A2 |
| 12…24V DC ±10% 50 mA | | | Red 660 nm | NPN Output: 100 mA Stability: 50 mA 500 µs | | 2 m 500V cable | **42FT-F2LNA-A2** |
| | | | Green 565 nm | | | 2 m 500V cable | 42FT-F3LNA-A2 |

# 42FA Visible Red Plastic Fiber Optic

## Slim Housing

## Features

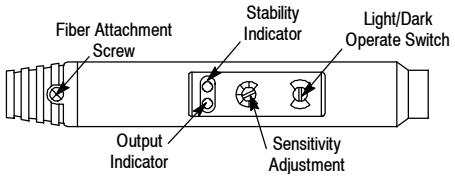
- Compact 8 x 10 mm size
- Dual LED indicators: output (red), stability (green)
- Fast 500 µs response time
- Visible red light source
- Selectable light or dark operate
- Can be DIN Rail mounted or mounted separately

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | NEMA 1, 12, 13; IP65 (IEC 529) |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% |
| **Optical** | |
| Sensing Mode | Fiber optic |
| Sensing Range | Depends on fiber optic selected |
| Field of View | Depends on fiber optic selected |
| Light Source | Visible red LED (660 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 12…24V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Reverse polarity, false pulse, transient noise |
| **Outputs** | |
| Response Time | 500 µs |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 24V DC |
| **Mechanical** | |
| Housing Material | Noryl® |
| Lens Material | Not applicable |
| Connection Types | 3-pin DC pico (M8) QD |
| Supplied Accessories | Mounting bracket, adhesive apertures (transmitted beam models), screwdriver, reflector (retroreflective models) |
| Optional Accessories | See cordsets and 35 mm DIN Rail on page 1-146 |

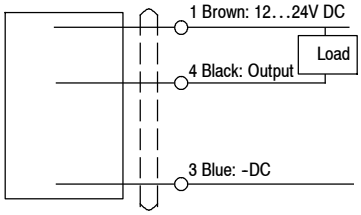
## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| STB | Green | OFF | 0.8X< Margin <1X |
| | | ON | 0.8X> Margin >1X |
| OUT | Red | OFF | Output not activated |
| | | ON | Output activated |

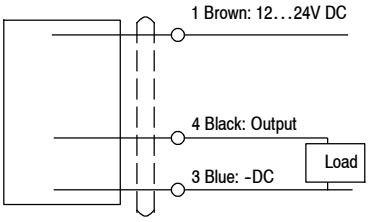


## Wiring Diagrams

**NPN Output**




**PNP Output**

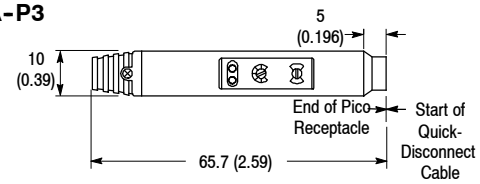



**Face View Male Receptacle (Sensor)**

**Note:** Details regarding connection of Rockwell Automation Bulletin 42FA photoelectric sensors to Rockwell Automation Programmable Controllers can be found in the *PHOTOSWITCH® Interface Manual*. Refer to *www.ab.com/literature* for more information.

## Approximate Dimensions [mm (in.)]

**Pico Quick-Disconnect Versions**
**42FA-F2LPA-P3**
**42FA-F2LNA-P3**

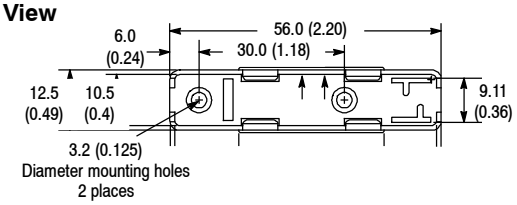



## DIN Rail Mounting Assembly—60-2639 (included with sensor)

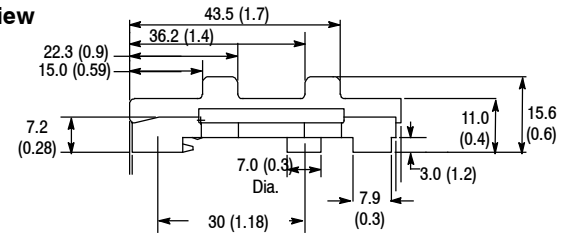
Mounting bracket and hardware for DIN rail mounting.

## Approximate Dimensions [mm (in.)]

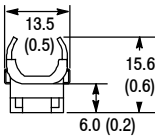
**Top View**




**Side View**




**End View**



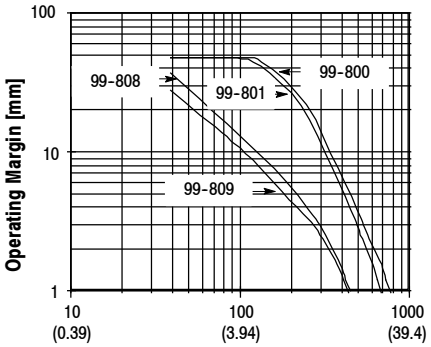

**Note**: Replacement mounting assembly and fiber optic cable adaptors are available on page 1-293.

# 42FA Visible Red Plastic Fiber Optic

## Slim Housing

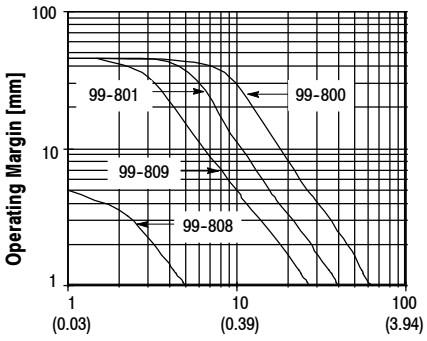
## Typical Response Curves

### Retroreflective



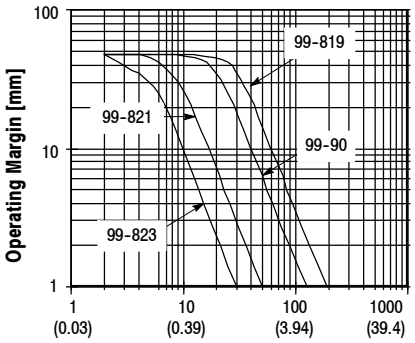

Distance to 76 mm Reflector Model 92-39 [mm (in.)]

### Diffuse



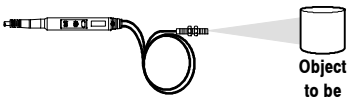

Distance to White Target [mm (in.)]

### Transmitted Beam




Operating Distance [mm (in.)]

## Product Selection




**Field of View:** Refer to Fiber Optic section
**Emitter LED:** Visible red 660 nm

| Operating Voltage Supply Current | Output Type Capacity Response Time | Max Leakage Current | Connection Type | Cat. No. |
|---|---|---|---|---|
| 12…24V DC ±10%<br>25 mA | NPN<br>100 mA<br>500 µs | 0.5 mA | 3-pin pico | 42FA-F2LNA-P3 |
| 12…24V DC ±10%<br>30 mA | PNP<br>100 mA<br>500 µs | | 3-pin pico | **42FA-F2LPA-P3** |

## Cordsets and Accessories

| Description | Cat./Page No. |
|---|---|
| 2 m (6.5 ft) 3-pin Pico QD Cordset | **889P-S3AB-2** |
| Plastic Fiber Optic Cables | 1-270 |
| Adaptor for 1.25 mm Fiber Optic Cables | 61-6731 |
| DIN Rail Mounting Bracket | 60-2639 |

# 45FPL Visible Red Small Aperture Teachable Fiber Optic

## Extended Range with Digital Display

## Description

DIN rail mountable fiber optic sensors with easy to read LED display and teach-in functionality.

The 45FPL photoelectric sensors are designed for use with fiber optic cables up to 2.2 mm in diameter. An adaptor is supplied for use with either 1.0 or 1.25 mm fiber optic cables. No tools are required to attach or remove the fiber optic cables.

## Features

- Two step static or dynamic teach functionality: allows the 45FPL photoelectric sensor to determine an optimum sensitivity setting for applications.
- Large, easy to read back lit display: clearly indicates detected light levels, operating modes, functions and diagnostic information.
- High speed and long range modes: allows for maximum application flexibility.
- Selectable 45 ms OFF delay output timer: useful for interfacing to slower systems.
- DIN rail mountable: for installation convenience, a steel bracket is supplied for applications requiring side mounting.
- Reverse polarity, false pulse and transient noise protection.
- Selectable L.O. or D.O. operating mode.
- Manual override of switching threshold.

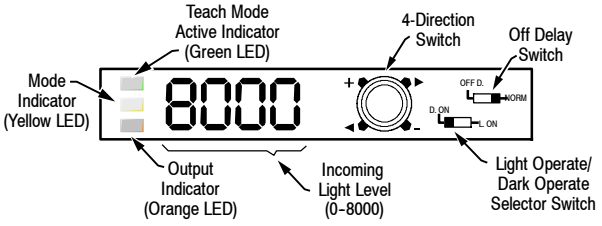
## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL and CE Marked for all applicable directives |
| Operating Environment | IP40 |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) |
| Vibration | 10…55 Hz, 1.5 mm double amplitude, 2 hrs. each in X, Y and Z directions |
| Shock | 500 m/s$^2$ three times each in X, Y and Z directions |
| Relative Humidity | 35…85% relative humidity (without condensation) |
| Ambient Light Immunity | Incandescent lamp: 3,500 lux max. |
| **Optical** | |
| Sensing Modes | Diffuse or transmitted beam, depends on fiber optic cable selected |
| Light Source | Visible red LED (660 nm) |
| LED Indicators | See User Interface Panel below |
| Adjustments | Full auto-teaching and manual adjustment |
| **Electrical** | |
| Voltage | 12…24V DC ±10% |
| Current Consumption | PNP type 32 mA, NPN type 25 mA |
| Sensor Protection | Reverse polarity, short circuit, surge absorption (overload) |
| **Outputs** | |
| Response Time | High speed mode: 190 µs, Long range mode: 1.8 ms |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA @ 30V DC max |
| **Mechanical** | |
| Housing Material | Polycarbonate |
| Connection Types | 2 m (6.5 ft) cable or 3-pin pico on 300 mm (11.8 in.) pigtail |
| Supplied Accessories | #61-6731 fiber optic cable adaptor (Qty 2),<br>#60-2638 Steel mounting bracket (Qty 1) |
| Optional Accessories | Cordsets, ArmorBlock I/O, distribution boxes, fiber optic cables |

## User Interface Panel

The use interface contains a large, easy to read back lit LCD display, a four position thumb switch, two operation mode selection switches, and LED indicators for configuring and viewing the sensor's operation and status.

| Color | State | Status |
|---|---|---|
| Green | Flashing | Teach mode active |
| Yellow | ON | Long range mode |
| | OFF | High speed mode |
| Orange | ON | Output ON |
| | OFF | Output OFF |





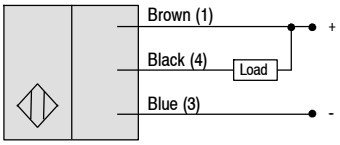

New

# 45FPL Visible Red Small Aperture Teachable Fiber Optic

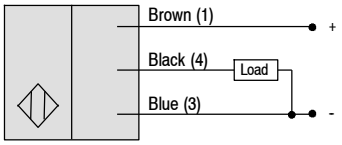
## Extended Range with Digital Display

## Wiring Diagrams

### PNP Output

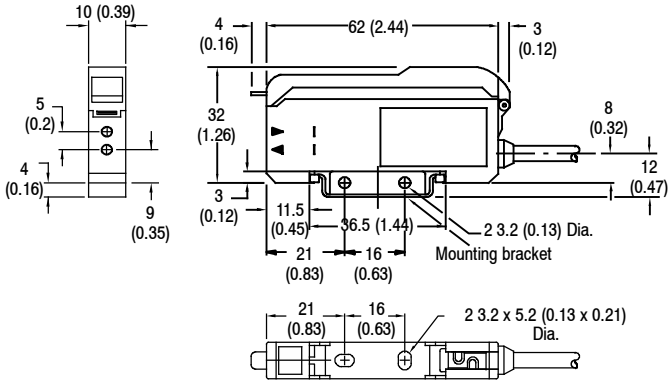



### NPN Output

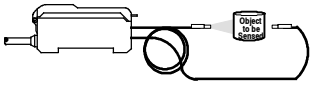



### Pico QD (M8)

## Approximate Dimensions [mm (in.)]




## Product Selection

| Sensing Characteristics | Operating Voltage | Output Type | Connection Type | Cat. No. |
|---|---|---|---|---|
|  **Emitter LED:** Visible red 660 nm **Sensing Range:** Refer to fiber optic selection below | 12…24V DC ±10% | PNP | 2 m cable | 45FPL-2LHE-A2 |
| | | | 3-pin pico QD (M8) on 300 mm pigtail | 45FPL-2LHE-Y3 |
| | | NPN | 2 m cable | 45FPL-2LGE-A2 |
| | | | 3-pin pico QD (M8) on 300 mm pigtail | 45FPL-2LGE-Y3 |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| Pico cordset | 889P-F3AB-2 | 8-port, 3-pin pico distribution box | 898P-P38PT-B5 |
| 3-pin pico patchcord, 2 m, straight | 889P-F3ABPM-2 | Fiber optic cables | Refer to *Sensors* catalog |
| ArmorBlock DeviceNet 8-port sinking input module (for use with PNP sensors only) | 1732D-IB8M8 | Fiber optic adaptor (included) 1.0…2.2 mm OD | 60-6731 |
| | | Mounting assembly (included) | 60-2638 |
| 4-port, 3-pin pico distribution box | 898P-P34PT-B5 | | |

# 45FPL Visible Red Small Aperture Teachable Fiber Optic

## Extended Range with Digital Display

## 43GR Glass Fiber Optic Cable Selection

### Threaded Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

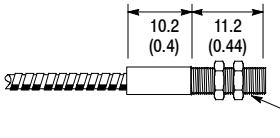
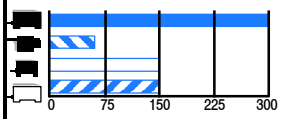
45FPL-xxxx

42KL-L2xxx

45FSL-xxxx

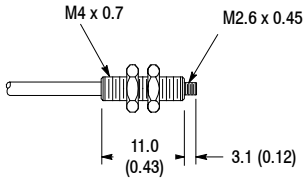
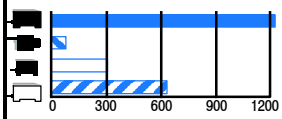
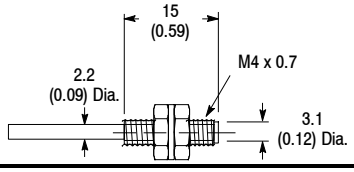
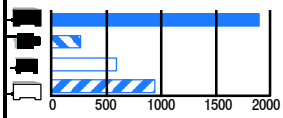
45FVL-xxxx

| Approximate Metric / Standard Distances | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 50 | 100 | 150 | 200 | 250 | 300 | mm |
| 0 | 2 | 4 | 6 | 8 | 10 | 12 | in. |

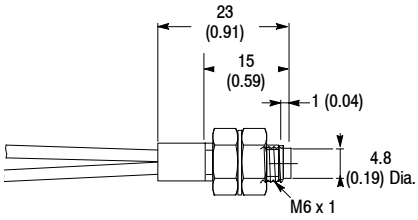
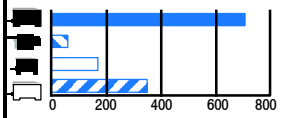
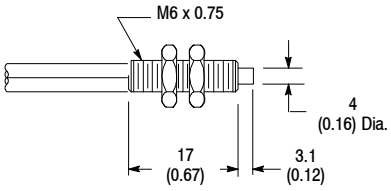
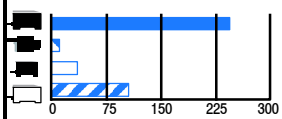
| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] ❶ | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 2.2 (0.09) | Stainless Steel |  | **43GR-TAB20SS** |

## 43PT Plastic Fiber Optic Cable Selection

### Threaded Transmitted Beam Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm]❶ | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | **43PT-NJS56FS** |
|  | 40 (1.6) | 1.5 (0.06) | Polyethylene |  | **43PT-NAS58FS** |

### Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm]❶ | Cat. No. |
|---|---|---|---|---|---|
|  | 40 (1.6) | 2 x 1.5 (0.06) | Polyethylene |  | **43PR-NDS59FS** |
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | **43PR-NES57ZS** |

❶ The sensing distance for the 45FPL is two times the sensing distance for the 45FVL when used in long range mode.

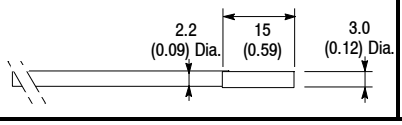
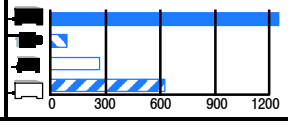


New

# 45FPL Visible Red Small Aperture Teachable Fiber Optic

## Extended Range with Digital Display

### Ferrule Transmitted Beam for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm]❶ | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | **43PT-CBS56FS** |

**Notes:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.
Two cables per one plastic transmitted beam cat. no.

❶ The sensing distance for the 45FPL is two times the sensing distance for the 45FVL when used in long range mode.

*ClearSight 9000*

*ClearSight RightSight*

*ClearSight 7000*

## Features

Three product families for application flexibility

- Configurable ClearSight 9000 for harsh duty glass and PET bottle detection
- ClearSight RightSight and 7000 for general purpose plastic film and stretch-wrap detection

## Specifications

| | 9000 | RightSight | 7000 |
|---|---|---|---|
| **Environmental** | | | |
| Certifications | cULus Listed and CE Marked for all applicable directives | | |
| Operating Environment | NEMA 3, 4X, 6P, 12, 13, IP67 (IEC529); 1200 psi (8270 kpa) washdown for RightSight and Series 9000 models | | |
| Operating Temperature [C (F)] | -34…+70° (-29…+158°) | -25…+55° (-13…+131°) | -40…+65° (+13…+150°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 | | |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 | | |
| Relative Humidity | 35…85% | | |
| Ambient Light Immunity | Incandescent light: 5000 lux | | |
| **Optical** | | | |
| Sensing Modes | Clear object | | |
| Sensing Range | 1.2 m max | 1 m max | 1.5 m max |
| Field of View | See Product Selection table on page 1-149 | | |
| Light Source | Visible red LED (660 nm) | | |
| **Electrical** | | | |
| Voltage | 10…40V DC; 70…264V AC/DC | 10.8…30V DC | 11.8…28V DC |
| Current Consumption | 30 mA max | 35 mA max | 46 mA max |
| Sensor Protection | Short circuit, false pulse, reverse polarity, overload | | |
| **Outputs** | | | |
| Response Time | See Product Selection table on page 1-149 | | |
| Output Type | PNP and NPN, SDPT, SS relay, diagnostic output, see Product Selection table on page 1-149 | | |
| Output Mode | Light or dark operate selectable, light or dark operate by cat. no. (see Product Selection table on page 1-149) | | |
| Output Current | Refer to Product Selection table on page 1-149 | | |
| **Mechanical** | | | |
| Housing Material | Valox® | Mindel® | Valox |
| Lens Material | Acrylic | | |
| Connection Types | See Product Selection table on page 1-149 | | |
| Supplied Accessories | 92-90 Reflector | | |
| Optional Accessories | See mounting brackets and cordsets on page 1-150 | | |

## Wiring Diagrams

For Wiring Diagrams, please refer to base product specifications:

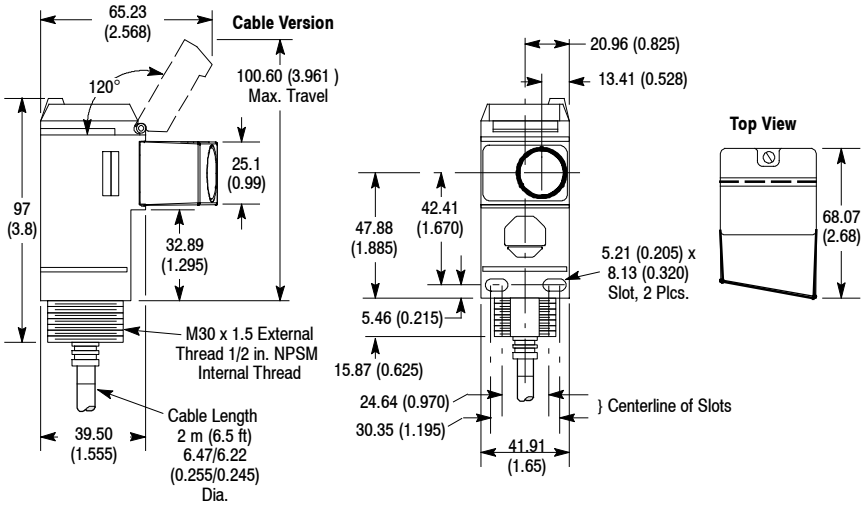
ClearSight RightSight see page 1-32

ClearSight 9000 see page 1-66

ClearSight 7000 see page 1-103

## Approximate Dimensions [mm (in.)]

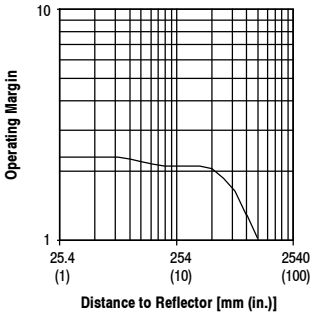
### ClearSight 9000




Dimensions for ClearSight RightSight and ClearSight 7000 are located on page 1-32 and 1-103, respectively.

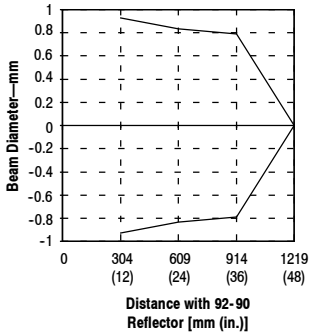
## Typical Response Curve

### 9000



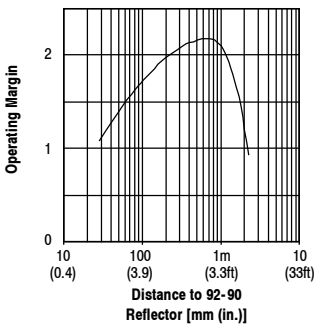

## Beam Pattern

### 9000



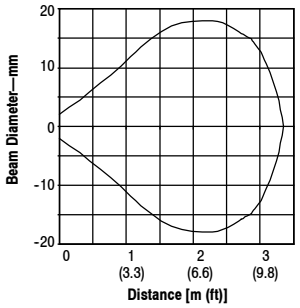

## Typical Response Curve

### RightSight

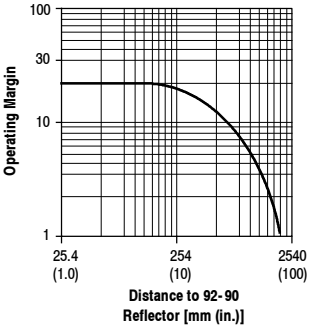



## Beam Pattern

### RightSight




### 7000

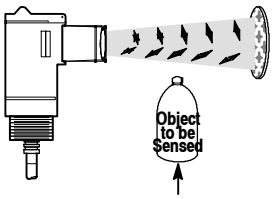
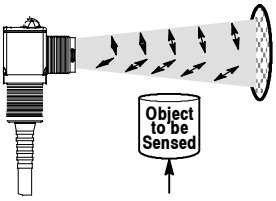
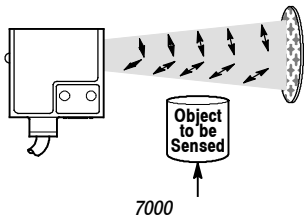





Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

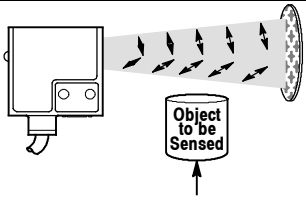
## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
| **On/Off Sensors and Timing** | | | | | | |
|  *9000* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 10…40V DC 30 mA | 0.025…1.2 m (0.08…4 ft) | Light/Dark Selectable | NPN/PNP 250 mA 2 ms | 2 m 300V cable | 42G⊗C-9200 |
| | | | | | 4-pin DC micro | **42G⊗C-9200-QD** |
| | | | | | 4-pin mini | 42G⊗C-9200-QD1 |
| | 70…264V AC/DC 50/60 Hz 15 mA | | | SPDT EM Relay 2 A/132V AC/ 1 A/264V AC 1 A/150V DC 15 ms | 2 m 300V cable | 42G⊗C-9202 |
| | | | | | 5-pin mini | **42G⊗C-9202-QD** |
| | 45…264V DC/ 40…264V AC 50/60 Hz 15 mA | | | Solid State Isolated N.O. 300 mA 2 ms | 2 m 300V cable | 42G⊗C-9203 |
| | | | | | 4-pin mini | 42G⊗C-9203-QD |
| | | | | | 4-pin AC micro | **42G⊗C-9203-QD1** |
|  *RightSight* **Field of View**: 1.5° **Emitter LED**: Visible red 660 nm | 21.6…264V AC/DC 15 mA | 25 mm…1 m (1 in…3.28 ft) | Dark Operate | N-MOSFET/100 mA 8.3 ms | 2 m 300V cable | 42EF-C2SCA-A2 |
| | | | | | 4-pin AC micro | 42EF-C2SCA-G4 |
| | 10.8…30V DC 35 mA | | | NPN/PNP 100 mA 1 ms | 2 m 300V cable | 42EF-C2KBA-A2 |
| | | | | | 4-pin DC micro | **42EF-C2KBA-F4** |
| **Linear Polarized Sensors for Detection of Clear Films** | | | | | | |
|  *7000* **Field of View**: 3° **Emitter LED**: Visible red 660 nm | 11…28V DC 46 mA | 50 mm…1.5 m (2 in…4.9 ft) | Comple-mentary L.O./D.O. | NPN 100 mA 1 ms | 3 m cable | 42SMU-7250 |
| | | | | | 4-pin DC micro | 42SMU-7250-QD |
| | | | | PNP 100 mA 1 ms | 3 m cable | 42SMU-7251 |
| | | | | | 4-pin DC micro | **42SMU-7251-QD** |

⊗ R for standard (i.e. 42GRC-9200)
T for timing (i.e. 42GTC-9200)

**Refer to page 1-150 for cordsets and accessories.**

## Product Selection (continued)

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
| **Circular Polarized Sensors for Detection of Clear Objects (Bottles, Clear Packages)** | | | | | | |
|  *7000*<br>**Field of View:** 3°<br>**Emitter LED:** Visible red 660 nm | 11…28V DC 46 mA | 50 mm…1.5 m (2 in…4.9 ft) | Comple-mentary L.O./D.O. | NPN 100 mA 1 ms | 3 m cable | 42SMU-7260 |
| | | | | | 4-pin DC micro | 42SMU-7260-QD |
| | | | | PNP 100 mA 1 ms | 3 m cable | 42SMU-7261 |
| | | | | | 4-pin DC micro | **42SMU-7261-QD** |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| 2 m (6.5 ft), 4-pin DC Micro QD Cordset | 889D-F4AC-2 | Mounting Bracket Swivel/Tilt for ClearSight 7000 | 60-2619 |
| 2 m (6.5 ft) 5-pin DC Micro QD Cordset | 889D-F5AC-2 | Mounting Bracket Swivel/Tilt for ClearSight RightSight | 60-2649 |
| 2 m (6.5 ft), 4-pin AC Micro QD Cordset, Straight | 889R-F4AEA-2 | Mounting Bracket Swivel/Tilt for ClearSight 9000 and 10,000 | 60-2681 |
| 1.8 m (6 ft) 4-pin, Mini QD Cordset | 889N-F4AF-6F | Reflector | 92-90 (included) |
| 1.8 m (6 ft) 5-pin Mini QD Cordset | 889N-F5AF-6F | | |

## Description

The 45LPT is an optical label sensor designed exclusively for the detection of standard or opaque labels on a high speed web. The 45LPT provides a solution for packaging industry applications such as label counting and web, “double sheet” and mark detection on a translucent film.

## Features

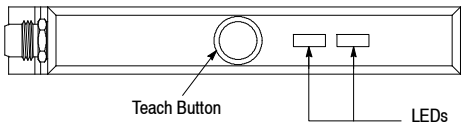
- “One Touch” local and remote teach capability
- 10…30V DC operation
- Fast 50 μsec response time
- User interface lockout feature
- IP65 housing
- Industrial anodized aluminum housing

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP65 |
| Operating Temperature [C (F)] | -20…+60° (-4…+140°) |
| Vibration/Shock | 10…55 Hz, 1.5 mm amplitude; meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| Ambient Light Immunity | Incandescent light 3000 lux |
| **Optical** | |
| Sensing Mode | Transmitted beam |
| Sensing Gap | 3 mm (0.12 in.) |
| Light Source | Nonpulsed infrared |
| Adjustments | Push button for sensitivity adjustment, local and remote teach |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 40 mA max |
| Sensor Protection | Short circuit, overload, transient noise, reverse polarity |
| Power ON Delay | 350 ms |
| **Outputs** | |
| Response Time | 50 μs |
| Output Type | PNP or NPN selectable |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 30 V DC |
| Output Leakage Current | 12V Supply: 0.78 mA @ 10 mA load, 6.9 mA @100 mA load<br>24V Supply: 0.30 mA @ 10 mA load, 3 mA @ 100 mA load |
| **Mechanical** | |
| Housing Material | Aluminum |
| Connection Types | 4-pin pico (M8) QD |
| Supplied Accessories | None |
| Optional Accessories | Cordsets |

## User Interface

| Label | Color | State | Condition |
|---|---|---|---|
| — | Green ❶ | OFF | Sensor power not present |
| | | Steady | Sensor power present |
| | | Flash | Fine teach—translucent label teach |
| — | Red ❶ | OFF | Output inactive |
| | | Steady | Interface lockout |
| | | Flash | Standard label teach |



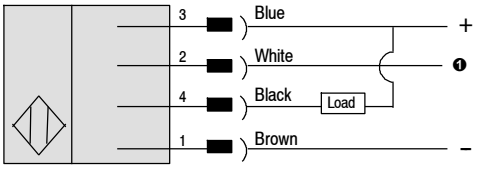

❶ Red and green LED flash: SCP active or label too translucent or web to opaque.

# 45LPT

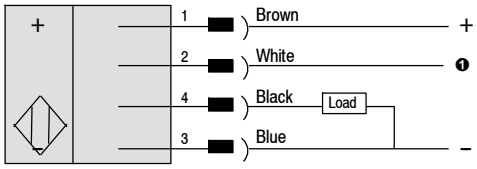
## Optical Label Sensor

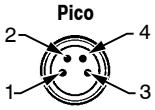
## Wiring Diagrams

### NPN (Light Operate)

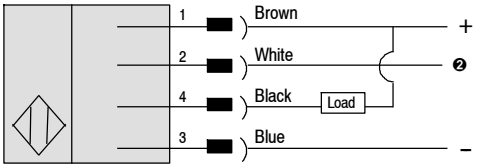



### PNP (Light Operate)

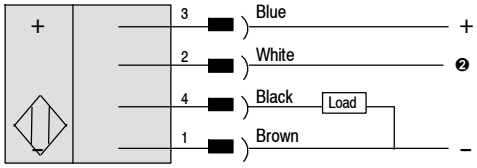


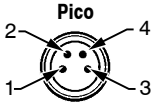




### NPN (Dark Operate)




### PNP (Dark Operate)

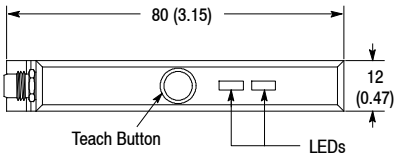


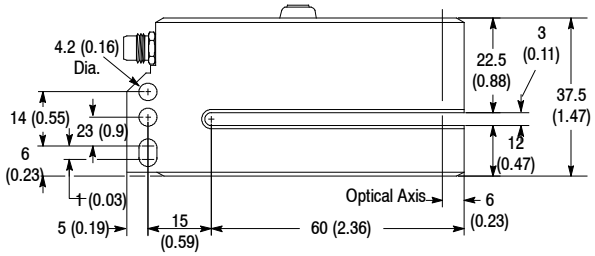




❶ Remote teach = Connect **white wire** to (+) positive terminal.
❷ Remote teach = Connect **white wire** to (–) negative terminal.
**Note**: If remote teach (white wire) is not used, connect it to (–) negative terminal.
**Note**: In the event of power failure, the sensor remembers the last threshold taught-in.

| **IMPORTANT** | For Label detection use Dark operate. For Web detection use Light operate. |
|---|---|

## Approximate Dimensions [mm (in.)]




## Product Selection

| Operating Voltage | Sensing Gap [mm (in.)] | Output Energized | Output Type | Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
| 10…30V DC | 3 (0.12) | L.O./D.O. Selectable | NPN or PNP Selectable | 50 µsec | 4-pin Pico | **45LPT-1LEB1-P4** |
| 2 m (6.5 ft) pico QD Cordset | | | | | | 889P-F4AB-2 |

## Description

The Allen-Bradley 45LFM capacitive label sensor uses an innovative electronic design to sense and/or count labels. Its unique technology enables it to sense the leading or trailing edges of labels that are not detectable by other similar sensors. The 45LFM provides an auto-teach function and a display to aid in initial setup and operational efficiency.

## Features

- Consistently senses the presence of most labels on a web
  - Clear labels on clear backing
  - Clear labels on opaque backing
  - Metallic labels on clear backing
  - Opaque labels on clear backing
  - Metallic labels on opaque backing
  - Opaque labels on opaque backing
- Count 50,000 labels per minute with registration error less than 0.01 inch
- Heavy-duty metal housing
- Ideal for label counting and label registering applications

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | 45LFM-CMBA1-D5 meets CE Marked for all applicable directives |
| Operating Environment | IP54 |
| Operating Temperature [C (F)] | 4…+50° (40…+120°) |
| **Target Detection** | |
| Sensing Modes | Capacitive |
| Registration Accuracy | 0.025 mm (0.01 in.) |
| Minimum Sensing Gap | 0.76 mm (0.03 in.) |
| LED Indicators | Edge, zero |
| Adjustments | Multi-turn potentiometer, selectable output polarity by wire |
| **Electrical** | |
| Voltage | 11…28V DC |
| Current Consumption | 50 mA |
| Sensor Protection | Short circuit, overload,reverse polarity |
| Power On delay | 10 µs |
| **Outputs** | |
| Response Time | 10 µS |
| Output Type | PNP and NPN |
| Output Mode | Selectable output polarity by wire |
| Output Current | 150 mA max |
| Output Leakage Current | 5 µA max |
| **Mechanical** | |
| Housing Material | Anodized aluminum |
| Connection Types | 5-pin DC micro (M12) QD |

## User Interface—45LFM-CMBA1-D5

| Label | Function |
|---|---|
| Gain | Sensitivity Adjustment |
| Zero | Gap Adjustment |

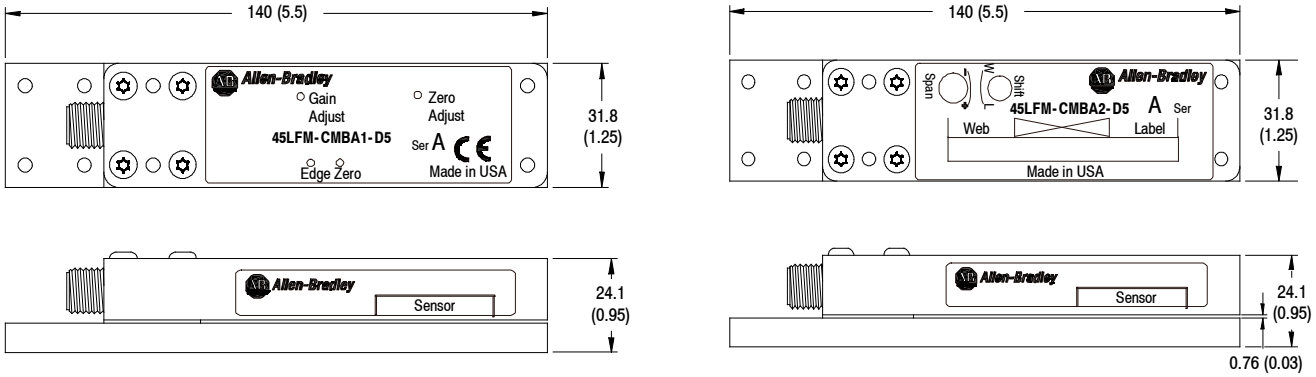
## User Interface—45LFM-CMBA2-D5

| Label | Function |
|---|---|
| Shift | Adjusts position of illuminated LED on display |
| Span | Sensitivity Adjustment |

# 45LFM

## Capacitive Label Sensor

### Approximate Dimensions [mm (in.)]




### Wiring

| Designation | Lead Color (Cordset) | 5-Pin Micro QD Pin Assignment |
|---|---|---|
| Termination | | |
| V+ | Brown | 1 |
| -V | Blue | 2 |
| PNP Output | Black | 3 |
| NPN Output | White | 4 |
| Output Polarity | Grey | 5 |

### Product Selection

| Operating Voltage | Labels Sensed | Output Type | Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|
| 11…28V DC | Opaque<br>Clear | NPN and PNP | 10 µs | 5-pin DC micro | 45LFM-CMBA1-D5 |
| | Opaque<br>Clear<br>Metallic | | | | 45LFM-CMBA2-D5 |
| 2 m (6.5 ft) Micro QD Cordset | | | | | 889D-F5AC-2 |

**Note:** Pin 5 must be connected to +V or ground for reliable detection.

## Description

The 45LSP is family of optical fork sensors housed in a plastic enclosure. Fork sensors offer self-contained transmitted beam sensing, ideal for applications that require reliable parts detection. The simple push button teach-in sensitivity adjustment, several connection options and multiple mounting features (via side thru-holes, rear threaded inserts, or optional dovetail brackets) make the 45LSP an economical, easy to use solution for typical applications such as small parts detection, edge detection, parts counting, gear tooth detection, dimension verifications, etc.

## Specifications

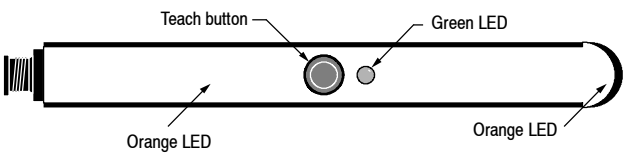
| | |
|---|---|
| **Environmental** | |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -20…+60° (-4…+140°) |
| **Optical** | |
| Sensing Modes | Transmitted beam |
| Sensing Gap | 30, 50, 80, and 120 mm |
| Light Source | Visible red LED (640 nm) |
| LED Indicators | See User Interface below |
| Adjustments | Teach button |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 30 mA max |
| Sensor Protection | Short circuit, reverse polarity |
| **Outputs** | |
| Response Time | 250 µS |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light or dark operate selectable (via teach button or remote) |
| Output Current | 100 mA max |
| **Mechanical** | |
| Housing Material | Polycarbonate |
| Connection Types | 4-pin DC pico (M8) QD connector, 3-pin DC pico (M8) QD connector |
| Optional Accessories | Cordsets and dovetail mounting brackets |

## Features

- Detection of objects as small as 0.2 mm (0.008 in.)
- Highly visible power and output LED indicators with output indication along both sides of the fork
- Remote teach and teach button lock on 4-pin models
- Light or dark operate selectable
- Multiple mounting options: thru-holes, threaded holes and dovetail
- Easy installation with no alignment required
- 3- and 4-pin pico (M8) QD models

## User Interface

| LED Color | State | Status |
|---|---|---|
| Orange | OFF | Output de-energized |
| | ON | Output energized |
| | Flashing | Teach mode or short circuit protection active |
| Green | OFF | Power is OFF |
| | ON | Power is ON |
| | Flashing | Teach mode |



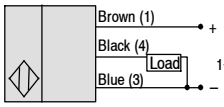
# 45LSP

## Optical Fork Sensor

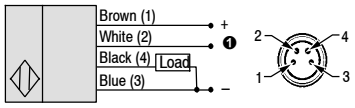
## Wiring Diagrams

### PNP Models

**3-Pin**

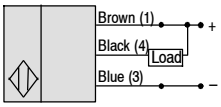



**4-Pin**

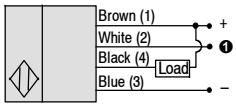



### NPN Models

**3-Pin**

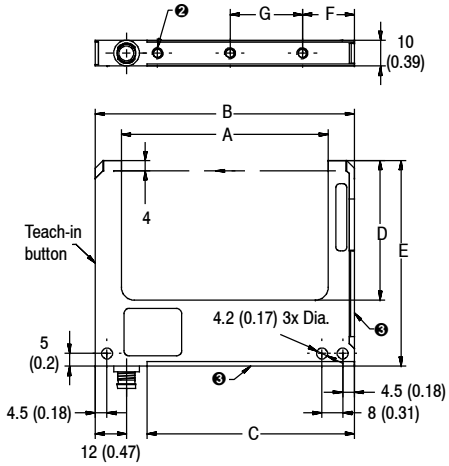



**4-Pin**




❶ Remote teach.

## Approximate Dimensions [mm (in.)]




## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 2 m (6.5 ft) 3-pin DC pico QD | 889P-F3AB-2 |
| 2 m (6.5 ft) 4-pin DC pico QD | 889P-F4AB-2 |
| Dovetail mounting bracket | 44B-BKT |

❷ M4 threaded inserts, 6 mm maximum depth.
❸ Dovetail mounting

| Gap Size | A | B | C | D | E | F | G |
|---|---|---|---|---|---|---|---|
| 30 mm | 30 (1.18) | 50 (1.97) | 30 (1.18) | 34 (1.34) | 59.5 (2.34) | 20 (0.79) | — |
| 50 mm | 50 (1.97) | 70 (2.76) | 50 (1.97) | 54 (2.13) | 79.5 (3.13) | 20 (0.79) | 28 (1.10) |
| 80 mm | 80 (3.15) | 100 (3.93) | 80 (3.15) | 54 (2.13) | 79.5 (3.13) | 20 (0.79) | 2 x 28 |
| 120 mm | 120 (4.72) | 140 (5.51) | 120 (4.72) | 54 (2.13) | 79.5 (3.13) | 20 (0.79) | 3 x 28 |

## Product Selection

| Sensing Gap | Resolution [mm (in.)]❹ | Operating Voltage | Output Mode | Connection Type | Output Type | Cat. No. |
|---|---|---|---|---|---|---|
| 30 mm | 0.2 (0.008)❺ | 10…30 V DC | Light or dark operate selectable | 3-pin pico | PNP | **45LSP-2LPA1-P3** |
| | | | | | NPN | 45LSP-2LNA1-P3 |
| | | | | 4-pin pico | PNP | 45LSP-2LPA1-P4 |
| | | | | | NPN | 45LSP-2LNA1-P4 |
| 50 mm | 0.2 (0.008) | | | 3-pin pico | PNP | **45LSP-2LPA2-P3** |
| | | | | | NPN | 45LSP-2LNA2-P3 |
| | | | | 4-pin pico | PNP | 45LSP-2LPA2-P4 |
| | | | | | NPN | 45LSP-2LNA2-P4 |
| 80 mm | 0.2 (0.008) | | | 3-pin pico | PNP | **45LSP-2LPA3-P3** |
| | | | | | NPN | 45LSP-2LNA3-P3 |
| | | | | 4-pin pico | PNP | 45LSP-2LPA3-P4 |
| | | | | | NPN | 45LSP-2LNA3-P4 |
| 120 mm | 0.4 (0.016) | | | 3-pin pico | PNP | **45LSP-2LPA4-P3** |
| | | | | | NPN | 45LSP-2LNA4-P3 |
| | | | | 4-pin pico | PNP | 45LSP-2LPA4-P4 |
| | | | | | NPN | 45LSP-2LNA4-P4 |

❹ Not over the entire temperature range. For maximum precision, allow for a heating period of approximately 15 minutes.
❺ For detection of objects less than 0.9 mm (0.035 in.), the object should be placed ≥10 mm away from the LED light source.

## Description

The 45LST optical fork sensor is designed for small part detection on machines and conveyors. With available slot widths from 2…225 mm (0.08…8.86 in.), these sensors feature adjustable sensitivity and selectable NPN/PNP with L.O./D.O. energized output in a heavy-duty IP65 aluminum housing. Applications include label detection on clear substrates, cap detection on bottles, and part sensing on conveyors for the packaging and material handling industries. The 45LST sensors are also ideal for the automotive, paper, and food industries.

## Features

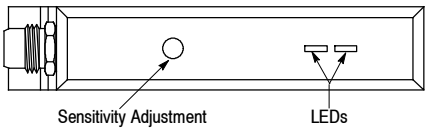
- 10…30V DC operation
- Fast 30 μsec response time for selected models
- NPN/PNP output
- IP65 housing
- Industrial aluminum housing
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | IP65 |
| Operating Temperature [C (F)] | -20…+60° (-4…+10°) |
| Ambient Light Immunity | Incandescent light 3000 lux |
| **Optical** | |
| Sensing Modes | Transmitted beam |
| Sensing Gap | 2…225 mm (0.08…8.86 in.) |
| Light Source | Nonmodulated infrared, infrared LED (880 nm) |
| LED Indicators | See User Interface below |
| Adjustments | 25 turn potentiometer |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 40 mA max |
| Sensor Protection | Short circuit, reverse polarity, transient, overload |
| Power On Delay | 129 ms |
| **Outputs** | |
| Response Time | 1 ms , 30 μS (45LST-1LEA1-P4 only) |
| Output Type | PNP or NPN selectable |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max |
| Output Leakage Current | 12V DC supply : 0.78 mA @ 10 mA load, 6.9 mA @ 100 mA load<br>24V DC supply : 0.30 mA @ 10 mA load, 3.0 mA @ 100 mA load |
| **Mechanical** | |
| Housing Material | Anodized aluminum |
| Connection Types | 4-pin DC pico (M8) QD connector |
| Optional Accessories | Cordsets |

## User Interface

| Label | Color | State | Condition |
|---|---|---|---|
| — | Green ❶ | OFF | Sensor power not present |
| | | Steady | Sensor power present |
| — | Red ❶ | OFF | Output inactive |
| | | Steady | Output active |



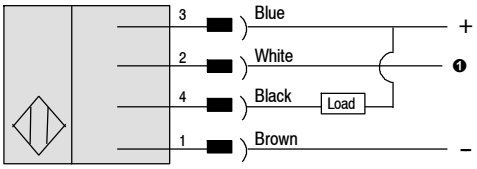

❶ Red and green LED flash: SCP active

# 45LST

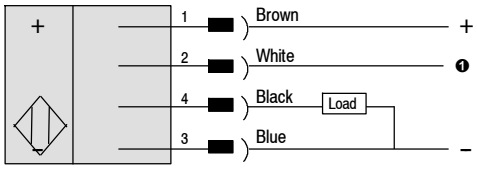
## Optical Fork Sensor

## Wiring Diagrams

### NPN (Light Operate)

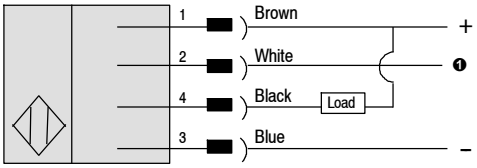



### PNP (Light Operate)

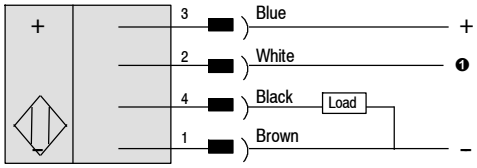



### Pico

### NPN (Dark Operate)




### PNP (Dark Operate)

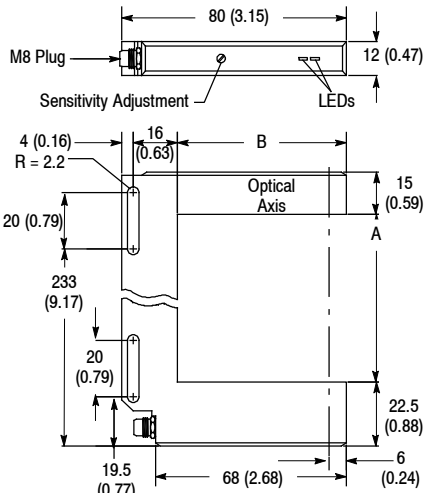



### Pico

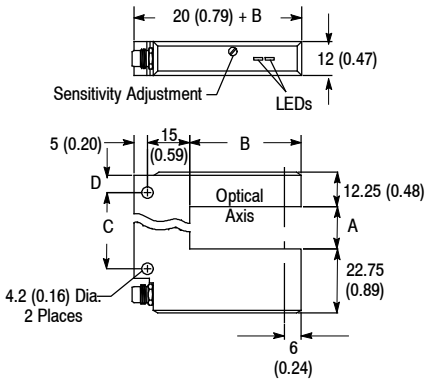
❶ White wire not used.

## Approximate Dimensions [mm (in.)]

### 225 mm




### 2…120 mm




| Dimensions [mm (in.)] | | | | |
|---|---|---|---|---|
| **Fork Size** | **A** | **B** | **C** | **D** |
| 2…120 (0.08…4.72) | 2 (0.08) | 40 (1.57) | 14 (0.55) | 6.25 (0.25) |
| | 15 (0.59) | 40 (1.57) | 27 (1.06) | 6.25 (0.25) |
| | 30 (1.18) | 40 (1.57) | 42 (1.65) | 6.25 (0.25) |
| | 50 (1.97) | 57 (2.24) | 40 (1.57) | 17.25 (0.68) |
| | 80 (3.15) | 57 (2.24) | 70 (2.75) | 17.25 (0.68) |
| | 120 (4.72) | 57 (2.24) | 110 (4.33) | 17.25 (0.68) |
| 225 (8.86) | 225 (8.86) | 60 (2.36) | — | — |

## Product Selection

| Operating Voltage | Sensing Gap [mm (in.)] | Output Energized | Output Type | Light Source Emission | Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|
| 10…30V DC | 2 (0.08) | LO/DO Selectable | NPN or PNP Selectable | Continuous | 30 µsec | 4-pin pico | 45LST-1LEA1-P4 |
| | 15 (0.59) | | | Modulated | 1 ms | | 45LST-1LEA2-P4 |
| | 30 (1.18) | | | | | | 45LST-1LEA3-P4 |
| | 50 (1.96) | | | | | | 45LST-1LEA4-P4 |
| | 80 (3.15) | | | | | | 45LST-1LEA5-P4 |
| | 120 (4.72) | | | | | | 45LST-1LEA6-P4 |
| | 225 (8.86) | | | | | | 45LST-1LEA7-P4 |
| 2 m (6.5 ft) pico QD Cordset | | | | | | | 889P-F4AB-2 |

# 45MLA

## Measuring Arrays and Controllers

## Description

The Allen-Bradley 45MLA is a measurement sensor that utilizes an array of transmitted beam photoelectric sensor pairs to detect and measure objects. The array housing is extremely compact, allowing for easy installation in a range of applications.

The 45MLA are packaged as transmitted beam pairs—the emitter and receiver arrays are both included. The system requires an Allen-Bradley 45MLA controller, which must be ordered separately. Three versions of the controller (I/O, RS485, CAN) are available, each offering a different communications platform that can be selected to function with a range of PLCs.

The controller drives the photoelectric elements in the emitter and reads out the receiver beam information. Use of this external controller allows the flexibility to configure up to four separate sensing zones with independent outputs or the communication of individual beam status via serial protocols. Additionally, the 45MLA can also be customized for application specific overhang and over-height detection.

## Features

- Height measuring capability
- Slim profile array housing
- Long operating range—4 m (13 ft)
- Fast reaction time and measurement speed
- Individual beam status available via controller (serial communication models only)

## Specifications

| Environmental | 45MLA Arrays | 45MLA Controller |
|---|---|---|
| Certifications | CE Marked for all applicable directives | |
| Operating Environment | IP54 | Housing IP54, terminal strip IP20 |
| Operating Temperature [C (F)] | 0…55° (32…131°) | |
| Storage Temperature [C (F)] | -20…70° (-4…158°) | -25…70° (-13…158°) |
| Vibration | 10…55 Hz; amplitude 0.35 mm (0.01 in.); meets or exceeds IEC 60068-2-6 | |
| Shock | Acceleration 10 g, pulse duration 16 ms, 10…55 Hz; amplitude 0.35 mm (0.01 in.); meets or exceeds IEC 60068-2-29 | |
| Relative Humidity | 15…95% | 15…95% |
| **Optical** | | |
| Sensing modes | Transmitted beam pair | — |
| Sensing Range | 0…4 m (0…13 ft) | — |
| Field of View | 3.2° | — |
| Light Source | 940 nm | — |
| Beam Spacing | 10 mm (0.4 in.) or 25 mm (1.0 in.) | — |
| Resolution | 18 mm (0.7 in.) or 33 mm (1.3 in.) | — |
| LED Indicators | Red: Status<br>Green: Alignment | Alignment, target present, outputs, inputs, power |
| **Electrical** | | |
| Voltage | Provided by controller | 20.4…27.6V DC ±5% max. ripple |
| Current Consumption | — | <300 mA with max. no. of beams to controller, outputs not connected |
| Sensor Protection | EN61000-4-2, EN 61000-4-4 and EN 61000-4-5; short circuit (SCP), reverse polarity, and overload | |
| **Outputs** | | |
| Response Time | See *45MLA Controller User Manual* | |
| Output Type | — | NPN and PNP (push/pull output) |
| Output Mode | — | Dark operate (when connected as PNP) |
| Output Current | — | 150 mA max. each |
| **Mechanical** | | |
| Housing Material | Aluminum | ABS(FR) UL94-V0 |
| Lens Material | Polycarbonate | — |
| Cover Material | Aluminum | Polycarbonate |
| Connection Types | 8-pin DC micro (M12) female QD on 500 mm (20 in.) cable pigtail—controller connection only | Spring loaded terminal connections |
| Supplied Accessories | Adjustable mounting kit (445L-AF6143) | |
| Required Accessories | Controller<br>45MLA controller I/O model Cat. No. 45MLA-CTRL<br>45MLA controller RS45 Cat. No.: 45MLA-CTRL-485<br>45MLA controller CAN Cat. No. 45MLA-CTRL-CAN<br>Light array to controller connecting cable<br>3 m (9.8 ft) M12—RJ45 Cat. No. 445L-AC8RJ3<br>5 m (16.4 ft) M12—RJ45 Cat. No. 445L-AC8RJ5<br>8 m (26.2 ft) M12—RJ45 Cat. No. 445L-AC8RJ8<br>Max. system length cannot exceed 10 m (32.8 ft) | |
| Optional Accessories | Flat mounting kit Cat. No. 445L-AF6145 | |

## User Interface

The following table indicates LED status and descriptions for LEDs on the emitter and receiver light arrays.

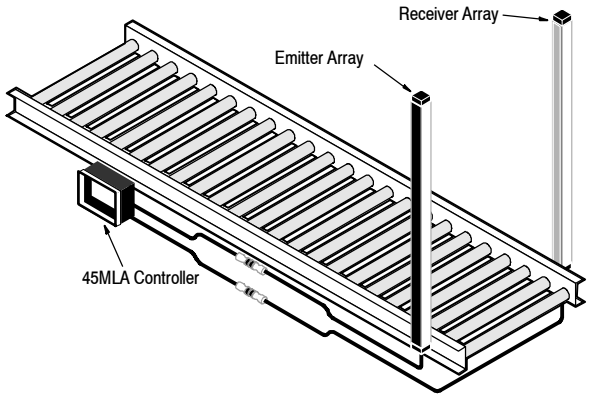
| Location | LED | Description | Status | Meaning |
|---|---|---|---|---|
| Emitter and Receiver Arrays | Green | Light array alignment | Off | Arrays not aligned (or target present) |
| | | | On | Arrays aligned (and target not present) |
| | | | Flashing | Low margin/light intensity inadequate |
| | Red | Light array status | Off | Target not present (and arrays aligned) |
| | | | On | Target present (or arrays not aligned) |

The following table indicates the status and description for each LED on the controller's main PCB.

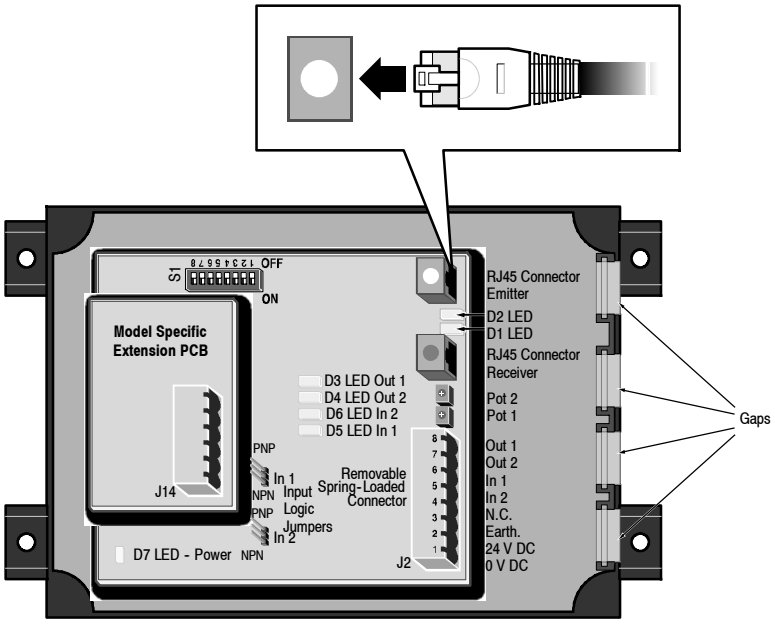
| LED | Description | Color | Meaning |
|---|---|---|---|
| D1 | Light Array OK | Off | Target present or light arrays not aligned |
| | | Green | Target not present and light arrays aligned |
| | | Green flashing | Low margin/light intensity inadequate |
| D2 | Light array status | Off | Target not present |
| | | Red | Target present |
| | | Red Flashing | Height Measurement Error |
| D3 | Out1 | Off | Output 1 inactive |
| | | Green | Output 1 active |
| D4 | Out2 | Off | Output 2 inactive |
| | | Green | Output 2 active |
| D5 | In1 | Off | Input 1 inactive |
| | | Green | Input 1 active |
| D6 | In2 | Off | Input 2 inactive |
| | | Green | Input 2 active |
| D7 | Power | Off | Power off |
| | | Green | Power on |

## Wiring Diagrams

The 45MLA is a “Three Box System.” Every setup consists of an emitter array, a receiver array, and an external controller.




Each controller has the same base PCB and a pre-installed extension PCB with model-specific functionality and additional connections.



Connector J2 on the base PCB has the following pinout for all controller models.

| Pin | Signal | Description |
|---|---|---|
| 1 | 0V DC | Power |
| 2 | +24V DC | Power |
| 3 | Ground | Ground |
| 4 | Not connected | Not connected |
| 5…8 | Model specific functions (see below) | |

Pins 5…8 on connector J2 (on the base PCB) have different functionality with each controller model. The following tables show the pin connections for each specific model.

**I/O Model**

| Pin | Signal | Description | Remarks |
|---|---|---|---|
| 5 | In 2 | Trigger and hold | DIP switch S1 (7) = 0 |
| | | Overhang back sensor | DIP switch S1 (7) = 1 |
| 6 | In 1 | Not used | DIP switch S1 (7) = 0 |
| | | Overhang front sensor | DIP switch S1 (7) = 1 |
| 7 | Out 2 | Light array interrupted❶ | 0 V DC = interrupted<br>24 V DC = not interrupted |
| 8 | Out 1 | Overhang | 0 V DC = overhang<br>24 V DC = no overhang |

❶ Or over-height (special function)

**RS485 and CAN models**

| Pin | Signal | Description | Remarks |
|---|---|---|---|
| 5 | In 2 | Trigger and hold | Special function |
| 6 | In 1 | Not used | Not used |
| 7 | Out 2 | Light interrupted❶ | 0V = interrupted |
| 8 | Out 1 | Overhang | 0V = overhang |

The extension PCB has connections specific to the functionality of each individual model. Here are the pin connections for each model. The connectors are labeled on the PCB.

**I/O Model**
**Connector J14**

| Pin | Signal | 0V DC | +24V DC |
|---|---|---|---|
| 1 | Out 3 | Zone Z1 interrupted | Zone Z1 not interrupted |
| 2 | Out 4 | Zone Z2 interrupted | Zone Z2 not interrupted |
| 3 | Out 5 | Zone Z3 interrupted | Zone Z3 not interrupted |
| 4 | Out 6 | Zone Z4 interrupted | Zone Z4 not interrupted |

**RS485 Model**
**Connector J16**

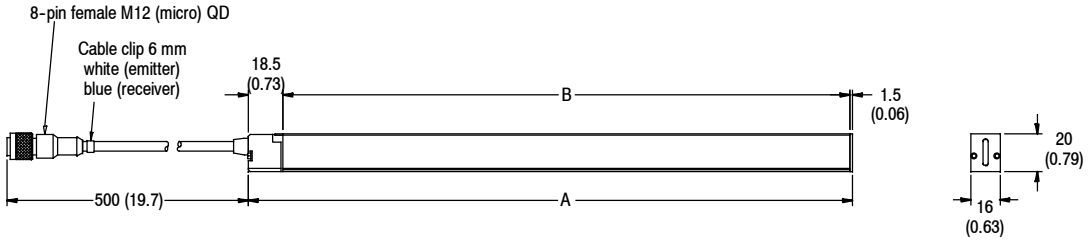
| Pin | 2 Wire | 4 Wire |
|---|---|---|
| 1 | 0V DC | 0V DC |
| 2 | — | Rx+ |
| 3 | Shielding | Shielding |
| 4 | — | Rx- |
| 5 | B | Tx+ |
| 6 | A | Tx- |

**CAN Model**
**Connectors J12 and J13 (RJ45)**

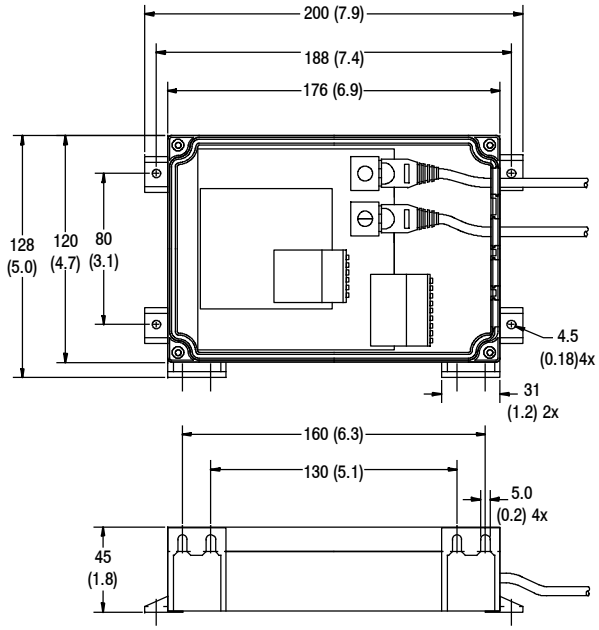
| Pin | Signal |
|---|---|
| 1 | CAN H |
| 2 | CAN L |
| 3 | 0V DC |
| 4 | Not connected |
| 5 | Not connected |
| 6 | Shield |
| 7 | 0V DC |
| 8 | CAN V+ |

## Approximate Dimensions [mm (in.)]

### Arrays




### Controller




**Note**: The controller can be mounted either on a DIN Rail using the mounting brackets on the back or with four screws through the holes on the tabs extending from the corners of the housing.

## Product Selection

### Arrays

| No. of Beams | A Housing Height [mm (in.)] | B Sensing Height [mm (in.)] | Beam Spacing [mm (in.)] | Length x Width [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|
| 30 | 320 (12.6) | 300 (11.8) | 10 (0.39) | 20 x 16 (0.79 x 0.62) | 45MLA-AT0300P10 |
| 60 | 630 (24.4) | 600 (23.6) | 10 (0.39) | 20 x 16 (0.79 x 0.62) | 45MLA-AT0600P10 |
| 90 | 920 (36.2) | 900 (35.4) | 10 (0.39) | 20 x 16 (0.79 x 0.62) | 45MLA-AT0900P10 |
| 120 | 1220 (48.0) | 1200 (47.2) | 10 (0.39) | 20 x 16 (0.79 x 0.62) | 45MLA-AT1200P10 |
| 36 | 920 (36.2) | 900 (35.4) | 25 (0.98) | 20 x 16 (0.79 x 0.62) | 45MLA-AT0900P25 |
| 48 | 1220 (48.0) | 1200 (47.2) | 25 (0.98) | 20 x 16 (0.79 x 0.62) | 45MLA-AT1200P25 |

### Controllers

| Description | Cat. No. |
|---|---|
| I/O Model | 45MLA-CTRL |
| RS485 | 45MLA-CTRL-485 |
| CAN | 45MLA-CTRL-CAN |

## Accessories

| Description | Cat. No. |
|---|---|
| Flat mounting kit (four pieces/set) | 445L-AF6145 |
| 180° adjustable mounting kit (four pieces/set, included with arrays) | 445L-AF6143 |
| Cable—Light array to controller | |
| 3 m M12—RJ45 | 445L-AC8RJ3 |
| 5 m M12—RJ45 | 445L-AC8RJ5 |
| 8 m M12—RJ45 | 445L-AC8RJ8 |

# 45DLA

## Discrete Light Arrays

## Description

The Allen-Bradley 45DLA discrete light array is an ON/OFF sensor that utilizes an array of transmitted beam photoelectric sensor pairs to detect objects over a much wider span than traditional sensors. The 45DLA are packaged as transmitted beam pairs (the emitter and receiver arrays are both included). The controls are integrated into the array housing and no separate controller is required. The emitter and receiver are optically synchronized and therefore do not need to be wired together.

## Features

- Integrated light array controller
- IP54
- Simple, flexible mounting
- Optically synchronized (no electrical connection between emitter and receiver required)
- Push/pull (PNP/NPN) outputs (connect to sinking or sourcing inputs)
- Wiring selectable range and output state (light/dark operate)
- 30 mm resolution
- Sensing height of 118…734 mm (4.6…28.9 in.)

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP54 |
| Operating Temperature [C (F)] | -20°…+55° (-4°…+131°) |
| Vibration | 2 g, 10…200 Hz; 20 sweeps each axis; meets or exceeds EN 60068-2-6 |
| Shock | 15 g, 11 ms, 3 x each axis; 10 g, 16 ms, 100 x each axis; meets or exceeds EN 60068-2-27 and EN 60068-2-29 |
| Relative Humidity | 5....95% (noncondensing) |
| Ambient Light Immunity | 75,000 Lux |
| **Optical** | |
| Sensing Modes | Transmitted beam pair |
| Sensing Range | 200…1500 mm (7.9…59 in.) or 1.0…8.0 m (3.3…26.2 ft) |
| Field of View | Emitter (long range selected): 15° @ 3.0 m (9.8 ft)<br>Receiver (when emitter has long range selected): 35° @ 3.0 m (9.8 ft) |
| Light Source | Infrared LED (880 nm) |
| LED Indicators | Green (transmitter only) = power, orange (receiver only) = target present |
| Adjustments | Selectable range (by wiring input) |
| Resolution | 30 mm (1.2 in.) |
| Beam Pitch | 22 mm (0.87 in.) |
| Number of Beams | 4…32 by Cat. No. |
| Sensing Height | 118…734 mm (4.65…28.9 in.) by cat. no. |
| **Electrical** | |
| Voltage | 14…30V DC |
| Current Consumption | 50 mA @ 24V DC without load connected |
| Sensor Protection | Short circuit (SCP), reverse polarity |
| **Outputs** | |
| Response Time | 25…165 ms by cat. no. |
| Power-On Time | 100 ms + response time |
| Output Type | PNP/NPN (single push/pull output) |
| Output Mode | Dark or light operate selectable (by wiring) |
| Output Current | 120 mA max. |
| **Mechanical** | |
| Housing Material | Aluminum |
| Housing Height | 266…882 mm (10.5…34.7 in.) by cat. no. |
| Lens Material | Polycarbonate |
| Cable Material | PVC |
| Connection Type | 4-pin DC micro (M12) on 150 mm (6 in.) cable pigtail |

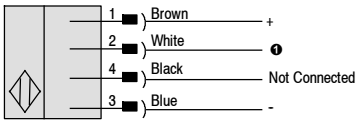
## User Interface Panel

| LED | Description | Status | Meaning |
|---|---|---|---|
| Emitter Array | Emitter Status | Off | No Power |
| | | Green | Power OK |
| Receiver Array | Receiver Status | Off | No power OR target not present |
| | | Orange | Power OK and target present (or arrays not aligned) |

## Wiring Diagrams

### Emitter

**Quick-Disconnect**



❶ Pin 2 (white wire): Connect to 0V or not connected for 1.0…8.0 m (3.3…26.2 ft) range; connect to V+ (24V) for 0.2…1.5 m (0.6…4.9 ft) range.

**Note**: In applications with multiple 45DLA pairs in one area, it is recommended to use the shorter range option (by connecting Pin 2/white wire to 24V) to reduce the potential for interference between separate pairs.

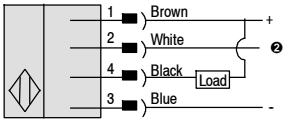
**Note**: For applications with a range of less than 1 m (3.3 ft) it is recommended to use the shorter range option to improve the response time.

### Receiver:

The 45DLA uses a push/pull transistor output that can be wired as either a PNP or NPN style output.

### Wired as NPN output:

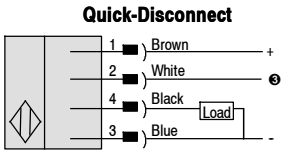
**Quick-Disconnect**



❷ Pin 2 (white wire): Connect to V+ (24V) or not connected for D.O.; connect to 0V for L.O.

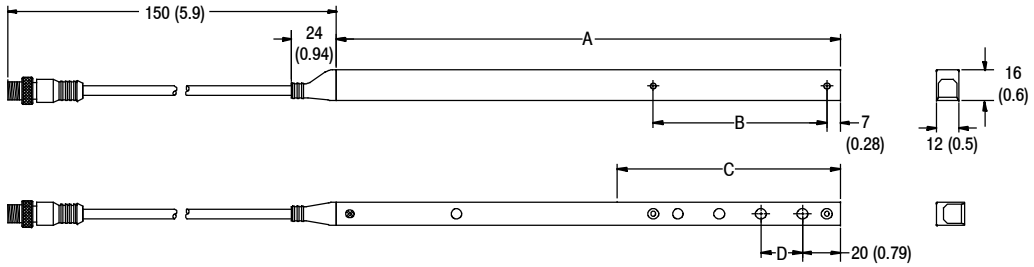
### Wired as PNP output:

**Quick-Disconnect**



❸ Pin 2 (white wire): Connect to V+ (24V) or not connected for L.O.; connect to 0V for D.O.

## Approximate Dimensions [mm (in.)]




**Note**: Mounting from the front of the array (lens side) requires M4 flat head (countersunk) screws (included). Mounting from the side of the array requires M4 pan head screws (not included).

| No. of Beams | Approximate Dimensions [mm (in.)] | | | | Cat. No. |
|---|---|---|---|---|---|
| | A: Housing Height | B: Mounting Holes | C: Sensing Height | D: Pitch | |
| 4 | 266 (10.5) | 92 (3.6) | 118 (4.65) | 22 (0.87) | 45DLA-1LEB1T-F4 |
| 8 | 354 (13.9) | 180 (7.1) | 206 (8.11) | 22 (0.87) | 45DLA-1LEB2T-F4 |
| 16 | 530 (20.9) | 356 (14.0) | 382 (15.04) | 22 (0.87) | 45DLA-1LEB4T-F4 |
| 24 | 706 (27.8) | 532 (20.9) | 558 (21.97) | 22 (0.87) | 45DLA-1LEB6T-F4 |
| 32 | 882 (34.7) | 708 (27.9) | 734 (28.9) | 22 (0.87) | 45DLA-1LEB8T-F4 |

## Product Selection

| Sensing Height [mm (in.)] | Response Time | Cat. No. |
|---|---|---|
| 118 (4.65) | 25 ms | 45DLA-1LEB1T-F4 |
| 206 (8.11) | 45 ms | 45DLA-1LEB2T-F4 |
| 382 (15.04) | 85 ms | 45DLA-1LEB4T-F4 |
| 558 (21.97) | 125 ms | 45DLA-1LEB6T-F4 |
| 734 (28.9) | 165 ms | 45DLA-1LEB8T-F4 |

**Note**: Both emitter (light source) and receiver arrays are included in the package. To identify the emitter, replace the "T" in the cat. no. with "E." To identify the receiver, replace the "T" in the cat. no. with "R." Example: 45DLA-1LEB2**T**-F4 contains one 45DLA-1LEB2**E**-F4 emitter array and one 45DLA-1LEB2**R**-F4 receiver array. Emitter and receiver arrays are not sold separately.

## Cordsets and Accessories

| Cordset | | Accessories | |
|---|---|---|---|
| Description | Cat. No. | Description | Cat. No. |
| DC Micro QD Cordset, 4-pin, 2 m (6.5 ft) | 889D-F4AC-2 | DC Micro Splitter | 879D-F4DM |
| DC Micro QD Patchcord, 4-pin, 2 m (6.5 ft) | 889D-F4ACDM-2 | | |

# 45AST Area Array

## Features

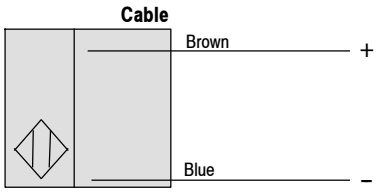
- Introduces Two-Dimensional Array Scanning Technology
- PNP or NPN Output
- Minimum object resolution from 11…17 mm (0.43…0.66 in.)
- Sensing ranges up to 2.5 m (8.2 ft)
- IP67 rated housing
- CE Marked for all applicable directives
- Easy bracket-free mounting
- Highly visible alignment LEDs

## Specifications

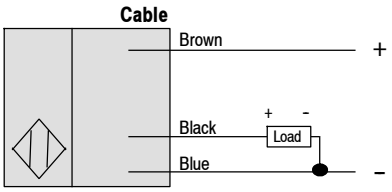
| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | IP67 |
| Operating Temperature [C (F)] | -5…+55° (23…+131°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 35…85% |
| Ambient Light Immunity | 500 lux max. |
| **Optical** | |
| Sensing Modes | Transmitted beam |
| Sensing Range | See Product Selection table on page 1-170 |
| Number of Optical Axis | See Product Selection table on page 1-170 |
| Light Source | Infrared LED (860 nm) |
| LED Indicators | Green LED for transmitted, green LED for alignment on receiver, and three orange LEDs for output |
| **Electrical** | |
| Voltage | 12…24V DC ±10% ripple |
| Current Consumption | See Product Selection table on page 1-170 |
| Sensor Protection | Reverse polarity, short circuit protection |
| **Outputs** | |
| Response Time | 4 ms or 8 ms max by cat. no. |
| Output Type | PNP or NPN by cat. no. |
| Output Mode | Light operate |
| Output Current | 100 mA @ 24V DC |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Aluminum |
| Lens Material | Acrylic |
| Connection Types | 2 m cable, 4-pin DC micro (M12) pigtail |
| Supplied Accessories | None |
| Optional Accessories | Mounting brackets, reflectors, cordsets |

## Wiring Diagrams

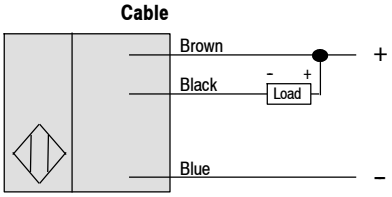
### Emitter




### PNP Output

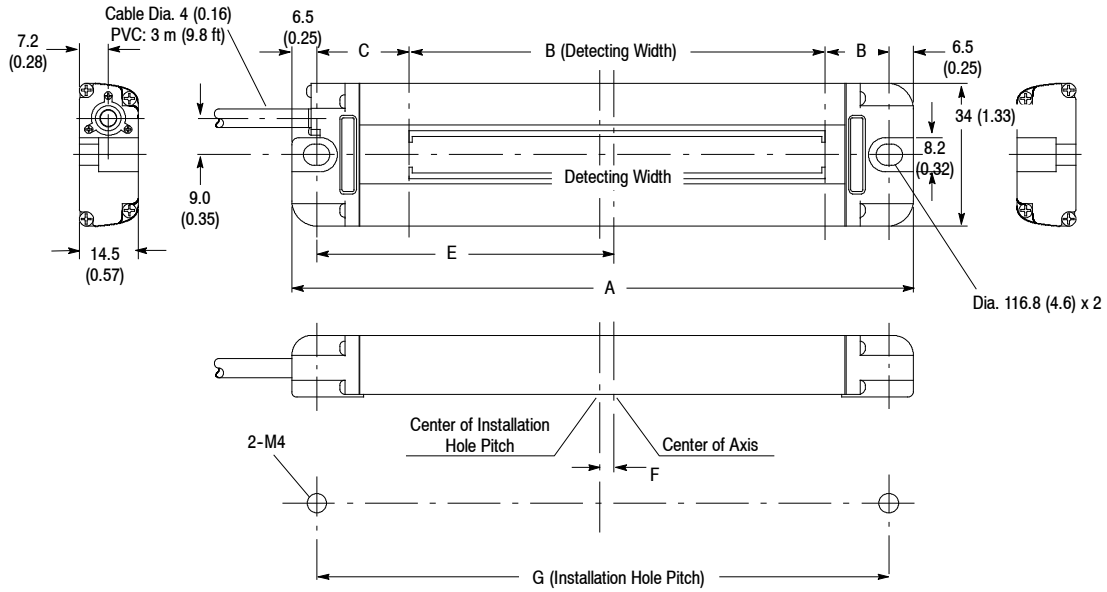



### NPN Output



# 45AST Area Array

## Approximate Dimensions [mm (in.)]




| Model | [mm (in.)] | | | | | | |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G |
| 45AST-1J❶B1-A2 | 100 (3.93) | 50 (1.96) | 22.5 (0.88) | 14.5 (0.57) | 47.5 (1.87) | 4 (0.15) | 87 (3.42) |
| 45AST-1J❶B2-A2 | 150 (5.9) | 100 (3.93) | 22 (0.86) | 15 (0.59) | 72 (2.83) | 3.5 (0.13) | 137 (5.39) |
| 45AST-1J❶B3-A2 | | | | | | | 137 (5.39) |
| 45AST-1J❶B4-A2 | 200 (7.87) | 150 (5.9) | 22 (0.86) | 15 (0.59) | 97 (3.81) | 3.5 (0.13) | 187 (7.36) |

❶ N = NPN and P = PNP.

## Product Selection

| Current Consumption (max.) | | Range | Number of Optical Axis | Response Time (max) | Resolution Diameter [mm (in.)] | Sensing Height [mm (in.)] | Output Type | Cat. No. ❸ |
|---|---|---|---|---|---|---|---|---|
| Transmitter | Receiver | | | | | | | |
| 70 mA | 65 mA | 0.5…2 m (1.6…6.5 ft) | 5 | 4 ms | 15 (0.59) | 50 (1.96) | PNP | 45AST-1JPB1-A2 |
| | | | | | | | NPN | 45AST-1JNB1-A2 ❷ |
| 80 mA | 110 mA | 0.15…0.8 m (0.49…2.62 ft) | 10 | 8 ms | 11 (0.43) | 100 (3.93) | PNP | **45AST-1JPB2-A2** |
| | | | | | | | NPN | 45AST-1JNB2-A2 ❷ |
| 80 mA | 110 mA | 0.5…2.5 m (1.6…8.2 ft) | 10 | 8 ms | 13 (0.51) | 100 (3.93) | PNP | 45AST-1JPB3-A2 |
| | | | | | | | NPN | 45AST-1JNB3-A2 ❷ |
| 80 mA | 110 mA | 0.15…0.8 m (0.49…2.62 ft) | 10 | 8 ms | 17 (0.66) | 150 (5.9) | PNP | **45AST-1JPB4-A2** |
| | | | | | | | NPN | 45AST-1JNB4-A2 ❷ |

❷ NPN versions available with longer lead times.

❸ Micro QD (M12) connector on pigtail models available. Refer to *www.ab.com/sensors* for more information.

# 45PVA Verification Array

## Slim Type Picking Sensor

## Description

The Allen-Bradley 45PVA is a photoelectric Parts Verification Array designed for bin picking applications and object detection in the parts assembly industry. When used as part of a suitably configured bin-picking system, the 45PVA effectively prevents mispicks to enhance efficiency and minimize down time. It is also the ideal solution to address the “error proofing” initiatives prevalent in the automotive industry.

The 45PVA uses an array of LEDs to create a light screen that can be spanned across bins at an assembly station. By mounting the sensors on parts bins and wiring them into a controller programmed with the necessary logic, a virtually error-free bin-picking process can be achieved. “Job lights” on the 45PVA will not only show the assembler the bins required to complete the current process, but will also indicate the correct picking sequence. In the event the assembler attempts to pick an incorrect part, a selectable warning light on the 45PVA will illuminate to indicate the error; additional fault enunciation can be achieved via controller logic in conjunction with a tower light or

In addition to increasing efficiency and quality control by preventing faults in the bin-picking process, the 45PVA is instrumental in personnel stress reduction and the simplification of personnel training—especially in multi-lingual facilities.

## Specifications

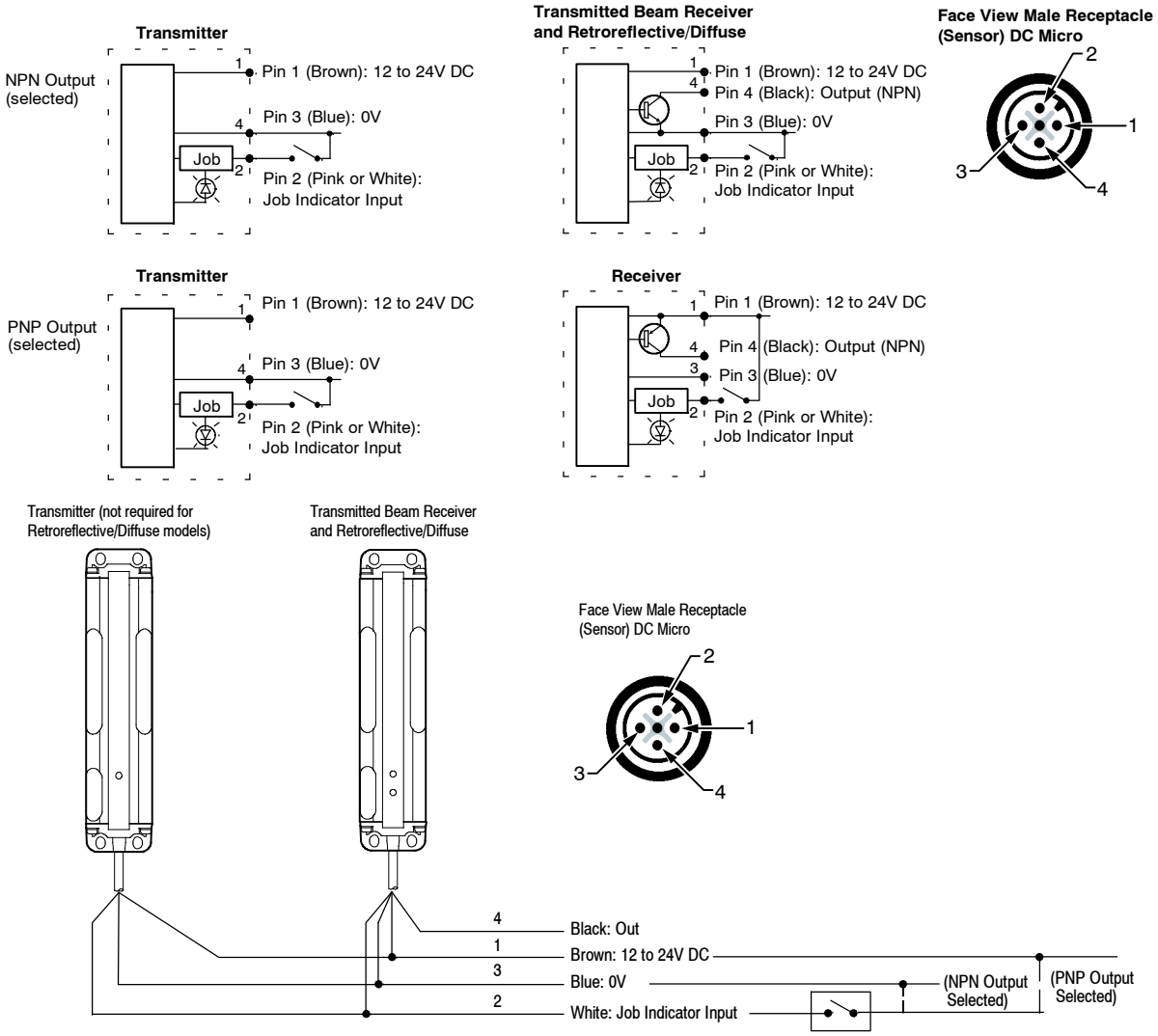
| | |
|---|---|
| **Environmental** | |
| Certifications | cULus and CE Marked for all applicable directives |
| Operating Environment | NEMA 12; IP62 |
| Operating Temperature [C (F)] | Transmitted beam: 0…+50° (32…+122°)<br>Retroreflective/diffuse: -10…+50° (14…+122°) |
| Vibration | 10…55 Hz, 1.5 mm amplitude, 2 hours, X, Y, and Z direction |
| Shock | 500 m/s, 3 times X, Y, and Z direction |
| Ambient Light Immunity | 10,000 lux max |
| **Optical** | |
| Sensing Modes | Transmitted beam or retroreflective/diffuse selectable |
| Sensing Range | Transmitted beam or retroreflective: 2 m (6.5 ft),<br>Diffuse: 400 mm (15.7 in.) |
| **Field of View** | |
| Light Source | Infrared LED (880 nm) or visible red (640 nm) |
| LED Indicators | See Approximate Dimensions on page 1-173 |
| Adjustments | DIP switches |
| **Electrical** | |
| Voltage | 12…264V DC |
| Current Consumption | 46 mA max |
| Sensor Protection | Short circuit protection |
| **Outputs** | |
| Response Time | See Product Selection table on page 1-174 |
| Output Type | PNP or NPN output selectable |
| Output Mode | Light or dark operate selectable |
| Output Current | 50 mA @ 30V DC max |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Aluminum |
| Lens Material | Polycarbonate |
| End Plate Material | Resin |
| Connection Types | 4-pin DC micro (M12) QD on 2 m pigtail |
| Supplied Accessories | Basic mounting brackets, reflective tape (retro/diffuse models) |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-174 |

## Features

- Robust metal enclosure with super slim 13 mm profile
- Large highly-visible job indicator lights
- Optional red fault light indicator to notify operator of incorrect component selection
- Dip switch selectable lighting operation for job lights
- NPN or PNP dip switch selectable output reduces inventory
- Two frequency dip switch selectable crosstalk protection
- Different sizes are available for different component racks. Transmitted beam models are available in four sizes (100 mm (4 in.), 225 mm (9 in.), 300 mm (12 in.), and 375 mm (15 in.)). Retroreflective/diffuse models are available in two sizes (100 mm (4 in.) and 225 mm (9 in.)).

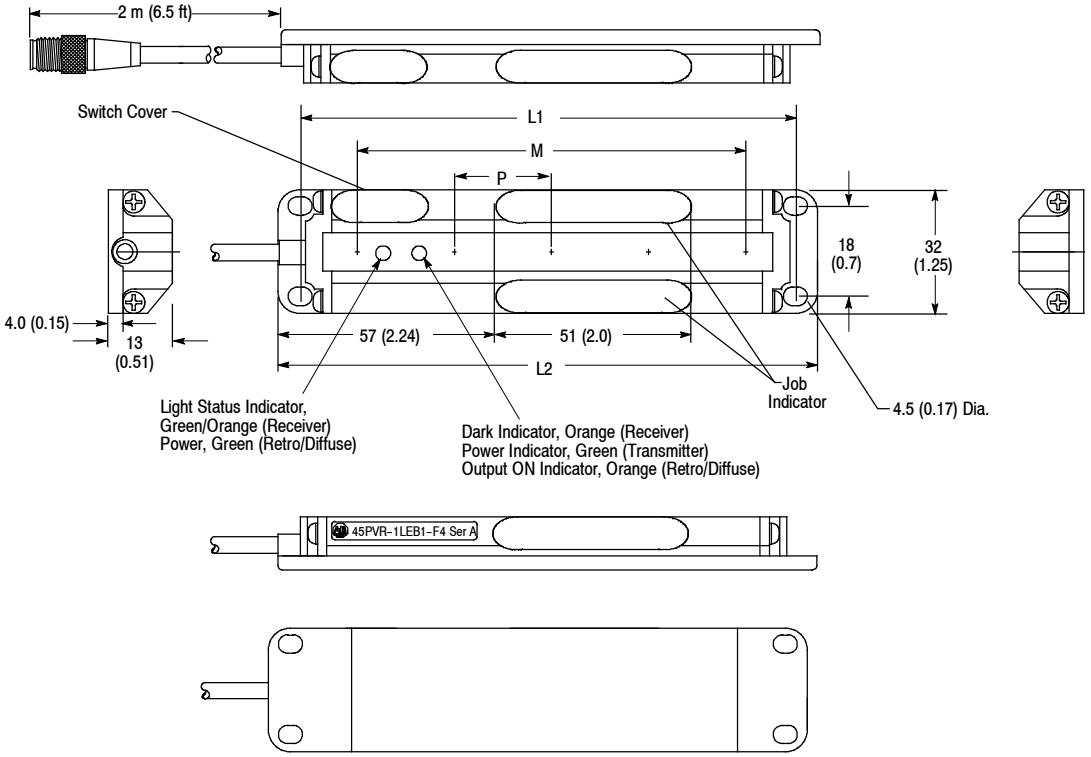
## Input/Output Circuit and Wiring Diagrams

The NPN/PNP input of the job indicator and the NPN/PNP output are selected by mode switch.



## Approximate Dimensions [mm (in.)]

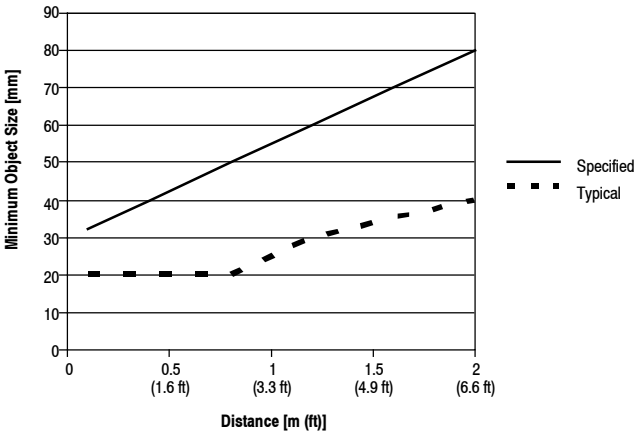
*Dimensions are not intended to be used for installation purposes.*




| Approximate Dimensions [mm (in.)] | | | | | |
|---|---|---|---|---|---|
| N | M | L1 | L2 | P | Cat. No. |
| 5 | 100 (3.9) | 130 (5.1) | 140 (5.5) | 25 (1.0) | 45PVA-1LEB1-F4 |
| 10 | 225 (8.9) | 255 (10.0) | 265 (10.4) | 25 (1.0) | 45PVA-1LEB2-F4 |
| 13 | 300 (11.8) | 330 (13.0) | 340 (13.4) | 25 (1.0) | 45PVA-1LEB3-F4 |
| 16 | 375 (14.8) | 405 (16.0) | 415 (16.3) | 25 (1.0) | 45PVA-1LEB4-F4 |
| 4 | 87 (3.4) | 130 (5.1) | 140 (5.5) | 29 (1.1) | 45PVA-2LEA1-F4 |
| 8 | 203 (8.0) | 255 (10.0) | 265 (10.4) | 29 (1.1) | 45PVA-2LEA2-F4 |

## Minimum Detectable Object Size

### Retroreflective Mode



# 45PVA Verification Array

## Slim Type Picking Sensor

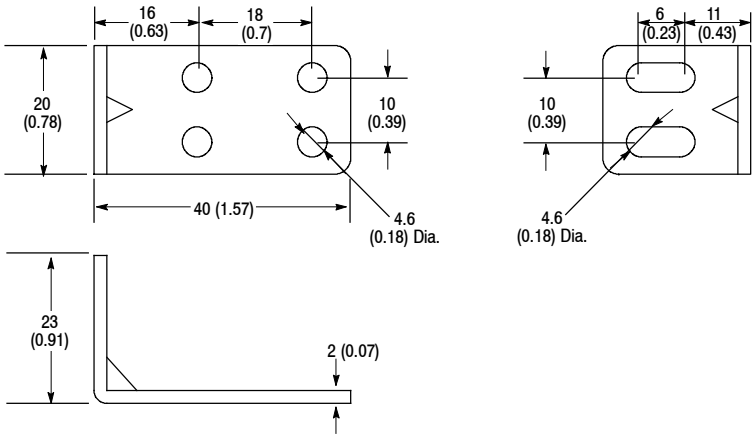
## Product Selection

| Sensing Mode | Light Source | Number of Optical Axis [mm (in.)] | Detection Width [mm (in.)] | Current Consumption | Response Time | Cat. No. |
|---|---|---|---|---|---|---|
| Transmitted Beam | Infrared LED, Wave-length 880 nm | 5 | 100 (3.93) | 130 mA | Standard: Standard: Light on: 35 ms/Dark on: 25 ms Interference Protection: Light on: 45 ms/Dark on: 28 ms | **45PVA-1LEB1-F4** |
| | | 10 | 225 (8.85) | 140 mA | Standard: Light on: 68 ms/Dark on: 42 ms Interference Protection: Light on: 84 ms/Dark on: 52 ms | 45PVA-1LEB2-F4 |
| | | 13 | 300 (11.8) | 150 mA | Standard: Light on: 70 ms/Dark on: 42 ms Interference Protection: Light on: 88 ms/Dark on: 54 ms | 45PVA-1LEB3-F4 |
| | | 16 | 375 (14.7) | 155 mA | Standard: Light on: 94 ms/Dark on: 58 ms Interference Protection: Light on: 116 ms/Dark on: 72 ms | 45PVA-1LEB4-F4 |
| Retroreflective/ Diffuse | Visible Red LED, 640 nm | 4 | 100 (3.93) | 68 mA | 120 ms | 45PVA-2LEA1-F4 |
| | | 8 | 225 (8.85) | 78 mA | | 45PVA-2LEA2-F4 |

## Accessories

### Mounting Brackets

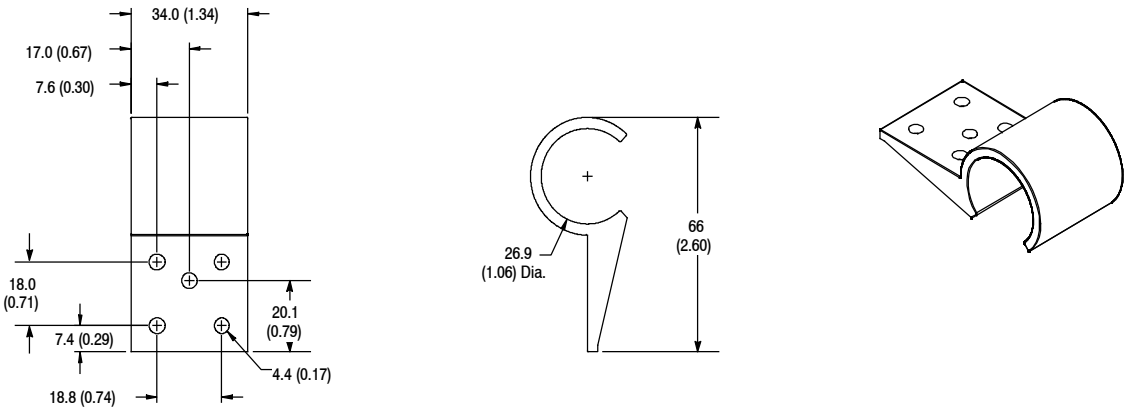
**#60-2773 (2 brackets) (included)**



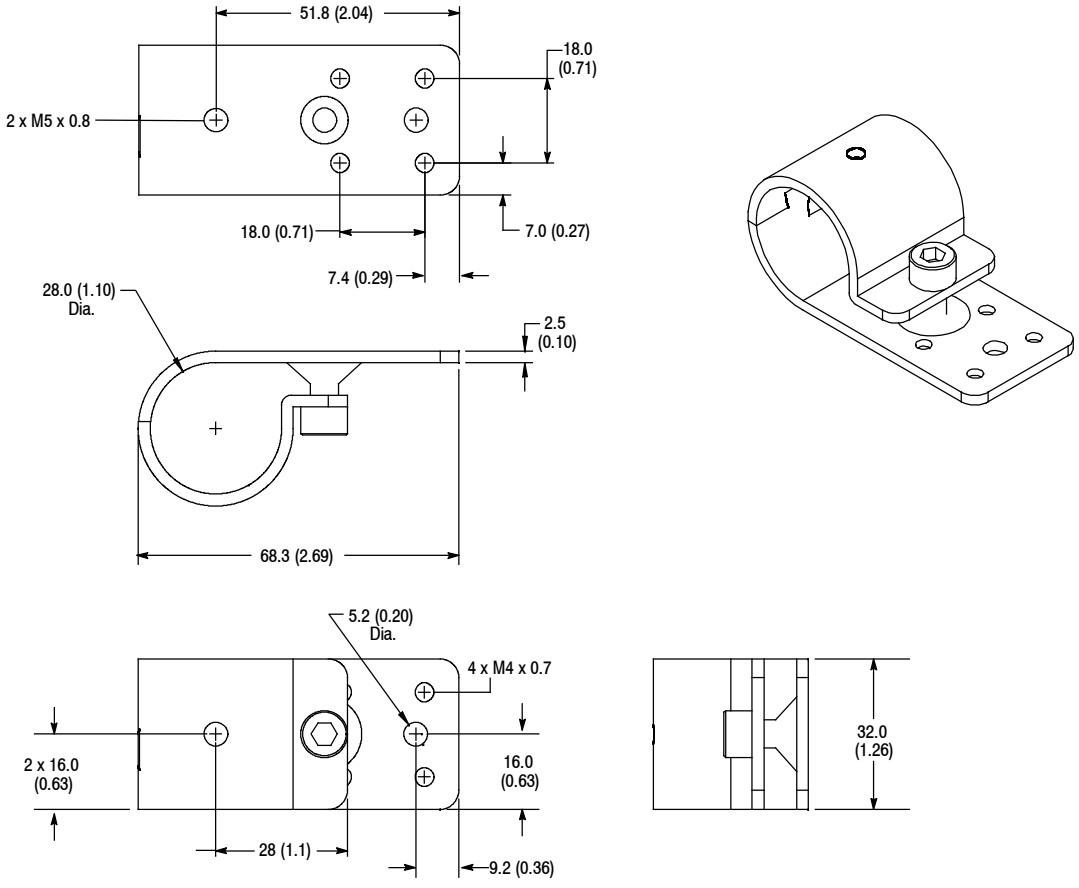
## Optional Mounting Brackets

Mounting brackets available as an option (not included with sensor).

**Plastic Bracket**
**#60-2779 (2 brackets)**



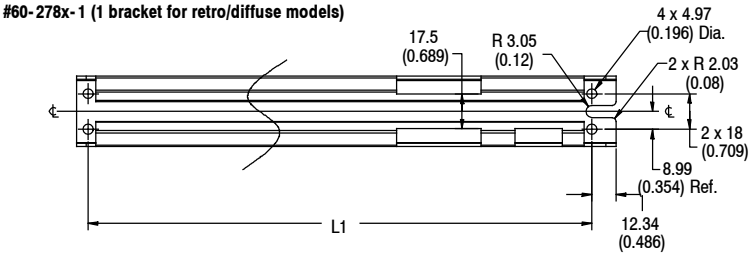

**Metal Bracket**
**#60-2772 (2 brackets)**

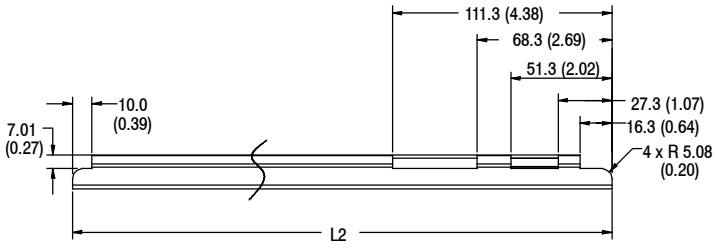


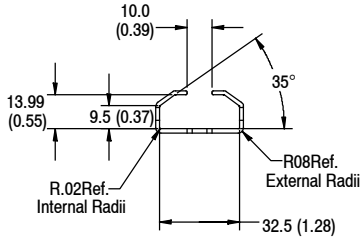
# 45PVA Verification Array

## Slim Type Picking Sensor

**Protective Metal Bracket**
**#60-277x-1 (2 brackets for transmitted beam models)**
**#60-278x-1 (1 bracket for retro/diffuse models)**

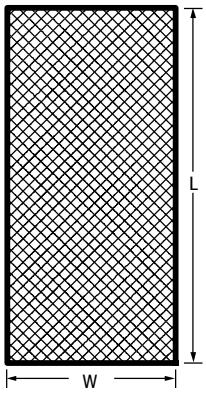



| L1 [mm (in.)] | L2 [mm (in.)] | Material | Cat. No. (1 Bracket) | Cat. No. (2 Brackets) |
|---|---|---|---|---|
| 130 (5.11) | 148.36 (5.84) | Galvanized Steel | 60-2785-1 | 60-2775-1 |
| 254 (10.03) | 273.35 (10.76) | | 60-2786-1 | 60-2776-1 |
| 330 (12.99) | 348.36 (13.71) | | NA | 60-2777-1 |
| 405 (15.94) | 423.34 (196.6) | | NA | 60-2778-1 |

### Reflective Tape (included with retroreflective/diffuse models)




| Dimensions | | Reflective Tape Cat. No. | Included with Cat. No. |
|---|---|---|---|
| Width [mm (in.)] | Length [mm (in.)] | | |
| 50 (2) | 120 (4.7) | — | 45PVA-2LEA1-F4 |
| 50 (2) | 245 (9.6) | — | 45PVA-2LEA2-F4 |
| 25 (1) | 2540 (100) | 92-100 | — |

# 44N Zone Control Sensor

## Description

The 44N provides an economical, noncontact, solution to zero pressure accumulation conveyor systems by combining built-in zone control with a photoelectric sensor. This simple approach replaces the conventional mechanical switch sensing device, central PLC, and large quantities of interconnecting wiring.

The use of a photoelectric sensor eliminates the need for minimum weight restrictions required by mechanically actuated switches. The polarized retroreflective sensing mode ensures reliable detection of even shiny packages over a 4.8 m (16 ft) range.

The 44N comes complete with micro QD connections to both an upstream and downstream 44N along with a variety of connection options for common pneumatic valves. Power for the 44N and the valve is distributed through these connections.

The zone logic of the 44N ensures that product being loaded on the conveyor will be separated into zone length gaps thus providing zero pressure accumulation throughout the conveyor system. Once product has accumulated, it may be released individually (singulate) or simultaneously as a train (slug). This release is activated through an external contact closure.

## Features

- Singulation release
- Slug release
- Adjustable 200 ms…10 secs ON (run) delay
- NEMA 4X rated

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | NEMA 4, 4X, 6, 12; IP67 |
| Operating Temperature [C(F)] | -20…+70° (-4…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| **Optical** | |
| Sensing Modes | Polarized retroreflective |
| Sensing Range | 50.8 mm…4.8 m (50.8 in…16 ft) with 92-39 reflector |
| Field of View | 1.5° |
| Light Source | Visible red (660 nm) |
| Adjustments | On delay (200 ms…10 s), DIP switch |
| LED Indicators | Green output LED indicator |
| **Electrical** | |
| Voltage | 10…30V DC |
| Current Consumption | 20 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 2 ms |
| Output Type | PNP |
| Output Mode | Light or dark operate selectable by dip switch (1 L.O., 0 D.O.) |
| Output Current | 100 mA @ 30V DC max |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Connection Types | 838 mm (33 in.) pigtail with 4-pin DC male micro QD (downstream)<br>838 mm (33 in.) pigtail with 4-pin DC female micro QD (upstream)<br>Cable connector for load (see Product Selection table) |
| Supplied Accessories | 129-130 mounting nut |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-179 |

# 44N Zone Control Sensor

## System Overview, Installation, and Operation

Install one 44N at the downstream side of each zone and make both upstream and downstream connections using the micro QD connectors. Connect the actuator lead of the 44N to the valve within its zone. Using an **889D-F4BC-2** cordset, connect 24V DC to a suitable power supply. A 4A supply will provide power for up to 25 zones when using a 1W pneumatic valve. Connect the black lead to the singulation release push button and the white lead to the slug release push button. Both push buttons should be normally open and maintained.

### Loading Product Onto the Conveyor

With power applied to the system, all zones will immediately drive feeding product onto the conveyor. As product passes the 44N mounted at the infeed zone, a gap will be formed equal to the zone length. This will ensure zero pressure throughout the system. Once the first product reaches the discharge zone (1), it will stop and await release from the conveyor.

### Release of Product from the Conveyor:

Once product has been transported and accumulated at the discharge end of the conveyor (Zone 1), it may be released in one of two manners.

### Singulation Release

With the singulation release signal active, only product in the discharge zone (1) will release. As the product clears the sensor, the adjacent upstream zones will advance into the discharge zone. Product will continue to discharge as long as the zone release push button remains closed.

### Slug Release

With the slug release push button closed and maintained, all accumulated product on the conveyor will release simultaneously. When the slug release push button is released, the remaining product will resume normal accumulation. This function overrides the 44N logic and can be used to load and unload product as a slug.

**Figure 1. System Overview**

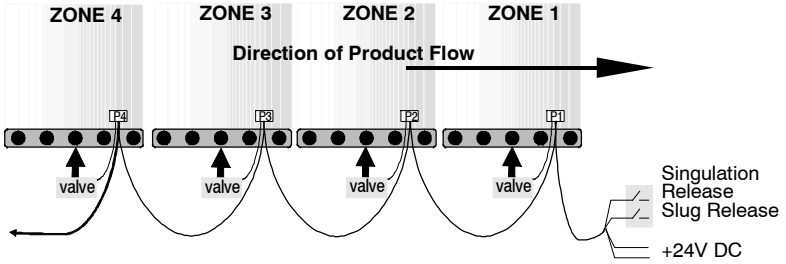



**Figure 2. Loading the Conveyor**

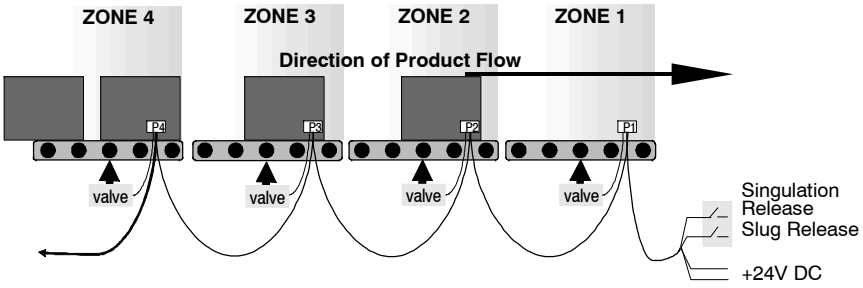



**Figure 3. Singulation Release of Accumulated Product**

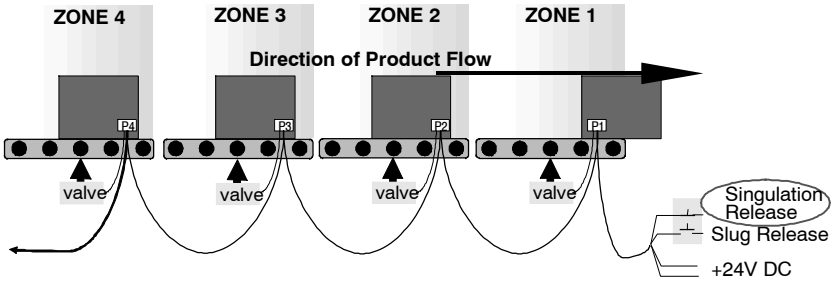
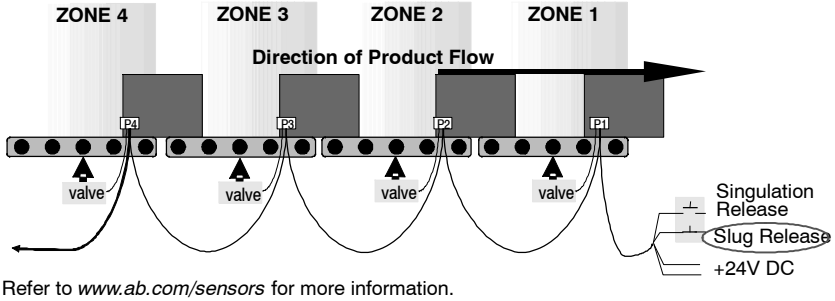
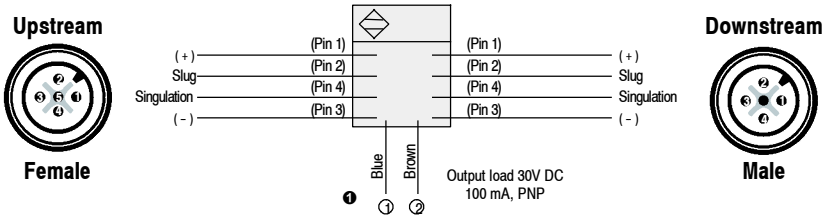



**Figure 4. Slug Release of Accumulated Product**



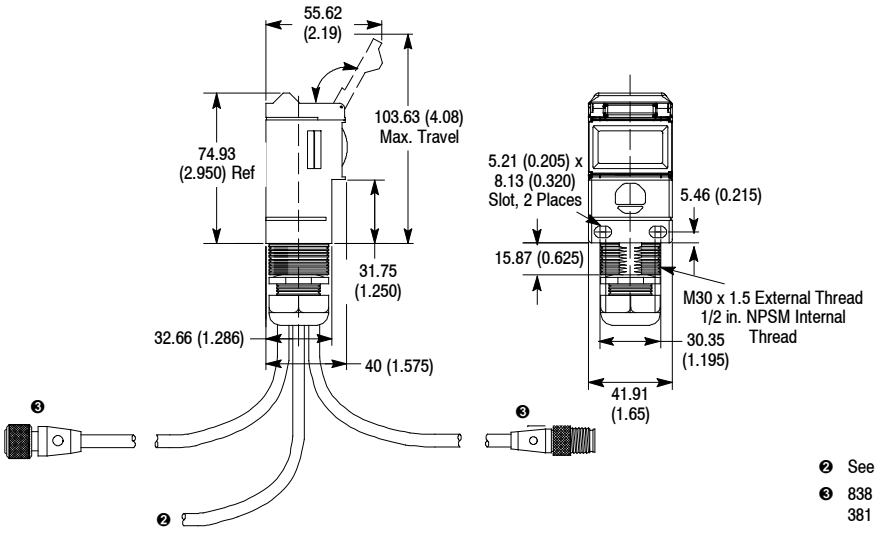

Refer to *www.ab.com/sensors* for more information.

## Wiring Diagrams

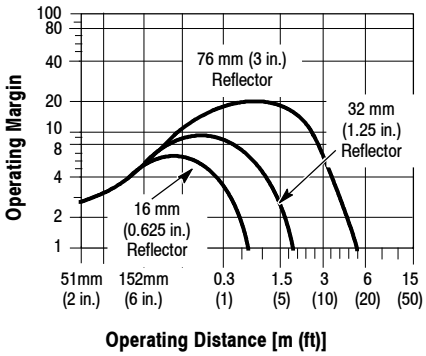



❶ Product comes with 22 AWG cable. Contact Rockwell Automation for DIN valve connection options.

## Approximate Dimensions [mm (in.)]



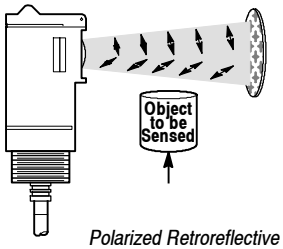

## Typical Response Curve




❷ See Product Selection table below for connection information.

❸ 838 (33) pigtail for 44NSP-2JPBD5-Z01 and 44NSP-2JPBD5-Z02.
381 (15) pigtail for 44NSP-2JPBD5-Z03.

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Load Connection Type | Cat. No.❹ |
|---|---|---|---|---|---|---|
|  *Polarized Retroreflective* **Field of View:** 1.5° **Emitter LED:** Visible red 660 nm | 10…30V DC 40 mA | 50.8 mm… 4.87 m (2 in…16 ft) | Light Operate | PNP 100 mA Variable 200 ms to 10 seconds | 304.8 mm (12 in.) cable | 44NSP-2JPBD5-Z01 |
| | | | | | 533.4 mm (21 in.) right angle pico (M8) female QD | 44NSP-2JPBD5-Z02 |
| | | | | | | 44NSP-2JPBD5-Z03 |

❹ See Approximate Dimensions.

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| Male cordset, 2 m cable | 889D-M4BC-2 | Patchcord, 3.3 ft | 889F-F4BCDM-1 | Torx screw | 129-135 |
| Reflector, 3 in. diameter | 92-39 | Cordset, for external release | 889D-F4BC-2 | Torx screwdriver | 57-144 |
| Mounting Bracket, for 44N | 60-2439 | Power Supply (24V DC/4 A) | 1606-XLP100E | | |

# 22ZC Zone Controller

## Description

The 22ZC Zone Controller bridges the gap between the 44N Zone Control Sensor and the 1799 embedded I/O module solutions. It offers the simplicity of a smart sensor, yet provides many of the advanced zone logic functions found in a networked, programmable device.

By placing the zone logic in a single zone controller, the user is given the flexibility to choose from a variety of both sensor input types (mechanical, optical) and actuator types (pneumatic, powered roller, DC motor).

The 22ZC uses a proven, industrial, IDC displacement flat media scheme for a high power transfer to maximize the number of zones connected to a single power supply.

The 22ZC offers two basic, switch selectable operating modes. First, is the single zone operation which is a run-on-demand system ideally suited for powered roller and DC motor applications. The second is a basic mode which provides a constant drive for both zero and low pressure accumulation.

Other advanced logic functions include selectable ON (RUN) and OFF (STOP) time delays, power conservation, jam detection, along with air-to-drive and air-to-brake operation.

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | NEMA 1; IP50 |
| Operating Temperature [C (F)] | 0…+50° (32…+122°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…85% (noncondensing) |
| **Zone Control** | |
| Zone Logic | Switch selectable single or basic operating modes for zero and low pressure accumulation with singulation and slug release |
| Advanced Zone Logic | JAM respond function, sleep function, air-to-drive or air-to-brake operation, ON/OFF time delays |
| Adjustments | Rotary switches, DIP switches |
| LED Indicators | Orange (zone status, fault) |
| **Electrical** | |
| Voltage | 24V DC |
| Current Consumption | 16 mA max |
| Sensor Protection | Over-voltage, reverse polarity, short-circuit (SCP) |
| **Outputs/Inputs** | |
| Response Time | 1 ms |
| Sensor Input | NPN |
| Actuator Output | NPN |
| Output Mode | Light or dark operate selectable by dip switch (1 L.O., 0 D.O.) |
| Actuator Output Current | 100 mA @ 24V DC max |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Connection Types | Input: 3-pin MOLEX; Output: 4-pin MOLEX; Power/Signal: IDC Cable |
| Required Accessories | Sensing device, actuating device, flat media |
| Optional Accessories | Mounting brackets, reflectors, cordsets |

**System Overview for Pneumatically Driven Conveyor Systems**

Install one 22ZC in each zone of the conveyor and attach a suitable sensing and actuating device. Note that the infeed module (22ZC-343) must be installed at the beginning of your zone control system (zone 4 on Figure 1 on page 1-182) and the master module (22ZC-413) at the discharge end of your system (zone 1 on Figure 1). Size, cut and install the flat media between each controller. Connect a suitable 24V DC power supply to any controller within the system. It is recommended to make this connection to the center controller for balanced power distribution. A 4 A power supply will provide power for up to 25 zones when using a 1 W pneumatic valve. Wire the infeed and discharge zone external connection as required using the wiring diagram shown on Figure 1.

**Loading Product Onto the Conveyor (Figure 2 on page 1-182)**

With power applied to the system, all zones will immediately drive feeding product onto the conveyor. As product passes the sensor mounted at the infeed zone, a gap will be formed equal to the zone length. This will ensure zero pressure throughout the whole system. Once the first product reaches the discharge zone (zone 1), it will stop and await release from the conveyor.

**Release of Product**

Once the product has been transported and accumulated at the discharge end of the conveyor (zone 1) it may be release in one of two manners:

**Singulation Release (Figure 3 on page 1-182)**

With the singulation release signal activate, only product in the discharge end of the conveyor (zone 1) will release. As the product clears the sensors, the adjacent upstream zones will advance into the discharge zone. Product will continue to discharge as long as the singulation release signal remains active.

**Slug Release (Figure 4 on page 1-182)**

With the slug release signal active, all accumulated product on the conveyor will release simultaneously. When the slug release signal is deactivated, the remaining product will resume normal accumulation. Predetermined slug lengths can be configured through the use of the slug respond switch on each controller.

For more information on these and other features refer to the 22ZC installation instructions or visit our website at *www.ab.com/sensors*.

**System Overview for Powered Roller Driven Conveyor Systems**

Install one 22ZC in each zone of the conveyor and attach a suitable sensing and actuating device. Note that the infeed module (22ZC-343) must be installed at the beginning of your zone control system (zone 4 on Figure 1) and the master module (22ZC-413) at the discharge end of your system (zone 1 on Figure 1). Size, cut and install the flat media between each controller. Connect a suitable 24V DC power supply to any controller within the system. It is recommended to make this connection to the center controller for balanced power distribution. Note that the power for the powered roller and amplifier are not provided by the 22ZC, only the RUN signal. Wire the infeed and discharge zone external connection as required using the wiring diagram shown on Figure 1.

**Loading Product onto the Conveyor (Figure 2 on page 1-182)**

With power applied to the system, all zones will be OFF until either the infeed sensor is blocked or the zone feed input is closed and maintained. As product passes the sensor mounted at the infeed zone, a gap will be formed equal to the zone length. This will ensure zero pressure throughout the whole system. Once the first product reaches the discharge zone (zone 1), it will stop and await release from the conveyor. If a low pressure accumulation is desired, a system wide OFF time delay can be configured to minimize product spacing on the conveyor.

**Release of Product**

Once the product has been transported and accumulated at the discharge end of the conveyor (zone 1) it may be release in one of two manners:

**Singulation Release (Figure 3 on page 1-182)**

With the singulation release signal activate, only product in the discharge end of the conveyor (zone 1) will release. As the product clears the sensors, the adjacent upstream zones will advance into the discharge zone. Product will continue to discharge as long as the singulation release signal remains active.

**Slug Release (Figure 4 on page 1-182)**

With the slug release signal active, all accumulated product on the conveyor will release simultaneously. When the slug release signal is deactivated, the remaining product will resume normal accumulation. Predetermined slug lengths can be configured through the use of the slug respond switch on each controller.

For more information on these and other features refer to the 22ZC installation instructions or visit our website at *www.ab.com/sensors*.

# 22ZC Zone Controller

**Figure 1. System Overview**

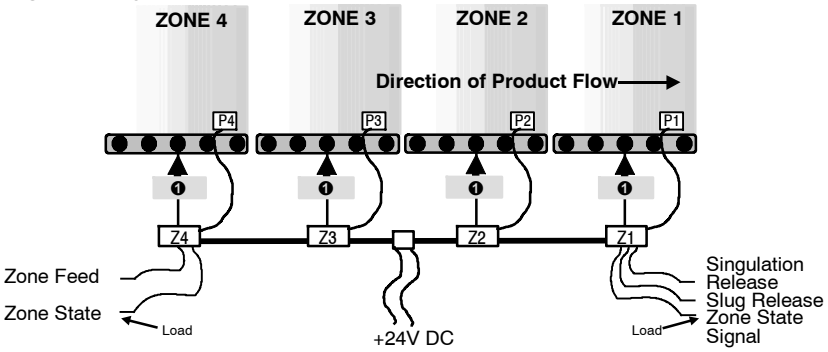



**Figure 2. Loading the Conveyor**

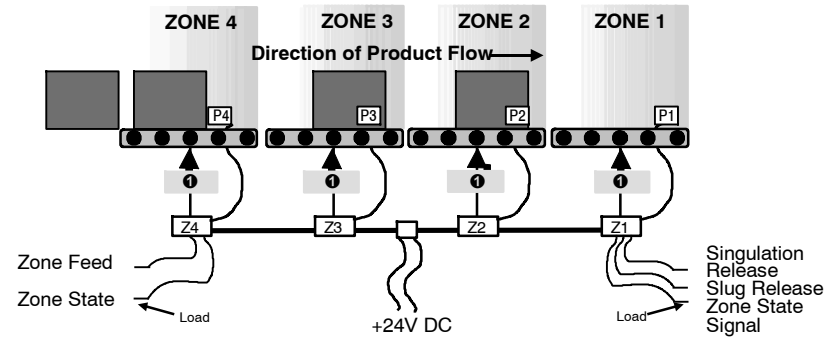



**Figure 3. Singulation Release of Accumulated Product**

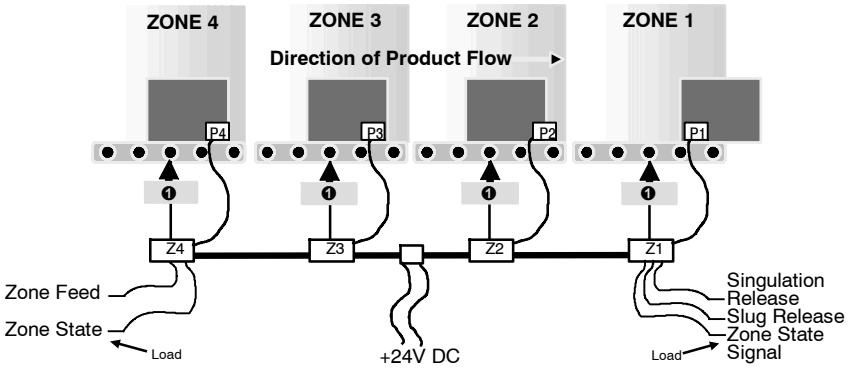
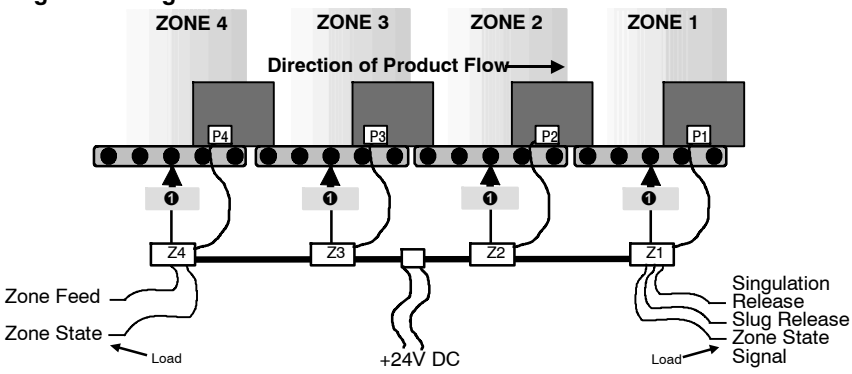



**Figure 4. Slug Release of Accumulated Product**




❶ Amplifier or Valve

### System Overview for Powered Roller Driven Conveyor Systems

Install one 22ZC in each zone of the conveyor and attach a suitable sensing and actuating device. Size, cut and install the flat media between each controller. Using a 22ZC–PWR cordset, connect to a suitable 24V DC power supply to any controller within the system. It is recommended to make this connection to the center controller for maximum power distribution. A 4A supply will provide power for up to 50 zones. Note that the power for the powered roller and amplifier are not provided by the 22ZC, only the RUN signal. Wire the infeed and discharge zone external connections as required using the wiring diagram to the right. Note that the zone and slug release, and the zone feed push buttons should be normally open and maintained.

### Loading Product onto the Conveyor

With power applied to the system, all zones will be OFF until either the infeed sensor is blocked or the zone feed contact is closed and maintained. As product passes the sensor mounted at the infeed zone, a gap will be formed equal to the zone length. This will ensure zero pressure throughout the system. Once the first product reaches the discharge zone (1), it will stop and await release from the conveyor. If a low pressure accumulation is desired, a system-wide, 1 second OFF time delay can be configured to minimize product spacing on the conveyor.

### Release of Product

Once product has been transported and accumulated at the discharge end of the conveyor (Zone 1), it may be released in one of two manners.

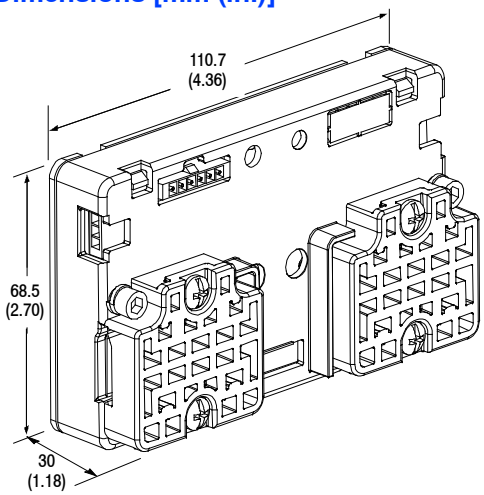
### Singulation Release

With the zone release push button closed and maintained, only product in the discharge zone (1) will release. As the product clears the sensor, the adjacent upstream zones will advance into the discharge zone. Product will continue to discharge as long as the zone release push button remains closed.

### Slug Release

With the slug release push button closed and maintained, all accumulated product on the conveyor will release simultaneously. When the slug release push button is released, the remaining product will resume normal accumulation. Predetermined slug lengths can be configured through the use of the SLUG RESPOND switch on each controller.

## Approximate Dimensions [mm (in.)]




| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| Zone Controllers | 22ZC-413 (master) | Flat Media, 75 m spool | 1485C-P1L75 | Reflector, 3 in. diameter | 92-39 |
| | 22ZC-223 (basic) | Power Supply, 24V DC/4 A | 1606-XLP100E | Mounting Bracket, sensor | 60-2657 |
| | 22ZC-343 (infeed) | Power Tap | 22ZC-PWR | | |
| Photoelectric Sensor | 44RSP-2JNE3-Z6 | Power Tap, IDC | 1485T-P1H4-R5 | | |

Refer to *www.ab.com/sensors* for more information.

## Description

The Series 9000 transmitted beam photoelectric sensors are designed and approved as an intrinsically safe device under the FM and CSA entity concept. It may be installed into a Class I, II, III; Division 1 hazardous location when connected to an appropriate safety barrier. The sensor is also approved as non-incendive for installation into Class I; Division 2 hazardous locations without the need for a safety barrier.

Typical applications

- Automotive
- Petrochemical
- Grain processing

Information on the Series 897H intrinsic safety barriers may be found on page 12-2.

## Features

- Intrinsically safe to North American standards
- Transmitted beam sensing mode
- Compatible with Series 897H intrinsic safety barriers
- 30 mm harsh duty package
- Fast response time
- Variety of connection types

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, FM Approved, and CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4X, 6P, 12, 13; IP67, 1200 psi washdown, IP69K |
| Operating Temperature [C (F)] | -40…+65° (-40…+150°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% max |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Transmitted Beam |
| Light Source | Infrared LED (880 nm) |
| LED Indicators | Red LED for output indication |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 13…30V DC |
| Current Consumption | 25 mA max |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 10 ms max |
| Output Type | PNP and NPN |
| Output Mode | Light operate and dark operate selectable |
| Output Current | 8.5 mA for PNP, 15 mA for NPN |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Connection Types | 2 m cable, 4-pin DC micro (M12) QD, 4-pin DC mini QD |
| Supplied Accessories | 129-130 mounting kit |
| Optional Accessories | Series 897H intrinsic safety barriers, cordsets, mounting brackets |

## Selection Guide for Intrinsic Safety Barriers

The 42GRx-95x0 is approved as an intrinsically safe apparatus under the entity concept by FM and CSA. Therefore, any safety barrier which meets both the stated operational and safety requirements (see Table 1) of the sensor may be used. Note that the sensor is also approved as non-incendive (FM) for installation into Class I; Division 2 hazardous locations without the need for a safety barrier.

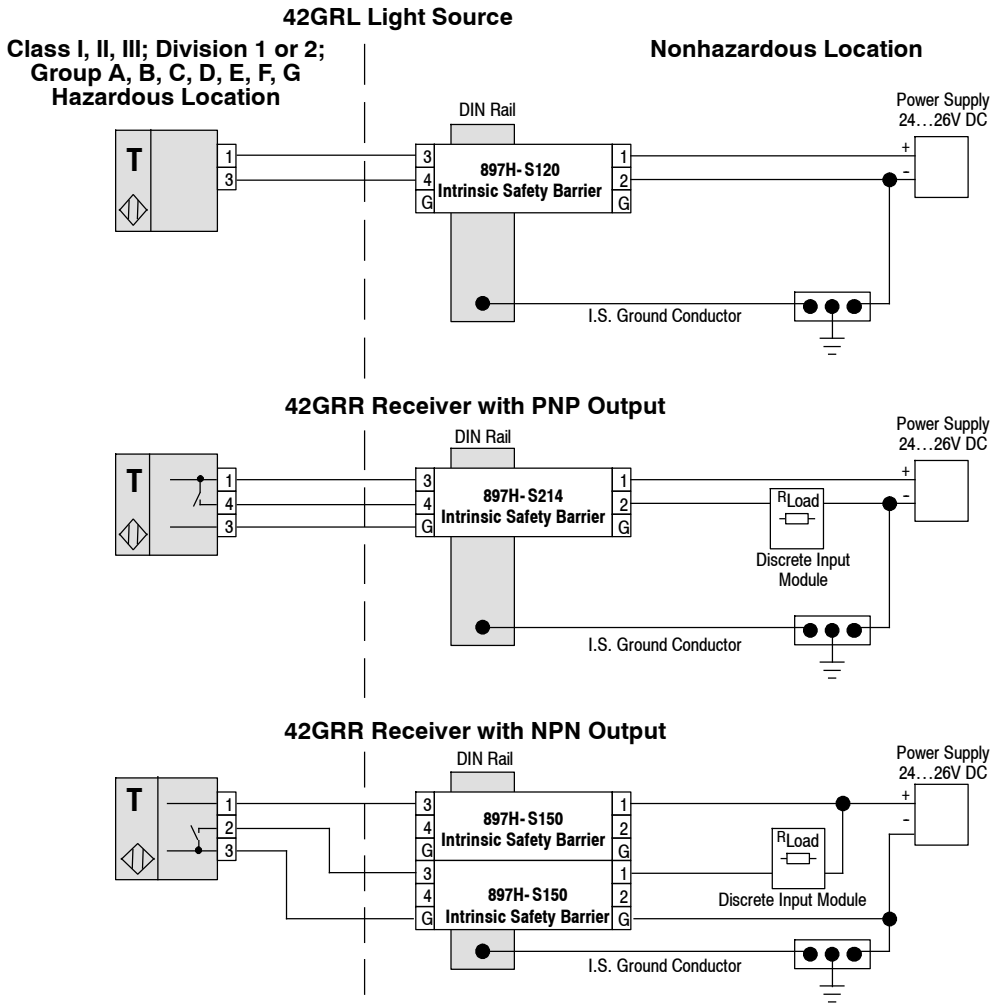
**Table 1**
**Entity Parameters**

| | Sensor | | Barrier |
|---|---|---|---|
| $V_{max}$ | 31.5V | ≥ | $V_t$ |
| $I_{max}$ | 150 mA | ≥ | $I_t$ |
| $P_{max}$ | 0.95 W | ≥ | $P_t$ |
| $C_i + C_{leads}$ | 0 uF | ≤ | $C_a$ |
| $L_i + L_{leads}$ | 0 mH | ≤ | $L_a$ |

## User Interface

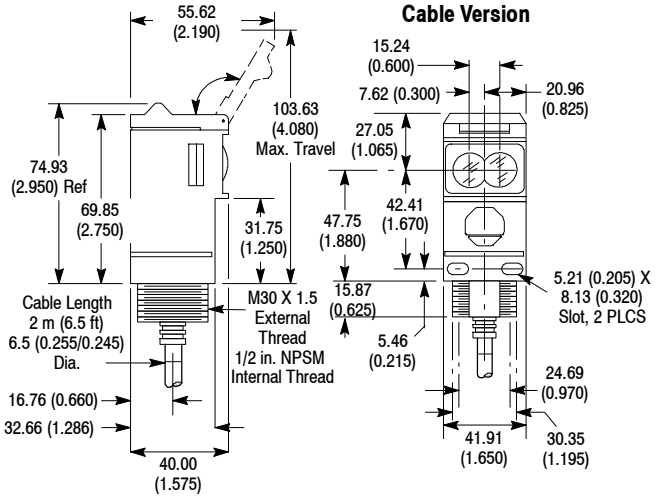
| Label | Color | State | Status |
|---|---|---|---|
| Output | Green | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |
| Margin/SCP | Red | OFF | Margin <2.5 |
| | | ON | Margin>2.5 |
| | | Flashing | Output SCP active |
| Power | Yellow | OFF | Sensor not powered |
| | | ON | Sensor powered |

## Wiring Diagrams

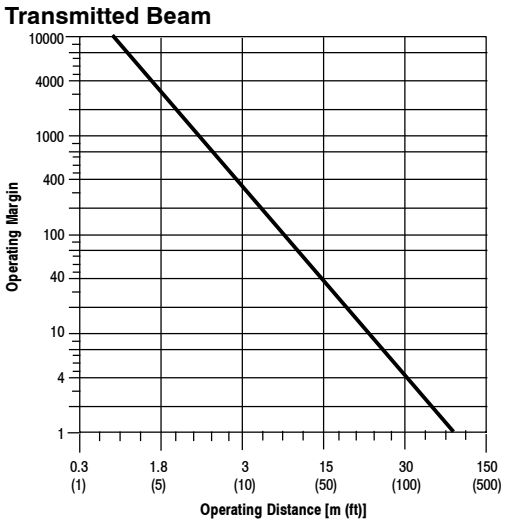



| IMPORTANT | See Control Drawing #75002-200. |
|---|---|

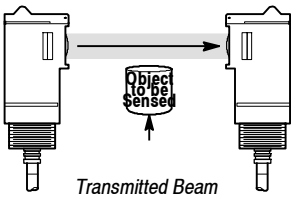
## Approximate Dimensions [mm (in.)]




## Typical Response Curve




## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Capacity Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
| **Light Sources** | 14…30V DC 16 mA | 25.4 mm…106 m (2 in…350 ft) | — | — | 2 m 300V cable | 42GRL-9540 |
| | | | | | 4-pin micro | 42GRL-9540-QD |
| | | | | | 4-pin mini | 42GRL-9540-QD1 |
| **Receivers** | | | | | | |
|  *Transmitted Beam* **Field of View:** 1.5° Receiver **Emitter LED:** Infrared 880 nm | 13…30V DC 25 mA | 25.4 mm…106 m (2 in…350 ft) | Light/Dark Operate | NPN/15 mA PNP/8.5 mA 10 ms max. | 2 m 300V cable | 42GRR-9500 |
| | | | | | 4-pin micro | 42GRR-9500-QD |
| | | | | | 4-pin mini | 42GRR-9500-QD1 |



## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| 1.8 m (6 ft) 4-pin, Mini QD Cordset | 889N-F4AF-6F ❶ |
| 2 m (6.5 ft) 4-pin, DC Micro QD Blue Cordset | 889D-F4LC-2 ❷ |
| Mounting Bracket | 60-2439 |

❶ Intrinsically Safe wiring labels 897H-L1 or 897H-L2 must be applied every 7.6 m (25 ft).

❷ Blue cable does not require labels to denote intrinsically safe wiring.



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Description

The Series 5000 intrinsically safe sensors are designed for the installation in hazardous locations. They can be used in Class I, II, III; Division 1, 2; groups A, B, C, D, E, F, and G locations with intrinsic Safety Zener Diode Barriers. They can also be used in Class I, II, II; Division 2 only without intrinsic safety zener diode barriers.

## Features

- Intrinsically Safe to North American standards
- Nonincendive for Division 2 hazardous (classified) locations
- Modular package for increased flexibility
- Wide variety of sensing modes
- Selectable light/dark operation
- Both NPN and PNP outputs
- Screw terminal connections

## Specifications

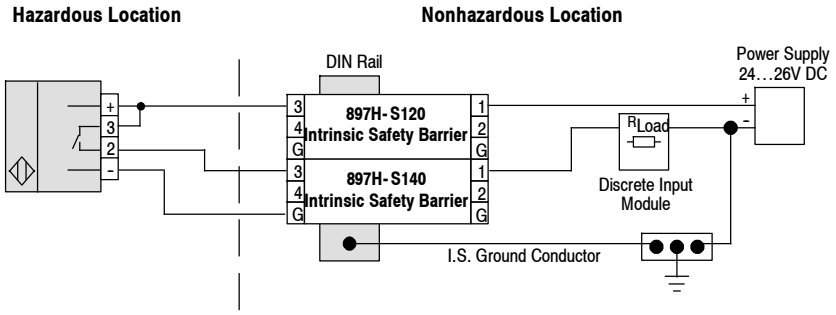
| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, FM Approved, and CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4, 12, 13; IP66 |
| Operating Temperature [C (F)] | -40…+65° (-40…+150°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 90% max |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, diffuse, polarized retroreflective, fiber optic |
| Sensing Range | See Product Selection table on page 1-189 |
| Field of View | See Product Selection table on page 1-189 |
| Light Source | Infrared LED (880 nm) |
| LED Indicators | Red LED for output indication |
| Adjustments | Sensitivity potentiometer |
| **Electrical** | |
| Voltage | 24V DC with suitable intrinsically safe barrier |
| Current Consumption | 30 mA max |
| Sensor Protection | False pulse |
| **Outputs** | |
| Response Time | 1 ms |
| Output Type | PNP and NPN |
| Output Mode | Light and dark operate selectable |
| Output Current | 20 mA @ 28V DC |
| Output Leakage Current | 1 μA |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic (glass on polarized lens) |
| Connection Types | 2 m (6.5 ft) cable, screw terminal |
| Supplied Accessories | None |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-190 |

## User Interface

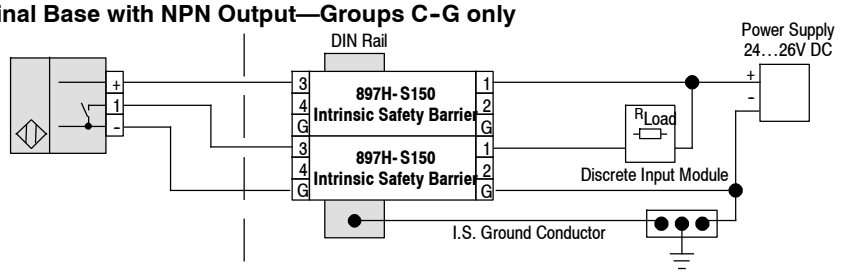
| Label | Color | State | Status |
|---|---|---|---|
| Output | Red | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |

## Wiring Diagrams

### Photohead and Terminal Base with PNP Output



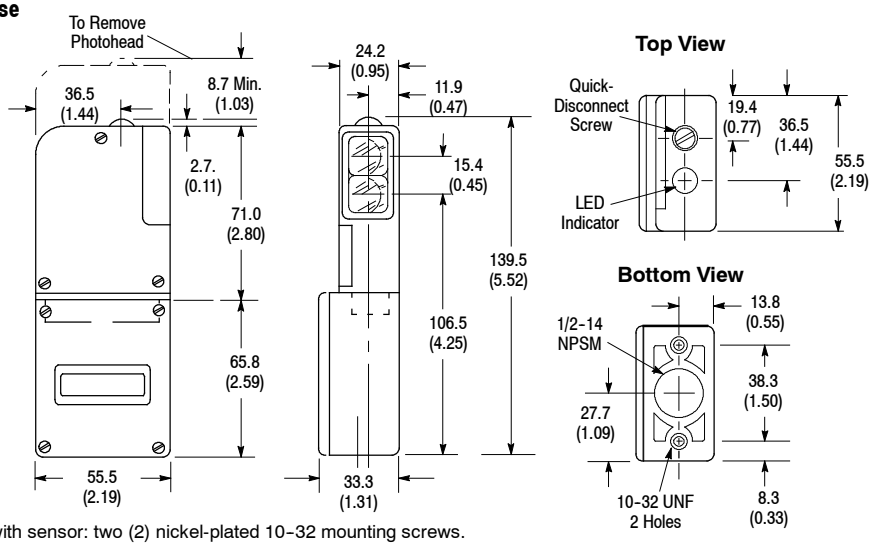

### Photohead and Terminal Base with NPN Output—Groups C-G only




| **IMPORTANT** | See Control Drawing #133-451. |
|---|---|

## Approximate Dimensions (Applies to all versions) [mm (in.)]

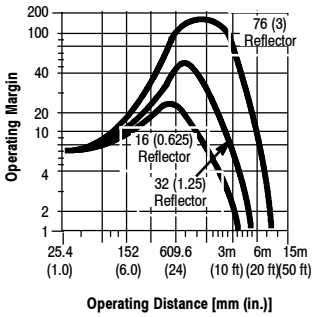
### Terminal Style Power Base



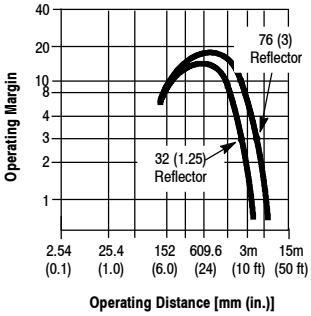

**Note**: Hardware included with sensor: two (2) nickel-plated 10-32 mounting screws.

## Typical Response Curve

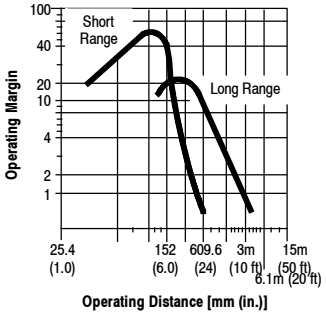
### Retroreflective



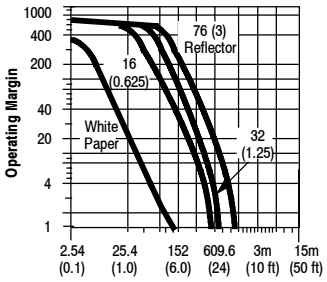

### Polarized Retroreflective




### Standard Diffuse

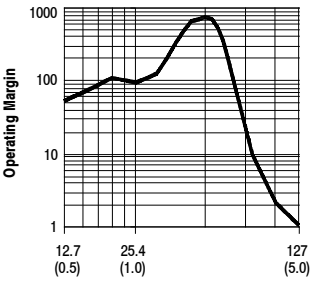



### Large Aperture Fiber Optic

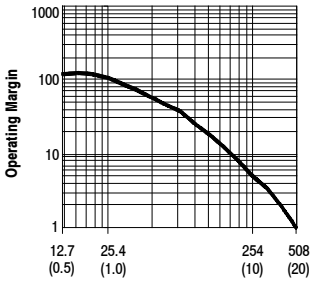



Fibers #43GR-FAS25SL through #43GR-BAA72ML
See Fiber Optic section in this catalog for additional information.

### Fixed Focus Lens

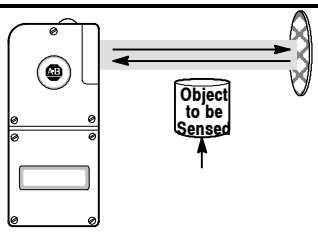
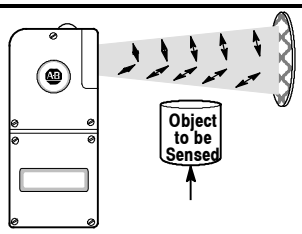



### Wide Angle Lens




## Product Selection

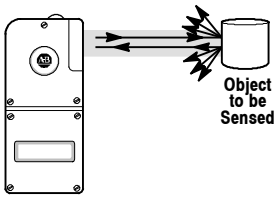
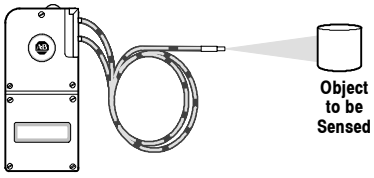
### Photohead

| Sensing Mode | Sensing Distance | Output Energized | Output Type Capacity | Response Time | Cat. No. |
|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 2.5° **Emitter LED:** Infrared 880 nm | 50.8 mm…10 m (2 in…33 ft) with 76 mm (3 in.) Reflector | Light/Dark Selectable | NPN and PNP 20 mA at 29.5V DC | 1 ms | 42DRU-5500 |
|  *Polarized Retroreflective* **Field of View:** 2.5° **Emitter LED:** Visible 660 nm | 50.8 mm…6 m (2 in…20 ft) with 76 mm (3 in.) Reflector | Light/Dark Selectable | NPN and PNP 20 mA at 29.5V DC | 1 ms | 42DRU-5700 |

**Refer to page 1-190 for cordsets and accessories.**

## Product Selection (continued)

### Photohead

| Sensing Mode | Sensing Distance | Output Energized | Output Type Capacity | Response Time | Cat. No. |
|---|---|---|---|---|---|
|  *Standard Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 50.8 mm (2 in.)…Short Range: 0.4 m (16 in.) Long Range: 2.1 m (7 ft) with White Paper | Light/Dark Selectable | NPN and PNP 20 mA at 29.5V DC | 1 ms | 42DRP-5500 |
|  *Large Aperture Fiber Optic* **Field of View:** Depends on the glass fiber optics and lens type **Emitter LED:** Infrared 880 nm | — | Light/Dark Selectable | NPN & PNP 20 mA at 29.5V DC | 1 ms | 42DRA-5500 ❶ |

❶ Lens assembly required, see below.

### Power Base

| Style | Operating Voltage | Supply Current | Cat. No. |
|---|---|---|---|
| Terminal | 13…29.5V DC | 26 mA max at 13V DC<br>30 mA max at 29.5V DC | 42DTB-5500 |

### Lens Assembly

| Lens Type | Cat. No. |
|---|---|
| Fiber Optic | 61-5550 |
| Fixed Focus | 61-5551 |
| Wide Angle | 61-5611 |

### Cordsets and Accessories

| Description | Page No. |
|---|---|
| Mounting Assemblies | 1-293 |
| Intrinsic Safety Barriers | 12-2 |
| 76 mm (3 in.) Diameter Reflector | 92-39 |
| 32 mm (1.25 in.) Diameter Reflector | 92-47 |

## Description

The MultiSight is an optical multi-pixel sensor with a pass/fail PNP output. The MultiSight uses several different methods of evaluation (pattern matching, contrast, brightness, and contour matching) to detect or differentiate objects by means of previously defined optical characteristics, e.g. for separating "good" and "bad" parts. The main applications are in the field of industrial automation for quality assurance purposes. The MultiSight is an easy-to-use economical alternative to conventional vision systems for detecting presence or absence, completeness, position, markings, labeling, packaging, and components.

## Features

- Standalone vision sensor
- Easy handling and setup
- Compact, sturdy industrial housing with IP67 rating
- Integrated lighting
- Optional EtherNet/IP™ connection with RSLogix™ 5000 Add-On Profile for I/O data
- Adjustable focus from 20 mm to infinity
- Short evaluation time (50…250 ms)
- Multiple evaluation methods: pattern matching, brightness, contrast, and contour matching
- Ten or 32 virtual detectors
- Individual virtual detectors can be logically linked or grouped for evaluation of different objects with several characteristics for inspection
- Ethernet connection for setup

## Specifications

| | Standard Models | EtherNet/IP Models |
|---|---|---|
| Certifications | cULus Certified and CE Marked for all applicable directives | |
| **Lighting and Optics** | | |
| Imager | 640 x 480 pixels, CCD-monochrome; 256 level (8-bit) greyscale | |
| Lighting | Integrated LEDs; 6 x white, 2 x red | |
| Lens Type | 6 mm or 12 mm integrated lens, adjustable focus | |
| Field of View | 12 mm Lens: @ 200 mm; X = 60 mm, Y = 40 mm<br>6 mm Lens: @ 200 mm; X = 150 mm Y = 100 mm<br>(see Field of View table for details) | |
| Sensing Range | Min. range: 20 mm; max. range: infinite but dependent on illumination | |
| Depth of Field | ±5% of focusing distance | |
| **Electrical** | | |
| Operating Voltage | 24V DC ±10% | |
| Current Consumption | ≤200 mA | |
| Open Circuit Protection | Short circuit, overload, false pulse, transient noise, reverse polarity | |
| Outputs | OUT1 (pass/fail), OUT2 (position), OUT3 (illumination), OUT4 (ready) | |
| Output Type | 4 x PNP type (sourcing MOSFET) | |
| Output Rating | 200 mA per output; max. 9.6 W | |
| Input Type | IN1 (trigger) and IN2 (control); high 10…30V DC, low 0…3V DC | |
| Ethernet Interface | Configuration only | Configuration (TCP/IP) and I/O (EtherNet/IP) |
| **Mechanical** | | |
| Housing Material | Aluminum and ABS Plastic | |
| Lens Material | Plastic (PMMA) | |
| LED Indicators | Green: Power; Red: Error; Yellow (2): Q1, Q2 output | |
| Connection Type | Power-I/O: 8-pin micro QD (M12);<br>Ethernet: 8-pin micro QD (M12) | Power-I/O: 8-pin micro QD (M12);<br>Ethernet: 4-pin d-code micro QD (M12) |
| Enclosure Type Rating | IP67 | |
| Vibration | 10…55 Hz, 1.5 mm amplitude; 3 planes; meets or exceeds IEC 60947-5-2 | |
| Shock | 30 g; 11 ms; meets or exceeds IEC 60947-5-2 | |
| Operating Temperature [C (F)] | 0…50° (32…122°) | |
| **Accessories** | | |
| Supplied Accessory | Dovetail bracket (48MS-BKTDT), focus adjustment screwdriver, 3 mounting screws, Allen-wrench, software CD | |
| Additional Required Accessory | PWR and I/O cordset, ethernet cable | |
| Optional Accessory | Mounting brackets, cordsets, external lighting, trigger sensors | |
| **Detectors** | | |
| Detector Types | Pattern matching, brightness, contrast | Pattern matching, brightness, contrast, contour matching |
| Number of Detectors | Up to 10 detectors | Up to 32 detectors |
| Angular Displacement | ±5° (for pattern matching); 360° (for contour matching) | |
| Typical Cycle Time | Pattern 50…100 ms; brightness 40…50 ms; contrast 40…50 ms; contour 120…500 ms | |
| Number of Job Selects | Combination of 10 detectors and job selections | Combination of 32 detectors and job selections |

# 48MS MultiSight™

## Vision Sensor

### Benefits

- Perform multiple inspections with one sensor
- Simple setup using PC and configuration software
- Multiple job storage to facilitate flexible product changeovers
- Simple inspection tools for detecting presence or absence, completeness, position, markings, labeling, packaging, and components
- Economical alternative to conventional vision system

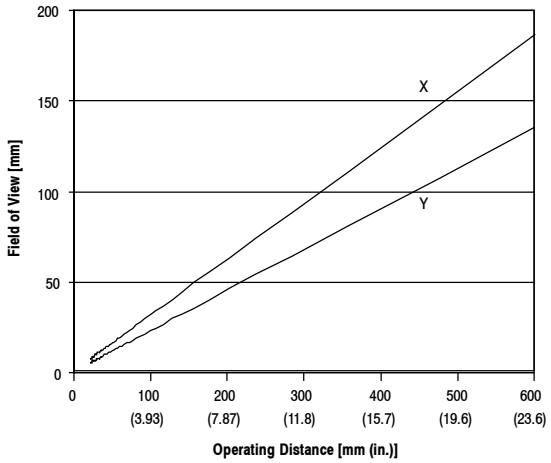
### Product Selection

| Focal Length of Lens | Field of View | EtherNet/IP | Cat. No. |
|---|---|---|---|
| 12 mm | 12 mm @ 200 mm; X = 60 mm, Y = 40 mm | No | 48MS-SE1PF2-M2 |
| 6 mm | 6 mm @ 200 mm; X = 150 mm, Y = 100 mm | No | 48MS-SE1PF1-M2 ❶ |
| 12 mm | 12 mm @ 200 mm; X = 60 mm, Y = 40 mm | Yes | 48MS-SN1PF2-M2 |
| 6 mm | 6 mm @ 200 mm; X = 150 mm, Y = 100 mm | Yes | 48MS-SN1PF1-M2 ❶ |

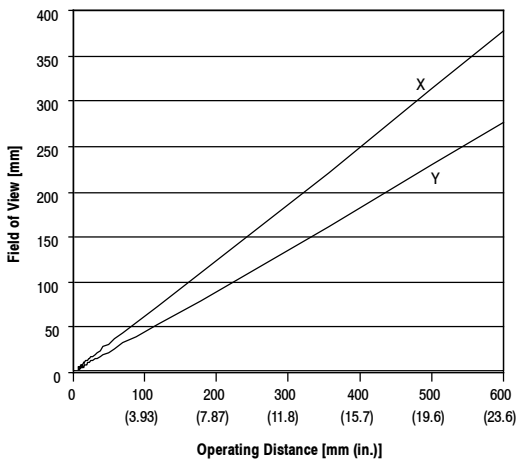
❶ The 6 mm lens models typically require external lighting because the integrated lighting does not illuminate the entire field of view, i.e., the edges of the image are dark.

### Field of View

**12 mm Lens**



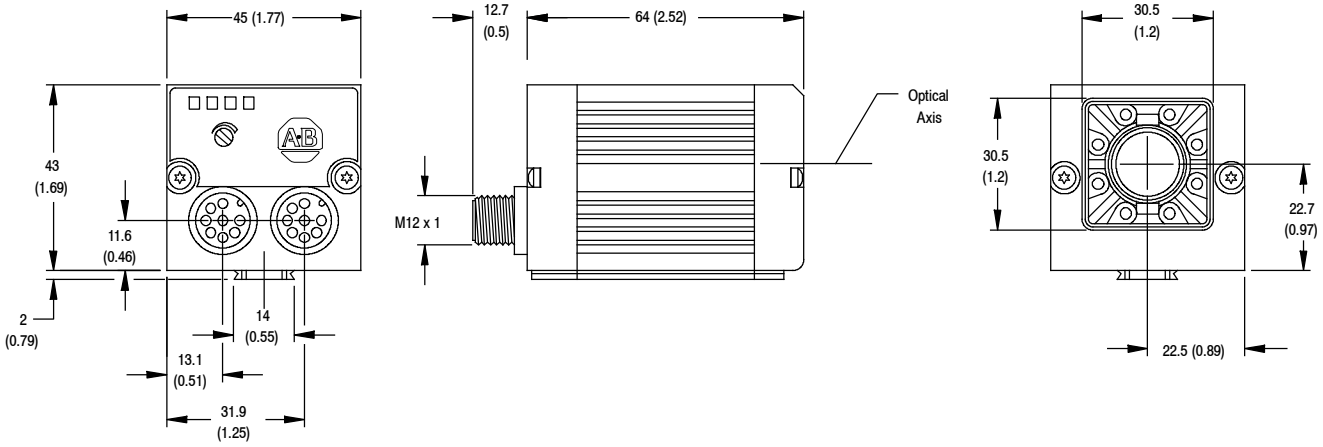

**6 mm Lens**



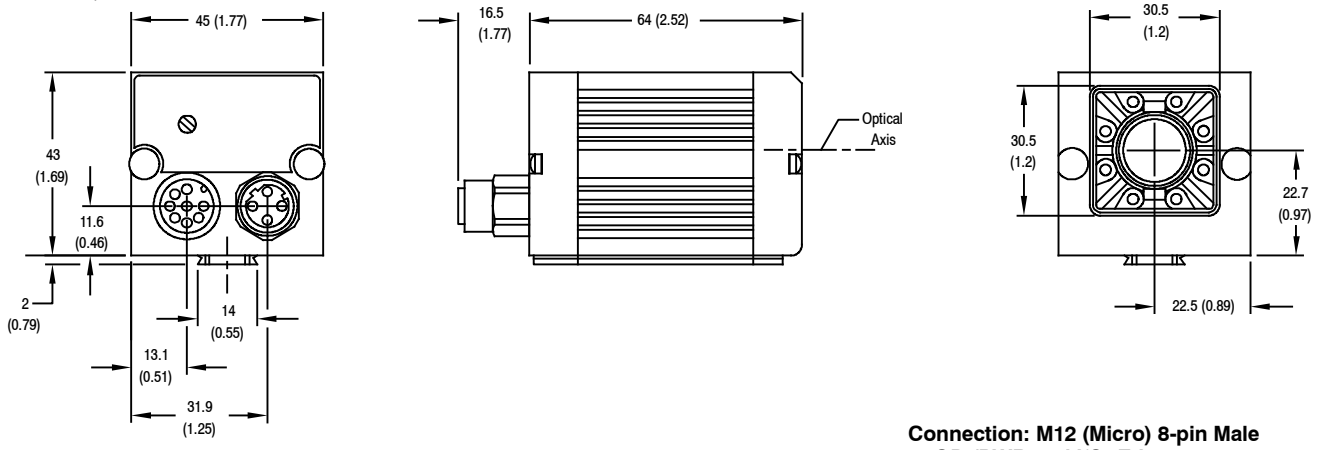
## Approximate Dimensions [mm (in.)]

*Dimensions are not intended to be used for installation purposes.*

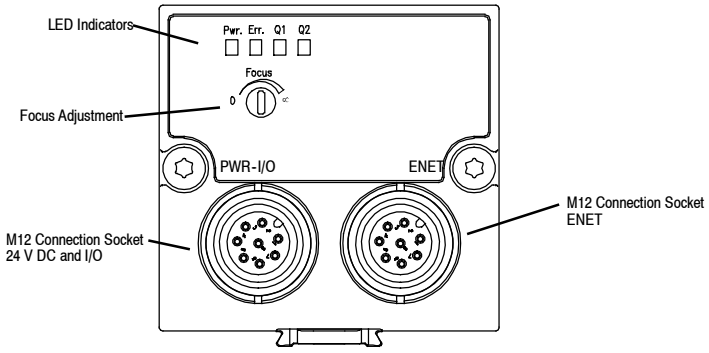
**Standard Models**



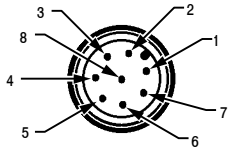

**EtherNet/IP Models**




**Rear View of the MultiSight**




**Connection: M12 (Micro) 8-pin Male QD (PWR and I/O; Ethernet on standard models)**

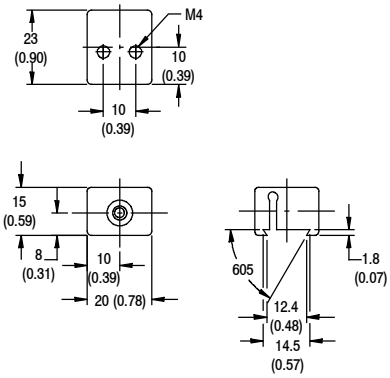



**Connection: 4-pin D Code Female QD (Ethernet connection for EtherNet/IP models)**

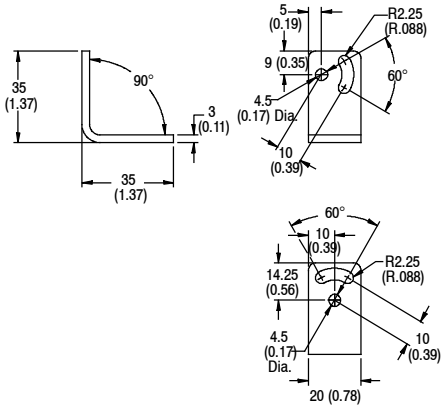
## Approximate Dimensions [mm (in.)] (continued)

*Dimensions are not intended to be used for installation purposes.*

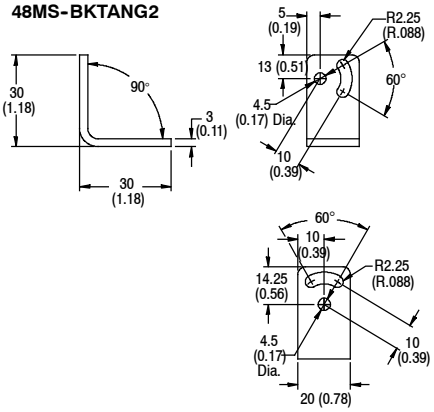
**Dovetail Bracket—48MS-BKTDT (included with MultiSight)**



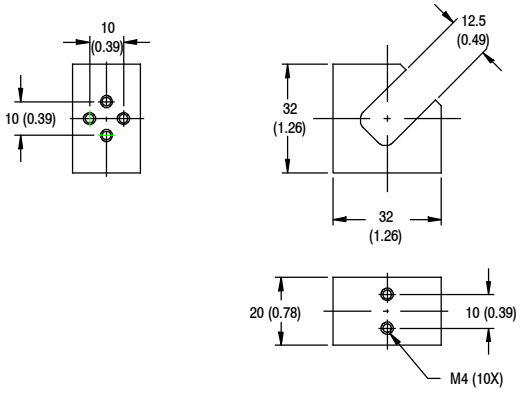

**Angle Bracket—48MS-BKTANG**



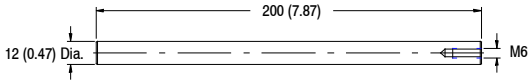

**Angle Bracket for Ring Light—48MS-BKTANG2**



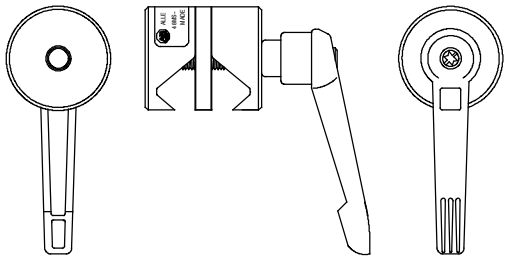

**Rod Bracket—48MS-BKTROD**



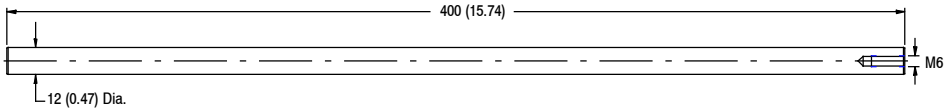

**Mounting Rod 200—48MS-ROD200**



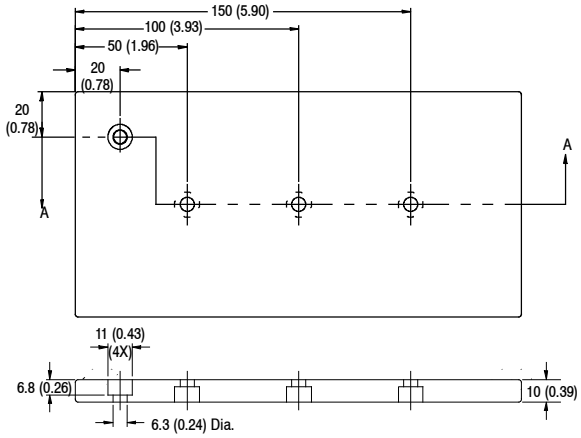

**Rod Clamp—48MS-CLAMP**



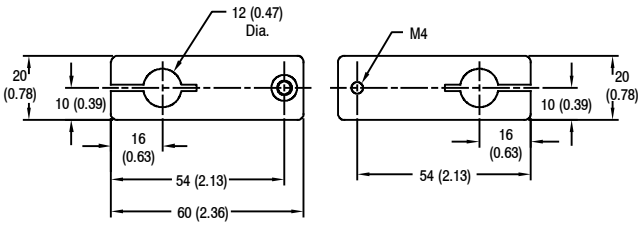
**Mounting Rod 400—48MS-ROD400**




**Mounting Plate—48MS-MTPLATE**



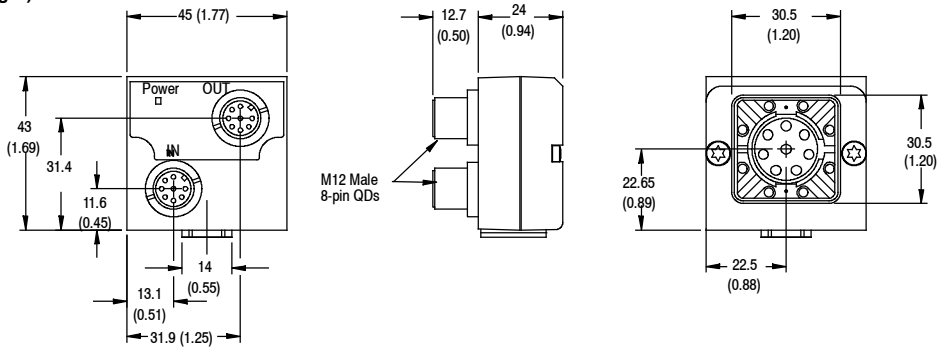

**Rod Link—48MS-RODLINK**



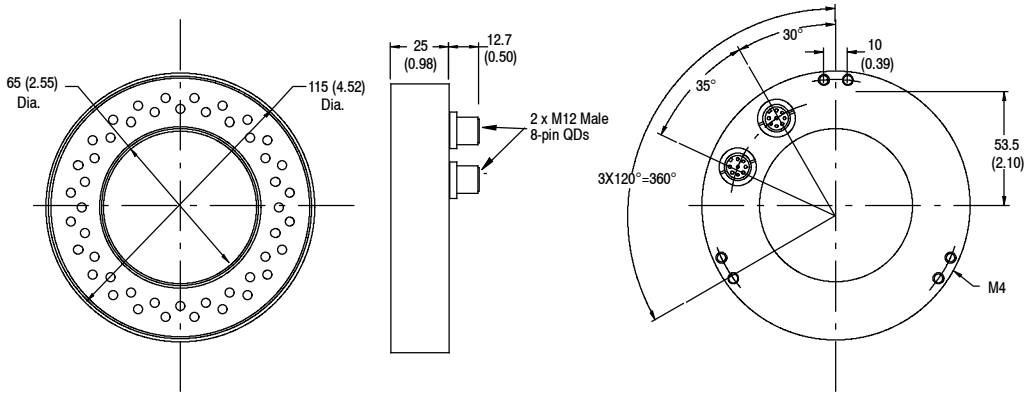
## Approximate Dimensions [mm (in.)] (continued)

*Dimensions are not intended to be used for installation purposes.*

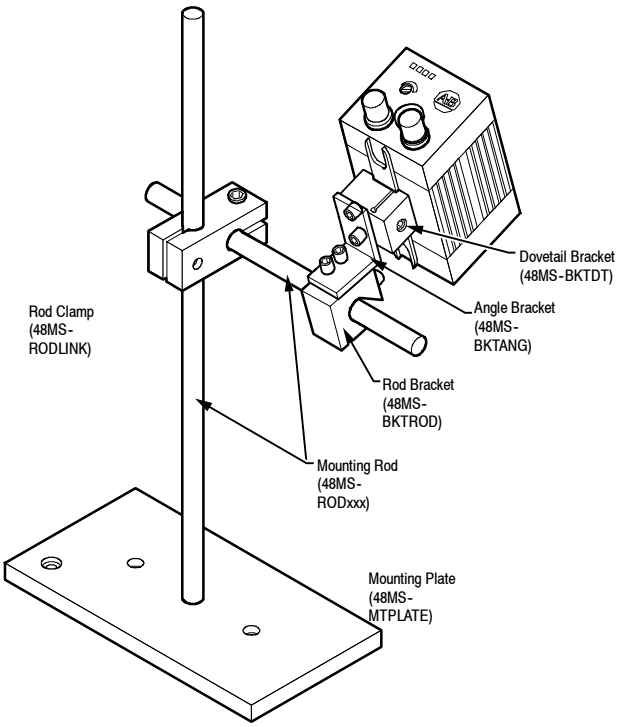
**Area Light (White Light)—48MS-ALWH**




**Ring Light (White Light)—48MS-RLWH**




**Mounting Setup**



## Wiring

### Power I/O Connection

| Pin (M12) | Color | Use |
|---|---|---|
| 1 | White | IN1 (external trigger) |
| 2 | Brown | 24V DC (V+) |
| 3 | Green | OUT1 (pass/fail); display LED = Q1 |
| 4 | Yellow | OUT4 (ready) ❶ |
| 5 | Grey | IN2 (control input) |
| 6 | Pink | OUT3 (external illuminated trigger) |
| 7 | Blue | GND (V+) |
| 8 | Red | OUT2 (position); display LED = Q2 |

❶ Indicates sensor evaluation is valid for OUT1 and OUT2, except in special cases as noted in the *MultiSight User Manual*.

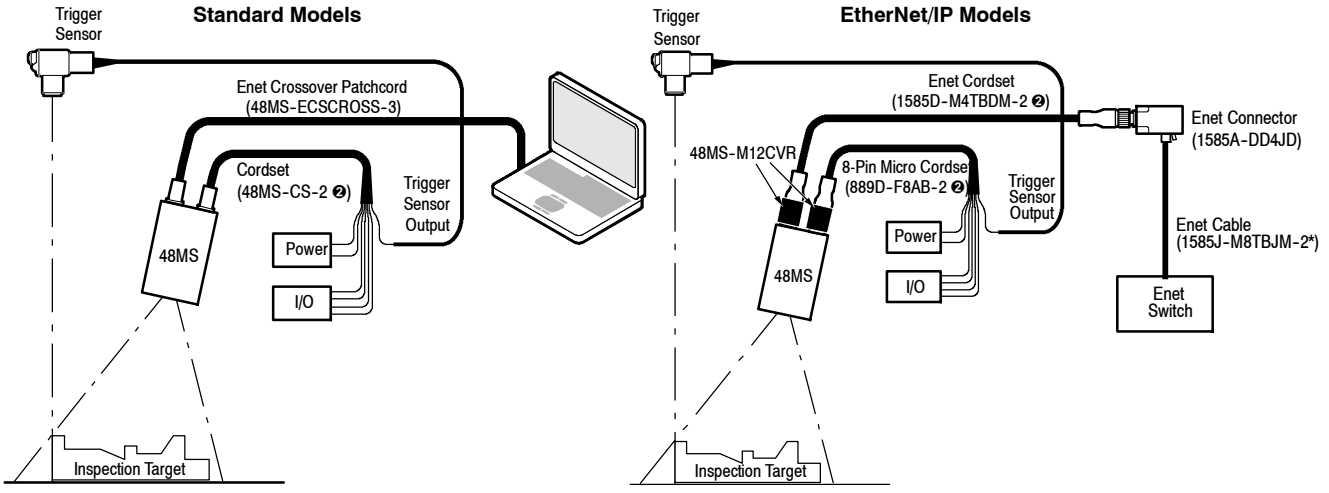
### Ethernet (Standard Models)

| Pin (M12) | Use |
|---|---|
| 1 | — |
| 2 | — |
| 3 | — |
| 4 | TxD- |
| 5 | RxD+ |
| 6 | TxD+ |
| 7 | RxD- |
| 8 | — |

### Ethernet (EtherNet/IP Models)

| Pin (M12 D-Code) | Use |
|---|---|
| 1 | Tx+ |
| 2 | Rx+ |
| 3 | Tx- |
| 4 | Rx- |

### Setup and Wiring




❷ Other lengths available: replace 2 with length in meters (5 m and 10 m are standard lengths).

## Accessories

| Product Descriptor | Cat. No. |
|---|---|
| Dovetail Bracket | 48MS-BKTDT ❶ |
| Angle Bracket | 48MS-BKTANG |
| Rod Bracket | 48MS-BKTROD |
| Mounting Rod 200 mm | 48MS-ROD200 |
| Mounting Rod 400 mm | 48MS-ROD400 |
| Rod Link | 48MS-RODLINK |
| Rod Clamp | 48MS-CLAMP |
| Mount Plate | 48MS-MTPLATE |
| RJ45 Connector | 48MS-RJ45CONN |
| Ethernet Crossover Cable, RJ45 to RJ45 | 48MS-ECROSS |
| Area Light—White Light | 48MS-ALWH |
| Ring Light—White Light | 48MS-RLWH |
| Angle Bracket for Ring Light | 48MS-BKTANG2 |
| Lighting Cable | 48MS-LCS |
| Lighting Cable Right Angle | 48MS-LCRT |
| MultiSight Test Box | 48MS-TESTBOX |

### Standard Model

| Product Descriptor | Cat. No. |
|---|---|
| Cordset 2 m | 48MS-CS-2 |
| Cordset 5 m | 48MS-CS-5 |
| Cordset 10 m | 48MS-CS-10 |
| Cordset Right Angle 2 m | 48MS-CSRT-2 |
| Cordset Right Angle 5 m | 48MS-CSRT-5 |
| ENET Cordset Crossover 3 m | 48MS-ECSCROSS-3 |
| ENET Cordset 3 m | 48MS-ECS-3 |
| Sealing Cap—M12 Male Connector | 889A-DCAP |

### EtherNet/IP Model

| Product Descriptor | Cat. No. |
|---|---|
| Power and I/O cordset—M12 8-pin female, 2 m | 889D-F8AB-2 ❷ |
| Cable Connector Cover (nonconducting)—M12 | 48MS-M12CVR ❶ |
| Sealing Cap—M12 Female Connector | 1485A-M12 |
| Ethernet Patchcord M12 D-code to RJ45—2 m | 1585D-M4TBJM-2 ❷ |
| Ethernet Patchcord M12 D-code to M12 D-code—2 m | 1585D-M4TBDM-2 ❷ |
| Ethernet M12 D-code to RJ45 converter | 1585A-DD4JD |
| Ethernet Cable RJ45 to RJ45—2 m | 1585J-M8PBJM-2 ❷ |
| Ethernet Patchcord Crossover M12 D-code to RJ45—3 m | 48MS-EPC-3 |

❶ Included with MultiSight Sensor.

❷ Other lengths available: replace 2 with length in meters (5 m and 10 m are standard lengths).

**Note**: Additional accessories (longer cordsets and additional LED colors for external lighting) available with longer lead times. Consult your local Rockwell Automation sales office or Allen-Bradley distributor for additional information.

## Description

These UL 325 Recognized and UL 508 Listed photoelectric sensing solutions are based on the industry proven Series 9000 and are specifically designed for noncontact detection of vehicles in automatic access control (gate entry) applications. These sensors are available individually or as bundled kits.

## Features

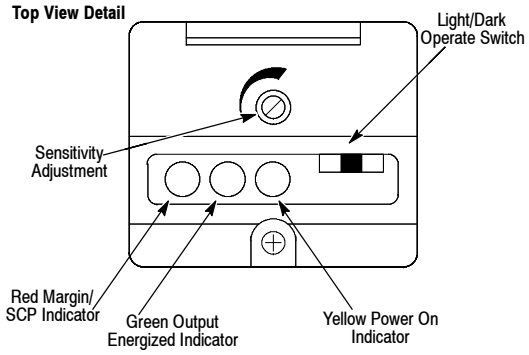
- Complete sensing solutions based on the industry proven Series 9000 photoelectric sensors
- SPDT electro-mechanical relay output
- 24V AC/DC and 120/220V AC/DC models
- -34…+70°C (-29…+158°F) operating temperature range
- NEMA 3, 4X, 6P, 12, 14 (IP 67) environmental rating
- 1200 psi washdown rating
- Offered as kits or individual components

## Specifications

| | |
|---|---|
| **Environmental** | |
| Operating Temperature [C (F)] | -34…+70° (-29…+158°) |
| Relative Humidity | 5…95% noncondensing |
| Operating Environment | NEMA 2, 4, 4X, 6P, 13; IP67 (IEC 602529), 1200 psi (8270 kPa) washdown |
| Certifications | UL 325 Recognized component for US and Canada and CE Marked for all applicable directives |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| **Optical** | |
| Sensing Mode | Retroreflective, transmitted beam |
| Sensing Distance | 25.4 mm…9.15 m (1 in…30 ft) with AB #92-39 reflector,<br>25.4 mm…6 m (1 in…20 ft) transmitted beam |
| Transmitting LED | Visible red 660 nm, infrared (880 nm) |
| Field of View | 1.5° |
| Operating Mode | Light or dark operate selectable |
| Sensitivity Adjustment | See User Interface on page 1-199 |
| **Electrical** | |
| Supply Current | 40 mA |
| Power Consumption | 2.2 W/1.6V A |
| Protection | False pulse, reverse polarity, overload, short circuit |
| Output Type | SPDT EM Relay |
| Output Load Current/Voltage | 1 A @ 264V AC, 2 A @ 132V AC, 1 A @ 150V DC |
| Response Time | 23 ms max. |
| Leakage Current | Not applicable |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Mounting Bracket | #12 steel impact bracket |
| Connection Type | 2 m 300V cable, 5-pin, AC mini QD |

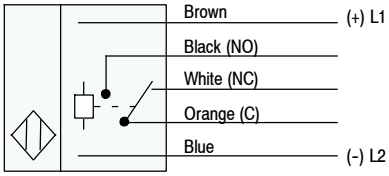
## User Interface

| Label | Color | State | Status |
|---|---|---|---|
| Output | Green | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |
| Margin/SCP | Red | OFF | Margin < 2.5 |
| | | ON | Margin > 2.5 |
| | | Flashing | Output SCP active |
| Power | Yellow | OFF | Sensor not powered |
| | | ON | Sensor powered |



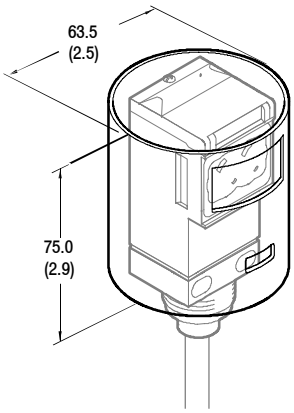

## Wiring Diagrams

Cable Models

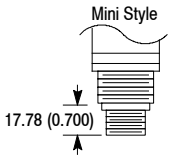



5-Pin AC/DC Mini QD Models

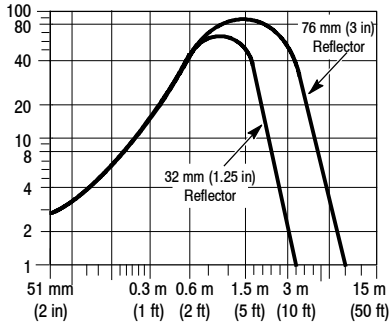
## Approximate Dimensions [mm (in.)]




### Mini Connector




## Typical Response Curve



## Product Selection—UL 325 Rated Retroreflective Sensor Kits

| Description | Contents | Sensor Operating Voltage | Cat. No. |
|---|---|---|---|
| 24V UL 325 Kit | Sensor: 60-2728<br>Mounting Bracket: 60-2421<br>Reflector: 92-39<br>Impact Bracket: 60-2725 | 10…55V DC/20…40V AC | 60-GR1-24UL325 |
| 120/220V UL 325 Kit | Sensor: 60-2730<br>Mounting Bracket: 60-2421<br>Reflector: 92-39<br>Impact Bracket: 60-2725 | 70…264V AC/DC | 60-GR1-120UL325 |

## Product Selection—UL 508 Rated Sensor Kits (General Purpose)

| Description | Contents of Kit | Cat. No. |
|---|---|---|
| 24V AC/DC Retroreflective Kit | 42GRU-9001, 60-2421 Bracket, 92-39 Reflector | 60-GR1-24 |
| 120/220V AC/DC Retroreflective Kit | 42GRU-9002, 60-2421 Bracket, 92-39 Reflector | 60-GR1-120 |
| 24V AC/DC Transmitted Beam Kit | 42GRL-9000, 42GRR-9001, 60-2421 Bracket (2 pcs.) | 60-GRR1-24 |
| 120/220V AC/DC Transmitted Beam Kit | 42GRL-9000, 42GRR-9002, 60-2421 Bracket (2 pcs.) | 60-GRR1-120 |

Refer to Series 9000 in the *Sensors* catalog for detailed specifications for sensor models included in above kits.

## Replacement Sensors Product Selection

| Description | Details | Cat. No. |
|---|---|---|
| 24V UL 325 Retroreflective | Retroreflective with 2 m Cable | 60-2728 |
| | Retroreflective with 5-pin Mini QD | 60-2729 |
| 120/220V UL 325 Retroreflective | Retroreflective with 2 m Cable | 60-2730 |
| | Retroreflective with 5-pin Mini QD | 60-2731 |

## Cordsets and Accessories

| Description | Cat. No. |
|---|---|
| Spare impact bracket for Series 9000 photoelectric sensor | 60-2725 |
| Spare mounting bracket for Series 9000 photoelectric sensor | 60-2421 |
| Spare reflector, 76 mm (3 in.) diameter with mounting hole | 92-39 |
| Spare reflector, 32 mm (1.25 in.) diameter with mounting hole | 92-47 |
| 1.8 m (6 ft) 5-pin, mini QD cordset | 889N-F5AF-6F |

## Description

The Series 9000 photoelectric sensors with diagnostic output are designed to provide both a visual and electrical indication of a “dirty lens” condition. This is useful in applications where dirt and dust build-up on the optic lens are expected. This action will reduce the return light signal to the sensor thereby reducing its capability to reliably detect passing targets.

## Features

- Both visual and electrical indication of “dirty lens” condition
- Supports both static and diagnostic modes of operation
- Harsh duty 30 mm package
- Wide selection of sensing modes
- Both DC and AC/DC operation
- Fast response time
- Variety of connection types

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Approved, CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4X, 6P, 12, 13; IP67 (IEC 529) 1200 psi (8270 kPa) washdown, IP69K |
| Operating Temperature [C (F)] | 0…+70° (32…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retroreflective, diffuse, transmitted beam |
| Sensing Range | See Product Selection table on page 1-205 |
| Field of View | See Product Selection table on page 1-205 |
| Light Source | Visible red (660 nm), Infrared (880 nm) |
| LED Indicators | See User Interface on page 1-202 |
| Adjustments | Single-turn potentiometer for sensitivity |
| **Electrical** | |
| Voltage | 10…30V DC, 95…264V AC/DC models |
| Current Consumption | 30 mA max (DC models), 15 mA max (AC/DC models) |
| Sensor Protection | Overload, short circuit, reverse polarity, false pulse |
| **Outputs** | |
| Response Time | 2 ms (DC models), 15 ms (AC/DC models) |
| Output Type | PNP and NPN both sensor and diagnostic output (DC models) |
| | SPST relay (sensor) with SPDT relay for diagnostic (AC/DC models) |
| Output Mode | Light or dark operate selectable |
| Output Current | 100 mA max @ 30V DC, 2 A @ 132V (AC/DC sensor and diagnostic), 11 A @ 264V (AC/DC sensor and diagnostic) |
| Output Leakage Current | 10 μA max |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Cover Material | Neoprene |
| Connection Types | 4-pin DC micro QD, 4-pin DC mini QD, 5-pin DC micro QD |
| Supplied Accessories | 129-130 mounting kit |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-206 |

## User Interface

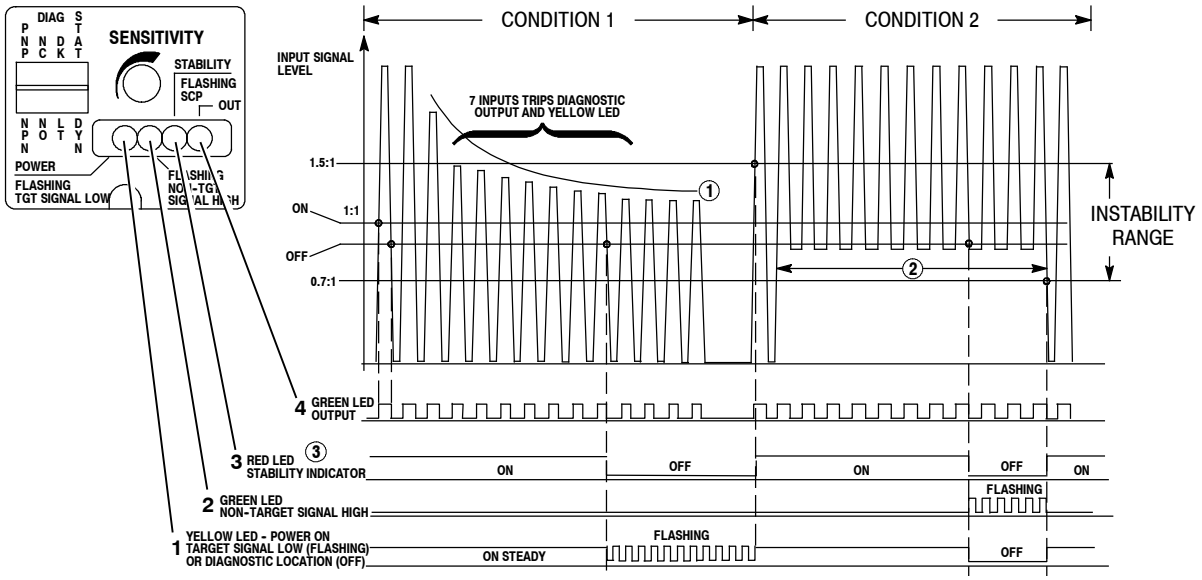
| Label | Color | State | Diagnostic Operating Mode | |
|---|---|---|---|---|
| | | | Static | Dynamic |
| POWER<br>FLASHING<br>TGT SIGNAL LOW | Yellow | On Steady | Sensor Power On | |
| | | Flashing | Unstable operation<br>(0.7 < Margin < 1.5) | 1.0 < Margin > 1.5 for seven successive operations<br>Diffuse: Target margin too low<br>Retro/Polarized Retro: Reflector margin too low<br>Transmitted Beam unbroken beam margin too low |
| FLASHING NON-TGT<br>SIGNAL HIGH | Green | Flashing | Unstable operation<br>(0.7 < Margin < 1.5) | 0.7 < Margin > 1.0 for seven successive operations<br>Diffuse: Background margin too high<br>Retro / Polarized Retro: Target margin too high<br>Transmitted Beam broken beam margin to high |
| STABILITY ❶<br>FLASHING SCP | Red | On Steady | Stable operation (Margin < 0.7 or Margin > 1.5) | |
| | | Off | Unstable operation (0.7 < Margin < 1.5) | |
| | | Flashing ❷ | Overload or short circuit at sensor output | |
| OUTPUT | Green | On | Output energized | |

❶ To prevent potentially confusing indications during rapid signal transitions, the red STABILITY indicator has a typical delay of 100 ms before it turns **off**. As a result, the indicator will not turn **off** for quick, brief events. (The Diagnostic Output has no delay.)

❷ 10…30V DC sensors only.

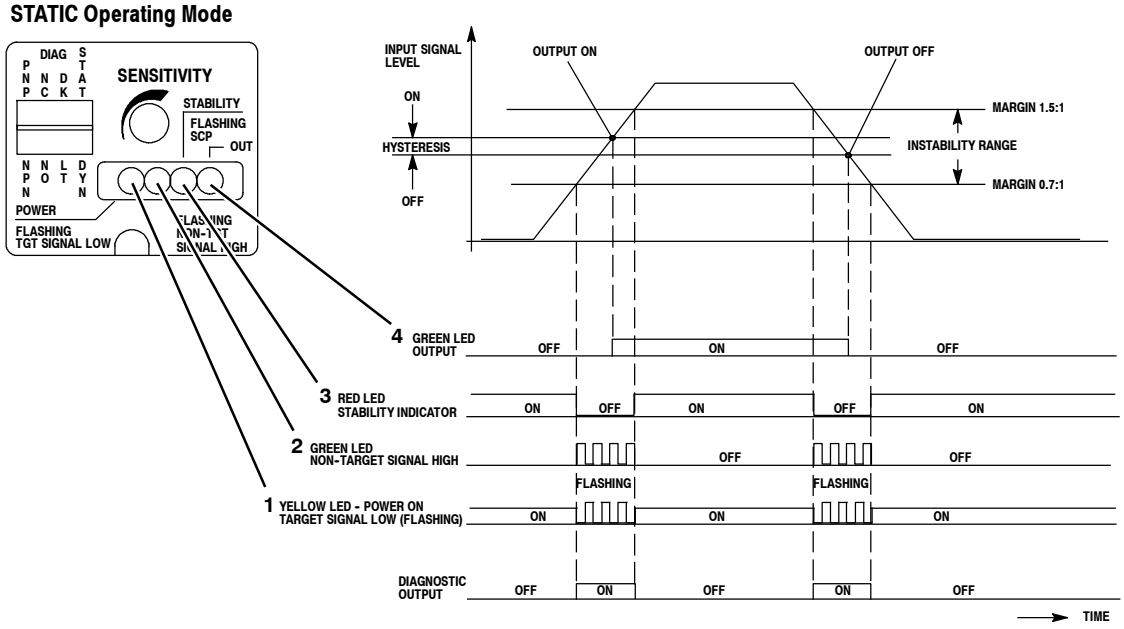
## User Interface Panel—DC model shown

**DYNAMIC Operating Mode**



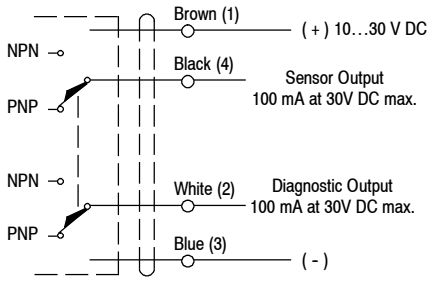

## User Interface Panel—DC model shown (continued)

**STATIC Operating Mode**

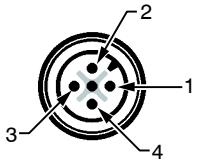


## Wiring Diagrams

### DC Sensors




**Micro Quick-Disconnect Version (QD)**



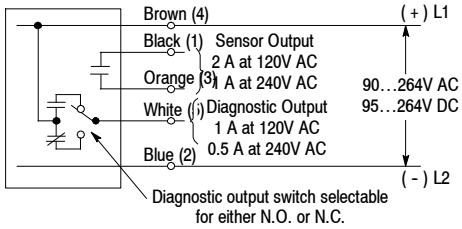

**Mini Quick-Disconnect Version (QD1)**

**ATTENTION**

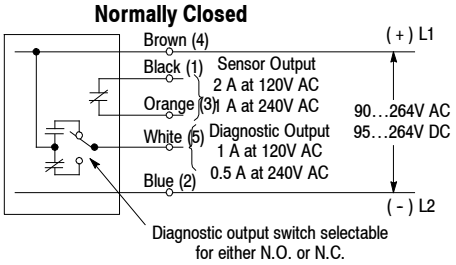
DO NOT connect both an NPN and PNP load at the same time!

### AC Sensors

**Normally Open**



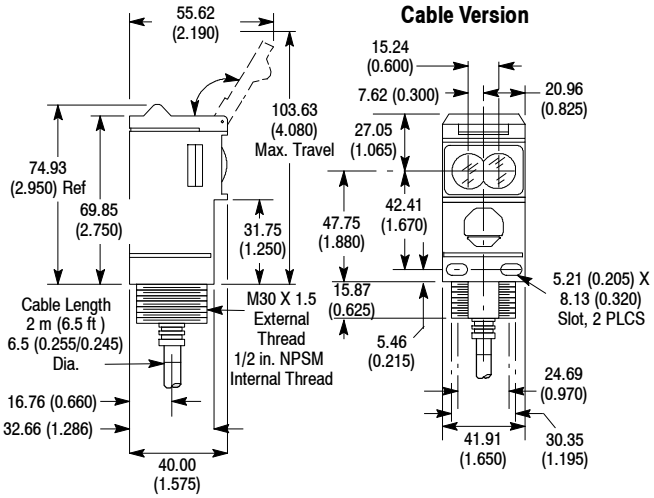

**Normally Closed**




**Mini Quick-Disconnect Version (QD)**

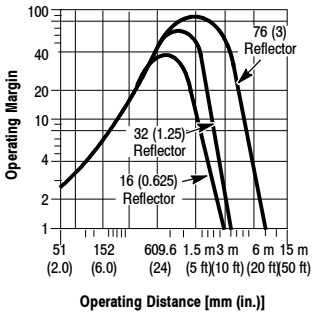
## Approximate Dimensions [mm (in.)]

### All Versions

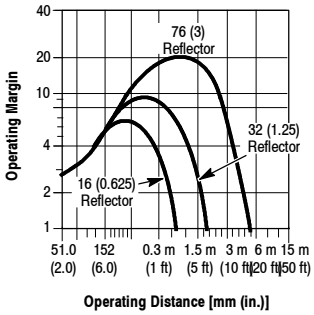


## Typical Response Curve

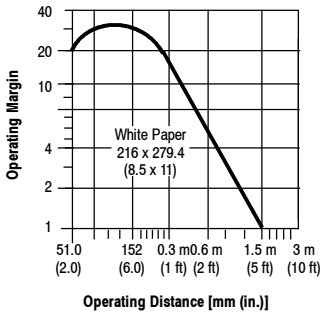
### Retroreflective



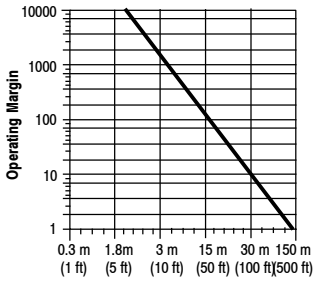

### Polarized Retroreflective



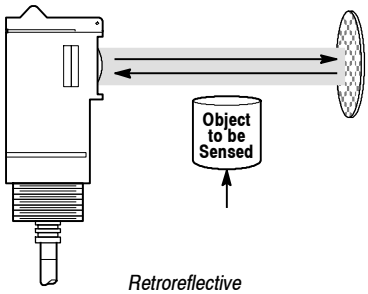
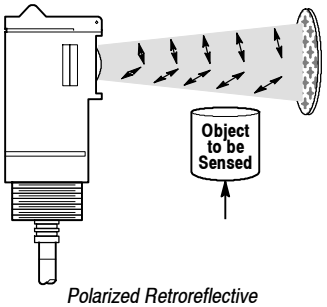

### Standard Diffuse




### Transmitted Beam

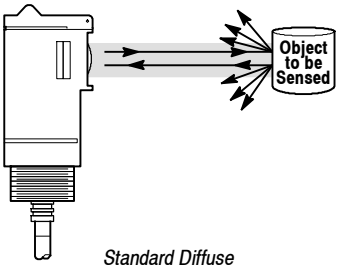
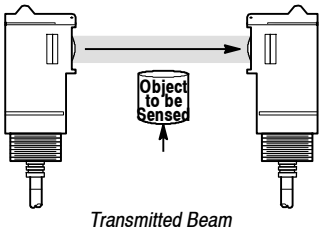
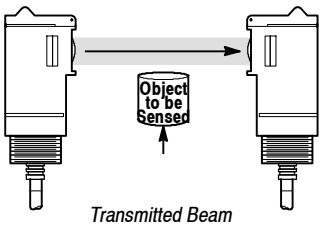



## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 1.5° **Emitter LED:** Visible Red 660 nm | 10…30V DC 30 mA | 50.8 mm …9.14 m (2 in…30 ft) with 76 mm (3 in.) Reflector | Light/Dark Selectable | NPN and PNP (Sensor and Diagnostic) 100 mA @ 30V DC 2 ms | 4-pin DC micro | 42GDU-9000-QD |
| | | | | | 4-pin mini | 42GDU-9000-QD1 |
| | 90…264V AC 95…264V DC 15 mA | | | SPST Relay N.O. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic) 15 ms | 5-pin mini | 42GDU-9004-QD |
| | | | | SPST Relay N.C. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic) 15 ms | 5-pin mini | 42GDU-9005-QD |
|  *Polarized Retroreflective* **Field of View:** 1.5° **Emitter LED:** Visible Red 660 nm | 10…30V DC 30 mA | 50.8 mm… 4.87 m (2 in…16 ft) with 76 mm (3 ft) Reflector | Light/Dark Selectable | NPN and PNP (Sensor and Diagnostic) 100 mA @ 30V DC 2 ms | 4-pin DC micro | **42GDU-9200-QD** |
| | | | | | 4-pin mini | 42GDU-9200-QD1 |
| | 90…264V AC 95…264V DC 15 mA | | | SPST Relay N.O. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic) 15 ms | 5-pin mini | **42GDU-9204-QD** |
| | | | | SPST Relay N.C. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic) 15 ms | 5-pin mini | 42GDU-9205-QD |

**Refer to page 1-206 for cordsets and accessories.**

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance | Output Energized | Output Type/ Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Standard Diffuse* **Field of View:** 3.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 30 mA | 50.8 mm… 1.52 m (2 in…5 ft) to White Paper | Light/Dark Selectable | NPN and PNP (Sensor and Diagnostic) 100 mA @ 30V DC/2 ms | 4-pin DC micro | 42GDP-9000-QD |
| | 90…264V AC 95…264V DC 15 mA | | | SPST Relay N.O. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic)/15 ms | 5-pin mini | 42GDP-9004-QD |
| | | | | SPST Relay N.C. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic)/15 ms | 5-pin mini | 42GDP-9005-QD |
| **For Light Sources** | | | | | | |
|  *Transmitted Beam* **Field of View:** 1.5° **Emitter LED:** Infrared 880 nm | 10…264V AC/DC 15 mA | 25.4 mm… 61 m (1 in…200 ft) | — | — | 4-pin DC micro | **42GRL-9000-QD** |
| | | | | | 4-pin mini | 42GRL-9002-QD |
| | 10…264V AC/DC 15 mA | 25.4 mm… 152 m (1 in…500 ft) | — | — | 4-pin DC micro | 42GRL-9040-QD |
| | | | | | 4-pin mini | 42GRL-9042-QD |
| **For Receivers** | | | | | | |
|  *Transmitted Beam* **Field of View:** 1.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 30 mA | — | Receiver Light/Dark Selectable | NPN and PNP (Sensor and Diagnostic) 100 mA @ 30V DC/2 ms | 4-pin DC micro | **42GDR-9000-QD** |
| | | | | | 4-pin mini | 42GDR-9000-QD1 |
| | 90…264V AC 95…264V DC 15 mA | — | Light/Dark Selectable | SPST Relay N.O. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic)/15 ms | 5-pin mini | 42GDR-9004-QD |
| | | | | SPST Relay N.C. (Sensor) 15 ms SPDT Relay, N.O. and N.C. (Diagnostic)/15 ms | 5-pin mini | 42GDR-9005-QD |

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| 1.8 m (6 ft) 4-pin, Mini QD Cordset | 889N-F4AF-6F | 2 m (6.5 ft) 4-pin, DC Micro QD Cordset | 889D-F4AC-2 | 76 mm (3 in.) Diameter with Center Mount Hole | 92-39 |
| 1.8 m (6 ft) 5-pin, Mini QD Cordset | 889N-F5AF-6F | Mounting Bracket | 60-2439 | 32 mm (1.25 in.) Diameter | 92-47 |



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

## Features

- Compact cylindrical package
- Wide selection of sensing modes
- Universal supply voltage models
- Both NPN or PNP outputs (DC)
- Fast response time
- Variety of connection types

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Approved, and CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4X, 6, 12, 13; IP67 |
| Operating Temperature [C (F)] | -40…+56° (-40…+150°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retro, diffuse, fixed focus, sharp cutoff, wide angle, transmitted beam |
| Sensing Range | See Product Selection table on page 1-210 |
| Field of View | See Product Selection table on page 1-210 |
| Light Source | Visible red LED (660 nm), infrared LED (880 nm) |
| LED Indicators | Red LED for output indication |
| Adjustments | 4-turn sensitivity potentiometer |
| **Electrical** | |
| Voltage | 10…30V DC, 20…264V AC/DC |
| Current Consumption | 35 mA max |
| Sensor Protection | Reverse polarity, false pulse |
| **Outputs** | |
| Response Time | See Product Selection table on page 1-210 |
| Output Type | PNP and NPN (DC models); MOSFET (AC/DC models) |
| Output Mode | Light or dark operate by cat. no. |
| Output Current | See Product Selection table on page 1-210 |
| Output Leakage Current | 1 μA max |
| **Mechanical** | |
| Housing Material | Noryl |
| Lens Material | Acrylic |
| Cover Material | Neoprene |
| Connection Types | 3 m (9.8 ft) cable, 4-pin DC micro (M12) QD, 4-pin AC micro (M12) QD |
| Supplied Accessories | Mounting kit # 129-106-1 and 129-106-2 |
| Optional Accessories | See mounting brackets on page 1-212 |

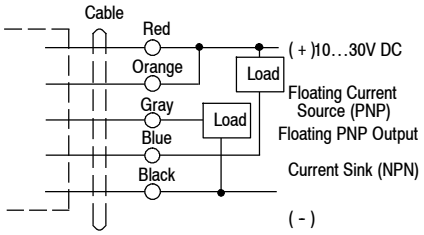
## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Output | Red | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |

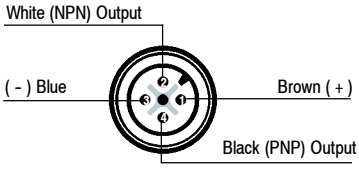
## Wiring Diagrams

### DC All Models Except Transmitted Beam Source and High Speed Diffuse

**Cable Version**
**Models: 42SR_-6__2 and 6__3**

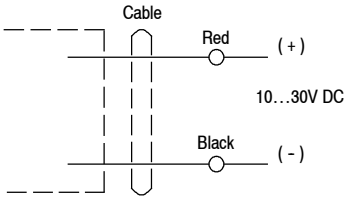



**Quick-Disconnect Versions**
**Models: 42SR_-6__2-QD and 6__3-QD**

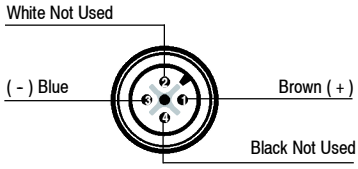



### Transmitted Beam Source (42SRL-6000)

**Cable Version**

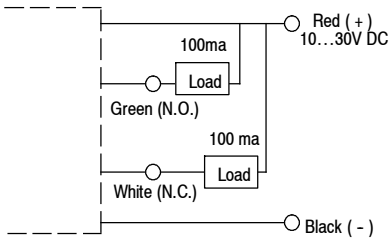



**Quick-Disconnect Version**

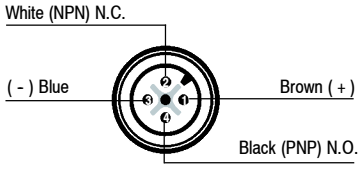



### High Speed Diffuse (42SRP-6302)

**Cable Version—NPN Outputs**

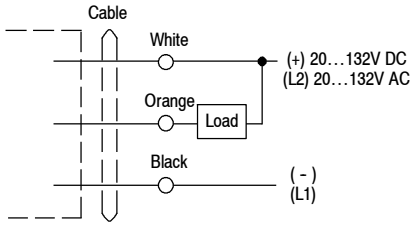



**Quick-Disconnect Version**

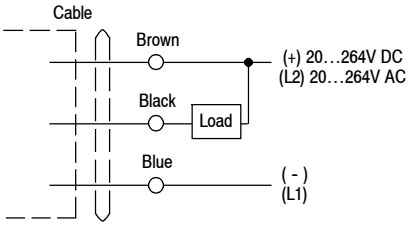



### AC/DC All Models Except Transmitted Beam Source

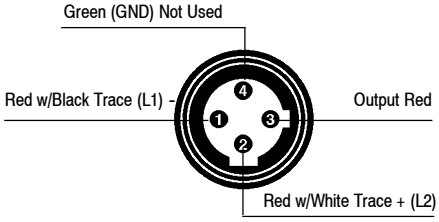
**Cable Versions**
**Models: 42SR_-6__4 and 6__5**




**Models: 42SR_-6__6 and 6__7**

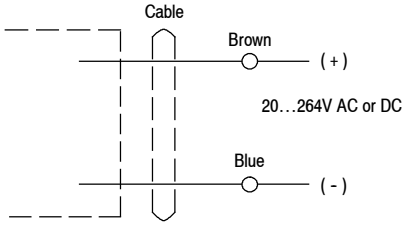



**Quick-Disconnect Versions**
**Models: 42SR_-6__4-QD thru 6__7-QD**

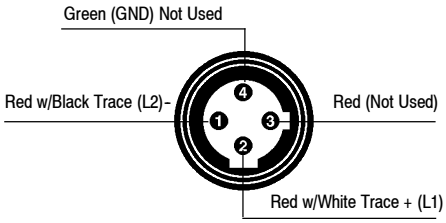



### Transmitted Beam Source (42SRL-6006)

**Cable Version**




**Quick-Disconnect Version**

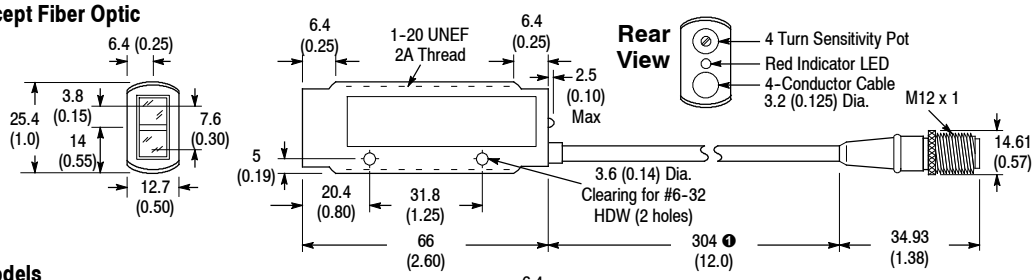



**Note**: Details regarding connection of Allen-Bradley Series 6000 photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.
All wire colors shown refer to Allen-Bradley quick-disconnect cables.

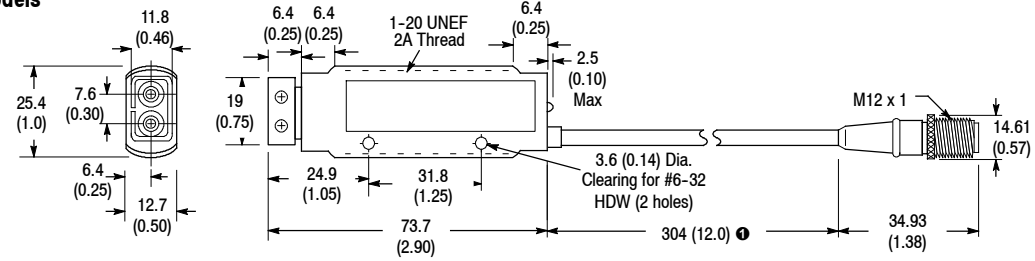
## Approximate Dimensions [mm (in.)]

### DC Models

#### All Models Except Fiber Optic



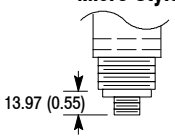

#### Fiber Optic Models




❶ Quick-disconnect cable length shown. Cable versions length is 3 m (10 ft).

### Connector Version

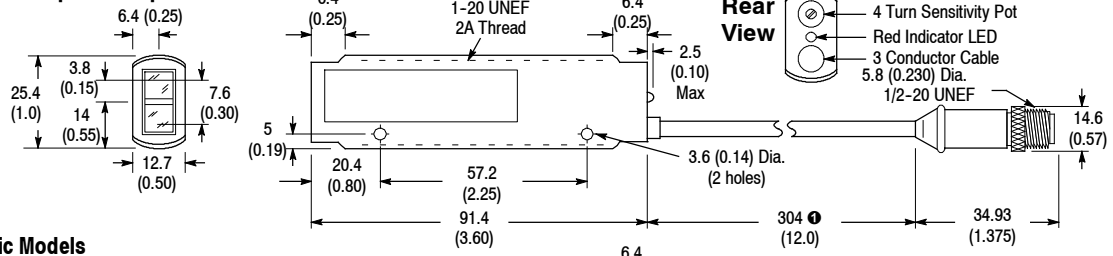
#### Micro Style



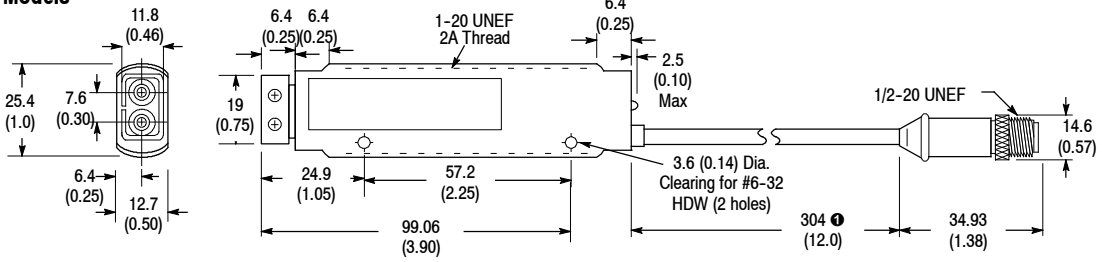

### Thread Size

| | AC | DC |
|---|---|---|
| Micro | 1/2-20 UNF 2 Keyways | M12 x 1 1 Keyway |

#### All Models Except Fiber Optic




#### Fiber Optic Models

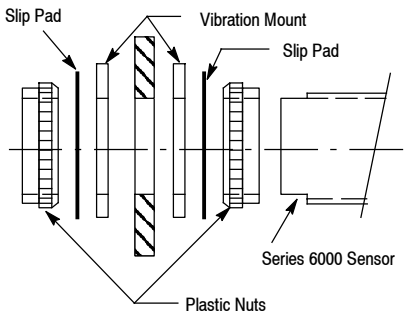



❶ Quick-disconnect cable length shown. Cable versions length is 3 m (10 ft).

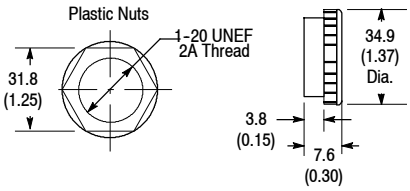
### Supplied Accessories

Mounting Kit **#129-106-1** contains two plastic nuts, anti-vibration mount, and slip pads.

Mounting Kit **#129-106-2** contains two plastic nuts, anti-vibration mount, slip pads, and fiber optic mounting hardware.

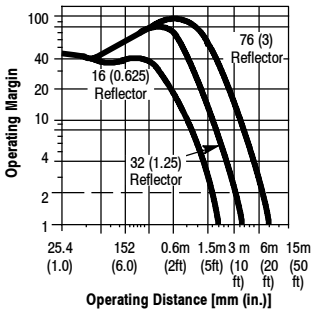



### Plastic Nuts

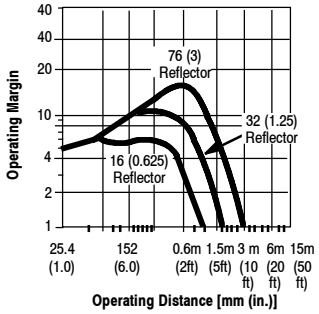


## Typical Response Curve

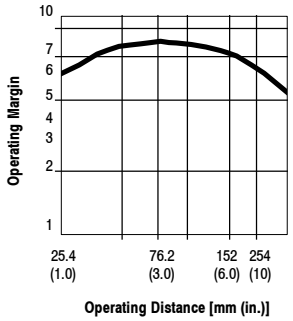
### Retroreflective



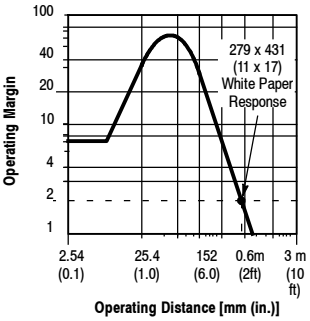

### Polarized Retroreflective



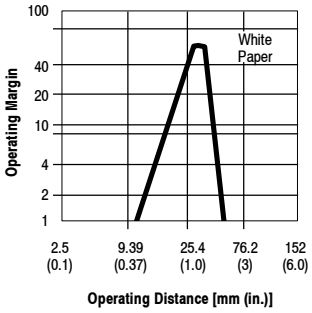

### Retroreflective Code Reader



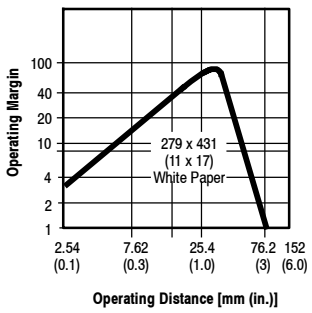

### Standard Diffuse



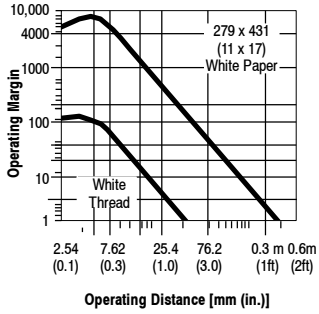

### Fixed Focus Diffuse



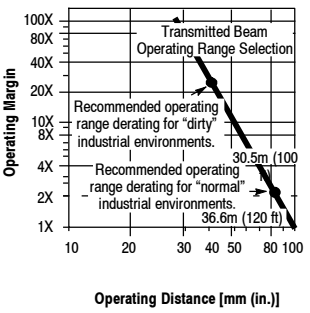

### Sharp Cutoff Diffuse



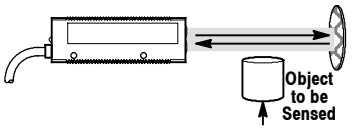
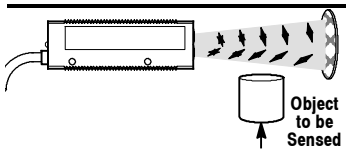

### Wide Angle Diffuse




### Transmitted Beam




## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance @ 1X Margin | Output Energized | Output Type Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 10…30V DC 35 mA | 25.4 mm… 9 m (1 in…30 ft) with 76 mm (3 in.) Reflector | Light | NPN and PNP 200 mA 1 ms | 3 m cable | 42SRU-6002 |
| | | | | | 4-pin DC micro | 42SRU-6002-QD |
| | | | Dark | | 3 m cable | 42SRU-6003 |
| | | | | | 4-pin DC micro | 42SRU-6003-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | **42SRU-6004** |
| | | | | | 4-pin AC micro | 42SRU-6004-QD |
| | | | Dark | | 3 m cable | **42SRU-6005** |
| | | | | | 4-pin AC micro | 42SRU-6005-QD |
|  *Polarized Retroreflective* **Field of View:** 3° **Minimum Sensing Distance:** 50.8 mm (2 in.) **Emitter LED:** Visible Red 660 nm **Indicator LED:** Red: Output | 10…30V DC 35 mA | 50.8 mm… 3 m (2 in…10 ft) with 76 mm (3 in.) Reflector | Light | NPN and PNP 200 mA 1 ms | 3 m cable | **42SRU-6202** |
| | | | | | 4-pin DC micro | 42SRU-6202-QD |
| | | | Dark | | 3 m cable | 42SRU-6203 |
| | | | | | 4-pin DC micro | 42SRU-6203-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | **42SRU-6204** |
| | | | | | 4-pin AC micro | 42SRU-6204-QD |
| | | | Dark | | 3 m cable | 42SRU-6205 |
| | | | | | 4-pin AC micro | 42SRU-6205-QD |

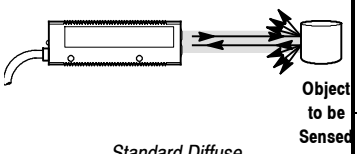
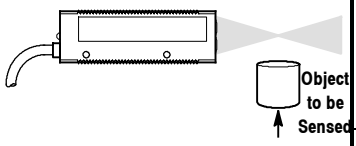
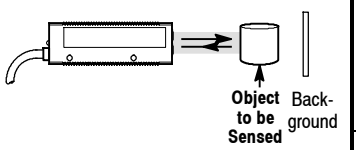
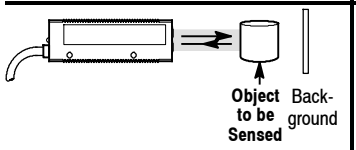
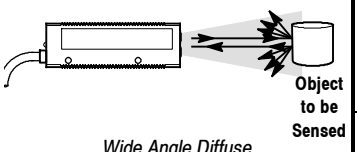
**Refer to page 1-212 for cordsets and accessories.**



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

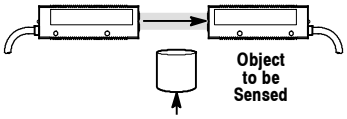
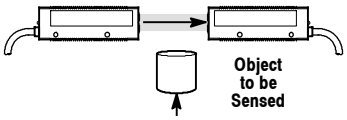
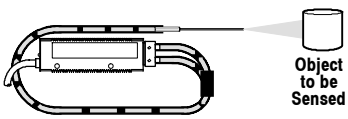
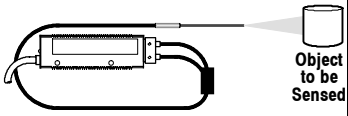
Allen-Bradley

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance @ 1X Margin | Output Energized | Output Type Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
|  *Standard Diffuse* **Field of View:** 7.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 35 mA | 2.54…760 mm (0.1…30 in.) to White Paper | Light | NPN and PNP 200 mA 1 ms | 3 m cable | 42SRP-6002 |
| | | | | | 4-pin DC micro | **42SRP-6002-QD** |
| | | | Dark | | 3 m cable | 42SRP-6003 |
| | | | | | 4-pin DC micro | 42SRP-6003-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | **42SRP-6004** |
| | | | | | 4-pin AC micro | 42SRP-6004-QD |
| | | | Dark | | 3 m cable | 42SRP-6005 |
| | | | | | 4-pin AC micro | 42SRP-6005-QD |
|  *Fixed Focus Diffuse* **Field of View:** 1.52 mm (0.06 in.) square **Emitter LED:** Visible Red 660 nm | 10…30V DC 35 mA | 27.9…28 mm (1.098…1.10 in.) to White Paper | Light | NPN and PNP 200 mA 1 ms | 3 m cable | 42SRP-6022 |
| | | | | | 4-pin DC micro | **42SRP-6022-QD** |
| | | | Dark | | 3 m cable | 42SRP-6023 |
| | | | | | 4-pin DC micro | 42SRP-6023-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | 42SRP-6024 |
| | | | | | 4-pin AC micro | 42SRP-6024-QD |
| | | | Dark | | 3 m cable | 42SRP-6025 |
| | | | | | 4-pin AC micro | 42SRP-6025-QD |
|  *Sharp Cutoff Diffuse* **Field of View:** 7.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 35 mA | 5…76 mm (0.2…3 in.) to White Paper | Light | NPN and PNP 200 mA 1 ms | 3 m cable | 42SRP-6032 |
| | | | | | 4-pin DC micro | **42SRP-6032-QD** |
| | | | Dark | | 3 m cable | 42SRP-6033 |
| | | | | | 4-pin DC micro | 42SRP-6033-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | 42SRP-6034 |
| | | | | | 4-pin AC micro | 42SRP-6034-QD |
| | | | Dark | | 3 m cable | 42SRP-6035 |
| | | | | | 4-pin AC micro | 42SRP-6035-QD |
|  *Sharp Cutoff Diffuse* **Field of View:** 7.5° **Emitter LED:** Infrared 880 nm | 20…264V AC/DC 50…60 Hz 1.2V A | 5…76 mm (0.2…3 in.) to White Paper | Dark | Power MOSFET 150 mA AC/DC 18 ms AC, 10 ms DC | 4-pin AC micro | 42SRP-6037-QD |
|  *Wide Angle Diffuse* **Field of View:** 62° **Emitter LED:** Infrared 660 nm | 10…30V DC 35 mA | 2.54…380 mm (0.1…15 in.) to White Paper | Light | NPN and PNP 200 mA 1 ms | 3 m cable | 42SRP-6012 |
| | | | | | 4-pin DC micro | **42SRP-6012-QD** |
| | | | Dark | | 3 m cable | 42SRP-6013 |
| | | | | | 4-pin DC micro | 42SRP-6013-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | 42SRP-6014 |
| | | | | | 4-pin AC micro | 42SRP-6014-QD |
| | | | Dark | | 3 m cable | 42SRP-6015 |
| | | | | | 4-pin AC micro | 42SRP-6015-QD |

**Refer to page 1-212 for cordsets and accessories.**

## Product Selection

| Sensing Mode | Operating Voltage Supply Current | Sensing Distance @ 1X Margin | Output Energized | Output Type Response Time | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|
| **For Light Source** | | | | | | |
|  *Transmitted Beam* **Field of View:** 7.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 15 mA | 2.54 mm…36.6 m (0.1 in…120 ft) | — | — | 3 m cable | 42SRL-6000 |
| | 10…30V DC 15 mA | 2.54 mm…36.6 m (0.1 in…120 ft) | — | — | 4-pin DC micro | **42SRL-6000-QD** |
| | 20…264V AC/DC 50…60 Hz 1V A | | — | | 3 m cable | 42SRL-6006 |
| | | | — | | 4-pin AC micro | 42SRL-6006-QD |
| **For Receiver** | | | | | | |
|  *Transmitted Beam* **Field of View:** 7.5° **Emitter LED:** Infrared 880 nm | 10…30V DC 15 mA | — | Light | NPN and PNP 200 mA 5 ms | 3 m cable | 42SRR-6002 |
| | | | | | 4-pin DC micro | **42SRR-6002-QD** |
| | | | Dark | | 3 m cable | 42SRR-6003 |
| | | | | | 4-pin DC micro | **42SRR-6003-QD** |
| | 20…264V AC/DC 50…60 Hz 1V A | — | Light | Power MOSFET 300 mA AC/DC 18 ms AC, 10 ms DC | 3 m cable | 42SRR-6006 |
| | | | | | 4-pin AC micro | 42SRR-6006-QD |
| | | | Dark | | 3 m cable | 42SRR-6007 |
| | | | | | 4-pin AC micro | 42SRR-6007-QD |
|  *Large Aperture Fiber Optic* **Field of View:** Depends on Glass Fiber Optics selected. See Glass Fiber Optic section, page 1-234. **Emitter LED:** Infrared 880 nm | 10…30V DC 35 mA | Depends on Fiber Optic cable selected | Light | NPN and PNP 200 mA 1 ms | 4-pin DC micro | 42SRF-6002-QD |
| | | | Dark | | 3 m cable | 42SRF-6003 |
| | | | | | 4-pin DC micro | 42SRF-6003-QD |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | 42SRF-6004 |
| | | | | | 4-pin AC micro | 42SRF-6004-QD |
| | | | Dark | | 3 m cable | 42SRF-6005 |
| | | | | | 4-pin AC micro | 42SRF-6005-QD |
|  *Small Aperture Fiber Optic* **Field of View:** Depends on Plastic or Glass Fiber Optics selected. See Plastic Fiber optic section, page 1-270 and Glass Fiber Optic section, page 1-234. **Emitter LED:** Visible 660 nm | 10…30V DC 35 mA | Depends on Glass or Plastic Fiber Optics selected | Light | NPN and PNP 200 mA 1 ms | 3 m cable | 42SRF-6102 |
| | | | | | 4-pin DC micro | 42SRF-6102-QD |
| | | | Dark | | 3 m cable | 42SRF-6103 |
| | | | | | 4-pin DC micro | **42SRF-6103-QD** |
| | 20…132V AC/DC 50…60 Hz 1.2V A | | Light | Power MOSFET 300 mA AC/DC 12 ms AC, 5 ms DC | 3 m cable | 42SRF-6104 |
| | | | | | 4-pin AC micro | 42SRF-6104-QD |
| | | | Dark | | 3 m cable | 42SRF-6105 |
| | | | | | 4-pin AC micro | 42SRF-6105-QD |

**See below for cordsets and accessories.**

## Cordsets and Accessories

| Description | Cat. No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| 2 m (6.5 ft) 4-pin DC Micro QD Cordset | 889D-F4AC-2 | Mounting Brackets | 60-2618 | 76 mm (3 in.) Diameter Reflector | 92-39 |
| 2 m (6.5 ft) 4-pin AC Micro QD Cordset | 889R-F4AEA-2 | Right Angle Reflector | 60-2052 | 32 mm (1.25 in.) Diameter Reflector | 92-47 |

## Features

- Wide selection for increased application flexibility
- Quick-disconnect design reduces down time
  - No disruption of alignment or wiring
- Three power base styles:
  - Terminal base can eliminate need for separate junction box
  - 3 m (10 ft) cable base for lower profile (red and blue line only)
  - Pre-wired mini-style quick-disconnect (green line only)
- False turn-on pulse protection
- Switch selectable light or dark operating mode
- Adjustable sensitivity
- Choice of relay or solid-state outputs
- Highly visible LED output indicator

## Specifications

| | Red Line | Blue Line | Green Line | Analog Output |
|---|---|---|---|---|
| **Environmental** | | | | |
| Certifications | UL Listed, CSA Approved, and CE Marked for all applicable directives | | | |
| Operating Environment | NEMA 3, 4, 12, 13; IP66 | | | |
| Operating Temperature [C (F)] | -40…+52° (-40…+125°) for TRIAC output<br>-40…+65° (-40…+150°) for all others | -40…+65° (-40…+150°) | -40…+65° (-40…+150°) for EM relay<br>-40…+52° (-40…+125°) for solid state | -40…+65° (-40…+150°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 | | | |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 | | | |
| Relative Humidity | 90% max | | | |
| Ambient Light Immunity | Incandescent light: 5000 lux | | | |
| **Optical** | | | | |
| Sensing Modes | Retroreflective, diffuse, long range diffuse, fiber optic, background suppression, transmitted beam (see Product Selection table on page 1-220) | | | |
| Sensing Range | See Product Selection table on page 1-220 | | | |
| Field of View | See Product Selection table on page 1-220 | | | |
| Light Source | Visible red LED (660 nm), infrared LED (880 nm) | | | |
| **Electrical** | | | | |
| Voltage | 12…30V DC, 120V AC (see Product Selection table on page 1-220) | | | |
| Current Consumption | Depends on power base (see Product Selection table on page 1-220) | | | |
| Sensor Protection | False pulse | Reverse polarity and false pulse | False pulse | False pulse, short circuit |
| **Outputs** | | | | |
| Response Time | 1…8 ms | 1 ms | Determined by plug-in module | 100 ms |
| Output Type | PNP and NPN, FET,SPDT relay,TRIAC, analog output (see Product Selection table on page 1-220) | | | |
| Output Mode | Light or dark operate selectable, selectable positive or negative slope for analog models (see Product Selection table on page 1-220) | | | |
| Output Current | 30 mA…2A max | 100 mA | Determined by plug-in module | See Product Selection table |
| Output Leakage Current | 1mA max | 1 µA | — | 10 µA |
| **Mechanical** | | | | |
| Housing Material | Valox® | | | |
| Lens Material | Acrylic (glass on polarized models) | | | |
| Connection Types | See Product Selection table on page 1-220 | | | |
| Supplied Accessories | None | | | |
| Optional Accessories | See mounting brackets, reflectors, and cordsets on page 1-226 | | | |

## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Output | Red | OFF | Sensor output de-activated |
| | | ON | Sensor output activated |

## Plug-In Output Module (required for green line only)

| Output Type Capacity | Max Leakage Current | Output Response Time❶ | Cat. No. |
|---|---|---|---|
| SPDT EM-Relay 2 A, 120V AC/1 A, 240V AC | — | 10 ms On 15 ms Off | 8-590 |
| | | | 8-594❷ |
| SP-N.O. FET SS Relay 30 mA Cont./0…120V AC/DC | 10 mA | 1 ms | 8-591 |
| SP-N.O. AC Power TRIAC SS Relay 0.75 A Cont. 10 A Inrush/24…240V AC | 1 mA | 8 ms | 8-592 |
| NPN and PNP 100 mA 30V DC | 1 µA | 1 ms | 8-593❷ |

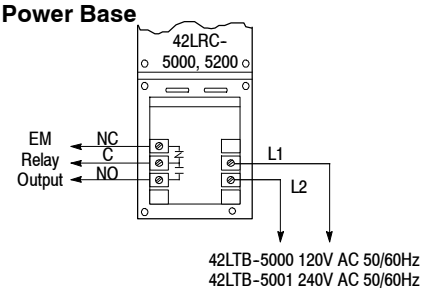
## Plug-In Control Function Module (optional for green line only)

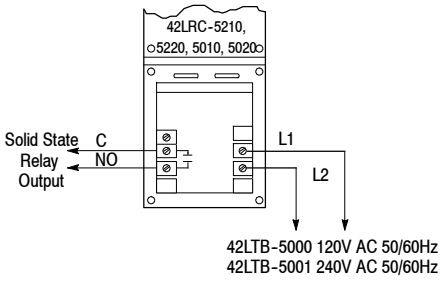
| Function | Adjustable Time Delay (s) | | Adjustable Dwell (s) | Cat. No. |
|---|---|---|---|---|
| | On | Off | | |
| On and/or Off Delay | 0.05…1.0 | 0.05…1.5 | — | 60-1790 |
| | 0.5…10 | 0.5…15 | | 60-1791 |
| | 2…4.0 | 2…6.0 | | 60-1798 |
| One-Shot | — | — | 0.005…0.5 | 60-1792 |
| | | | 0.5…15 | 60-1793 |
| Motion Detector | — | 0.05…1.5 | | 60-1796 |
| | | 0.5…15 | | 60-1797 |

❷ Add sensor and output response time for total response time.
❷ Use with 42MTB-5004 base ONLY. Other output modules will not function with 5004 base.

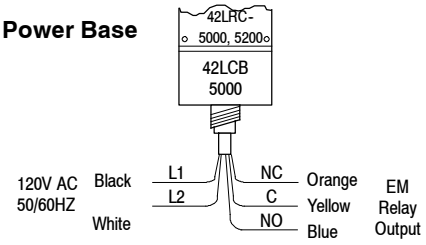
## Red Line Wiring Diagrams

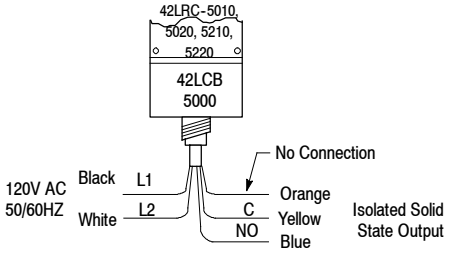
### With Terminal Style Power Base




### With Cable Style Power Base

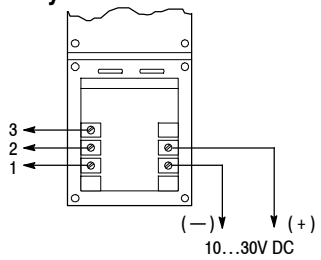


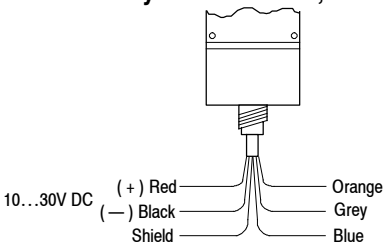

**Note:** Details of connection of Allen-Bradley Series 5000 photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0. Refer to *www.ab.com/literature* for more information.

## Blue Line Wiring Diagrams

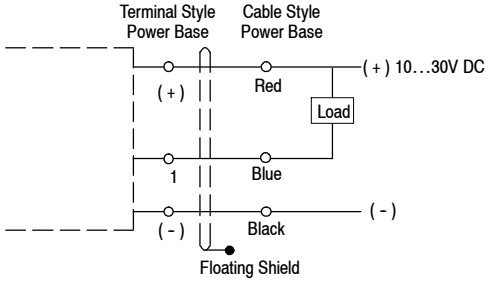
### Terminal Style Power Base. DTB-5000



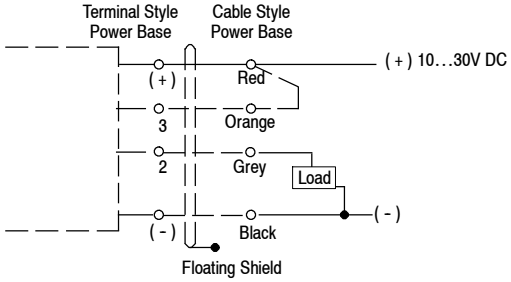

### Cable Style Power Base, DCB-5000




### NPN Output Connection (Sinking)

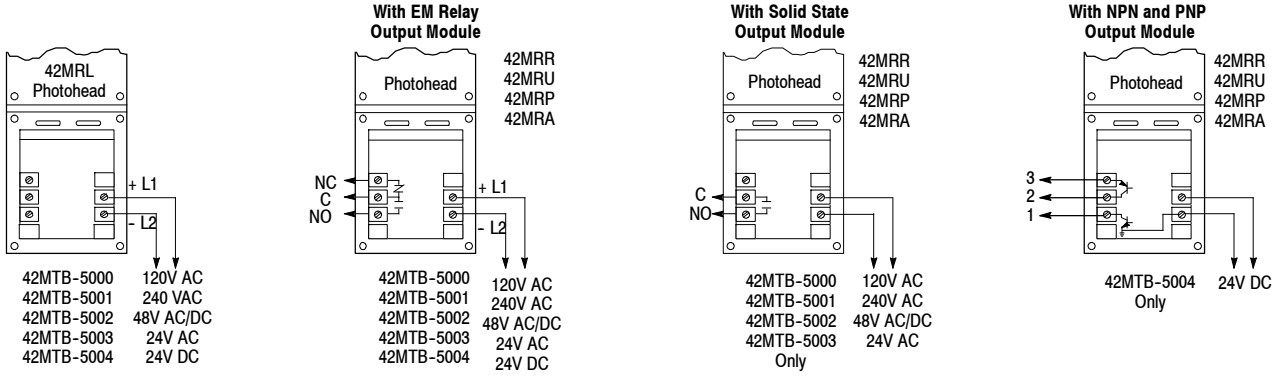



### PNP Output Connection (Sourcing)



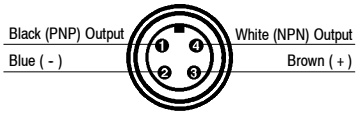

## Green Line Wiring Diagrams

### With Terminal Style Power Base

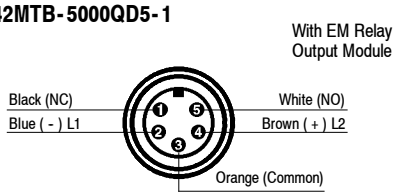



### With Mini Quick-Disconnector Style Power Base

**42MTB-5004QD4-1**



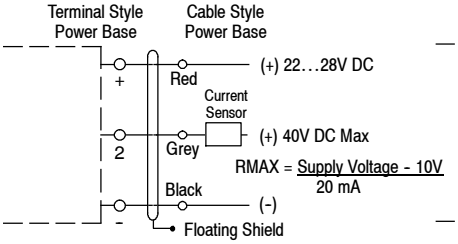

**42MTB-5000QD5-1**



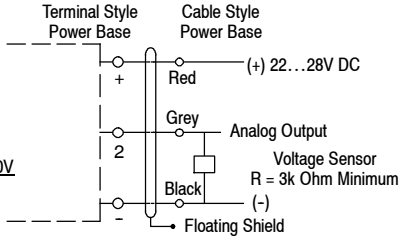

**Note:** Details of connection of Allen-Bradley Series 5000 photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.
Wire colors shown refer to Allen-Bradley quick-disconnect cables.

## Analog Output Wiring Diagrams

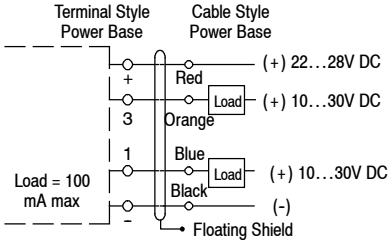
### Current Output Connections




### Voltage Output Connections



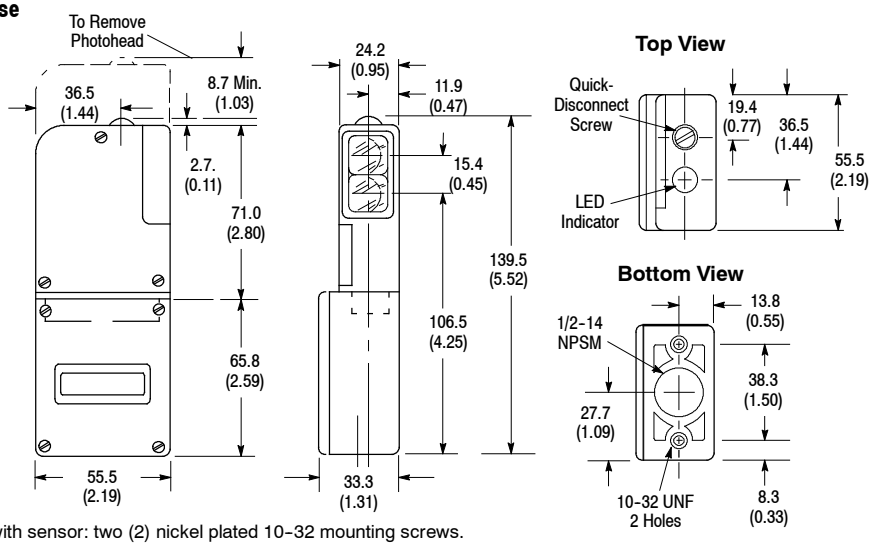

### NPN Set Point Output Connections




**Note:** Details of connection of Allen-Bradley Series 5000 Photoelectric sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.

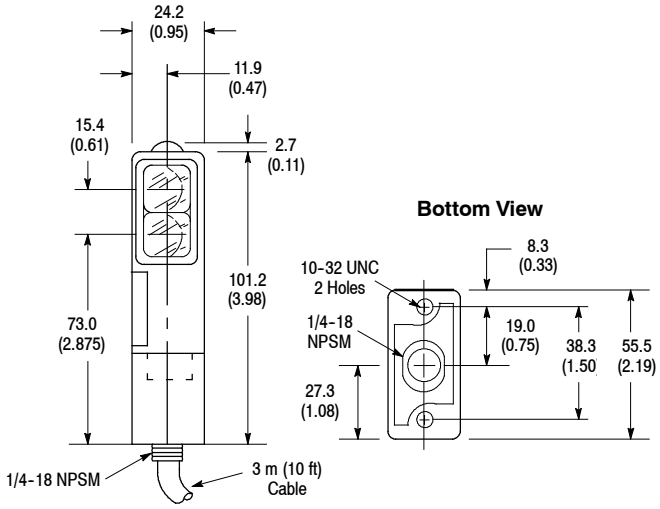
## Approximate Dimensions (Applies to all versions) [mm (in.)]

### Terminal Style Power Base



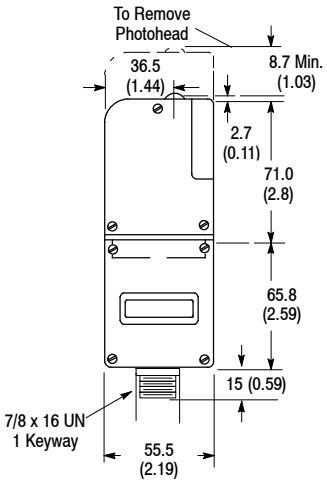

**Note**: Hardware included with sensor: two (2) nickel plated 10–32 mounting screws.

### Cable Style Power Base



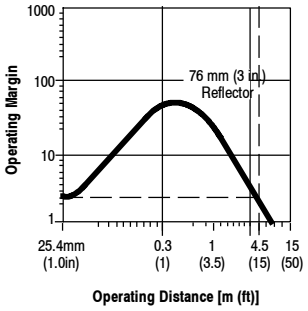
## Approximate Dimensions (Applies to all versions) [mm (in.)] (continued)

### Quick-Disconnect Style Power Base

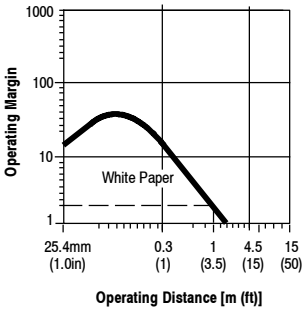



## Red Line Typical Response Curve

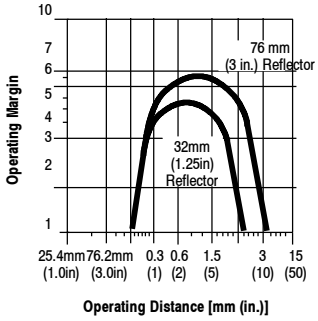
### Retroreflective




### Standard Diffuse

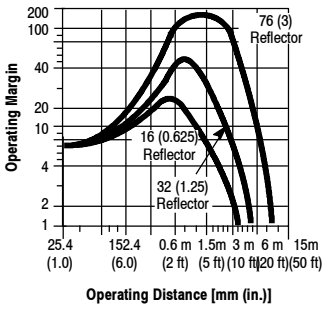



### Polarized Retroreflective

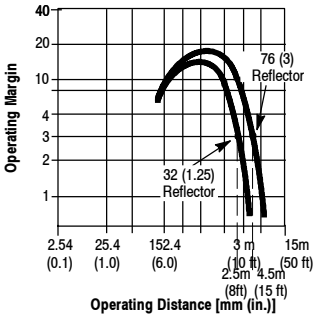



## Blue Line Typical Response Curve

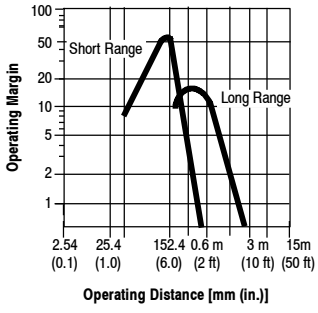
### Retroreflective



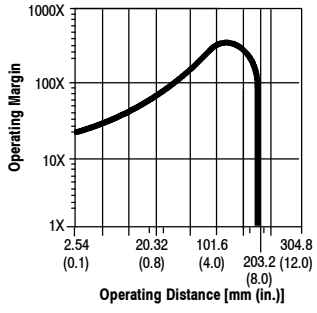

### Polarized Retroreflective




### Standard Diffuse

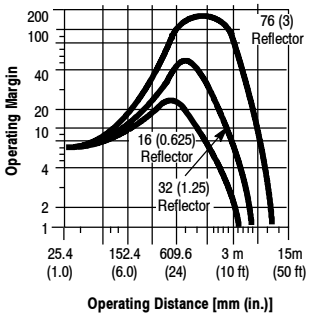



### Background Suppression❶

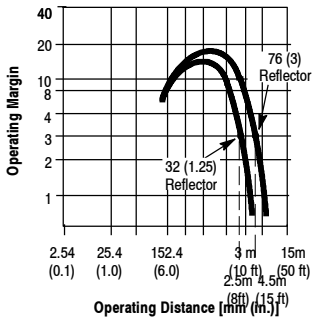


## Green Line Typical Response Curve

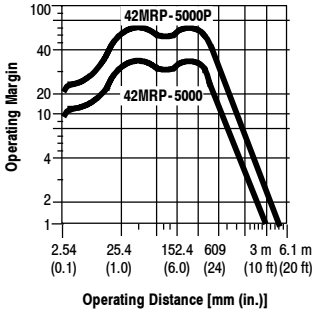
### Retroreflective



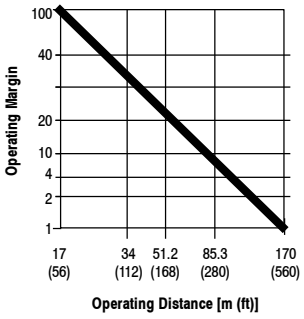

### Polarized Retroreflective



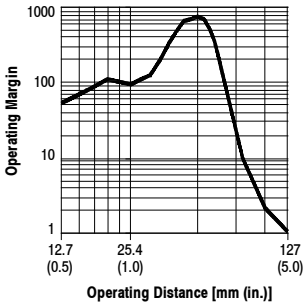

### Standard Diffuse



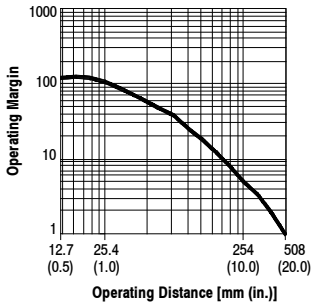

### Transmitted Beam



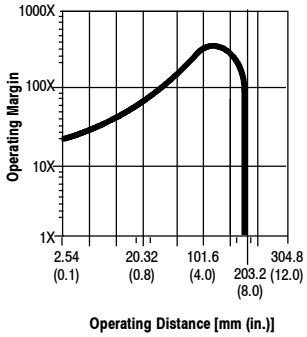

### Fixed Focus Lens




### Wide Angle Lens




### Background Suppression❶

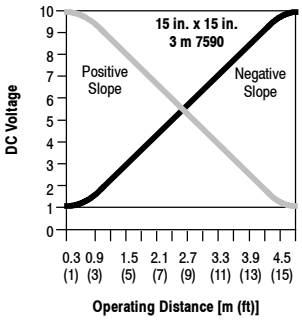



❶ Example: Operating distance set at 203.2 mm (8 in.).

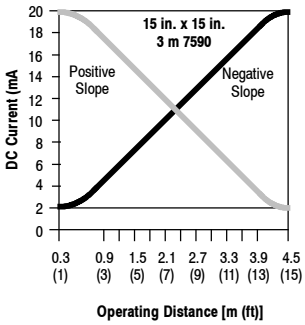
## Analog Output Typical Response Curve

### Retroreflective

**Voltage Output Slope**

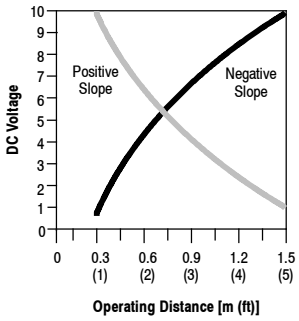



**Current Output Slope**

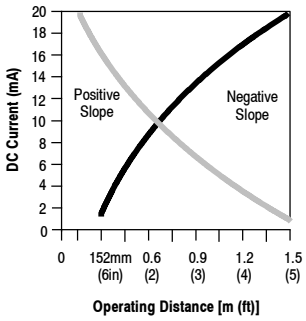



### Standard Diffuse

**Voltage Output**

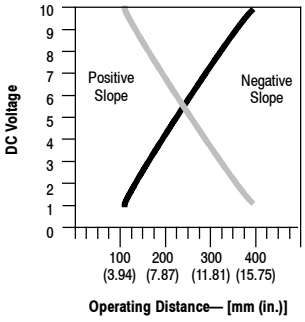



**Current Output**

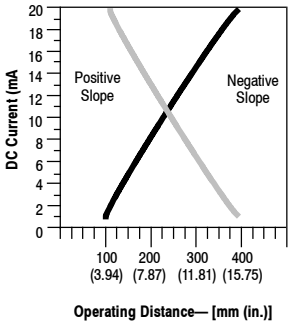



### Infrared Glass FO/Fixed Focus/Wide Angle Diffuse

**Voltage Output**




**Current Output**




## Product Selection Guidelines

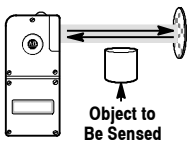
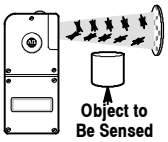
1. Select photohead (see pages 1-220 to 1-225).
2. Select power base (see page 1-226).
3. Select output module for green line models only (see page 1-226).
4. Select plug-in control function optional module on page 1-226 (green models only).

# Series 5000

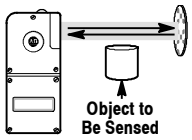
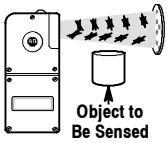
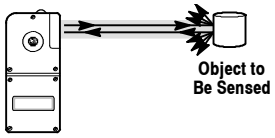
## Red Line/Blue Line

### Red Line Product Selection [mm (in.)]

**1. Select Photohead.**

| Sensing Mode | Sensing Distance [mm (in.)] | Output Energized | Output Type Capacity | Response Time❶ | | Cat. No. |
|---|---|---|---|---|---|---|
| | | | | Sensor | Output | |
|  *Red Line—Retroreflective/Standard Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 50.8 mm…6 m (2 in…20 ft) with 76 (3) Reflector<br>50.8 mm…1.5 m (2 in…5 ft) with White Paper | Light/Dark Selectable | EM Relay (SPDT) 2.0 A-120V AC 1.0 A-240V AC | 5 ms | On 10 ms Off 15 ms | **42LRC-5000** |
| | | | AC/DC Solid State FET (SP-N.O.) 30 mA 0…120V AC/DC | | 1 ms | 42LRC-5010 |
| | | | AC Solid State TRIAC (SP-N.O.) 0.75 A 240V AC cont. | | 8 ms | 42LRC-5020 |
|  *Red Line—Polarized Retroreflective* **Field of View:** 3° **Emitter LED:** Visible Red 660 nm | 50.8 mm…6 m (2 in…20 ft) with 76 (3) Reflector | Light/Dark Selectable | EM-Relay (SPDT) 2.0 A-120V AC 1.0 A-240V AC | 5 ms | On 10 ms Off 15 ms | **42LRC-5200** |
| | | | AC/DC Solid State FET (SP-N.O.) 30 mA 0…120V AC/DC | | 1 ms | 42LRC-5210 |
| | | | AC Solid State TRIAC (SP-N.O.) 0.75 A 240V AC cont. | | 8 ms | 42LRC-5220 |

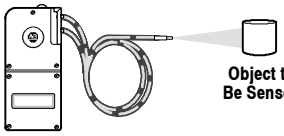
### Blue Line Product Selection [mm (in.)]

| | | | | | | |
|---|---|---|---|---|---|---|
|  *Blue Line—Retroreflective* **Field of View:** 2.5° **Emitter LED:** Infrared 880 nm | 50.8 mm…10 m (2 in…33 ft) with 76 (3) Reflector | Light/Dark Selectable | NPN and PNP 100 mA | 1 ms | | 42DRU-5000 |
|  *Blue Line—Polarized Retroreflective* **Field of View:** 2.5° **Emitter LED:** Visible Red 660 nm | 50.8 mm…6 m (2 in…20 ft) with 76 (3) Reflector | Light/Dark Selectable | NPN and PNP 100 mA | 1 ms | | **42DRU-5200** |
|  *Blue Line—Standard Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Long Range: 50.8 mm…2.1 m (2 in…7 ft) with White Paper | Light/Dark Selectable | NPN and PNP 100 mA | 1 ms | | 42DRP-5000 |

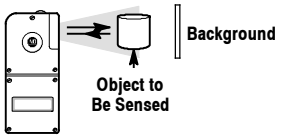
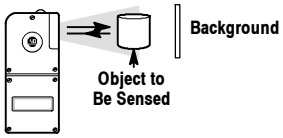
❶ Add Sensor and Output for total response time.

**Refer to page 1-226 for cordsets and accessories.**

## Blue Line Product Selection [mm (in.)] (continued)

| Sensing Mode | Sensing Distance | Output Energized | Output Type Capacity | Response Time | Cat. No. |
|---|---|---|---|---|---|
|  *Blue Line—Large Aperture Fiber Optic* **Field of View:** Depends on fiber optics or lens selected or lens type **Emitter LED:** Infrared 880 nm | Depends on Fiber Optic selected. | Light/Dark Selectable | NPN and PNP 100 mA | 1 ms | 42DRA-5000FO |

## Blue Line Product Selection [mm (in.)] (continued)

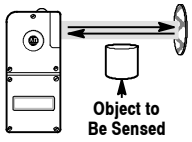
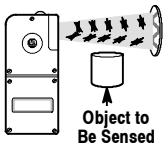
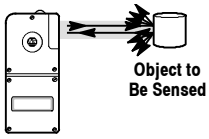
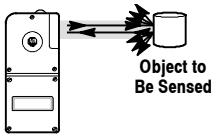
| Sensing Mode | Sensing Distance [mm (in.)] | Output Energized | Output | Timing | | Response Time | Cat. No. |
|---|---|---|---|---|---|---|---|
| | | | | Function | Range | | |
|  *Blue Line—Background Suppression without Timing* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Suppression Point Adjustment Range 50.8 (2) to 63.5…304.8 (2.5…12) | Light/Dark Selectable | NPN & PNP | — | — | 5 ms | 42DBS-5000 |
|  *Blue Line—Background Suppression with Timing* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Suppression Point Adjustment Range 50.8 (2) to 63.5…304.8 (2.5…12) | Light/Dark Selectable | NPN & PNP | Selectable On Delay Off Delay On & Off Delay Delayed One-shot One-shot | 0…1.5 s 0…15 s Selectable | | 42DBS-5100 |

**Refer to page 1-226 for cordsets and accessories.**

# Series 5000

## Green Line

### Green Line Product Selection [mm (in.)]

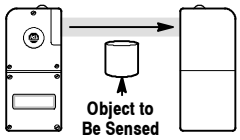
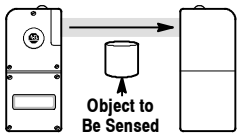
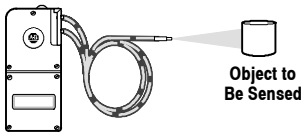
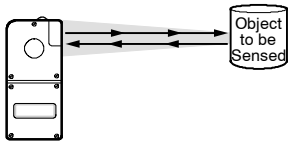
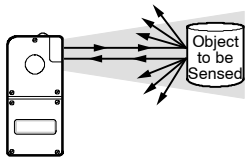
| Sensing Mode | Sensing Distance [mm (in.)] | Output Energized | Sensor Response Time❶ | Cat. No. |
|---|---|---|---|---|
|  *Green Line—Retroreflective* **Field of View:** 2.5° **Emitter LED:** Infrared 880 nm | 50.8 mm…10 m (2 in…33 ft) with 76 (3) Reflector | Light/Dark Selectable | 1 ms | **42MRU-5000** |
|  *Green Line—Polarized Retroreflective* **Field of View:** 2.5° **Emitter LED:** Visible Red 660 nm | 50.8 mm…6 m (2 in…20 ft) with 76 (3) Reflector | Light/Dark Selectable | 2.5 ms | **42MRU-5200** |
|  *Green Line—Standard Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Short Range: 50.8 mm… 3 m (2 in.…10 ft) with White Paper | Light/Dark Selectable | 2.5 ms | **42MRP-5000** |
|  *Green Line—Long Range Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Long Range: 50.8 mm… 4.8 m (2 in…16 ft) with White Paper | Light/Dark Selectable | 2.5 ms | 42MRP-5000P |

❶ Add Sensor and Output for total response time.

**Refer to page 1-226 for cordsets and accessories.**

## Green Line Product Selection [mm (in.)] (continued)

**1. Select Photohead (continued).**

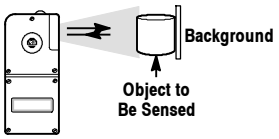
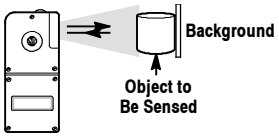
| Sensing Mode | Sensing Distance [mm (in.)] | Output Energized | Sensor Response Time❶ | Cat. No. |
|---|---|---|---|---|
|  *Green Line—Transmitted Beam Receiver* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 25.4 mm…171 m (1 in…560 ft) | Light/Dark Selectable | 5 ms | **42MRR-5000** Order one receiver and one light source |
|  *Green Line—Transmitted Beam Light Source* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 25.4 mm…171 m (1 in…560 ft) | — | N/A | **42MRL-5000** Order one receiver and one light source |
|  *Green Line—Large Aperture Fiber Optic* **Field of View:** Determined by fiber optics or lens type **Emitter LED:** Infrared 880 nm | Depends on Fiber Optic selected. | Light/Dark Selectable | 2.5 ms | 42MRA-5000FO |
|  *Green Line—Fixed Focus* **Emitter LED:** Infrared 880 nm | 5.08 mm…172 m (0.2 in…564 ft ) | Light/Dark Selectable | 2.5 ms | 42MRA-5000FF |
|  *Green Line—Wide Angle Diffuse* **Emitter LED:** Infrared 880 nm | 5.08 (0.2)…508 (20) | Light/Dark Selectable | 2.5 ms | 42MRA-5000WA |

❶ Prewired for use with output 8-593 only.

**Refer to page 1-226 for cordsets and accessories.**

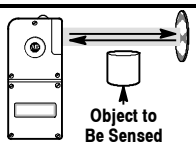
## Green Line Product Selection [mm (in.)] (continued)

**1. Select Photohead (continued).**

| Sensing Mode | Sensing Distance [mm (in.)] | Output Energized | Timing | | Sensor Response Time❶ | Cat. No. |
|---|---|---|---|---|---|---|
| | | | Function | Range | | |
|  *Green Line—Background Suppression without Timing* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Suppression Point Adjustment Range 50.8 (2) to 63.5…304.8 (2.5…12) | Light/Dark Selectable | — | — | 5 ms | **42MBS-5000** |
|  *Green Line—Background Suppression with Timing* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | Suppression Point Adjustment Range 50.8 (2) to 63.5…304.8 (2.5…12) | Light/Dark Selectable | Selectable On Delay<br>Off Delay<br>On & Off Delay<br>One-shot<br>Delayed One-shot | 0…1.5 s<br>0…15 s<br>Selectable | 5 ms | 42MBS-5100 |

## Analog Output Product Selection [mm (in.)]

**1. Select Photohead.**

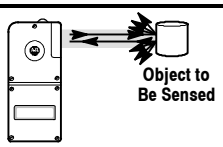
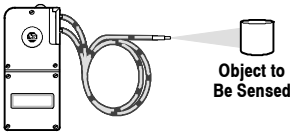
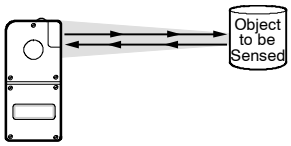
| Sensing Mode | Supply Current | Sensing Distance | Analog Output | Output Type Capacity | Response Time❷ | Slope | Cat. No. |
|---|---|---|---|---|---|---|---|
|  *Analog Output—Retroreflective* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 70 mA | 600 mm (2 ft)… Total: 4.6 m (15 ft) Linear 4.0 m (13 ft) | Voltage 1…10V DC<br>Current 1…20 mA | Two Adjustable Set Points NPN 100 mA (30V Max) | 100 ms | Selectable Positive or Negative | 42DRU-5400 |

❶ Prewired for use with output 8-593 only.

❷ Time needed for full analog swing.

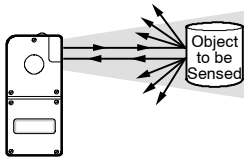
**Refer to page 1-226 for cordsets and accessories.**

## Analog Output Product Selection [mm (in.)] (continued)

| Sensing Mode | Sensing Distance [mm (in.)] | Analog Output | Output Type Capacity | Response Time❶ | Slope | Cat. No. |
|---|---|---|---|---|---|---|
|  *Analog Output—Standard Diffuse* **Field of View:** 3° **Emitter LED:** Infrared 880 nm | 150 (6)… Total: 1.5 m (5 ft) Linear: 1.2 m (4 ft) | Voltage 1…10V DC Current 1…20 mA | Two Adjustable Set Points NPN 100 mA (30V max) | 100 ms | Selectable Positive or Negative | 42DRP-5400 |
|  *Analog Output—Large Aperture Fiber Optic* **Field of View:** Depends on fiber optics (refer to fiber optic section) or lens type **Emitter LED:** Infrared 880 nm | Depends on Fiber Optic selected. | Voltage 1…10V DC Current 1…20 mA | Two Adjustable Set Points NPN 100 mA (30V max) | 100 ms | Selectable Positive or Negative | 42DRA-5400FO |
|  *Analog Output—Fixed Focus* **Emitter LED:** Infrared 880 nm | 5.08…101 (0.2…4) | Voltage 1…10V DC Current 1…20 mA | Two Adjustable Set Points NPN 100 mA (30V max) | 100 ms | Selectable Positive or Negative | 42DRA-5400FF |

## Analog Output Product Selection [mm (in.)] (continued)

**1. Select Photohead.**

| Sensing Mode | Sensing Distance | Analog Output | Output Type Capacity | Response Time | Slope | Cat. No. |
|---|---|---|---|---|---|---|
|  *Analog Output—Wide Angle Diffuse* **Emitter LED:** Infrared 880 nm | 5.08 (0.2 in.)… 152 mm (6 in.) | Voltage 1…10V DC Current 1…20 mA | Two Adjustable Set Points NPN 100 mA (30V max) | 100 ms | Selectable Positive or Negative | 42DRA-5400WA |

❶ Time needed for full analog swing.

**Refer to page 1-226 for cordsets and accessories.**

## Power Base Product Selection [mm (in.)]

**2. Select Power Base.**

| Style | Operating Voltage | Supply Current | Cat. No. |
|---|---|---|---|
| **Red Line** | | | |
| Terminal | 120V AC, 50/60 Hz | 2V A | 42LTB-5000 |
| | 240V AC, 50/60 Hz | 4V A | 42LTB-5001 |
| Cable | 120V AC, 50/60 Hz | 2V A | 42LCB-5000 |
| **Blue Line** | | | |
| Terminal | 10…30V DC | 35 mA | 42DTB-5000 |
| Cable | | | 42DCB-5000 |

| Operating Voltage | Supply Current | Cat. No. | |
|---|---|---|---|
| | | Terminal Style | Mini QD Style |
| **Green Line** | | | |
| 102…132V AC, 50/60 Hz | 2V A | 42MTB-5000 | **42MTB-5000QD5-1** |
| 204…254V AC, 50/60 Hz | 4V A | 42MTB-5001 | — |
| 40…54V AC/DC, 50/60 Hz | 1V A | 42MTB-5002 | — |
| 20…30V AC, 50/60 Hz | | 42MTB-5003 | — |
| 20…30V DC | | 42MTB-5004 | **42MTB-5004QD4-1** ❶ |

| | Operating Voltage | Supply Current | Connection Type | Cat. No. |
|---|---|---|---|---|
| **Analog Output Line** | | | | |
| All sensing modes | 22…28V DC | 70 mA maximum | Screw Terminal | 42DTB-5000 |
| | | 70 mA maximum | 3 m 300V Cable | 42DCB-5000 |

**3. Select Output module (green line models only) (required).**

**4. Select plug-in control function optional module (green line models only).**

## Cordsets and Accessories

| Description | Cat./Page No. | Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|---|---|
| Terminal Chambers | 8-1 | Right Angle Bracket | 60-1785 | 76 mm (3 in.) Diameter Reflector | 92-39 |
| Screw Terminal | 42MTB-5000 | Conduit Adaptor 1/2 inch NPT | 60-2213 | 32 mm (1.25 in.) Diameter Reflector | 92-47 |
| 5-pin DC Mini QD | 42MTB-5000-QD5-1 | Armored Cable Adaptor | 60-1577 | Heavy Duty Protective Guard | 60-2083 |
| Flexi-mount Mounting Assembly | 60-2014 | Limit Switch Type Mounting Assembly | 60-2230 | Heavy Duty Mounting Assembly | 60-1748 |

❶ Prewired for use with output 8-593 only.

## Features

- Harsh duty package
- Screw terminal connections
- Long-range sensing modes
- Plug-in logic and output modules
- Both DC and AC/DC operation
- Selectable light/dark operation

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Approved |
| Operating Environment | NEMA 3, 4, 12, 13; IP66 |
| Operating Temperature [C (F)] | -40…+57° (-40…+135°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…90% |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retroreflective, diffuse, transmitted beam |
| Sensing Range | See Product Selection table on page 1-230 |
| Field of View | See Product Selection table on page 1-230 |
| Light Source | Visible red LED (660 nm), infrared LED (880 nm) |
| LED Indicators | See User Interface below |
| Adjustments | Sensitivity adjustment potentiometer |
| **Electrical** | |
| Voltage | See Product Selection table on page 1-230 |
| Current Consumption | See Product Selection table on page 1-230 |
| Sensor Protection | False pulse |
| **Outputs** | |
| Response Time | 5 ms plus plug-in module delay |
| Output Type | EM relay, TRIAC, FET, PNP/NPN |
| Output Mode | Light or dark operate selectable |
| Output Current | Determined by plug-in module, see Product Selection table on page 1-230 |
| Output Leakage Current | 1 μA max |
| **Mechanical** | |
| Housing Material | Noryl® |
| Lens Material | Acrylic, glass for polarized sensor |
| Connection Types | Nickel-plated screw terminal |
| Supplied Accessories | 8-670 DPDT relay module |
| Optional Accessories | Mounting brackets, reflectors, cordsets |

## User Interface Panel

| Label | Color | State | Status |
|---|---|---|---|
| Power | Yellow | OFF | Sensor not powered |
| | | ON | Sensor powered |

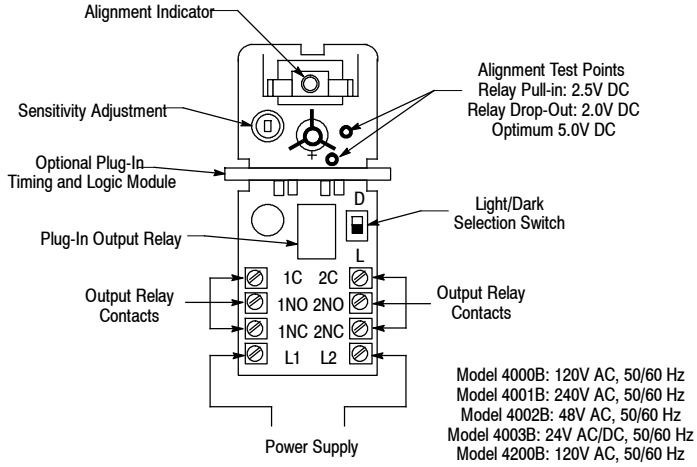
## Optional Timing and Logic Modules

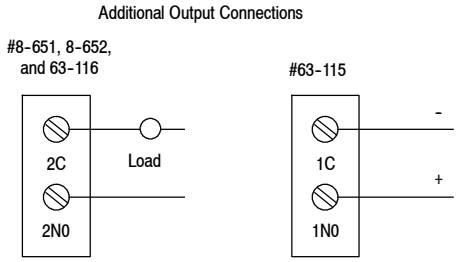
These plug-in modules can be added to any series 4000B Photoelectric sensor.

| Function | Adjustable Time Delay(s) | | Adjustable Dwell (s) | Cat. No. |
|---|---|---|---|---|
| | On | Off | | |
| One-shot | — | — | 0.040…0.250 | 60-1612-1 |
| | | | 0.5…15 | 60-1612-2 |
| On and/or Off Delay | 0.05…1.0 | 0.05…1.5 | — | 60-1613 |
| | 0.5…10 | 0.5…15 | | 60-1614 |
| Delayed One-shot | 0.10…1.5 | — | 0.040…0.250 | 60-1625 |
| | 1.0…15 | | 0.040…0.250 | 60-1626 |
| Motion Detector | — | 0.05…1.5 | — | 60-1660 |
| | | 0.5…15 | | 60-1661 |
| Preset Counter | 2…999 Counts | | 0.040…0.250 | 60-1716 |

## Wiring Diagrams

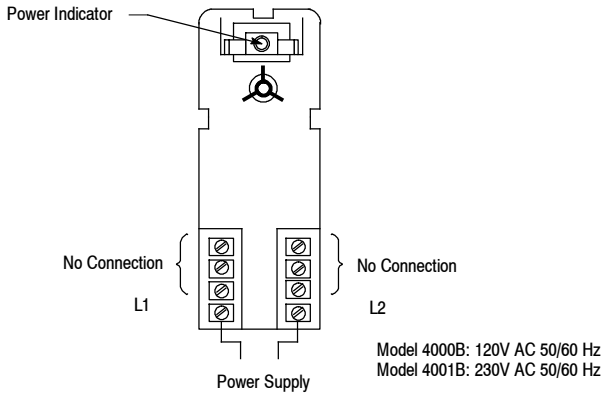
### All Sensing Modes Except Transmitted Beam Light Source



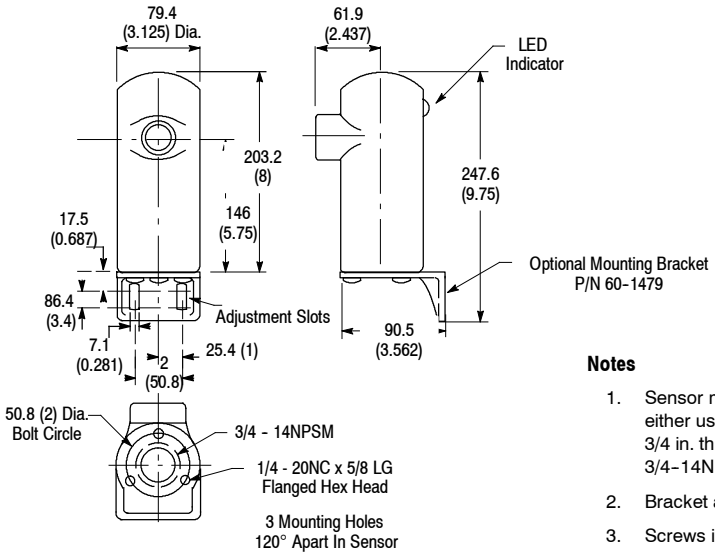




**Note**: Details regarding connection of Allen-Bradley Series 4000B sensors to Allen-Bradley Programmable Controllers can be found in publication 42-2.0.

### Transmitted Beam Light Source



## Approximate Dimensions [mm (in.)]




**Notes**

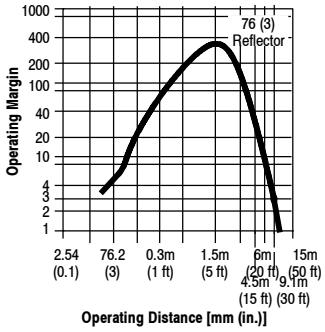
1. Sensor may be mounted without bracket, either using 3, 1/4-20NC mtg. holes or on a 3/4 in. threaded pipe, thread pitch 3/4-14NPSM.
2. Bracket allows 360°adjustment.
3. Screws included with mounting bracket.

**ATTENTION**

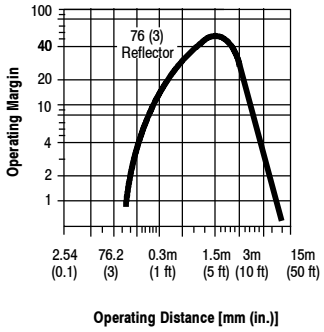
DO NOT use lockwashers with supplied whiz-lock mounting screws.

## Typical Response Curve

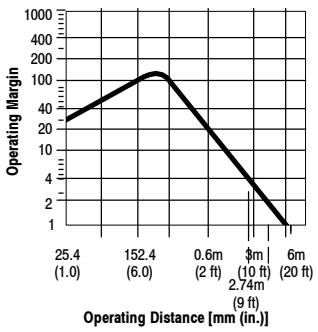
**Retroreflective**



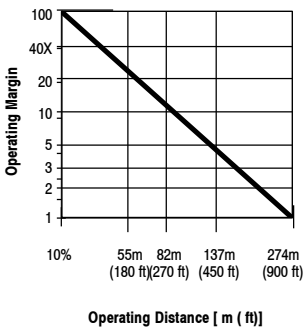

**Polarized Retroreflective**




**Standard Diffuse**

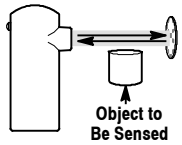
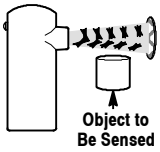
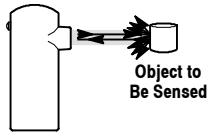
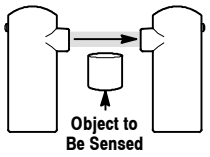



**Transmitted Beam**



## Product Selection

**1. Select sensor.**

| Sensing Mode | Operating Voltage/ Power Consumption | Sensing Range [mm (in.)] | Output Energized | Sensor Response Time ❶ | Cat. No. |
|---|---|---|---|---|---|
|  *Retroreflective* **Field of View:** 1.5° **Emitter LED:** Infrared 940 nm | 102…132V AC/ 2V A | 50.8 mm…10.6 m (2 in…35 ft) | Light/Dark Selectable | 5 ms | **42RLU-4000B** |
| | 195…253V AC/ 2V A | | | | 42RLU-4001B |
| | 40…58V AC/ 2V A | | | | 42RLU-4002B |
| | 18…28V AC/DC/2V A 20…32V DC | | | | 42RLU-4003B |
|  *Series 4000B Polarized Retroreflective* **Field of View:** 2° **Emitter LED:** Visible Red 660 nm | 102…132V AC/ 2 A | 50.8 mm…7 m (2 in…23 ft) | Light/Dark Selectable | 5 ms | 42RLU-4200B |
|  *Standard Diffuse* **Field of View:** 4° **Emitter LED:** Infrared 940 nm | 102…132V AC/ 2V A | 50.8 mm…3.6 m (2 in…12 ft) | Light/Dark Selectable | 5 ms | 42RLP-4000B |
|  *Transmitted Beam* **Field of View:** 3° **Emitter LED:** Infrared 940 nm Light sources and receivers must be ordered separately. Any light source is compatible with any receiver. | 102…132V AC, 50/60 Hz/ 2V A | 50.8 mm…274 m (2 in…900 ft) | Light/Dark Selectable | 5 ms | 42RLR-4000B |

**2. Select optional plug-in timing and logic module, page 1-227.**

**3. Select optional plug-in output module.**

| Sensing Mode | Type | Max Load Current | Output Response Time❶ | Cat. No. |
|---|---|---|---|---|
| All sensing modes | DPDT EM-Relay (included) | 5 A, 120V AC 2.5 A, 240V AC | 10 ms On 15 ms Off | 8-670❷ |
| | SP-N.O. AC TRIAC | 1 A, 265V AC, 20 mA min | 8 ms | 8-651 |
| | SP-N.O. AC/DC FET | 30 mA, 0…120V AC/DC | 1 ms | 8-652 |
| | Open Collector NPN | 250 mA, 30V DC | 1 ms | 63-115 |
| | DC Voltage Output Adaptor | 30 mA, 17V DC | | 63-116 |

❶ Add sensor response time and output response time for total response time.

❷ 8-670 relay output module supplied with sensor.

# Fiber Optic Cables

## Introduction

Fiber optic sensors permit the attachment of “light pipes” called fiber optic cables. Light emitted from the source is sent through transparent fibers in the cables and emerges at the end of the fiber. The transmitted or reflected beam is then carried back to the receiver through different fibers. Ideal for sensing small objects, fiber optic cables can be mounted in locations that would otherwise be inaccessible to photoelectric sensors. Other characteristics/advantages of fiber optic sensors include:

- Some glass fiber optic tips have the ability to withstand high temperatures (up to 482°C (900°F))
- Withstand extreme shock and vibration
- Often have the fastest response times
- Immunity to electrical interference (EMI, RFI).

### Fiber Optic Cables—Types

Fiber optic cables can be made of glass or plastic and categorized as either individual (transmitted beam) or bifurcated (diffuse).

Glass fiber optic cables contain multiple strands of very thin glass fiber that are bundled together in a flexible sheath. Typically more durable than their plastic counterparts, glass fiber optic cables will withstand much higher temperatures; glass fiber optic cables with a stainless steel sheath are rated up to 260°C (500°F). Special glass cables can be obtained with temperature ratings of up to 482°C (900°F). Most glass cables are available with a choice of PVC or flexible stainless steel sheath. While PVC-sheathed cables are typically less expensive, stainless steel sheathing offers greater durability and allows the cables to operate in higher temperatures. Glass fibers can be used with infrared or visible LED light sources.

Light transmission is maximized with a thicker bundle diameter. It is also important to note that attenuation increases as fiber optic cable length increases. For further details, see the Application Recommendations section on page 1-234 .

Plastic fiber optic cables are constructed of a single acrylic monofilament and, since plastic fibers absorb infrared light, they are most efficient when used with visible red LED sources. It is recommended that plastic fiber optic cables are used with visible light sources. Considered less durable than glass cables, plastic fibers are generally less expensive and can be used in applications where continuous flexing of the cable is required. For that reason, coiled plastic cables are also available for such applications.

### General Information

Sensor and Sensing Tip Selection . . . . . page 1-232 and 1-233

### Glass Fiber Optic Cables

Application Recommendations . . . . . page 1-234
Large Aperture Fibers . . . . page 1-235
Small Aperture Fibers . . . . page 1-251
Custom Fiber Configurator . . . . . page 1-258
Sensing Tip Drawings . . . . page 1-260
Standard Bundle Sizes . . . page 1-268
Accessories . . . . . page 1-269

### Plastic Fiber Optic Cables

Application Recommendations . . . . . page 1-270
Small Aperture Fibers . . . . page 1-271
Miniature Aperture Fibers . page 1-277
Special Purpose Fibers . . . page 1-280
Custom Fiber Configurator . . . . . page 1-281
Sensing Tip Drawings . . . . page 1-283
Standard Bundle Sizes . . . page 1-286
Accessories . . . . . page 1-287
Cross Reference . . . . . page 1-292

# Fiber Optic Cables

## Introduction

### Selection Process

**1. Determine the sensing mode**

- Transmitted beam (two separate cables required)
  - Greater distance from sensing tip to the object
  - Reflectivity of the object is low
  - Generally darker colors reflect less light.
- Diffuse (one bifurcated cable)
  - Distance from sensing tip to the object is small
  - Reflectivity of the object is high
  - Generally lighter colors reflect more light.

**2. Choose between glass or plastic fiber optic cables**

- Glass
  - Higher temperature rating (up to 482°C (900°F) possible)
  - Used with infrared or visible red light sources
  - More expensive.
- Plastic
  - Typically used for visible light sources
  - Lower temperature applications (lower than 70°C (158°F))
  - Less expensive.

**3. Mechanical considerations**

- Glass has a more restrictive bending radius.
- Select sensing tip configuration based on mounting space availability
  - Threaded tip versus ferruled
  - Straight tip versus 45° or 90° bend
  - Straight tip with light exiting at 90°.

**4. Select fiber bundle size for the application.**

- The smaller the bundle size, the smaller the light spot size for seeing smaller objects.
- The larger the bundle size, the greater the sensing distance

**5. Cable length**

- Determine distance from sensor to object including required bending radii
- Longer (custom length) cables have shorter sensing distances due to light loss
  - Light loss is approximately 6% per foot for glass and 3% for plastic
- Use of extended range lens assemblies significantly increases sensing distance.

### Custom Fiber Optic Cables

Rockwell Automation/Allen-Bradley can provide custom glass fiber optic cables to meet nearly any application requirement.

Typical cable modifications include:

- Custom lengths up to 15.2 m (50 ft)
- Custom temperature ratings up to 482°C (900°F) applies to glass fiber optic cables
- Custom configurations including multiple sensing tips
- Custom sensing end tips— nearly any modification is possible
- Reference pages 1-258…1-259 for glass and 1-281…1-282 for plastic.

**Note:** For more information contact product support at 1.440.646.5800.

**ATTENTION**

Fiber optic cables are not recommended for explosion-proof applications in hazardous environments. The fiber optic cable can provide a path for explosive fumes to travel from the hazardous area to the safe area.

### Sensing Modes

The standard photoelectric sensors, fiber optic sensors are offered in two sensing modes: transmitted beam and diffuse. Reflective sensing can be accomplished in a diffuse mode or retroreflective mode.

Standard ***diffuse*** sensing with fiber optic cables is similar to sensing with lensed photoelectrics. When adjusted to maximum sensitivity these sensors, using bifurcated fiber optic cables, can detect extremely small targets.

Individual fiber optic cables may be used for more specialized diffuse mode applications. For instance, aiming the two separate sensing tips of the cables at the target can create sharp cutoff, fixed focus and mechanically convergent sensing modes.

### Bifurcated Cable (Diffuse/Retroreflective)

Standard ***retroreflective*** sensing is possible with fiber optics, but polarized retroreflective sensing is not. In some applications, it will be necessary to reduce the sensitivity of the sensor to prevent diffuse detection of the target.

Transmitted beam sensing, the most reliable sensing mode, requires two individual fiber optic cables. Targets are detected when they break the light path established between the emitter and receiver cables.

## Individual Cable (Transmitted Beam)

## Sensing End Tip Selection

One of the most important decisions to be made when selecting fiber optic cables is the sensing end tip configuration. Among the many considerations:

- Size of the object to be sensed
- Rate of travel of the target object
- Distance to the object
- Mounting options
- Environmental conditions
- Moving parts surrounding the object
- Sensing mode

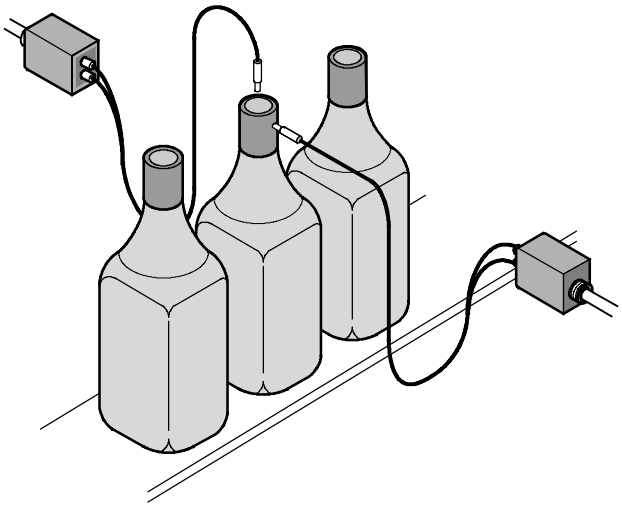
Based on these factors, there are many sensing tips to select from offering various fiber diameters and arrays, bending radii, threaded and smooth body configurations, etc. The following pages are designed to assist in the selection of the proper sensing end tip for the application. Once a selection has been made, proceed to the fiber optic cables section to select the appropriate fiber optic cable part number.

## 45FVL/45FSL Light Source Selector Guide for Color Contrast Sensing

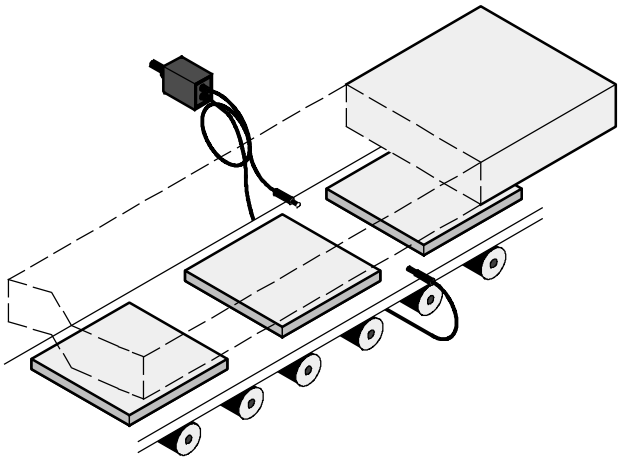
| Background | Target | | | | | | |
|---|---|---|---|---|---|---|---|
| | White | Yellow | Orange | Red | Green | Blue | Black |
| White | ❶ | B | B | B | R | R | R |
| Yellow | B | ❶ | G | G | R | R | R |
| Orange | B | G | ❶ | G | G | G | R |
| Red | B | G | G | ❶ | R | B | R |
| Green | R | R | G | R | ❶ | B | G |
| Blue | R | R | G | B | B | ❶ | B |
| Black | R | R | R | R | G | B | ❶ |

R = Red; B = Blue; G = Green
❶ 45CLR ColorSight sensor suggested for shades of same color.
**Note**: White LED light source can be used selectively in place of red, blue and green.

## Cork Detection with Bifurcated Fiber Optic Cables

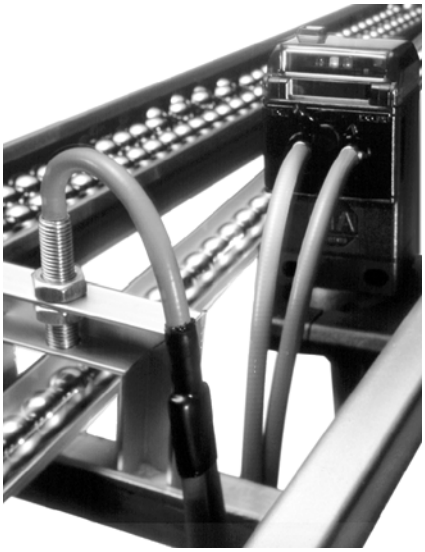


## Work Piece Detection with Individual Fiber Optic Cables



# Glass Fiber Optic Cables

## Introduction



### Application Recommendations

1. Many glass fiber optic cables are available with different glass fiber bundle diameters.

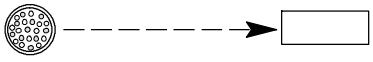
   Larger diameter bundles contain more fibers to carry light between the sensor and application. These cables will generally offer **longer sensing ranges**.

   Smaller diameter bundles provide greater resolution and the ability to detect smaller targets.
2. Glass fiber optic cables can be applied in high shock and vibration applications, but secure the cables to prevent excess flexing. Do not use glass cables in applications where they are constantly flexing. ***They will break***. Plastic fiber optic cables provide better performance in these applications.
3. Avoid sharp bends. The individual glass fibers in the cable can be broken. Don't exceed the following bend tolerances with PVC sheathed cables:

**Minimum Cable Bend Radius**

| Bundle Diameter [mm (in.)] | Minimum Bend Radius [mm (in.)] |
|---|---|
| 0.68 (0.027) | 12.7 (0.50) |
| 1.16 (0.046) | 12.7 (0.50) |
| 1.6 (0.063) | 15.8 (0.625) |
| 2.28 (0.090) | 15.8 (0.625) |
| 3.17 (0.125) | 19.0 (0.75) |
| 3.96 (0.156) | 25.4 (1.0) |
| 4.57 (0.180) | 31.7 (1.25) |

4. Glass fiber optic cables cannot be cut, spliced or repaired.
5. Glass fiber optic cables tip cannot be bent. Only special plastic fiber optic cable sensing end tips can be bent as specified in the Selection Guide. When using bendable end tips, bend should not be attempted closer than 19 mm (0.75 in.) to the sensing end of the cable.
6. Some applications call for glass fiber optic cables to be used to isolate the sensor from **high voltage**. Custom cables with special nonconductive components must be ordered for these applications.
7. X-RAY or GAMMA radiation will cause glass fibers to eventually become opaque. Custom cables constructed with special optical quartz fibers must be ordered for use in areas with **high radiation**.
8. Use Transmitted Beam sensing in **submerged applications** when possible. Spiral-wound stainless steel sheathing is generally not suitable for wet applications. Fiber optic cables with PVC sheathing should be used for these applications.
9. A glass fiber optic sensor with a **bifurcated** cable can provide **retroreflective** or **diffuse sensing** depending upon the distance to the target and the sensitivity adjustment on the sensor. If the sensor and cable are to be used for retroreflective sensing, the sensitivity of the sensor must be adjusted low enough to avoid unwanted diffuse response from the targets to be sensed.
10. Glass fiber optic cables have a wide **field of view**, typically 82°. A smaller field of view can be achieved by attaching an Extended Range Lens Assembly to the sensing end of the fiber. These lens assemblies will also increase the available sensing distance. Refer to the Accessories section for more information.
11. Most glass fiber optic cables have round sensing tips with the glass fibers arranged in a circular configuration. Other cables such as 43GT-FIS40SL offer sensing tips with a **rectangular shaped opening** for the glass fibers, referred to as "slotted" cables (see illustration below).



Control Interface End Tip — Sensing End Tip

Use these equivalent diameters to determine the approximate performance of slotted cables.

| Slot Dimensions [mm (in.)] | Round Sensing Tip Equivalent Diameter [mm (in.)] |
|---|---|
| 2.5 x 0.5 (0.1 x 0.02) | 1.2 (0.046) |
| 0.5 x 2.5 (0.02 x 0.1) | 1.2 (0.046) |
| 5.1 x 0.25 (2.0 x 0.01) | 1.2 (0.046) |
| 9.7 x 0.8 (0.382 x 0.032) | 3.1 (0.125) |

Formula:
Approximate diameter = $1.128 \times \sqrt{\text{Length x Width}}$

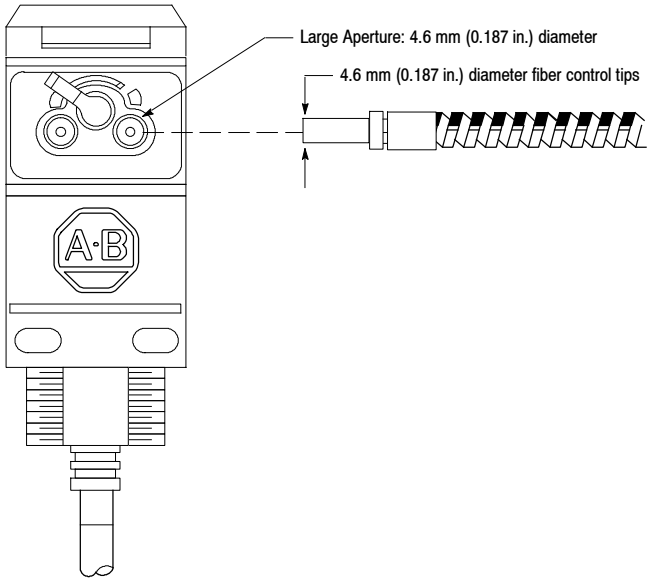
**ATTENTION**

Fiber optic cables are not recommended for explosion-proof applications in hazardous environments. The fiber optic cable can provide a path for explosive fumes to travel from the hazardous area to the safe area.

## Glass Fiber Optic Cables for use with Large Aperture Sensors

The fiber optic cables on pages 1-236…1-250 are for use with the large aperture sensors shown below.

**42GxF-900x**




## Large Aperture Sensors:

*42SRF-60xx*
*42SRF-65xx*

*42GTGF-100x0*
*42GTGF-103x0*

*42xRx-5x00FO*

*42GxF-900x*

*42EF-G1xxA*

*42KL-G1xxx*

Note: Nominal Sensing Distance

- Due to the variation between fiber optic cables, sensing distance can vary widely
- The sensing distance of bifurcated cables is measured with white paper (90% reflectivity). Other surfaces may be less reflective and therefore would have shorter sensing distances.
- The published numbers are based on extensive testing and are conservative
- The sensing distance of transmitted beam cables is measured from tip to tip
- Application considerations that effect distance
  - Sensor selected
  - Reflectivity of target
  - Environment
  - Accessories such as range extending lenses
  - Length of the cable
- Consult with product support for additional information.

**All dimensions indicated are typical. The fiber optic cables on pages 1-236…1-250 are for use with large aperture sensors as seen on the following pages:**

# 43GR Glass Fiber Optic Cables

## Threaded Bifurcated Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

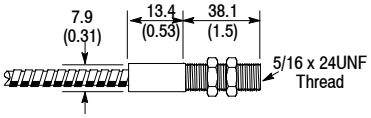
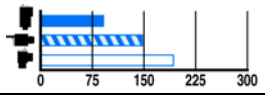
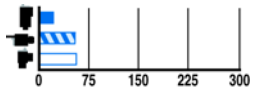
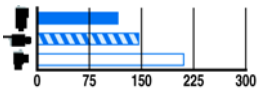
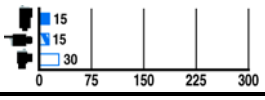
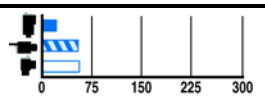
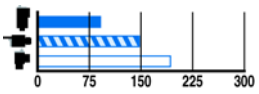
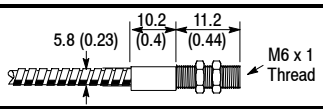
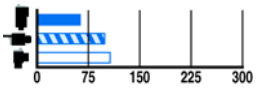
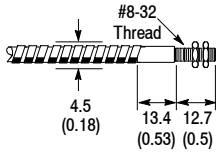
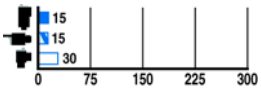
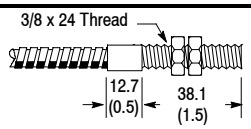
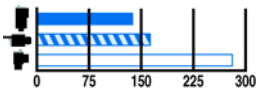
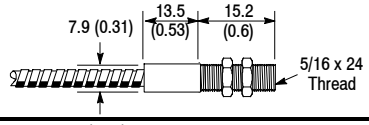
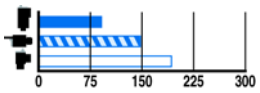
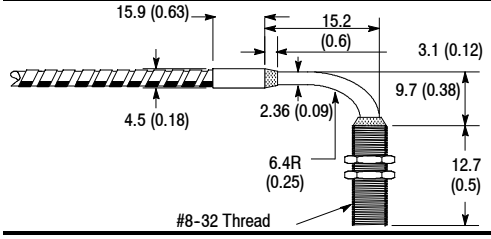
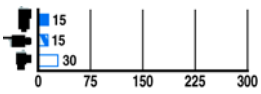
42GxF-900x

42KL-G1xx

42EF-G1xxA

Approximate Metric / Standard Distances

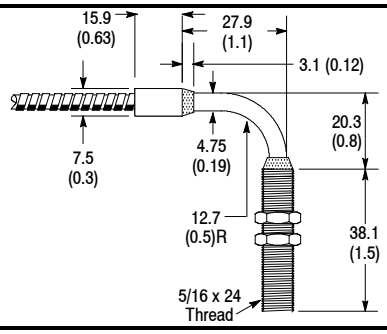
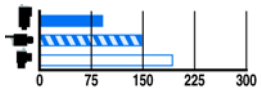
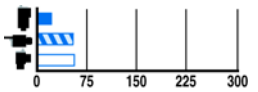
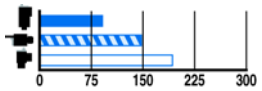
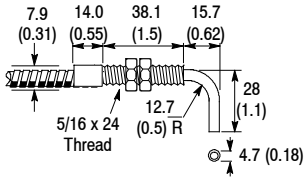
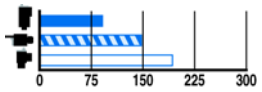
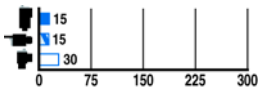
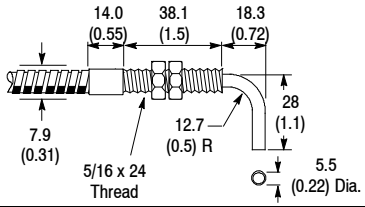
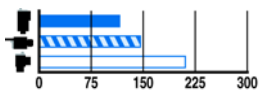
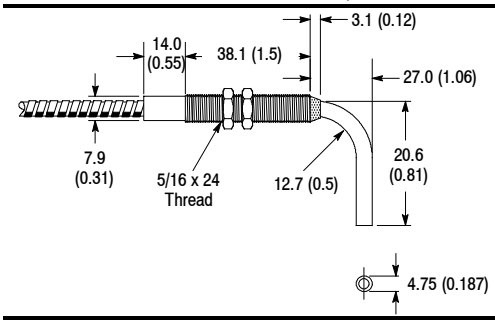
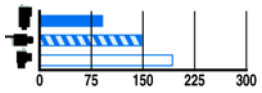
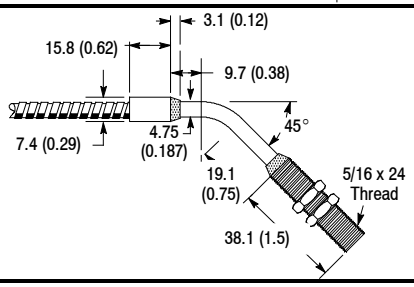
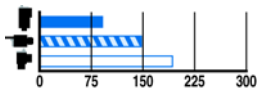
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 50 | 100 | 150 | 200 | 250 | 300 | mm |
| 0 | 2 | 4 | 6 | 8 | 10 | 12 | in. |

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 3.2 (0.125) | Stainless Steel |  | **43GR-TBB25SL** |
| | | | PVC | | 43GR-TBB25ML |
| | | 1.6 (0.062) | Stainless Steel |  | 43GR-TBB15SL |
| | | | PVC | | 43GR-TBB15ML |
| | | 4.0 (0.156) | Stainless Steel |  | 43GR-TBB30SL |
| | | | PVC | | 43GR-TBB30ML |
| | | 2.5 x 0.5 (0.1 x 0.02) E-W Slot | Stainless Steel |  | 43GR-TBB40SL |
| | | | PVC | | 43GR-TBB40ML |
| | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GR-TBS15SL |
| | | | PVC | | 43GR-TBS15ML |
| | | 3.2 (0.125) | Stainless Steel |  | **43GR-TBS25SL** |
| | | | PVC | | 43GR-TBS25ML |
|  | Stainless Steel | 2.3 (0.09) | Stainless Steel |  | 43GR-TAS20SL |
| | | | PVC | | 43GR-TAS20ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-TFS10SL |
| | | | PVC | | **43GR-TFS10ML** |
|  | Brass | 4.6 (0.180) | Stainless Steel |  | 43GR-TGB33SL |
| | | | PVC | | 43GR-TGB33ML |
|  | Brass | 3.2 (0.125) | Stainless Steel |  | 43GR-XDB25SL |
| | | | PVC | | 43GR-XDB25ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-TCS10SL |
| | | | PVC | | 43GR-TCS10ML |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

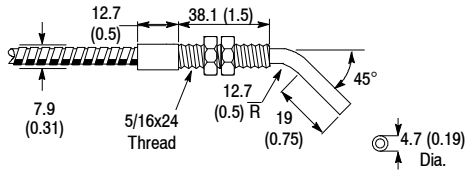
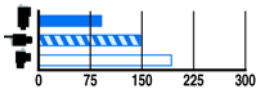
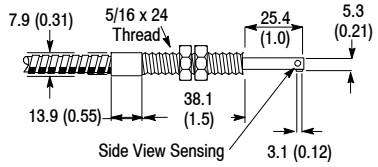
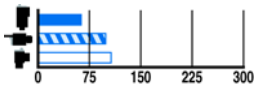
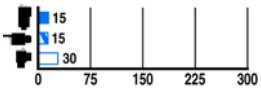
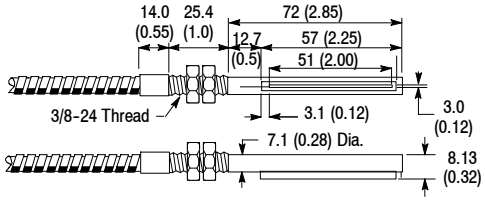
## Threaded Bifurcated Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass/ Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GR-TMC25SL** |
| | | | PVC | | 43GR-TMC25ML |
| | | 1.6 (0.062) | Stainless Steel |  | 43GR-TMC15SL |
| | | | PVC | | 43GR-TMC15ML |
| | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GR-TMS25SL |
| | | | PVC | | 43GR-TMS25ML |
|  | Brass/ Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GR-TQC25SL** |
| | | | PVC | | 43GR-TQC25ML |
| | | 2.5 x 0.5 (0.1 x 0.02) E-W Slot | Stainless Steel |  | 43GR-TQC40SL |
| | | | PVC | | 43GR-TQC40ML |
|  | Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GR-TRC30SL |
| | | | PVC | | 43GR-TRC30ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GR-TXC25SL |
| | | | PVC | | 43GR-TXC25ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GR-THC25SL |
| | | | PVC | | 43GR-THC25ML |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

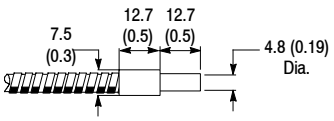
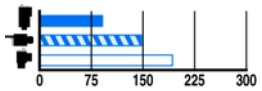
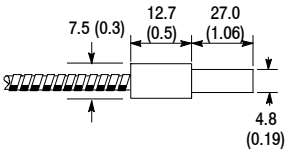
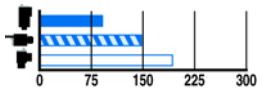
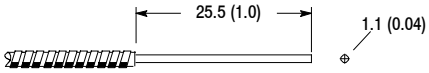
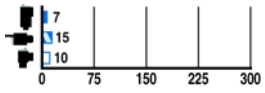
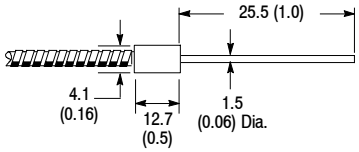
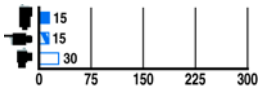
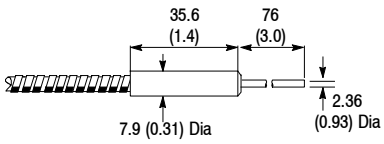
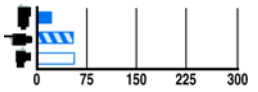
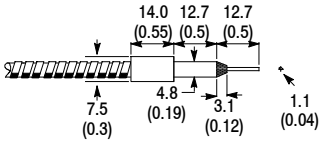
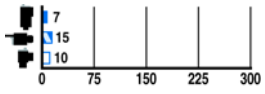
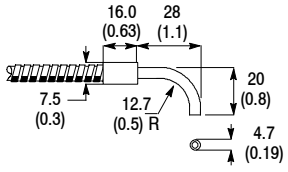
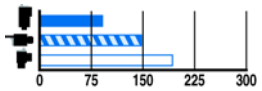
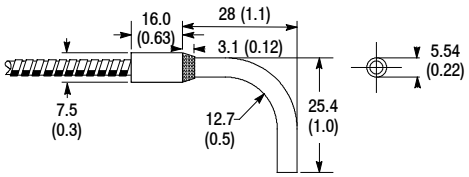
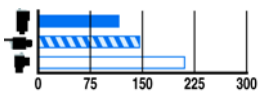
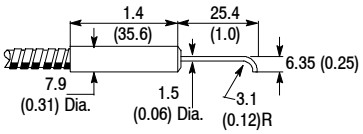
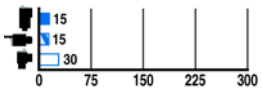
## Threaded Bifurcated Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass/ Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GR-TKC25SL |
| | | | PVC | | 43GR-TKC25ML |
|  | Stainless Steel | 2.3 (0.09) | Stainless Steel |  | 43GR-TTS20SL |
| | | | PVC | | 43GR-TTS20ML |
| | | 1.2 (0.046) | Stainless Steel |  | 43GR-TTS10SL |
| | | | PVC | | 43GR-TTS10ML |
|  | Stainless Steel | 51 x 0.25 (2.0 x 0.01) (N-S) | Stainless Steel | Characterization not available at time of publication | 43GR-TUS46SL |
| | | | PVC | | 43GR-TUS46ML |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

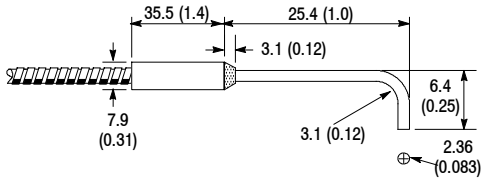
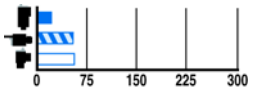
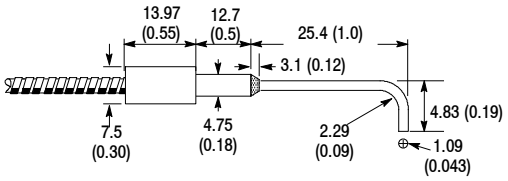
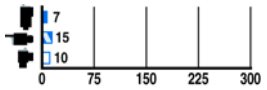
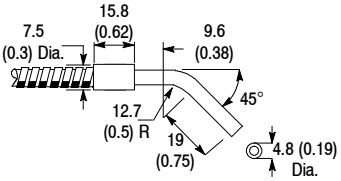
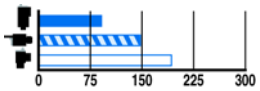
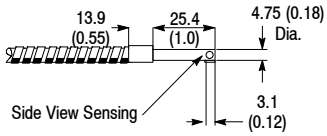
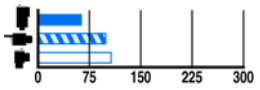
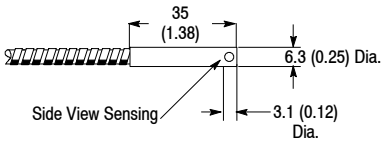
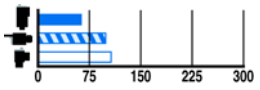
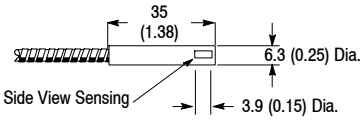
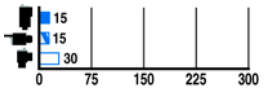
## Ferrule Bifurcated Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GR-FAS25SL** |
| | | | PVC | | 43GR-FAS25ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GR-FBS25SL |
| | | 3.2 (0.125) | PVC | | 43GR-FBS25ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GR-MAS00SL |
| | | | PVC | | 43GR-MAS00ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MDS10SL |
| | | | PVC | | 43GR-MDS10ML |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GR-MHS15SL |
| | | | PVC | | 43GR-MHS15ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GR-MVS00SL |
| | | | PVC | | 43GR-MVS00ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GR-FIS25SL** |
| | | | PVC | | 43GR-FIS25ML |
|  | Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GR-FJS30SL |
| | | | PVC | | 43GR-FJS30ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MOS10SL |
| | | | PVC | | 43GR-MOS10ML |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

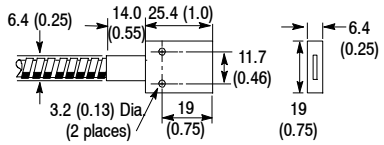
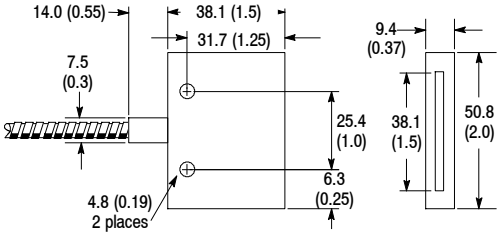
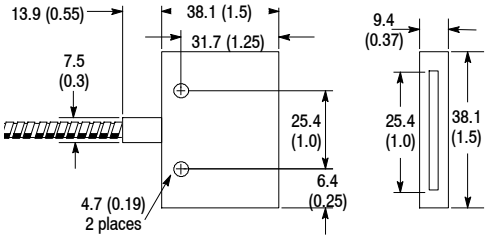
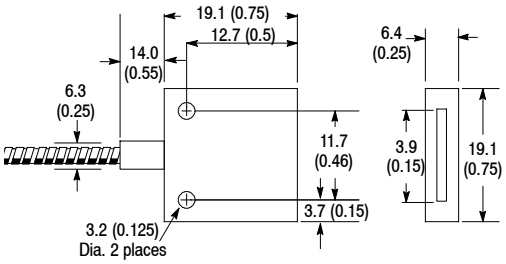
## Ferrule Bifurcated Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GR-MQS15SL |
| | | | PVC | | 43GR-MQS15ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GR-MKS00SL |
| | | | PVC | | 43GR-MKS00ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GR-FGS25SL |
| | | | PVC | | 43GR-FGS25ML |
|  | Stainless Steel | 2.3 (0.09) | Stainless Steel |  | 43GR-FOS20SL |
| | | | PVC | | 43GR-FOS20ML |
|  | Stainless Steel | 2.3 (0.09) | Stainless Steel |  | 43GR-FPS20SL |
| | | | PVC | | 43GR-FPS20ML |
|  | Stainless Steel | 2.5 x 0.5 (0.1 x 0.02) (E-W) | Stainless Steel |  | 43GR-FRS40SL |
| | | | PVC | | 43GR-FRS40ML |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

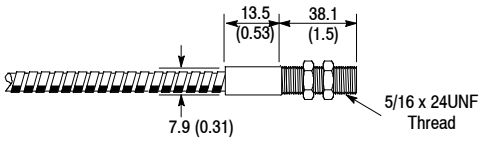
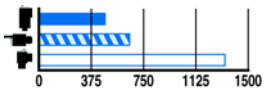
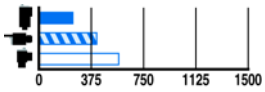
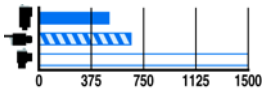
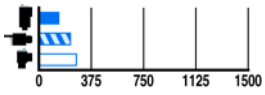
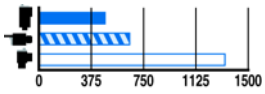
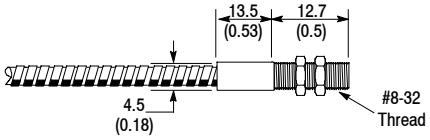
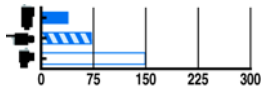
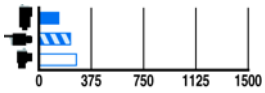
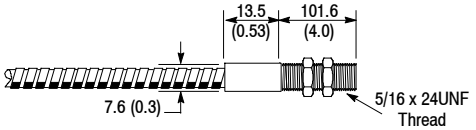
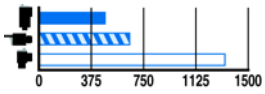
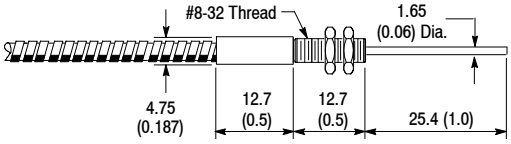
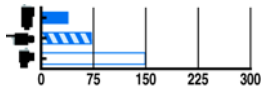
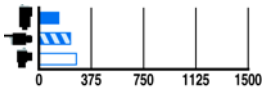
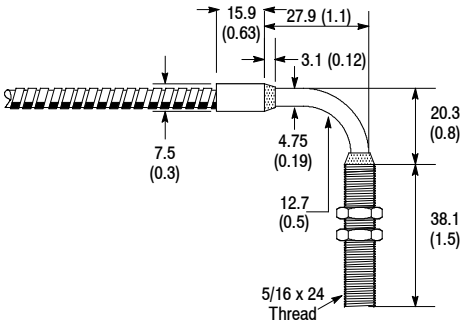
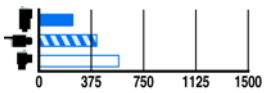
## Block Bifurcated Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheath. Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Aluminum | 9.7 x 0.8 (0.382 x 0.032) (E-W) | Stainless Steel | 120 mm Nominal | 43GR-BAA72SL |
| | | | PVC | | 43GR-BAA72ML |
|  | Aluminum | 38.1 x 0.3 (1.5 x 0.01) | Stainless Steel | Characterization not available at time of publication | 43GR-BCA73SL |
| | | | PVC | | 43GR-BCA73ML |
|  | Aluminum | 25.4 x 0.4 (1.0 x 0.015) | Stainless Steel | Characterization not available at time of publication | 43GR-BRA79SL |
| | | | PVC | | 43GR-BRA79ML |
|  | Aluminum | 3.9 x 0.5 (0.154 x 0.02) | Stainless Steel | Characterization not available at time of publication | 43GR-BTA70SL |
| | | | PVC | | 43GR-BTA70ML |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

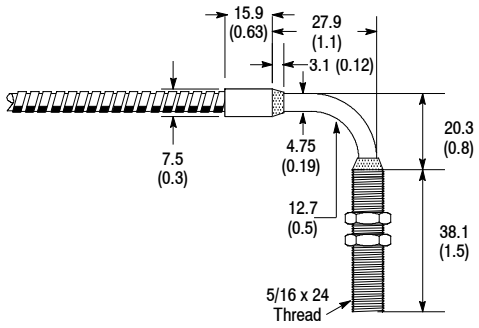
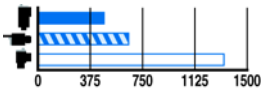
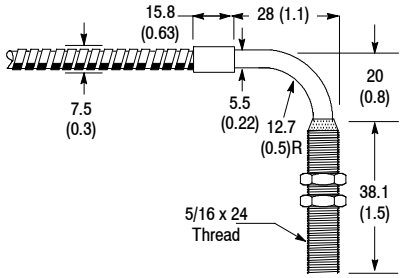
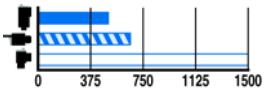
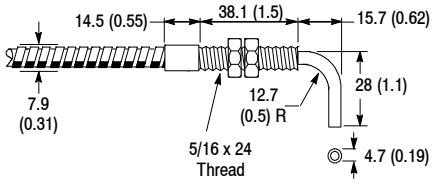
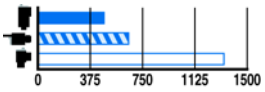
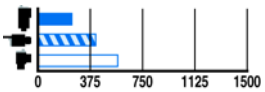
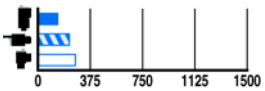
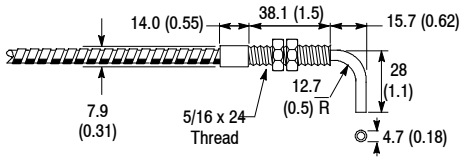
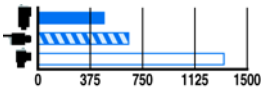
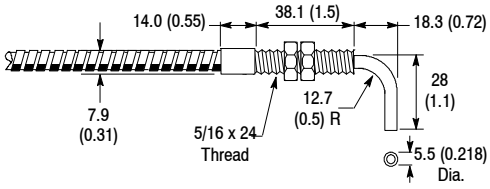
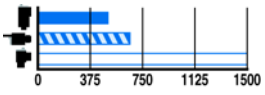
## Threaded Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 3.2 (0.125) | Stainless Steel |  | **43GT-TBB25SL** |
| | | | PVC | | 43GT-TBB25ML |
| | | 1.6 (0.062) | Stainless Steel |  | 43GT-TBB15SL |
| | | | PVC | | 43GT-TBB15ML |
| | | 4.0 (0.156) | Stainless Steel |  | 43GT-TBB30SL |
| | | | PVC | | 43GT-TBB30ML |
| | | 2.5 x 0.5 (0.1 x 0.02) E-W Slot | Stainless Steel |  | 43GT-TBB40SL |
| | | | PVC | | 43GT-TBB40ML |
| | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TBS25SL |
| | | | PVC | | 43GT-TBS25ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GT-TFS00SL |
| | | | PVC | | 43GT-TFS00ML |
| | | 1.2 (0.046) | Stainless Steel |  | 43GT-TFS10SL |
| | | | PVC | | 43GT-TFS10ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TYS25SL |
| | | | PVC | | 43GT-TYS25ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GT-MRS00SL |
| | | | PVC | | 43GT-MRS00ML |
| | | 1.2 (0.046) | Stainless Steel |  | 43GT-MRS10SL |
| | | | PVC | | 43GT-MRS10ML |
|  | Brass/ Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GT-TMC15SL |
| | | | PVC | | 43GT-TMC15ML |
| | | 3.2 (0.125) | Stainless Steel | | **43GT-TMC25SL** |
| | | | PVC | | 43GT-TMC25ML |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

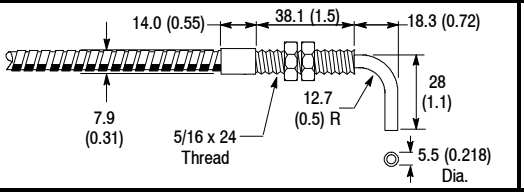
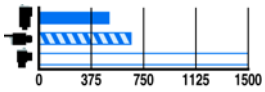
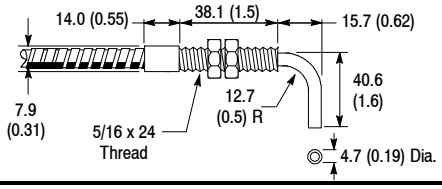
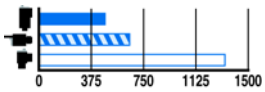
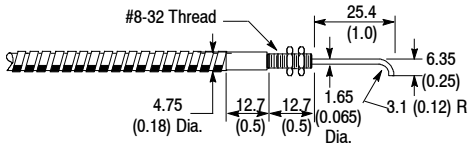
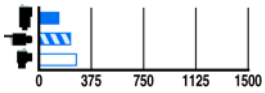
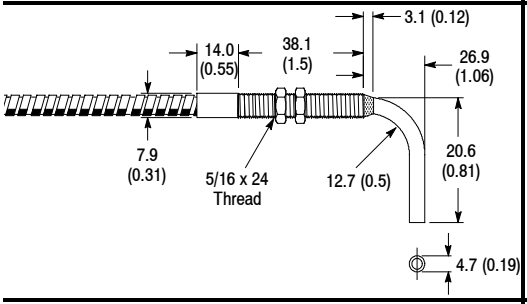
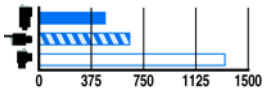
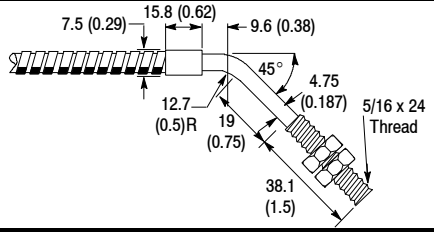
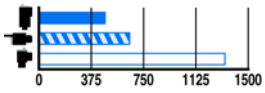
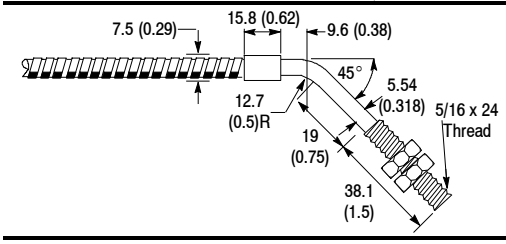
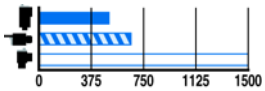
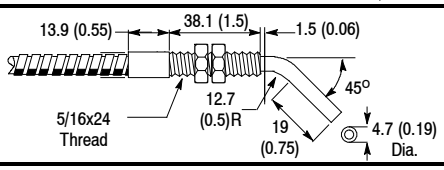
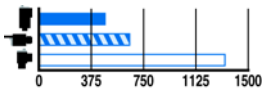
## Threaded Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TMS25SL |
| | | | PVC | | 43GT-TMS25ML |
|  | Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GT-TOC30SL |
| | | | PVC | | 43GT-TOC30ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GT-TQC25SL** |
| | | | PVC | | 43GT-TQC25ML |
| | | 1.6 (0.062) | Stainless Steel |  | 43GT-TQC15SL |
| | | | PVC | | 43GT-TQC15ML |
| | | 2.5 x 0.5 (0.1 x 0.02) E-W Slot | Stainless Steel |  | 43GT-TQC40SL |
| | | | PVC | | 43GT-TQC40ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TQS25SL |
| | | | PVC | | 43GT-TQS25ML |
|  | Brass/ Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GT-TRC30SL |
| | | | PVC | | 43GT-TRC30ML |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

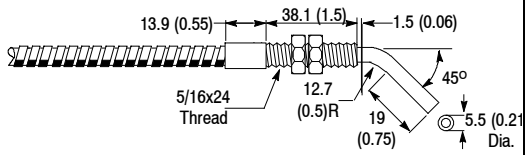
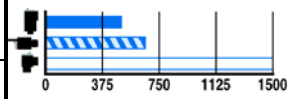
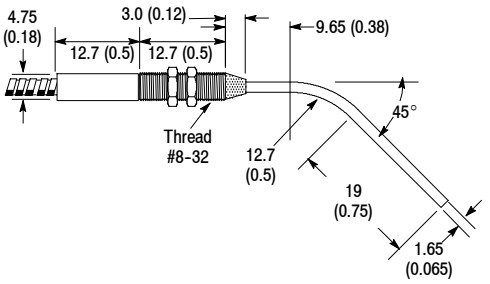
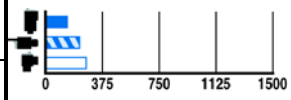
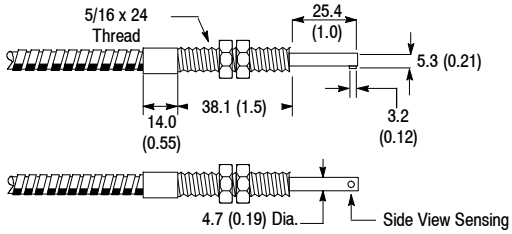
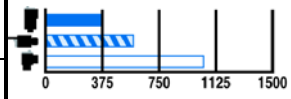
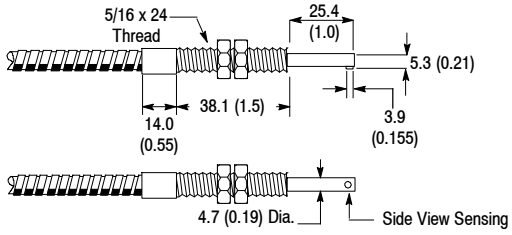
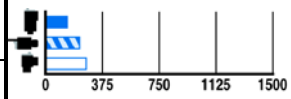
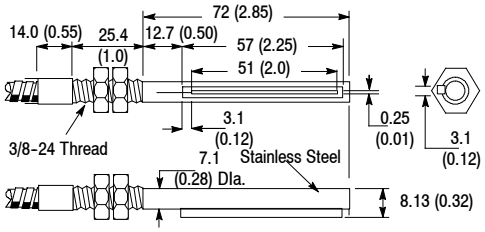
## Threaded Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GT-TRS30SL |
| | | | PVC | | 43GT-TRS30ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TWC25SL |
| | | | PVC | | 43GT-TWC25ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MUS10SL |
| | | | PVC | | 43GT-MUS10ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TXC25SL |
| | | | PVC | | 43GT-TXC25ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-THC25SL |
| | | | PVC | | 43GT-THC25ML |
|  | Brass/ Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GT-TJC30SL |
| | | | PVC | | 43GT-TJC30ML |
|  | Brass/ Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-TKC25SL |
| | | | PVC | | 43GT-TKC25ML |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

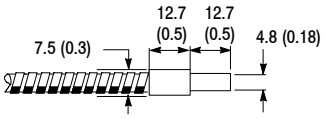
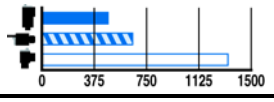
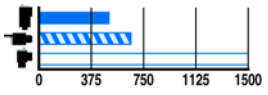
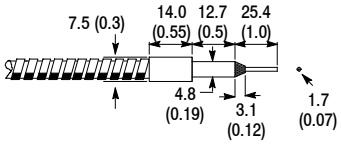
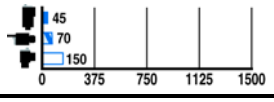
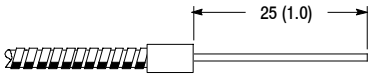
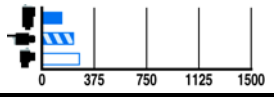
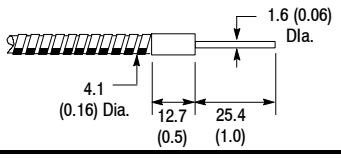
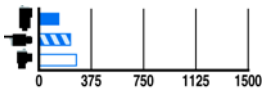
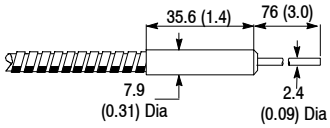
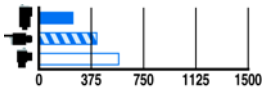
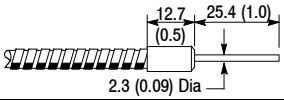
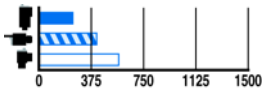
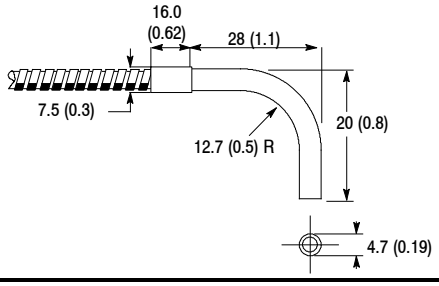
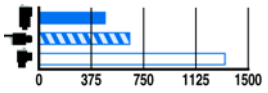
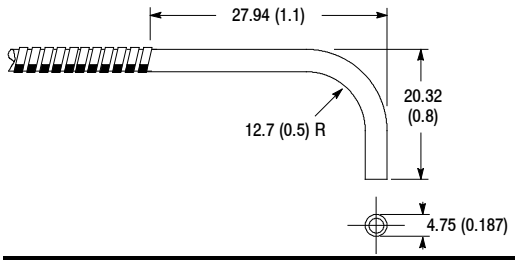
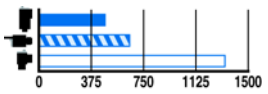
## Threaded Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 4.0 (0.156) | Stainless Steel |  | 43GT-TLC30SL |
| | | | PVC | | 43GT-TLC30ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MSS10SL |
| | | | PVC | | 43GT-MSS10ML |
|  | Stainless Steel | 2.3 (0.090) | Stainless Steel |  | 43GT-TTC20SL |
| | | | PVC | | 43GT-TTC20ML |
|  | Stainless Steel/ Brass | 2.5 x 0.5 (0.1 x 0.02) (E-W) | Stainless Steel |  | 43GT-TZC40SL |
| | | | PVC | | 43GT-TZC40ML |
|  | Stainless Steel | 51 x 0.25 (2.0 x 0.01) (N-S) | Stainless Steel | 130 mm Nominal | 43GT-TUS46SL |
| | | | PVC | | 43GT-TUS46ML |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

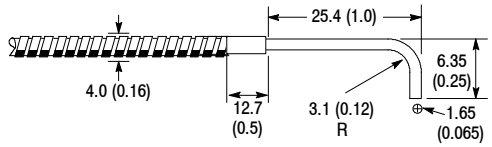
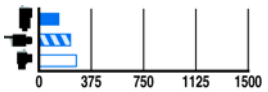
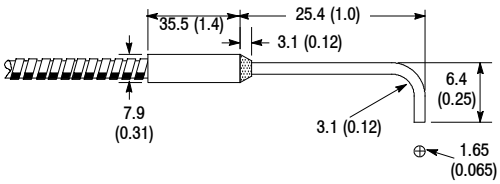
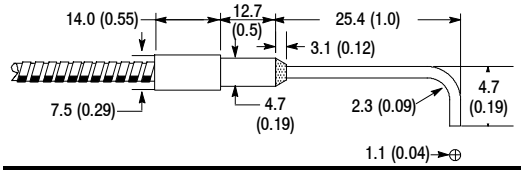
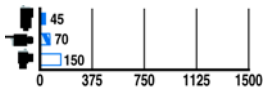
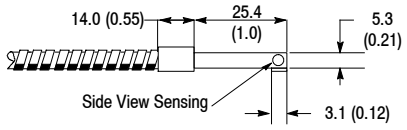
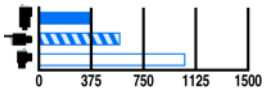
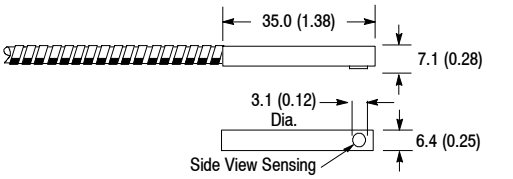
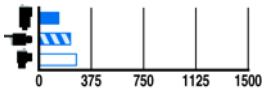
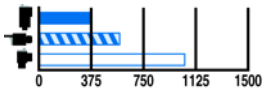
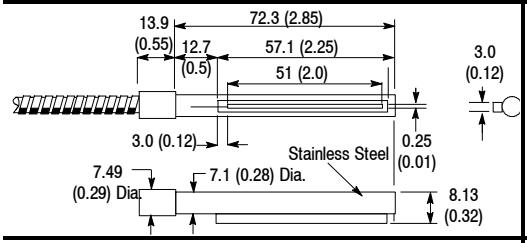
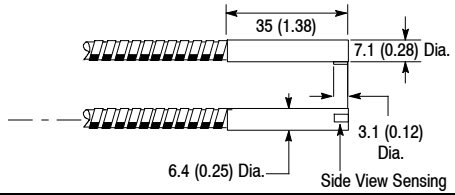
## Ferrule Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GT-FAS25SL** |
| | | | PVC | | 43GT-FAS25ML |
| | | 4.0 (0.156) | Stainless Steel |  | 43GT-FAS30SL |
| | | | PVC | | 43GT-FAS30ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GT-MBS00SL |
| | | | PVC | | 43GT-MBS00ML |
| | | 1.2 (0.046) | Stainless Steel | | 43GT-MBS10SL |
| | | | PVC | | 43GT-MBS10ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MCS10SL |
| | | | PVC | | 43GT-MCS10ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MDS10SL |
| | | | PVC | | 43GT-MDS10ML |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GT-MHS15SL |
| | | | PVC | | 43GT-MHS15ML |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GT-MIS15SL |
| | | | PVC | | 43GT-MIS15ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | **43GT-FIS25SL** |
| | | | PVC | | 43GT-FIS25ML |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel |  | 43GT-FSS25SL |
| | | | PVC | | 43GT-FSS25ML |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

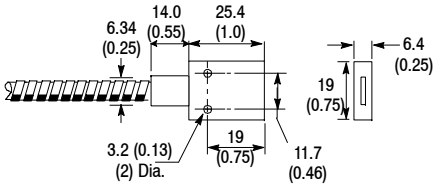
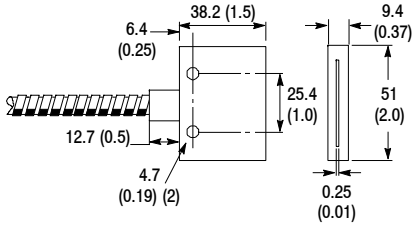
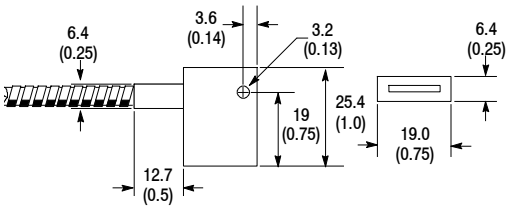
# 43GT Glass Fiber Optic Cables

## Ferrule Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MMS10SL |
| | | | PVC | | 43GT-MMS10ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel | | 43GT-MOS10SL |
| | | | PVC | | 43GT-MOS10ML |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GT-MKS00SL |
| | | | PVC | | 43GT-MKS00ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel | | 43GT-FOS10SL |
| | | | PVC | | 43GT-FOS10ML |
| | | 2.3 (0.09) | Stainless Steel |  | 43GT-FOS20SL |
| | | | PVC | | 43GT-FOS20ML |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-FPS10SL |
| | | | PVC | | 43GT-FPS10ML |
| | | 2.3 (0.09) | Stainless Steel |  | 43GT-FPS20SL |
| | | | PVC | | 43GT-FPS20ML |
|  | Stainless Steel | 51 x 0.25 (2.0 x 0.01) (N-S) | Stainless Steel | 130 mm Nominal | 43GT-FQS46SL |
| | | | PVC | | 43GT-FQS46ML |
|  | Stainless Steel | 2.5 x 0.5 (0.1 x 0.02) | Stainless Steel | | 43GT-FRS40SL |
| | | | PVC | | 43GT-FRS40ML |

# 43GT Glass Fiber Optic Cables

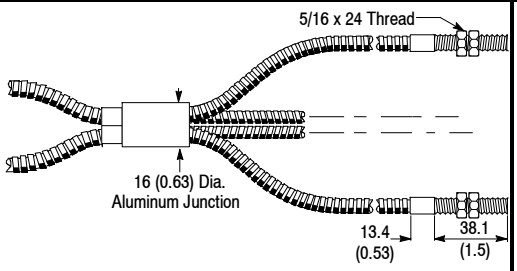
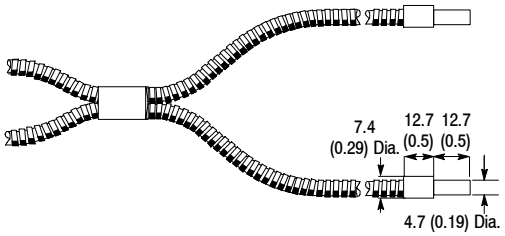
## Block Transmitted Beam Cables for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Aluminum | 9.7 x 0.8 (0.382 x 0.032) (E-W) | Stainless Steel | 500 mm Nominal | 43GT-BAA72SL |
| | | | PVC | | 43GT-BAA72ML |
|  | Aluminum | 38 x 0.25 (1.5 x 0.01) (E-W) | Stainless Steel | Characterization not available at time of publication | 43GT-BCA73SL |
| | | | PVC | | 43GT-BCA73ML |
|  | Aluminum | 9.7 x 0.8 (0.382 x 0.032) (E-W) | Stainless Steel | Characterization not available at time of publication | 43GT-BEA72SL |
| | | | PVC | | 43GT-BEA72ML |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

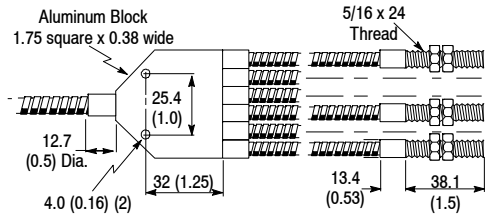
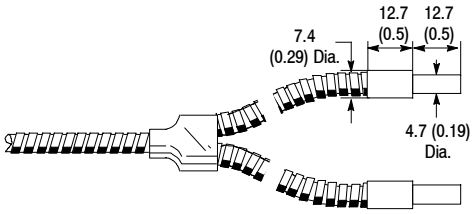
## Bifurcated Specialty Cable for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 2.8 (0.11) | Stainless Steel | Characterization not available at time of publication | 43GR-4TBB22SL |
|  | Stainless Steel | 3.2 (0.125) | Stainless Steel | Characterization not available at time of publication | 43GR-2FAS25SL |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

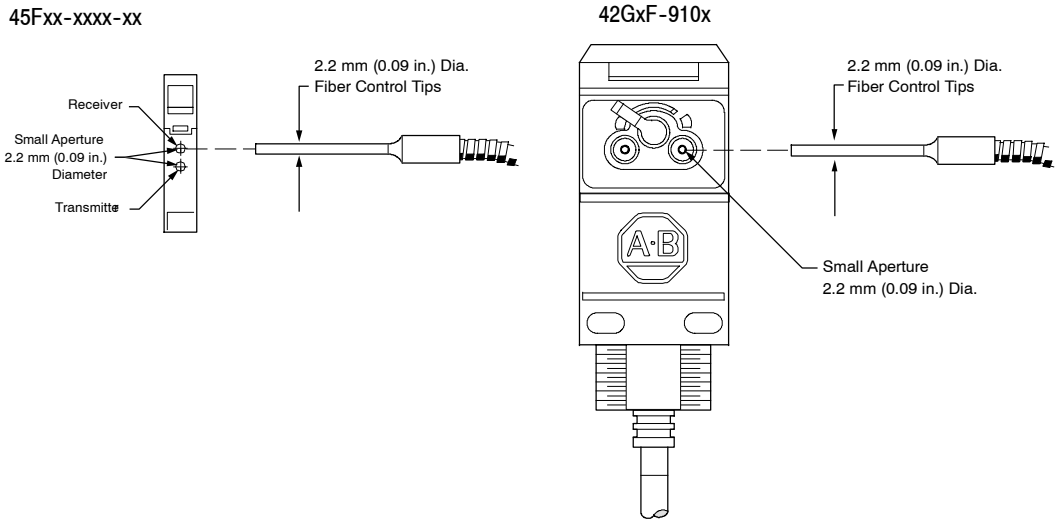
## Transmitted Beam Specialty for Large Aperture Sensors [4.6 mm (0.187 in.)]

| Approximate Dimensions [mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheath. Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 1.6 (0.062) (x6) | Stainless Steel | Characterization not available at time of publication | 43GT-6TBB15SL |
|  | Stainless Steel | 2.3 (0.090) (x2) | Stainless Steel | 200 mm Nominal | 43GT-2FAS20SL |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

## Glass Fiber Optic Cables for use with Small Aperture Sensors

The glass fiber optic cables  cables on pages  1-252…1-257 are for use with small aperture sensors.




## Small Aperture Sensors:

Note: Nominal Sensing Distance

- Due to the variation between fiber optic cables, sensing distance can vary widely
- The published numbers are based on extensive testing and are conservative
- The sensing distance of bifurcated cables is measured with white paper (90% reflectivity). Other surfaces may be less reflective and therefore would have shorter sensing distances.
- The sensing distance of transmitted beam cables is measured from tip to tip
- Application considerations that effect distance
  - Sensor selected
  - Reflectivity of target
  - Environment
  - Accessories such as range extending lenses
- Consult with product support for additional information.

**All dimensions indicated are typical.**

# 43GR Glass Fiber Optic Cables

## Threaded Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

**The fiber optic cables on pages 1-252…1-257 are for use with small aperture sensors including the following:**

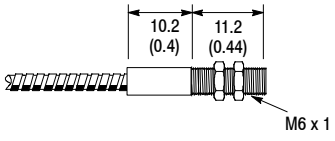
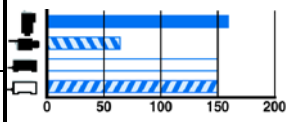
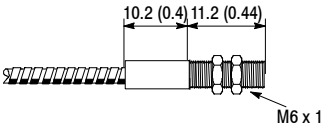
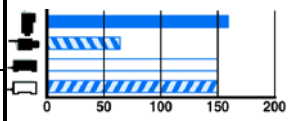
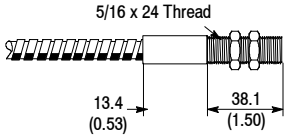
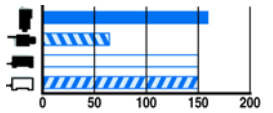
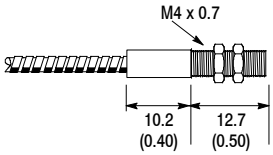
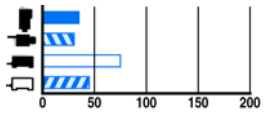
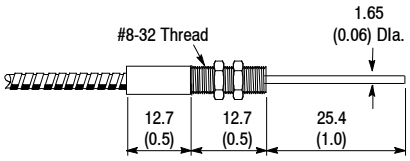
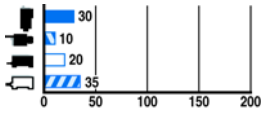
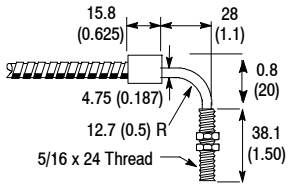
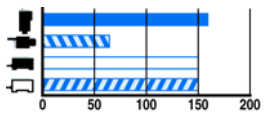
*42GxF-910x*

*42KL-L2xxx*

*45FSL-xxxx*

*45FVL-xxxx*

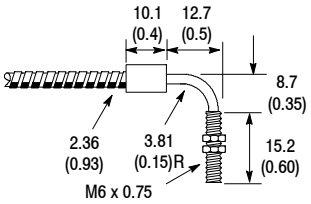
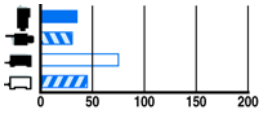
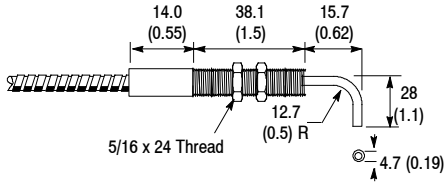
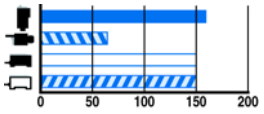
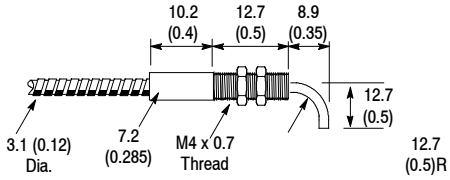
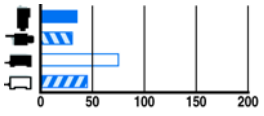
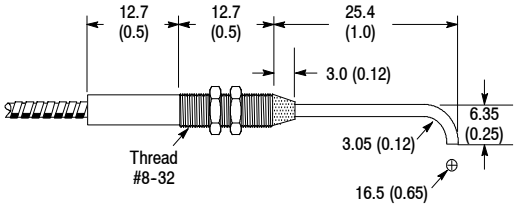
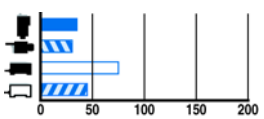
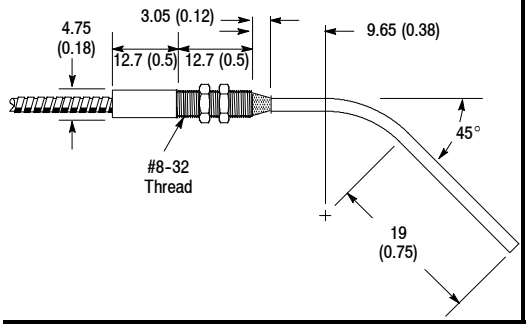
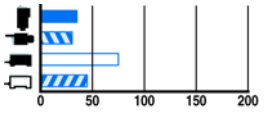
| Approximate Metric / Standard Distances | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 50 | 100 | 150 | 200 | 250 | 300 | mm |
| 0 | 2 | 4 | 6 | 8 | 10 | 12 | in. |

| Dimensions—[mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 2.2 (0.09) | Stainless Steel |  | **43GR-TAB20SS** |
| | | | PVC | | 43GR-TAB20MS |
|  | Stainless Steel | 2.2 (0.09) | Stainless Steel |  | 43GR-TAS20SS |
| | | | PVC | | 43GR-TAS20MS |
|  | Stainless Steel | 2.2 (0.09) | Stainless Steel |  | 43GR-TBS20SS |
| | | | PVC | | 43GR-TBS20MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-XAS10SS |
| | | | PVC | | 43GR-XAS10MS |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GR-MRS00SS |
| | | | PVC | | 43GR-MRS00MS |
|  | Stainless Steel | 2.2 (0.09) | Stainless Steel |  | 43GR-TMS20SS |
| | | | PVC | | 43GR-TMS20MS |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

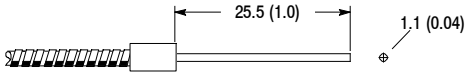
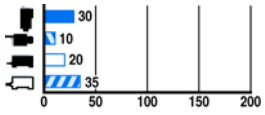
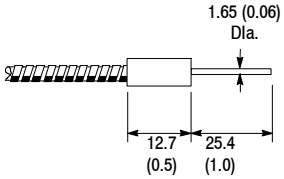
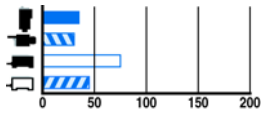
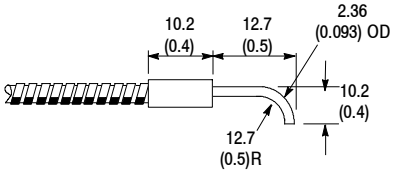
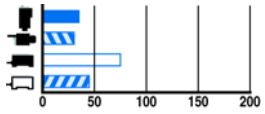
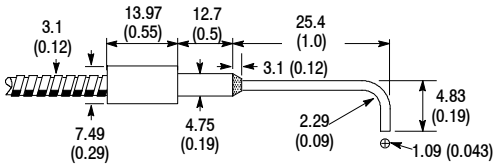
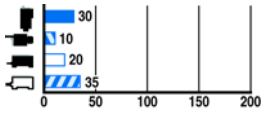
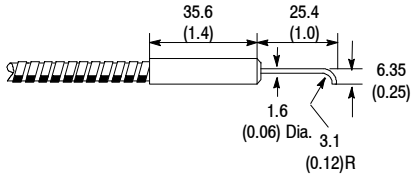
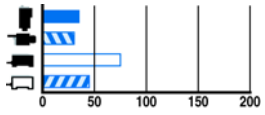
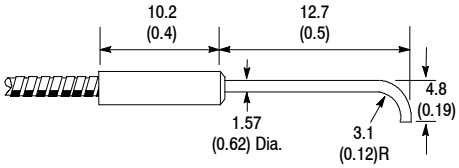
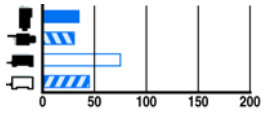
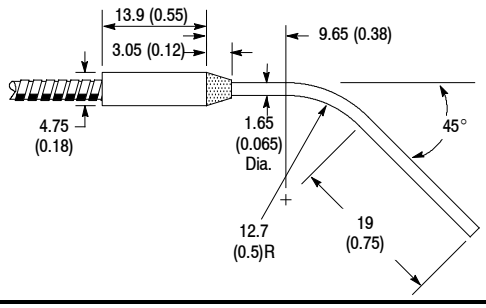
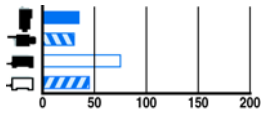
## Threaded Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Dimensions—[mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-TIS10SS |
| | | | PVC | | 43GR-TIS10MS |
|  | Stainless Steel | 2.2 (0.09) | Stainless Steel |  | 43GR-TQS20SS |
| | | | PVC | | 43GR-TQS20MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-TDS10SS |
| | | | PVC | | 43GR-TDS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MUS10SS |
| | | | PVC | | 43GR-MUS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MSS10SS |
| | | | PVC | | 43GR-MSS10MS |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GR Glass Fiber Optic Cables

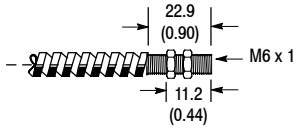
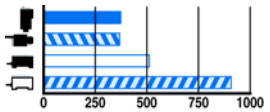
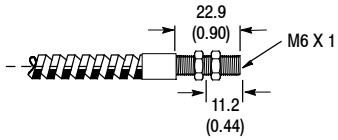
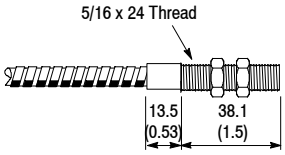
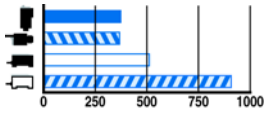
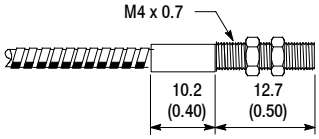
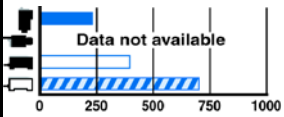
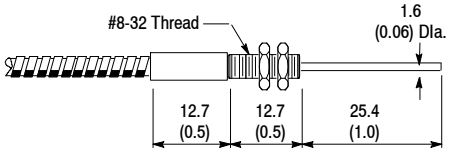
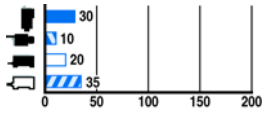
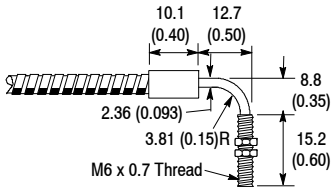
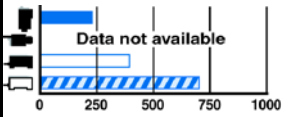
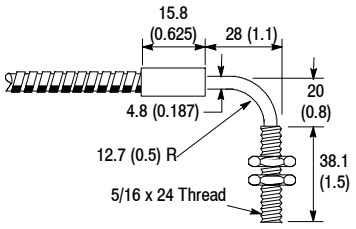
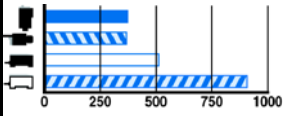
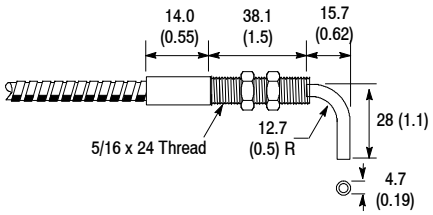
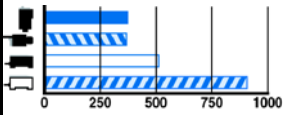
## Ferrule Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Dimensions—[mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GR-MAS00SS |
| | | | PVC | | 43GR-MAS00MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MDS10SS |
| | | | PVC | | 43GR-MDS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-FTS10SS |
| | | | PVC | | 43GR-FTS10MS |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GR-MKS00SS |
| | | | PVC | | 43GR-MKS00MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MOS10SS |
| | | | PVC | | 43GR-MOS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MYS10SS |
| | | | PVC | | 43GR-MYS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GR-MJS10SS |
| | | | PVC | | 43GR-MJS10MS |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

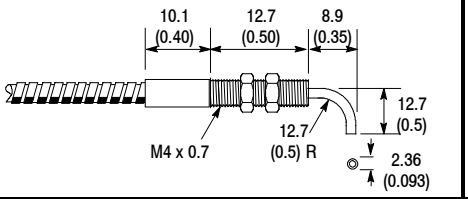
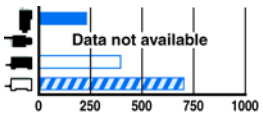
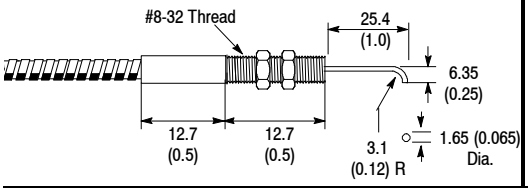
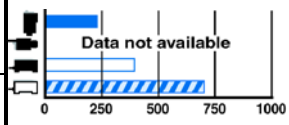
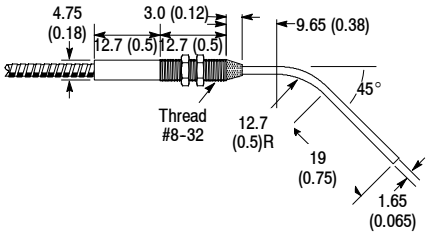
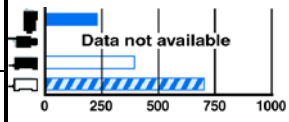
## Threaded Transmitted Beam for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Dimensions—[mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Brass | 1.6 (0.062) | Stainless Steel |  | 43GT-TAB15SS |
| | | | PVC | | 43GT-TAB15MS |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel | | 43GT-TAS15SS |
| | | | PVC | | 43GT-TAS15MS |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GT-TBS15SS |
| | | | PVC | | 43GT-TBS15MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-XAS10SS |
| | | | PVC | | 43GT-XAS10MS |
|  | Stainless Steel | 0.7 (0.027) | Stainless Steel |  | 43GT-MRS00SS |
| | | | PVC | | 43GT-MRS00MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-TIS10SS |
| | | | PVC | | 43GT-TIS10MS |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GT-TMS15SS |
| | | | PVC | | 43GT-TMS15MS |
|  | Stainless Steel | 1.6 (0.062) | Stainless Steel |  | 43GT-TQS15SS |
| | | | PVC | | 43GT-TQS15MS |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

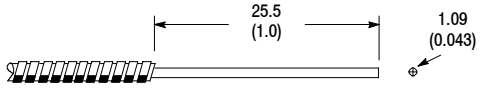
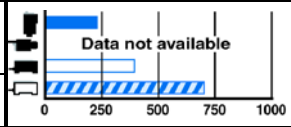
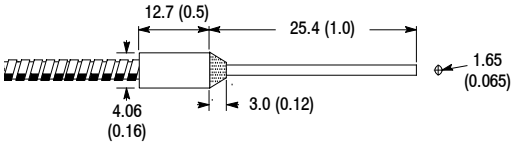
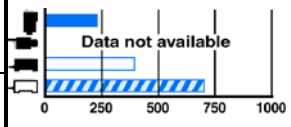
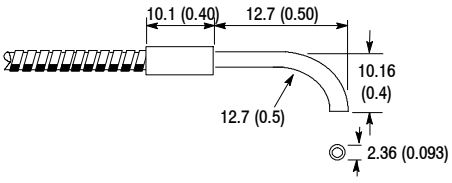
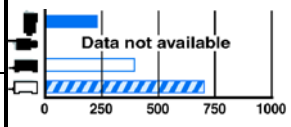
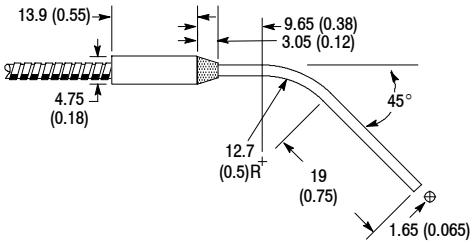
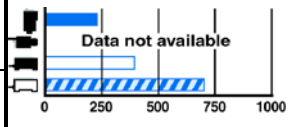
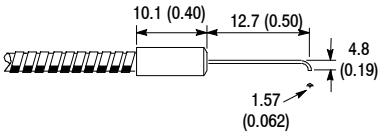
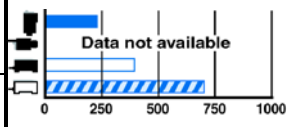
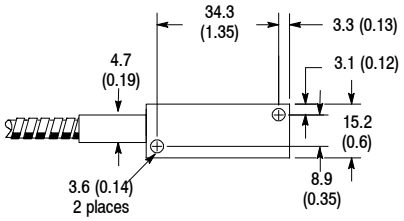
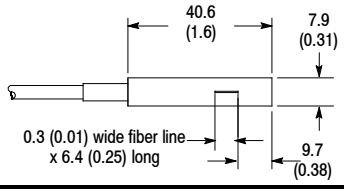
## Threaded Transmitted Beam for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Dimensions—[mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-TDS10SS |
| | | | PVC | | 43GT-TDS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MUS10SS |
| | | | PVC | | 43GT-MUS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MSS10SS |
| | | | PVC | | 43GT-MSS10MS |

**Note**: Two transmitted beam fiber cables required for each sensor.
Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# 43GT Glass Fiber Optic Cables

## Ferrule Transmitted Beam for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Dimensions—[mm (in.)] | Sensing Tip Material | Fiber Bundle Diameter [mm (in.)] | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MAS10SS |
| | | | PVC | | 43GT-MAS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MDS10SS |
| | | | PVC | | 43GT-MDS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-FTS10SS |
| | | | PVC | | 43GT-FTS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MJS10SS |
| | | | PVC | | 43GT-MJS10MS |
|  | Stainless Steel | 1.2 (0.046) | Stainless Steel |  | 43GT-MYS10SS |
| | | | PVC | | 43GT-MYS10MS |
|  | Aluminum | 6.35 x 0.3 (0.25 x 0.012) | Stainless Steel | 215 mm Nominal | 43GT-BSA80SS |
|  | | | PVC | | 43GT-BSA80MS |

**Note**: Standard length for glass fiber optic cables is 0.91 m (36 in.) tip to tip.

# Glass Fiber Optic Cables

## Additional Cables for Large Aperture Sensors [4.6 mm (0.187 in.) OD Sensor End Tip]

### Custom Fiber Optic Cables

Rockwell Automation/Allen-Bradley can provide custom glass fiber optic cables to meet nearly any application requirement.

Typical cable modifications include:

- Custom lengths up to 15.2 m (50 ft)
- Custom temperature ratings up to 482°C (900°F)
- Custom configurations including multiple sensing tips
- Custom sensing end tips—nearly any modification is possible

For more information contact your local Rockwell Automation sales office or Allen-Bradley distributor.

### To Build a Custom Fiber Optic for a Large Aperture Sensor:

**43 — L**

**Fiber Optic Cable**

**Fiber Material**
G = Glass
Q = Quartz

**Sensing Mode**
R = Reflective (Bifurcated)
T = Transmitted Beam (Individual)

**Sensing End Tip Style (see pages 1-260…1-267)**
Threaded
- Axial
- Angled
- Side view

Ferruled
- Axial
- Angled
- Side view

Block
- Axial
- Side view

**Sensing End Tip and Nut Material**
A = Aluminum (block tips only)
B = Brass
C = Combination Brass/Stainless Steel
S = Stainless Steel

**Fiber Bundles**
See page 1-268 for dimensions.

**Overall Length (in.)**
**Standard lengths are 36 inches** and do not require these spaces to be filled in. If a special length is required, complete the above with the number of total inches, i.e. 024 for a two foot cable.

Lengths typically ordered:

| | | |
|---|---|---|
| 24 inches | = | 024 |
| 48 inches | = | 048 |
| 60 inches | = | 060 |
| 72 inches | = | 072 |
| 96 inches | = | 096 |
| 108 inches | = | 108 |
| 120 inches | = | 120 |

Any length over 120 inches, please contact product support.

**Fits large aperture (4.6 mm/ 0.187 in. OD) sensors which include:**
- 42EF-G1xxA
- 42EF-KL-G1xxx
- 42GxF-900x
- 42GTGF-100x0
- 42GTGF-103x0
- 42SRF-60xx
- 42SRF-65xx
- 42xRx-5x00FO

**Sheathing**
E = Stainless Steel Flexible Conduit 600°F
F = Stainless Steel Flexible Conduit 900°F
M = PVC 200°F
S = Stainless Steel Flexible Conduit 500°F

PVC

Stainless Steel Flexible Conduit

# Glass Fiber Optic Cables

## Additional Cables for Small Aperture Sensors [2.2 mm (0.09 in.) OD Sensor End Tip]

### Custom Fiber Optic Cables

Rockwell Automation/Allen-Bradley can provide custom glass fiber optic cables to meet nearly any application requirement.

Typical cable modifications include:

- Custom lengths up to 15.2 m (50 ft)
- Custom temperature ratings up to 482°C (900°F)
- Custom configurations including multiple sensing tips
- Custom sensing end tips—nearly any modification is possible

For more information contact your local Rockwell Automation sales office or Allen-Bradley distributor.

### To Build a Custom Fiber Optic for Small Aperture Sensor:

**43 G — S**

**Fiber Optic Cable**

**Fiber Material**
G = Glass

**Sensing Mode**
R = Reflective (Bifurcated)
T = Transmitted Beam (Individual)

**Sensing End Tip Style (see pages 1-260…1-267)**
Threaded
- Axial
- Angled
- Side view

Ferruled
- Axial
- Angled
- Side view

Block
- Axial
- Side view

**Sensing End Tip and Nut Material**
A = Aluminum (block tips only)
B = Brass
C = Combination Brass/Stainless Steel
S = Stainless Steel

**Fiber Bundles**
See page 1-268 for dimensions.

**Overall Length (in.)**
**Standard lengths are 36 inches** and do not require these spaces to be filled in. If a special length is required, complete the above with the number of total inches, i.e. 024 for a two foot cable.

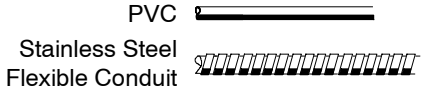
Lengths typically ordered:

| | | |
|---|---|---|
| 24 inches | = | 024 |
| 48 inches | = | 048 |
| 60 inches | = | 060 |
| 72 inches | = | 072 |
| 96 inches | = | 096 |
| 108 inches | = | 108 |
| 120 inches | = | 120 |

Any length over 120 inches, please contact factory.

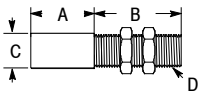
**Fits small aperture (2.2 mm/ 0.09 in. OD) sensors which include:**
- 42KL-L2xxx
- 42GxF-910
- 42GTGF-101x0
- 42SMF71xx
- 42SRF-61xx w/61-6374 adaptor
- 42SRF-63xx w/61-6374 adaptor
- 42xRx-5x00FO w/61-6374 adaptor
- 45FVL-xxxx-xx
- 45FSL-xxxx-xx

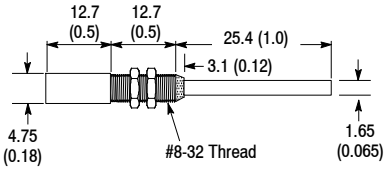
**Sheathing**
E = Stainless Steel Flexible Conduit 600°F
F = Stainless Steel Flexible Conduit 900°F
M = PVC 200°F
S = Stainless Steel Flexible Conduit 500°F

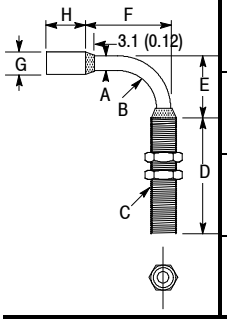


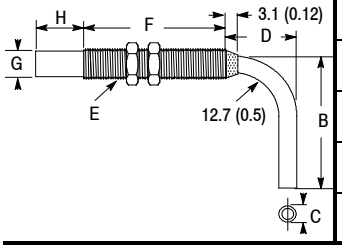
# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | [mm (in.)] | Approximate Dimensions [mm (in.)] | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
|  | TA | 2.29 (0.09) | 10.16 (0.40) | 11.18 (0.44) | 5.84 (0.23) | M6 x 1 class 6g |
| | TB | 3.2 (0.125) | 13.46 (0.53) | 38.1 (1.5) | 7.92 (0.312) | 5/16 x 24 UNF |
| | TF | 3.2 (0.125) | 13.46 (0.53) | 12.7 (0.5) | 4.45 (0.175) | #8-32 |
| | TG | 1.2 (0.046) | 13.46 (0.53) | 38.1 (1.5) | 9.53 (0.375) | 3/8 x 24 UNF |
| | TV | 4.0 (0.156) | 13.46 (0.53) | 139.7 (5.5) | 7.92 (0.312) | 5/16 x 24 UNF |
| | TY | 3.2 (0.125) | 13.46 (0.53) | 101.6 (4.0) | 7.62 (0.3) | 5/16 x 24 UNF |
| | XA | 1.2 (0.046) | 10.16 (0.40) | 12.7 (0.5) | 4.75 (0.187) | M4 x 0.7 |
| | XB | 1.2 (0.046) | 10.16 (0.40) | 12.7 (0.5) | 4.75 (0.187) | M6 x 0.75 |
| | XD | 3.2 (0.125) | 13.46 (0.53) | 15.24 (0.6) | 7.92 (0.312) | 5/16 x 24 UNF |

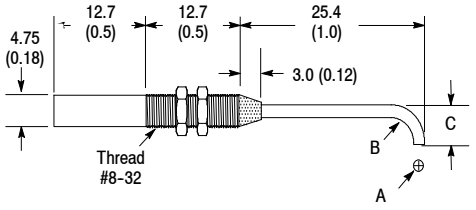
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | MR | 1.2 (0.046) |

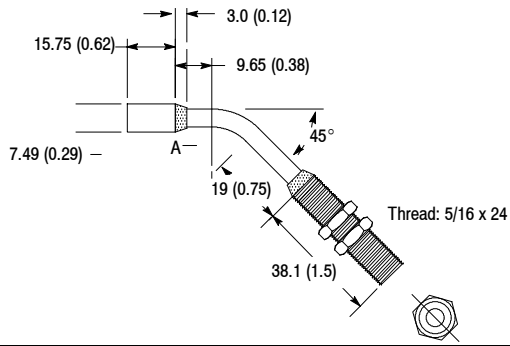
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Approximate Dimensions [mm (in.)] | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | G | H |
|  | TM | 3.2 (0.125) | 4.75 (0.187) | 12.7 (0.5) | 5/16 x 24 | 38.1 (1.5) | 20.3 (0.8) | 27.9 (1.1) | 7.49 (0.295) | 15.8 (0.625) |
| | TO | 4.0 (0.156) | 5.54 (0.218) | 12.7 (0.5) | 5/16 x 24 | 38.1 (1.5) | 20.3 (0.8) | 27.9 (1.1) | 7.49 (0.295) | 15.8 (0.625) |
| | TC | 1.2 (0.046) | 2.36 (0.093) | 6.35 (0.25) | 8 - 32 | 12.7 (0.5) | 9.65 (0.38) | 15.2 (0.6) | 4.45 (0.175) | 15.8 (0.625) |
| | TI | 1.2 (0.046) | 2.36 (0.093) | 3.81 (0.15) | M6 x 0.75 | 15.2 (0.6) | 8.89 (0.35) | 12.7 (0.5) | 4.75 (0.187) | 10.1 (0.40) |

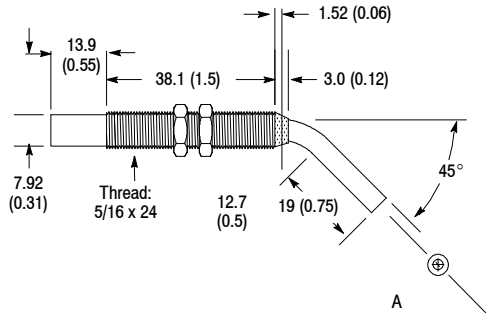
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Approximate Dimensions [mm (in.)] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | B | C | D | E | F | G | H |
|  | TQ | 3.2 (0.125) | 27.9 (1.1) | 4.75 (0.187) | 15.75 (0.62) | 5/16 x 24 | 38.1 (1.5) | 7.92 (0.312) | 13.97 (0.55) |
| | TR | 3.98 (0.156) | 27.9 (1.1) | 5.54 (0.218) | 18.29 (0.72) | 5/16 x 24 | 38.1 (1.5) | 7.92 (0.312) | 13.97 (0.55) |
| | TW | 3.2 (0.125) | 40.6 (1.6) | 4.75 (0.187) | 15.75 (0.62) | 5/16 x 24 | 38.1 (1.5) | 7.92 (0.312) | 13.97 (0.55) |
| | TX | 3.2 (0.125) | 20.6 (0.81) | 4.75 (0.187) | 26.9 (1.06) | 5/16 x 24 | 38.1 (1.5) | 7.92 (0.312) | 13.97 (0.55) |
| | TD | 1.2 (0.046) | 12.7 (0.5) | 2.36 (0.093) | 8.89 (0.35) | M4 x 0.7 | 12.7 (0.5) | 4.75 (0.187) | 10.16 (0.40) |

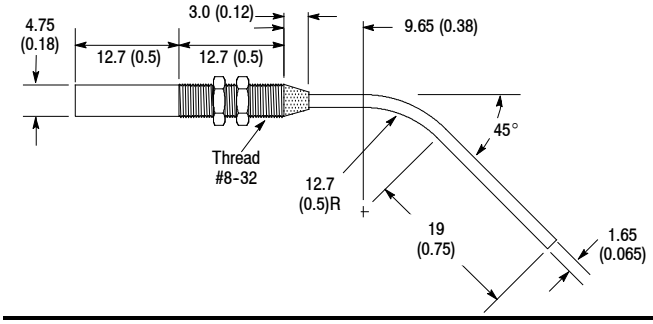
# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimensions [mm (in.)] | | |
|---|---|---|---|---|---|
| | | | A | B | C |
|  | **MT** | 0.70 (0.027) | 1.09 (0.043) | 2.29 (0.09) | 4.83 (0.19) |
| | **MU** | 1.2 (0.046) | 1.65 (0.065) | 3.05 (0.12) | 6.35 (0.25) |

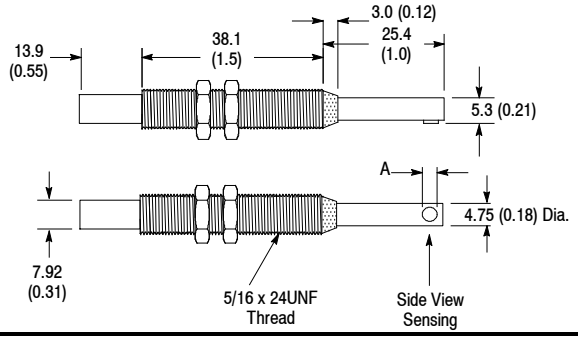
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle—[mm (in.)] | Dimension A [mm (in.)] |
|---|---|---|---|
|  | **TH** | 3.2 (0.125) | 4.75 (0.187) |
| | **TJ** | 4.0 (0.156) | 5.54 (0.218) |

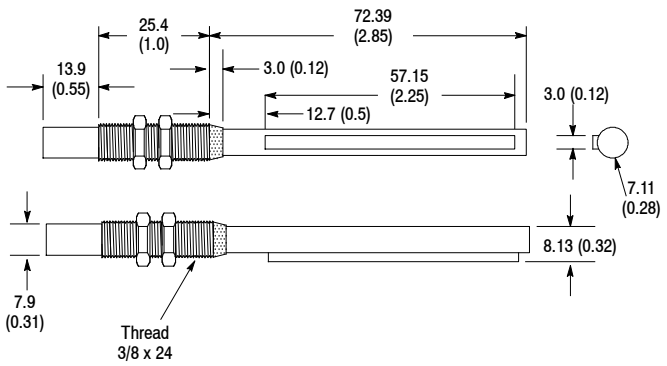
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimension A [mm (in.)] |
|---|---|---|---|
|  | **TK** | 3.2 (0.125) | 4.75 (0.187) |
| | **TL** | 4.0 (0.156) | 5.54 (0.218) |

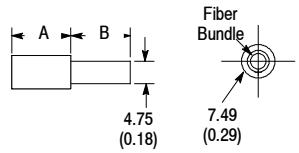
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **MS** | 1.2 (0.046) |

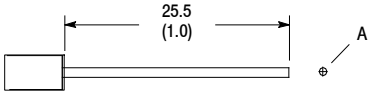
# Glass Fiber Optic Cable Tips

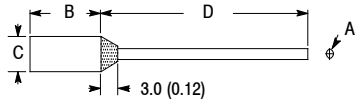
**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimension A [mm (in.)] |
|---|---|---|---|
|  | TT | 2.29 (0.09) | 3.2 (0.125) |
| | TZ | 2.5 x 0.5 (0.1 x 0.02) | 3.94 (0.155) |

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | TU | 51 x 0.3 (2.0 x 0.01) |

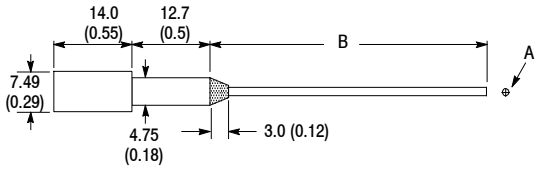
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimensions [mm (in.)] | |
|---|---|---|---|---|
| | | | A | B |
|  | FA | 3.2 (0.125) | 12.7 (0.5) | 12.7 (0.5) |
| | FB | | 12.7 (0.5) | 26.9 (1.06) |
| | FC | | 12.7 (0.5) | 31.7 (1.25) |
| | FD | | 12.7 (0.5) | 50.8 (2.0) |
| | FE | | 35.5 (1.4) | 76.2 (3.0) |

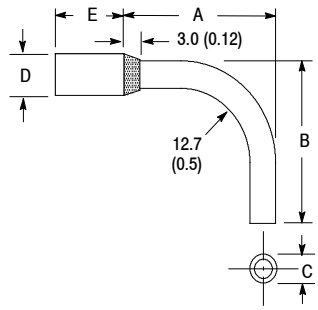
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimension A [mm (in.)] |
|---|---|---|---|
|  | MA | 0.70 (0.027) | 1.09 (0.043) |
| | MC | 1.2 (0.046) | 1.65 (0.065) |

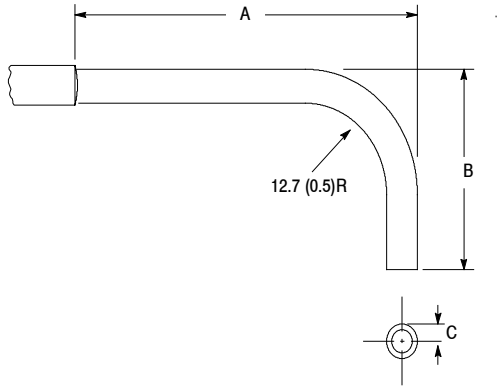
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimensions [mm (in.)] | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
|  | MD | 1.2 (0.046) | 1.65 (0.065) | 12.7 (0.5) | 4.06 (0.16) | 25.4 (1.0) |
| | MG | 1.2 (0.046) | | 35.5 (1.4) | 7.87 (0.31) | |
| | MH | 1.6 (0.062) | 2.36 (0.093) | 35.5 (1.4) | 7.87 (0.31) | 76.2 (3.0) |
| | MI | 1.6 (0.062) | | 12.7 (0.5) | 7.87 (0.31) | 25.4 (1.0) |

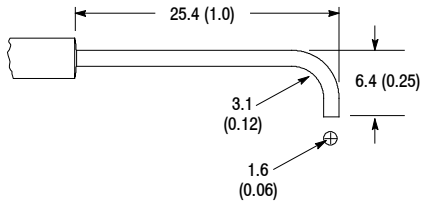
# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | [mm (in.)] | Dimensions [mm (in.)] | |
|---|---|---|---|---|
| | | | A | B |
|  | MB | 1.2 (0.046) | 1.65 (0.065) | 25.4 (1.0) |
| | MF | 1.2 (0.046) | 1.65 (0.065) | 50.8 (2.0) |
| | MV | 0.70 (0.027) | 1.09 (0.043) | 12.7 (0.5) |

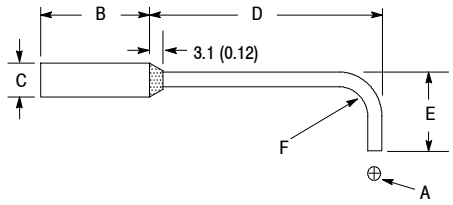
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimensions [mm (in.)] | | | | |
|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E |
|  | FI | 3.2 (0.125) | 27.9 (1.1) | 20.3 (0.8) | 4.75 (0.187) | 7.49 (0.295) | 15.8 (0.625) |
| | FJ | 4.0 (0.156) | 27.9 (1.1) | 25.4 (1.0) | 5.54 (0.218) | 7.49 (0.295) | 15.8 (0.625) |
| | FK | 3.2 (0.125) | 27.9 (1.1) | 27.9 (1.1) | 4.75 (0.187) | 7.49 (0.295) | 15.8 (0.625) |
| | FL | 3.2 (0.125) | 27.9 (1.1) | 35.0 (1.38) | 4.75 (0.187) | 7.49 (0.295) | 15.8 (0.625) |
| | FM | 3.2 (0.125) | 47.7 (1.88) | 47.7 (1.88) | 4.75 (0.187) | 7.49 (0.295) | 15.8 (0.625) |
| | FT | 2.2 (0.09) | 12.7 (0.5) | 10.16 (0.40) | 2.36 (0.093) | 4.75 (0.187) | 10.4(0.4) |

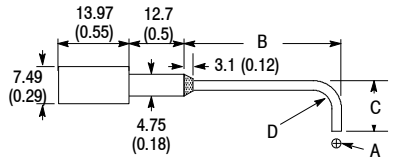
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimensions [mm (in.)] | | |
|---|---|---|---|---|---|
| | | | A | B | C |
|  | FS | 3.2 (0.125) | 27.9 (1.1) | 20.3 (0.8) | 4.75 (0.187) |

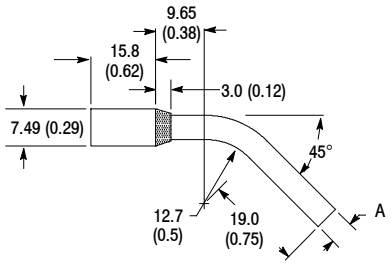
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | ML | 1.2 (0.046) |

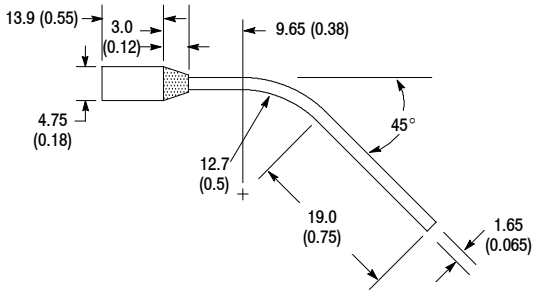
# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimensions [mm (in.)] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F |
|  | MM | 1.2 (0.046) | 1.65 (0.065) | 12.7 (0.5) | 4.06 (0.16) | 25.4 (1.0) | 6.35 (0.25) | 3.05 (0.12) |
| | MO | 1.2 (0.046) | 1.65 (0.065) | 35.5 (1.4) | 7.87 (0.31) | 25.4 (1.0) | 6.35 (0.25) | 3.05 (0.12) |
| | MQ | 1.6 (0.062) | 2.36 (0.083) | 35.5 (1.4) | 7.87 (0.31) | 25.4 (1.0) | 6.35 (0.25) | 3.05 (0.12) |
| | MY | 1.2 (0.046) | 1.57 (0.062) | 10.16 (0.40) | 4.83 (0.19) | 12.7 (0.5) | 4.83 (0.19) | 3.05 (0.12) |

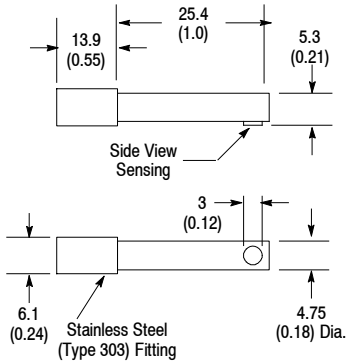
| Approximate Dimensions [mm (in.)] | Code | [mm (in.)] | Dimensions [mm (in.)] | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
|  | MK | 0.70 (0.027) | 1.09 (0.043) | 25.4 (1.0) | 4.83 (0.19) | 2.29 (0.09) |
| | MN | 1.2 (0.046) | 1.65 (0.065) | 12.7 (0.5) | 31.7 (1.25) | 19 (0.75) |

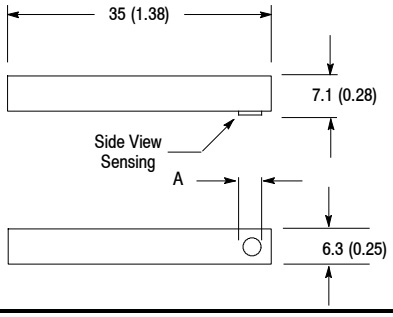
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimension A [mm (in.)] |
|---|---|---|---|
|  | FG | 3.2 (0.125) | 4.75 (0.187) |
| | FH | 4.0 (0.156) | 5.54 (0.218) |

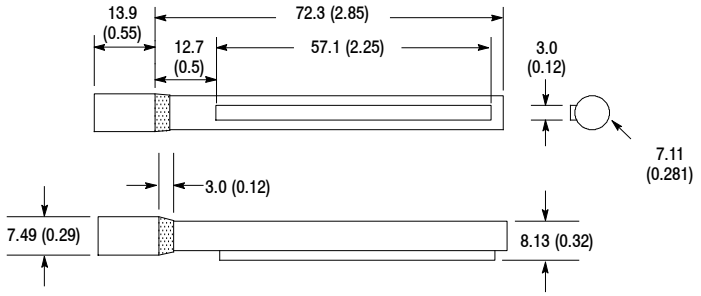
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | MJ | 1.2 (0.046) |

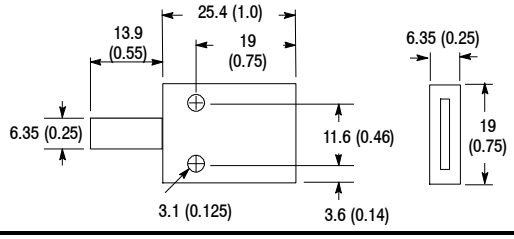
# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **FO** | 2.29 (0.09) |

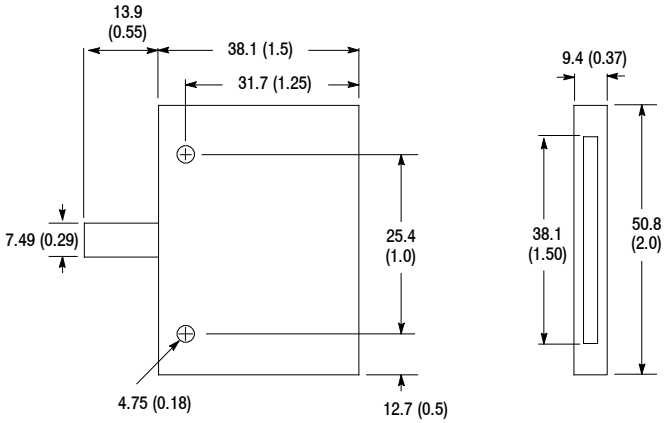
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] | Dimension A [mm (in.)] |
|---|---|---|---|
|  | **FP** | 2.29 (0.09) | 3.2 (0.125) |
| | **FR** | 0.5 x 2.5 (0.2 x 0.01) N-S slot | 3.94 (0.155) |

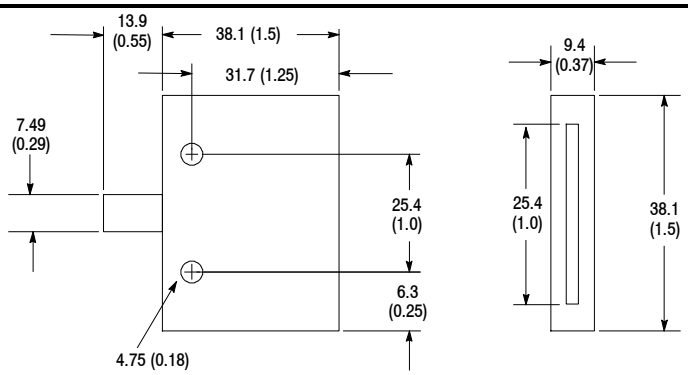
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **FQ** | 51 x 0.3 (2.0 x 0.01) N-S slot |

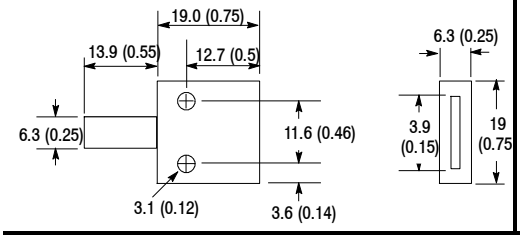
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BA** | 9.7 x 0.8 (0.382 x 0.032) (E-W) |

# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

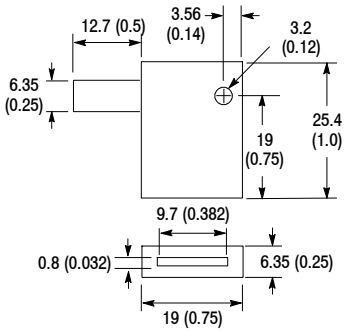
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BC** | 38.1 x 0.3 (1.5 x 0.01) |

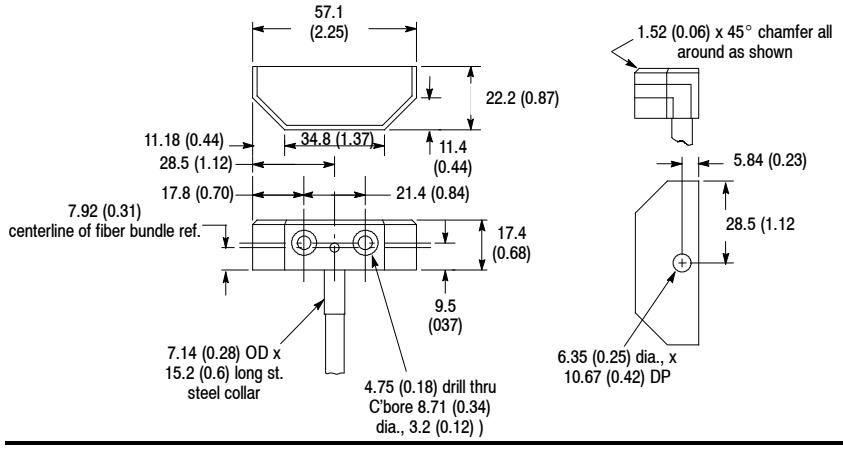
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BR** | 25.4 x 0.4 (1.0 x 0.015) |

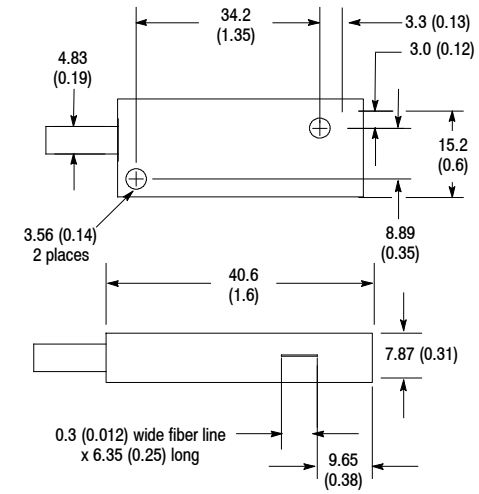
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BT** | 3.9 x 0.5 (0.154 x 0.02) |

# Glass Fiber Optic Cable Tips

**Use with Configurators on page 1-258 and 1-259.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BE** | 9.7 x 0.8 (0.382 x 0.032) (E-W) |

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BP** | 2.79 x 2.79 (0.11 x 0.11) |

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm (in.)] |
|---|---|---|
|  | **BS** | 0.3 x 6.35 (0.012 x 0.25) N-S slot |

# Glass Fiber Optic Cable Tips

## Bundle Sizes

**These bundle size codes are used with the configurators on page 1-258 and 1-259.**

### Glass Fiber Bundle with Cylindrical Sensing End Tips

| Code | Diameter | | Arrangement | 2.2 mm Control End Tip | | 4.6 mm Control End Tip | |
|---|---|---|---|---|---|---|---|
| | mm | inches | | Transmitted Beam | Bifurcated | Transmitted Beam | Bifurcated |
| 00 | 0.70 | 0.027 | Randomized | X | X | X | X |
| 05 | 0.81 | 0.032 | Randomized | X | X | X | X |
| 10 | 1.2 | 0.046 | Randomized | X | X | X | X |
| 15 | 1.57 | 0.062 | Randomized | X | X | X | X |
| 20 | 2.29 | 0.090 | Randomized | | X | X | X |
| 22 | 2.79 | 0.110 | Randomized | | | X | X |
| 25 | 3.2 | 0.125 | Randomized | | | X | X |
| 30 | 4.0 | 0.156 | Randomized | | | X | X |
| 33 | 4.57 | 0.180 | Randomized | | | | X |
| 35 | 5.59 | 0.220 | Randomized | | | | X |
| 40 | 2.5 x 0.5 | 0.10 x 0.02 | E-W Slot | X | X | X | X |
| 41 | 0.5 x 2.5 | 0.02 x 0.10 | N-S Slot | X | X | X | X |
| 45 | 22 x 0.5 | 0.875 x 0.02 | Randomized | | | X | X |
| 46 | 51 x 0.3 | 2.0 x 0.01 | N-S Slot | | | X | X |

X = Suitable for use with glass fiber bundle.

### Glass Fiber Bundle with Block Sensing End Tips

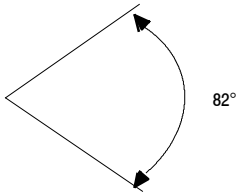
| Code | Diameter | |
|---|---|---|
| | mm | inches |
| 70 | 3.9 x 0.5 | 0.154 x 0.020 |
| 72 | 9.7 x 0.8 | 0.382 x 0.320 |
| 73 | 38 x 0.25 | 1.50 x 0.010 |
| 74 | 51 x 0.25 | 2.00 x 0.010 |
| 77 | 0.4 x 0.25 | 0.154 x 0.010 |
| 78 | 0.3 x 0.25 | 0.110 x 0.110 |
| 79 | 25.4 x 0.4 | 1.00 x 0.015 |
| 80 | 6.4 x 0.3 | 0.25 x 0.012 |

**Note: Typical fiber optic cable construction is normally randomized. Other options, such as half or shimmed half moon, are available. Please contact your local Rockwell Automation sales office or Allen-Bradley distributor.**

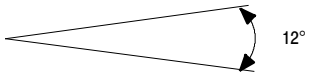
## Extended Range Lens Assemblies

Extended range assemblies provide greater sensing range and reduce the field of view for detecting smaller objects at a greater distance. Without the extended range lens assembly the field of view is a divergent beam of 82°, leaving the end of the fiber optic cable tip. With the extended range lens the beam is reduced to 12°, thus permitting the sensing of smaller objects.

**Fiber Optic Field of View Standard Fibers (Without Extended Range Lens Assembly)**




**Fiber Optic Field of View Standard Fibers (With Extended Range Lens Assembly)**

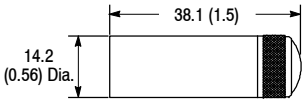
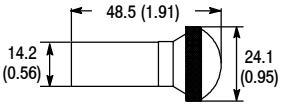
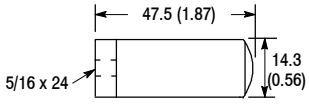
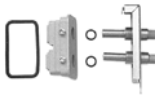
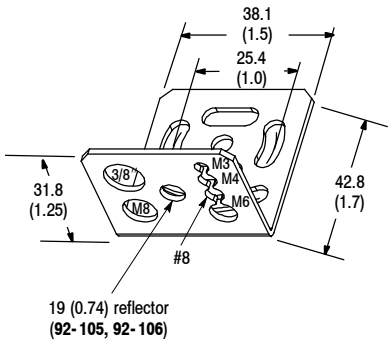
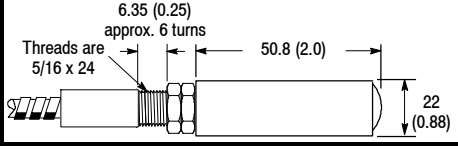



## Adjustable Fixed Focus Sensing Lens

Consult your local Rockwell Automation sales office or Allen-Bradley distributor for special applications. All the lens assemblies shown can provide fixed focus sensing with glass fiber optic cables. The distance between the lens and sensing tip can be adjusted, thus varying the focal point and spot size. An example of this using the Cat. No. 60-1844 lens is shown as follows:

| [mm (in.)] | Spot Size (Diameter [mm (in.)] | Focus Range [mm (in.)] |
|---|---|---|
| 0 | 31.8 (1.25) | 127 (5) |
| 2.54 (0.1) | 12.7 (0.5) | 51…89 (2…3.5) |
| 5.08 (0.2) | 7.62 (0.3) | 38…51 (1.5…2) |
| 7.62 (0.3) | 5.08 (0.2) | 33…38 (1.3…1.5) |
| 10.16 (0.4) | 3.81 (0.1) | 28…33 (1.1…1.3) |

It is necessary to reduce the sensitivity of the sensor when using lens assemblies with bifurcated cables to avoid detecting the rear surface of the adaptor lens.

| Description | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|
| Extended Range Lens Assembly—260°C (500°F) |   | 60-1844 (One Cat. No. = One Lens Assembly) Sensing end tips with a 4.74 mm (0.187 in.) diameter |
| Extended Range Lens Assembly—260°C (500°F) |   | 60-2559 (One Cat. No. = One Lens Assembly) Sensing tips with 4.74 mm (0.187 in.) diameter |
| Extended Range Lens Assembly—260°C (500°F) (Thread mount 5/16 x 24) |   | 60-2323 (One Cat. No. = One Lens Assembly) Sensing end tips with 5/16 x 24 threads |
|  Adaptor Kit for Series 5000 Green Line Sensors | | 61-5550 (One Cat. No. = One Lens Assembly) |
| Glass Fiber Optic Cable Bracket |   | 60-2696 |
| ColorSight Lens Extender |   | 60-2738 |

# Plastic Fiber Optic Cables

## Introduction

### Application Recommendations

1. Many plastic fiber optic cables are available in different core diameters. Larger core diameter cables can carry more light between the sensor and application. These cables will generally offer longer sensing ranges.

   Smaller core diameter cables provide greater resolution and the ability to detect smaller targets.

2. Note that different sensing distances can be achieved depending upon the cable core diameter. These sensing distances must be de-rated for adverse environments.

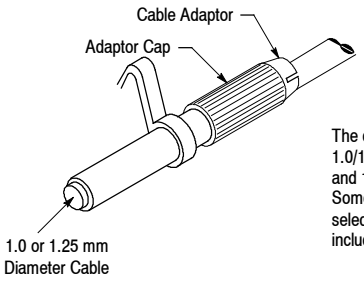
   **Longer custom cables will attenuate the light and reduce the operating range**. Light loss is approximately 3% per foot for Plastic Fiber Optic cables. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for application assistance.

3. Avoid sharp bends that can permanently deform the cable. Minimum radius bend is listed for each part.
4. Some plastic fiber optic cables can be cut to length. A very sharp right angle cut is essential to provide good performance. The supplied cable cutter Cat. No. 57-127, must be used. Each opening in the cutter can be used only once.
5. Some sensing tips cannot be bent. **Only special sensing tips can be bent as specified.** Bends should only be attempted in the areas shown in the illustrations. Do not exceed the minimum bend radius fo the cable.
6. Plastic fiber optic cables are suitable for applications where the sensor must be isolated from high voltage.
7. X-RAY or GAMMA radiation will cause plastic fibers to eventually become opaque. Custom cables constructed with special optical quartz fibers must be ordered for use in areas with high radiation.
8. Use Transmitted Beam sensing in submerged applications when possible.
9. A plastic fiber optic sensor with a duplex cable can provide Retroreflective or Diffuse sensing depending upon the distance to the target and the sensitivity adjustment on the sensor. If the sensor and cable are to be used for Retroreflective sensing, the sensitivity of the sensor must be adjusted low enough to avoid unwanted diffuse response from the targets to be sensed.
10. **Plastic fiber optic cables have a wide field of view**. A smaller field of view can be achieved by attaching an Extended Range Lens Assembly such as the Cat. No. 63-118 (see page 1-288) to the sensing end of the fiber. These lens assemblies will also increase the available sensing distance.
11. Plastic fiber optics cables can be used in applications where constant motion or flexing of the cable is required. Coiled cables (such as 43PR-NES57VS) are particularly well suited for these applications.
12. Plastic fiber optic cables can be successfully applied in most industrial environments. However, where abrasion or occasional impact to the cable is a concern, glass fiber optic cables may provide more durability.
13. Chemical Resistance: Acid and alkali solvents could damage the Polyethylene Fiber Core. The jacket will offer some washdown protection but long term use in chemical environments could destroy the core material.
14. The maximum temperature rating of standard plastic fiber optic cables is 70°C (158°F) . Custom cables with temperature ratings of 115°C (239°F) are available.

| ATTENTION | |
|---|---|
| | Fiber optic cables are not recommended for explosion-proof applications in hazardous environments. The fiber optic cable can provide a path for explosive fumes to travel from the hazardous area to the safe area. |

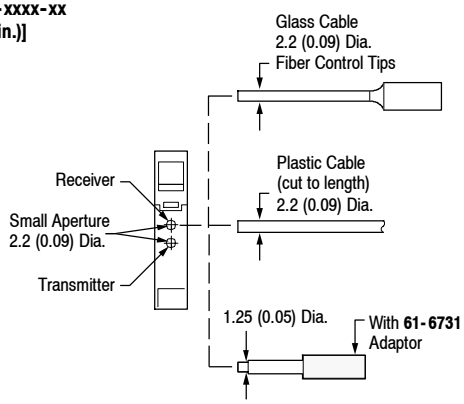
## Plastic Fiber Optic Cables for use with Small Aperture Sensors

The plastic fiber optic cables on pages 1-272…1-280 are for use with small aperture sensors. The cables shown on pages 1-277…1-279 require an adaptor (included with the cable).

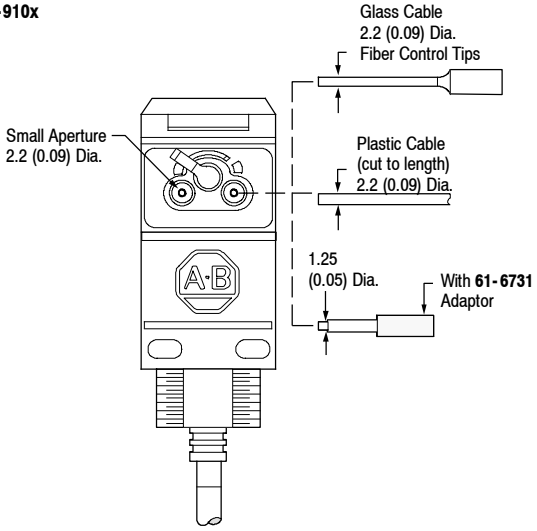



The drawing of the Cat. No. 61-6731 adaptor shows how 1.0/1.25 mm (0.04/0.05 in.) OD fibers (shown on pages 1-277 and 1-279) can be used with most small aperture sensors. Some sensors have adaptors for this purpose included. Product selection pages for each sensor will indicate if an adaptor is included as standard.

**45Fxx-xxxx-xx [mm (in.)]**




**42GxF-910x**




## Small Aperture Sensors:

42SRF-61xx
42SRF-63xx
with 61-6374 adaptor

45FVL-xxxx
45FSL-xxxx

42GTGF-101x0

42xRF-5x00FO
with 61-6374 adaptor

42GxF-910x

42KL-L2xxx

42SMF-71xx

## Note: Sensing Distance

- Due to the variation between fiber optic cables, sensing distance can vary widely
- The sensing distance of bifurcated cables is measured with white paper (90% reflectivity). Other surfaces may be less reflective and therefore would have shorter sensing distances.
- The published numbers are based on extensive testing and are conservative
- The sensing distance of transmitted beam cables is measured from tip to tip
- Application considerations that effect distance
  - Sensor selected
  - Reflectivity of target
  - Environment
  - Accessories such as focusing lens
  - Length of the cable
- The cut of the plastic. Re-cutting the cable with the proper tool (Cat. No. 57-127) will typically give a better surface for the sensor to interface with, allowing a longer sensing distance.
- Bending a bendable tip beyond the minimum bend radius of the cable will reduce sensing distance.
- Consult product support for additional information.

**All dimensions indicated are typical. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for exact dimensions.**

# 43PR Plastic Fiber Optic Cables

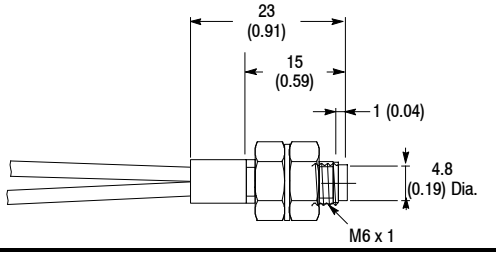
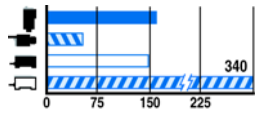
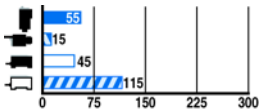
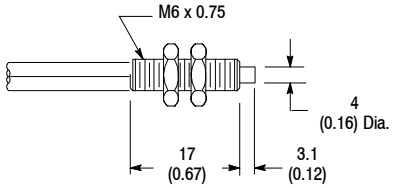
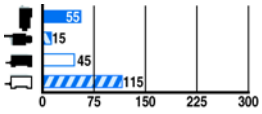
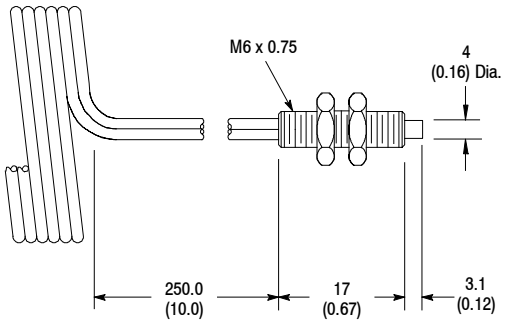
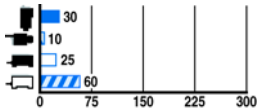
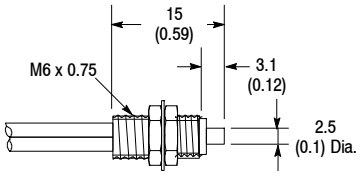
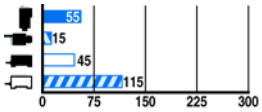
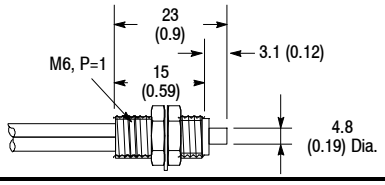
## Threaded Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

**The fiber optic cables on pages 1-272...1-279 are for use with small aperture sensors such as follows:**

42GxF-910x | 42KL-L2xxx | 45FSL-xxxx | 45FVL-xxxx

Approximate Metric / Standard Distances

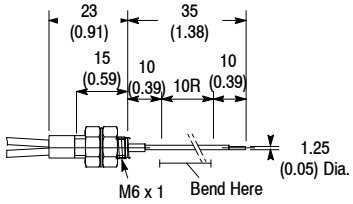
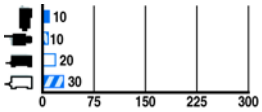
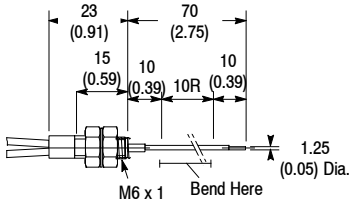
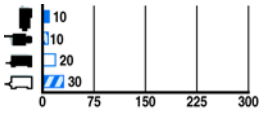
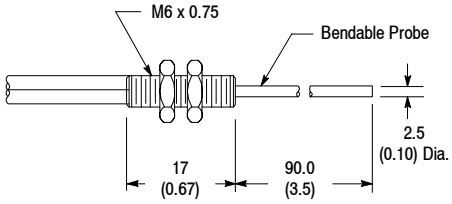
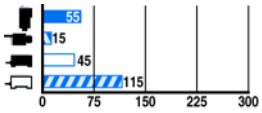
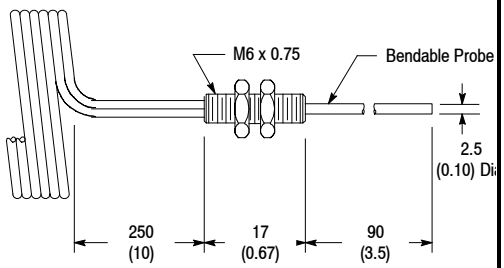
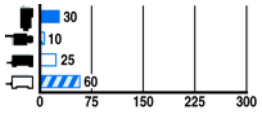
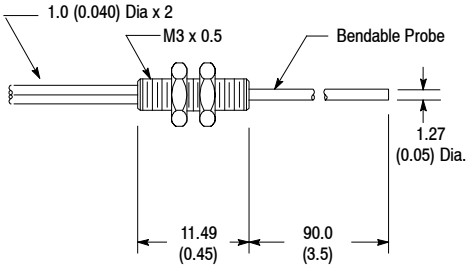
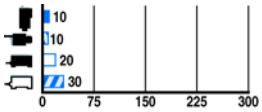
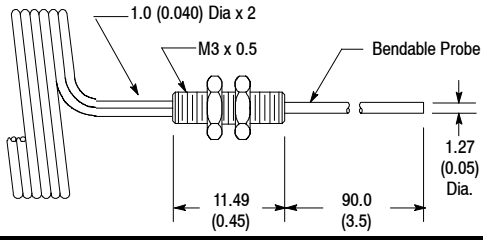
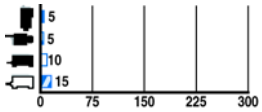
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 50 | 100 | 150 | 200 | 250 | 300 | mm |
| 0 | 2 | 4 | 6 | 8 | 10 | 12 | in. |

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Core Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 40 (1.6) | 2 x 1.5 (0.06) | Polyethylene |  | **43PR-NDS59FS** |
| | 25 (1.0) | 2 x 1 (0.04) | |  | 43PR-NDS57ZS |
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | **43PR-NES57ZS** |
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | 43PR-NES57VS |
|  <br>43PR-NKS61FS has coaxial optics for more precise sensing | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | 43PR-NKS57FS |
| | 20 (0.8) | 1 x 0.75 (0.03) 4 x 0.5 (0.02) | | Characterization not available at time of publication | 43PR-NKS61FS |
| | 2 (0.08) | 2 x 0.5 (0.02) | 1 R Polyflex | Characterization not available at time of publication | 43PR-NKS65YS |
|  | 2 (0.08) | 2 x 1.0 (0.04) | 1 R Polyflex | Characterization not available at time of publication | 43PR-NLS65YS |

**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.

# 43PR Plastic Fiber Optic Cables

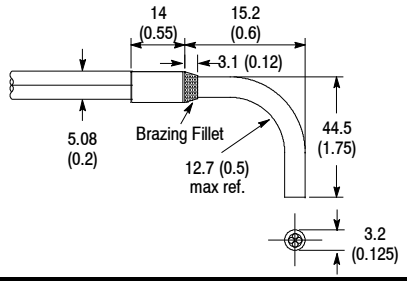
## Threaded Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-PES53FS |
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-PFS53FS |
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | 43PR-PIS57ZS |
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | 43PR-PIS57VS |
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-PJS53ZS |
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-PJS53VS |

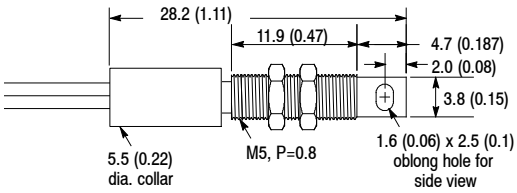
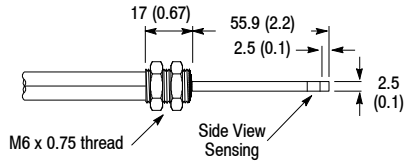
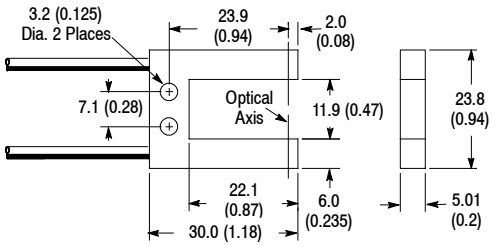
**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.

# 43PR Plastic Fiber Optic Cables

## Ferrule Bifurcated Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene | Characterization not available at time of publication | 43PR-RAS57ZS |

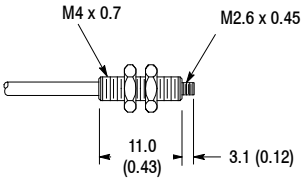
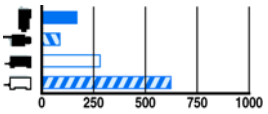
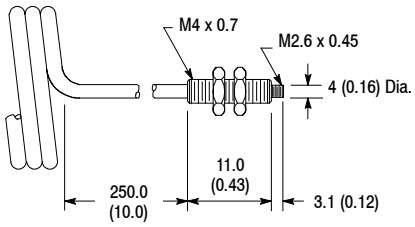
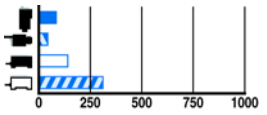
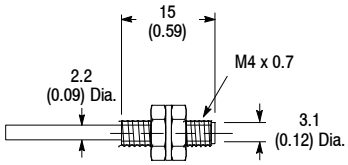
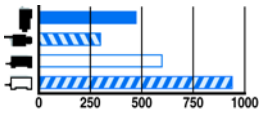
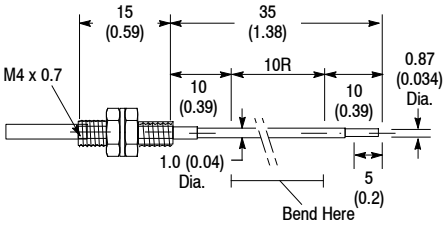
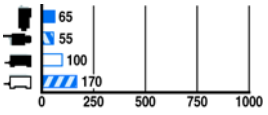
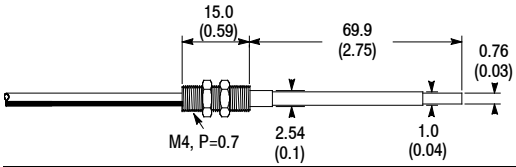
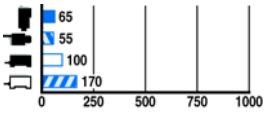
## Specialty Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| | | | | | |
|---|---|---|---|---|---|
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene | Characterization not available at time of publication | 43PR-SBS57ZS |
|  | 25 (1.0) | 2 x 1 (0.04) | Polyethylene | Characterization not available at time of publication | 43PR-SCS57ZS |
|  | 25 (1.0) | 1 (0.04) | Polyethylene | The sensing distance is the width of the gap (11.9 mm). The target must cross the optical axis between the two prongs of the fork | **43PR-UAA56MS** |

**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.

# 43PT Plastic Fiber Optic Cables

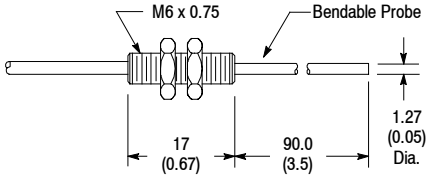
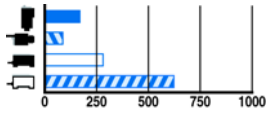
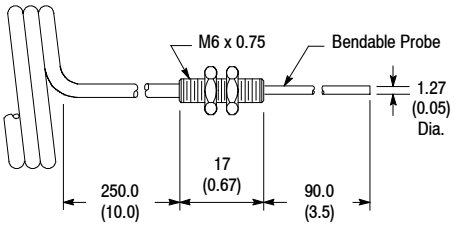
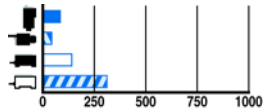
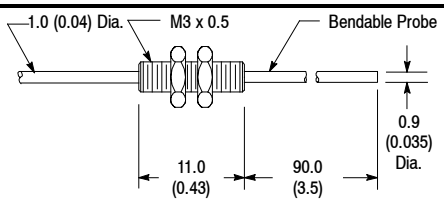
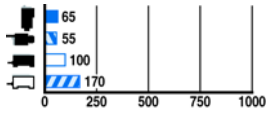
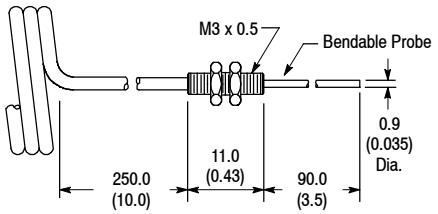
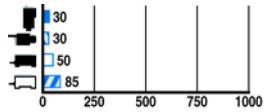
## Threaded Transmitted Beam Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | **43PT-NJS56FS** |
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | 43PT-NJS56GS |
|  | 40 (1.6) | 1.5 (0.06) | Polyethylene |  | **43PT-NAS58FS** |
| | 2 (0.08) | 1.0 (0.04) | 1 R Polyflex | Characterization not available at time of publication | 43PT-NAS66RS |
|  | 15 (0.6) | 0.5 (0.02) | Polyethylene |  | 43PT-PAS52FS |
|  | 15 (0.6) | 0.5 (0.02) | Polyethylene |  | 43PT-PBS52FS |

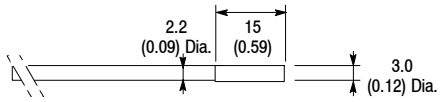
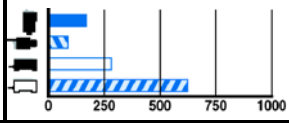
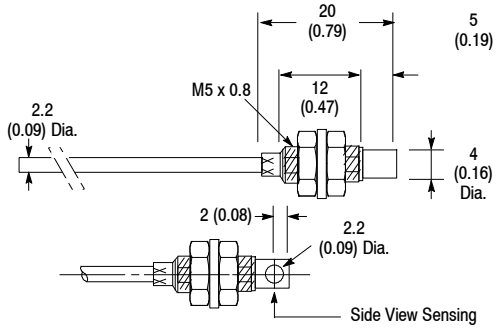
**Notes:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.
Two cables per one plastic transmitted beam cat. no.

# 43PT Plastic Fiber Optic Cables

## Threaded Transmitted Beam Cables for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | 43PT-PKS56FS |
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | 43PT-PKS56GS |
|  | 15 (0.6) | 0.5 (0.02) | Polyethylene |  | 43PT-PLS52FS |
|  | 15 (0.6) | 0.5 (0.02) | Polyethylene |  | 43PT-PLS52GS |

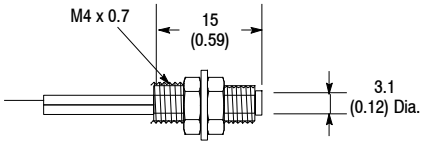
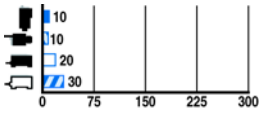
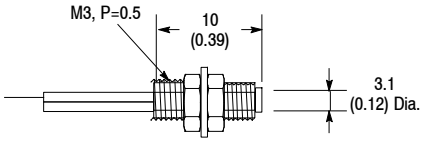
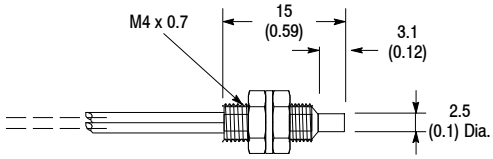
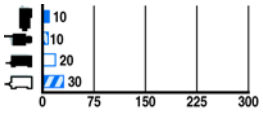
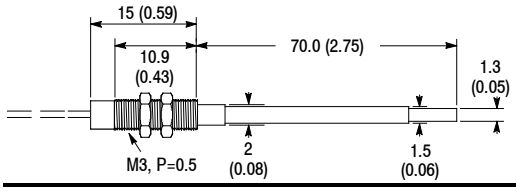
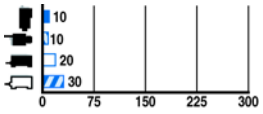
## Ferrule Transmitted Beam for Small Aperture Sensors [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | **43PT-CBS56FS** |
|  | 25 (1.0) | 1 (0.04) | Polyethylene | Characterization not available at time of publication | **43PT-SAS56FS** |

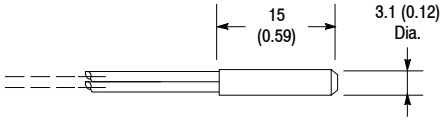
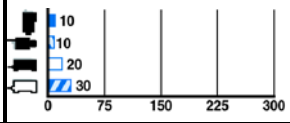
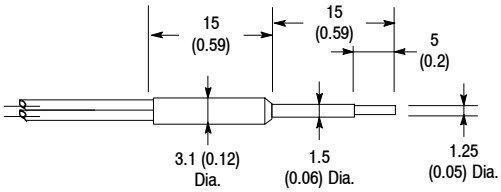
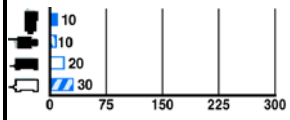
**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.
Two cables per one plastic transmitted beam Cat. No.

# 43PR Plastic Fiber Optic Cables

## Threaded Bifurcated Miniature Cables for Small Aperture Sensors (adaptor required)

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  43PR-NAS60FM has coaxial optics for more precise sensing | 25 (1.0) | 2 x 1 (0.04) | Polyethylene |  | 43PR-NAS57ZM |
| | 15 (0.6) | 1 x 0.5 (0.02)<br>4 x 0.25<br>(0.01) | | Characterization not available at time of publication | 43PR-NAS60FM |
|  | 2 (0.08) | 2 x 0.25<br>(0.01) | 1 R Polyflex | Characterization not available at time of publication | 43PR-NBS63YM |
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-NFS53FM |
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-PHS53ZM |

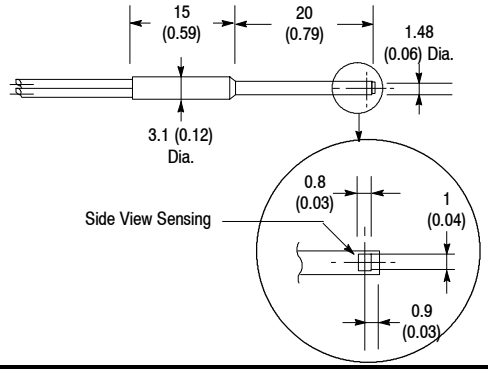
## Ferrule Bifurcated Miniature Cables for Small Aperture Sensors (adaptor required) [2.2 mm (0.09 in.)]

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No.5 |
|---|---|---|---|---|---|
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-CBS53ZM |
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene |  | 43PR-AAS53ZM |

**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.

# 43PR Plastic Fiber Optic Cables

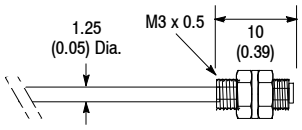
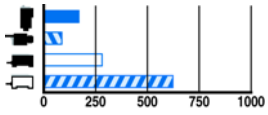
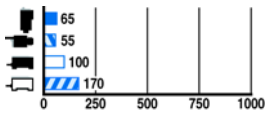
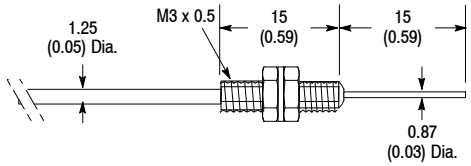
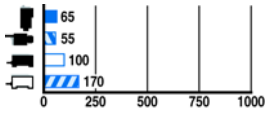
## Ferrule Bifurcated Miniature Cables for Small Aperture Sensors (adaptor required)

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 15 (0.6) | 2 x 0.5 (0.02) | Polyethylene | Characterization not available at time of publication | 43PR-VBS53ZM |

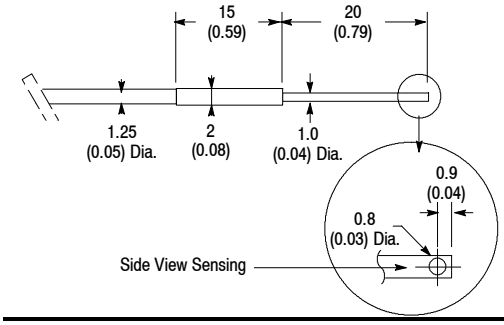
**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.

# 43PT Plastic Fiber Optic Cables

## Threaded Transmitted Beam Miniature Cables for Small Aperture Sensors (adaptor required)

| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 25 (1.0) | 1 (0.04) | Polyethylene |  | 43PT-NBS56FM |
| | 15 (0.6) | 0.5 (0.02) | |  | 43PT-NBS52FM |
| | 2 (0.08) | | 1R Polyflex | Characterization not available at time of publication | 43PT-NBS64RM |
|  | 15 (0.6) | 0.5 (0.02) | Polyethylene |  | 43PT-PCS52FM |

## Ferrule Transmitted Beam Miniature Cables for Small Aperture Sensors (adaptor required [2.2 mm (0.09 in.)])

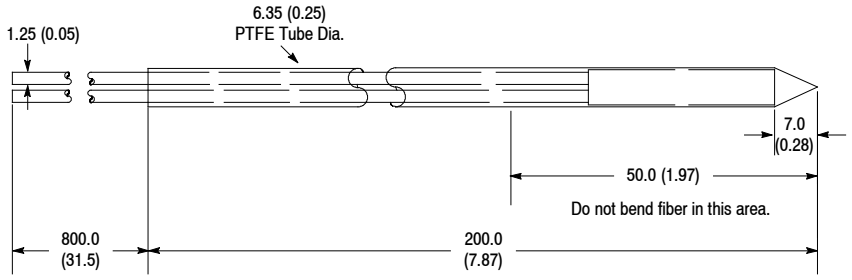
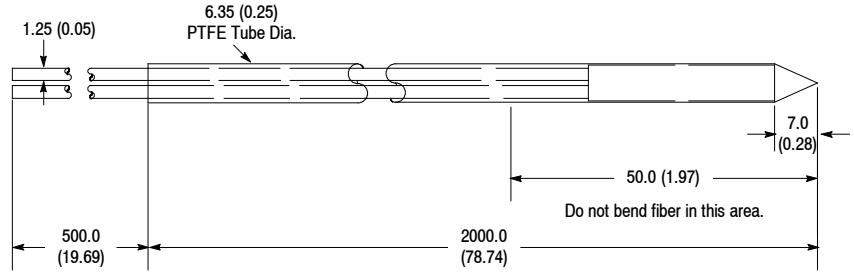
| Approximate Dimensions [mm (in.)] | Bend Radius [mm (in.)] | Fiber Bundle Diameter | Sheathing Material | Sensing Distance [mm] | Cat. No. |
|---|---|---|---|---|---|
|  | 15 (0.6) | 0.5 (0.02) | Polyethylene | Characterization not available at time of publication | 43PT-VCS52FM |

**Note:** Standard length for plastic fiber optic cables is 2 m (78 in.) tip to tip.
Two cables per one plastic transmitted beam Cat. No.

# Plastic Fiber Optic Cables

## Special Purpose

### Approximate Dimensions [mm (in.)]

| Sensing Tip Material | Fiber Diameter | Sheathing Material | Nominal Sensing Ref. | Cat. No. |
|---|---|---|---|---|
|  **Adaptor 61-6731 required.** | | | | |
| PTFE | 1.25 (0.049) x 2 | PTFE | NA | 99-193-1 |
|  **Adaptor 61-6731 required.** | | | | |
| PTFE | 2.2 (0.090) x 2 | PTFE | NA | 99-197-1 |

## Custom Fiber Optic Cables

Rockwell Automation/Allen-Bradley can provide custom plastic fiber optic cables to meet nearly any application requirement.

Typical cable modifications include:

- Custom lengths are available
- Custom temperature ratings up to 115°C (239°F)
- Custom configurations including multiple sensing tips
- Custom sensing end tips—nearly any modification is possible

For more information contact your local Rockwell Automation sales office or Allen-Bradley distributor.

## To Build a Custom Fiber Optic

**43 P — S**

**Fiber Optic Cable**

**Fiber Material**
P = Plastic

**Sensing Mode**
R = Reflective (Bifurcated)
T = Transmitted Beam (Individual)

**Sensing End Tip Style**

| | |
|---|---|
| Threaded | |
| Axial | page 1-283 |
| Probe | page 1-283 |
| Side view | page 1-283 |
| U-Shaped | page 1-284 |
| Ferrule | |
| Axial | page 1-284 |
| Side view | page 1-284 |
| Right angle | page 1-284 |

**Sensing End Tip**
S = Stainless Steel
U = Plastic U Shape

**Fiber Bundles**
See pages 1-286 for dimensions.

**Overall Length (in.)**
**Standard lengths are 78 inches** and do not require these spaces to be filled in. If shorter lengths are required, the plastic fiber optic cable can be cut to the desired length using the cutting tool provided in the package with the cable.

**Fits large aperture (0.187 in. OD) sensors which include:**
42KL-L2xx
42GxF-910x
42GTGF-101x0
42SMF-71xx
42SRF-61xx w/61-6374 adaptor*
42SRF-63xx w/61-6374 adaptor*
42Fx-Fxxxx
42xRF-5x00FO

***Adaptors must be ordered separately.**

**Sheathing**
F = Polyethylene 158°F
G = Plastic Coiled
Z = Zipped Plastic
V = Zipped & Coiled
R = Polyflex
H = XPE (cross linked poly) 239°F
Y = Zipped Polyflex

# Plastic Fiber Optic Cables

## Additional Cables for Small Aperture Sensors [1.0/1.25 mm (0.04/0.05 in.) OD Sensor End Tip]

### Custom Fiber Optic Cables

Rockwell Automation/Allen-Bradley can provide custom plastic fiber optic cables to meet nearly any application requirement.

Typical cable modifications include:

- Custom lengths are available
- Custom temperature ratings up to 70°C (158°F)
- Custom configurations including multiple sensing tips
- Custom sensing end tips—nearly any modification is possible

For more information contact your local Rockwell Automation sales office or Allen-Bradley distributor.

### To Build a Custom Fiber Optic

**43** — **M**

**Fiber Optic Cable**

**Fiber Material**
P = Plastic

**Sensing Mode**
R = Reflective (Bifurcated)
T = Transmitted Beam (Individual)

**Sensing End Tip Style**

| | |
|---|---|
| Threaded | |
| Axial | page 1-283 |
| Probe | 1-283 |
| Side view | page 1-283 to |
| U-Shaped | page 1-284 |
| Ferrule | |
| Axial | page 1-284 |
| Side view | page 1-284 |
| Right angle | page 1-284 |

**Sensing End Tip and Nut Material**
S = Stainless Steel

**Fiber Bundles**
See page 1-286 for dimensions.

**Overall Length (in.)**
**Standard lengths are 78 inches** and do not require these spaces to be filled in. If shorter lengths are required, the plastic fiber optic cable can be cut to the desired length using the cutting tool provided in the package with the cable.

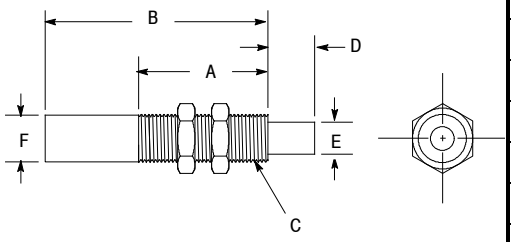
**Fits small aperture sensors with adaptor included with the fiber optic cable:**
42KL-L2xxx w/61-6731 adaptor*
42GxF-910x w/61-6731 adaptor*
42GTGF-101x0 w/61-6731 adaptor*
45FVL-xxxx-xx w/supplied adaptors
45FSL-xxxx-xx w/supplied adaptors

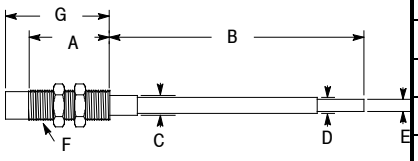
***Adaptors must be ordered separately.**

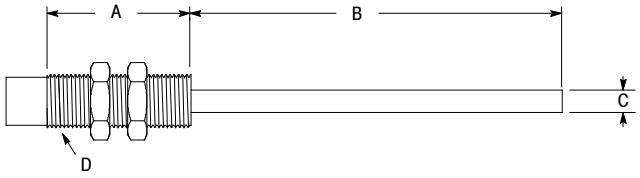
**Sheathing**
F = Polyethylene 158°F
G = Plastic Coiled
Z = Zipped Plastic
V = Zipped & Coiled
R = Polyflex
Y = Zipped Polyflex

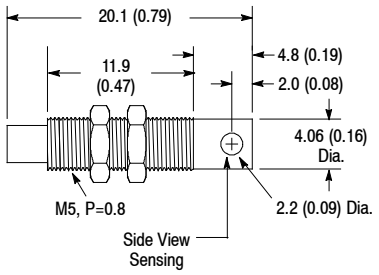
# Plastic Fiber Optic Cable Sensing Tips

**Use with Configurators on page 1-281 and 1-282.**

| Approximate Dimensions | Code | Standard Bundle [mm] | Approximate Dimensions [mm (in.)] | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F |
|  | NA | 0.5 | 14.9 (0.59) | — | M4, P=0.7 | 0.51 (0.02) | 3.0 (0.12) | — |
| | NB | 0.5 | 9.9 (0.39) | — | M3, P=0.5 | NA | — | — |
| | NC | 0.25 | 11.9 (0.47) | — | M4, P=0.7 | 3.05 (0.12) | 1.02 (0.04) | — |
| | ND | 1.5 | 13.9 (0.55) | 23.1 (0.91) | M6, P=1 | 1.02 (0.04) | 4.8 (0.19) | — |
| | NE | 1.0 | 17.0 (0.67) | — | M6, P=0.75 | 3.05 (0.12) | 4.06 (0.16) | — |
| | NF | 0.5 | 11.9 (0.47) | — | M4, P=0.7 | 3.05 (0.12) | 2.54 (0.10) | — |
| | NG | 0.75 | 10.9 (0.43) | 14.9 (0.59) | M3, P=0.5 | NA | — | 3.05 (0.12) |
| | NJ | 1.0 | 11.9 (0.47) | — | M4, P=0.7 | 3.05 (0.12) | — | — |
| | NK | 0.5 | 11.9 (0.47) | — | M6, P=0.75 | 3.05 (0.12) | 2.54 (0.10) | — |
| | NL | 0.5 | 14.9 (0.59) | 23.1 (0.91) | M6, P=1 | 4.8 (0.19) | 6.1 (0.24) | 6.1 (0.24) |

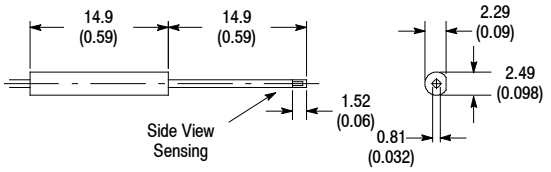
| Approximate Dimensions | Code | Standard Bundle [mm] | Approximate Dimensions [mm (in.)] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | A | B | C | D | E | F | G |
|  | PA | 0.5 | 14.9 (0.59) | 35.0 (1.38) | 2.54 (0.1) | 1.02 (0.04) | 0.76 (0.03) | M4, P=0.7 | — |
| | PB | 0.5 | 14.9 (0.59) | 69.8 (2.75) | 2.54 (0.1) | 1.02 (0.04) | 0.76 (0.03) | M4, P=0.7 | — |
| | PD | 0.5 | 9.9 (0.39) | 69.8 (2.75) | 2.03 (0.08) | 1.02 (0.04) | 0.76 (0.03) | M3, P=0.5 | — |
| | PE | 0.5 | 14.9 (0.59) | 35.0 (1.38) | 2.54 (0.1) | 1.52 (0.06) | 1.27 (0.05) | M6, P=1 | 23.1 (0.91) |
| | PF | 0.5 | 14.9 (0.59) | 69.8 (2.75) | 2.54 (0.1) | 1.52 (0.06) | 1.27 (0.05) | M6, P=1 | 23.1 (0.91) |
| | PG | 0.5 | 14.9 (0.59) | 69.8 (2.75) | 2.54 (0.1) | 1.52 (0.06) | 1.27 (0.05) | M4, P=0.7 | — |
| | PH | 0.5 | 10.9 (0.43) | 69.8 (2.75) | 2.03 (0.08) | 1.52 (0.06) | 1.27 (0.05) | M3, P=0.5 | 14.9 (0.59) |

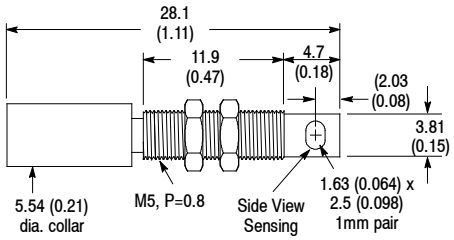
| Approximate Dimensions | Code | Standard Bundle [mm] | Approximate Dimensions [mm (in.)] | | | |
|---|---|---|---|---|---|---|
| | | | A | B | C | D |
|  | PC | 0.5 | 14.9 (0.59) | 14.9 (0.59) | 0.76 (0.03) | M3, P=0.5 |
| | PI | 1.0 | 17.0 (0.67) | 88.9 (3.5) | 2.54 (0.1) | M6, P=0.75 |
| | PJ | 0.5 | 11.4 (0.45) | 88.9 (3.5) | 1.27 (0.05) | M3, P=0.5 |
| | PK | 1.0 | 17.0 (0.67) | 88.9 (3.5) | 1.27 (0.05) | M6, P=0.75 |
| | PL | 0.5 | 10.9 (0.43) | 88.9 (3.5) | 0.86 (0.034) | M3, P=0.5 |

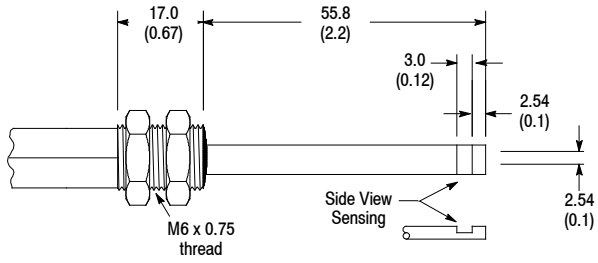
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | SA | 1.0 |

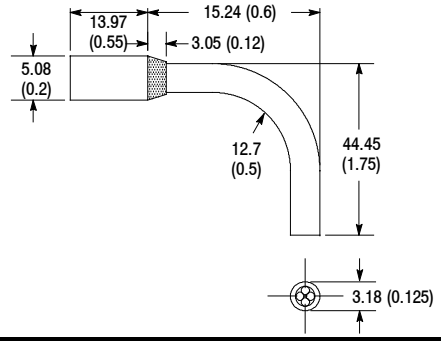
# Plastic Fiber Optic Cable Sensing Tips

**Use with Configurators on page 1-281 and 1-282.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | VC | 0.5 |

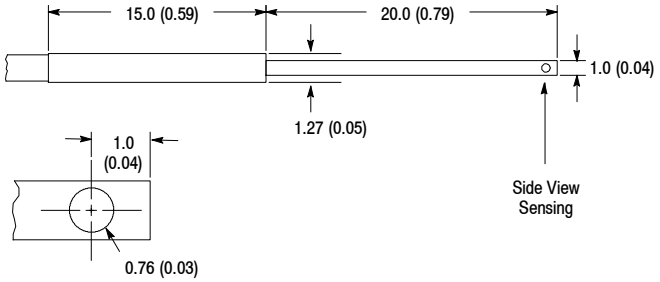
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | SB | 1.0 |

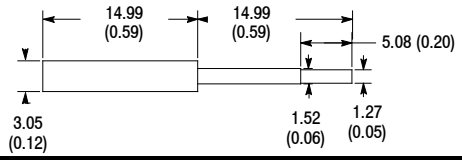
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | SC | 1.0 |

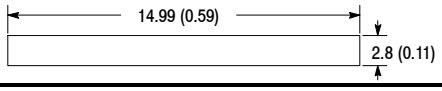
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | RA | 1.0 |

# Plastic Fiber Optic Cable Sensing Tips

**Use with Configurators on page 1-281 and 1-282.**

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | **VA** | 0.5 |

| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | **AA** | 0.5 |

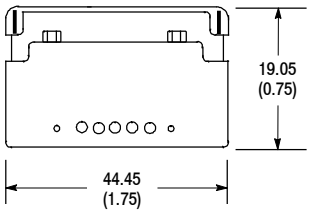
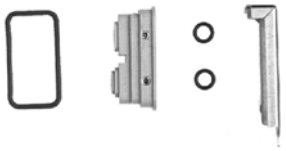
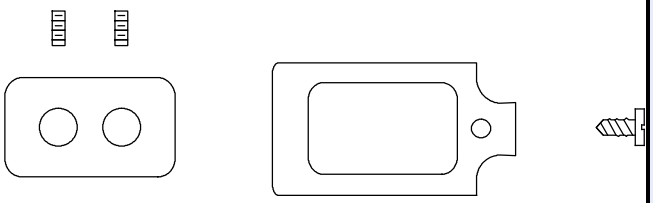
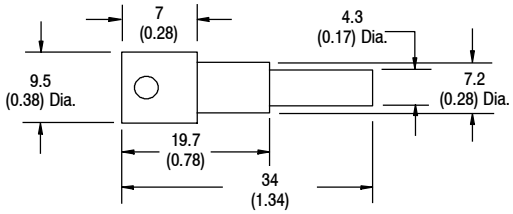
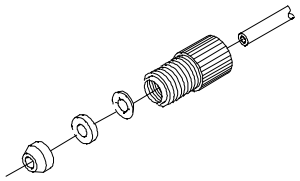
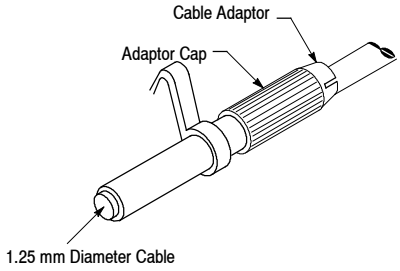
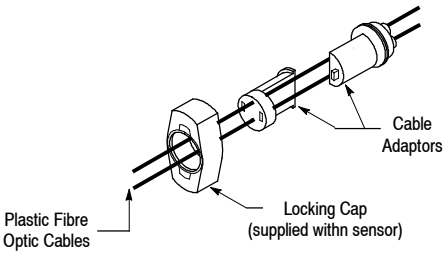
| Approximate Dimensions [mm (in.)] | Code | Standard Bundle [mm] |
|---|---|---|
|  | **CA** | 1.0 |

# Plastic Fiber Optic Cable Sensing Tips

**Use with Configurators on page 1-281 and 1-282.**

## The bundle size codes are used with the configurators on page 1-281 and 1-282.

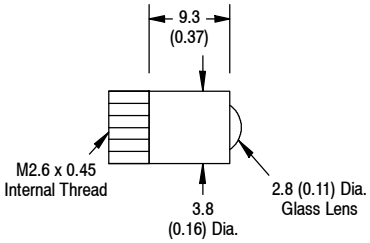
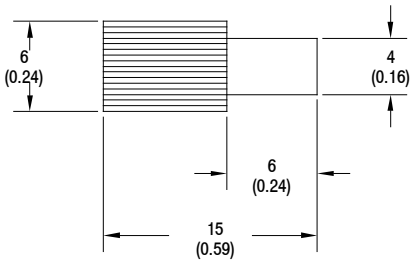
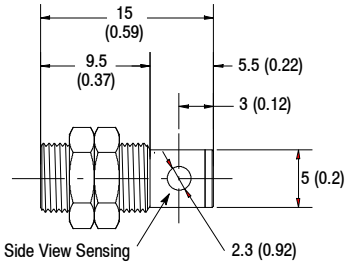
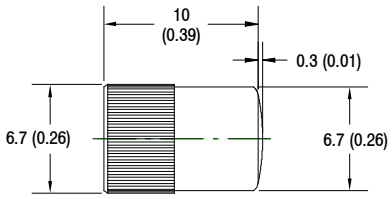
| Code | Diameter [mm] | Bend Radius [mm (in.)] | Arrangement |
|---|---|---|---|
| 52 | 0.50 | 15 (0.6) | Single |
| 53 | 0.50 | 15 (0.6) | Pair Zipped |
| 56 | 1.0 | 25 (1.0) | Single |
| 57 | 1.0 | 25 (1.0) | Pair Zipped |
| 58 | 1.5 | 40 (1.6) | Single |
| 59 | 1.5 | 40 (1.6) | Pair |
| 60 | 0.50 x 1<br>0.25 x 4 | 15 (0.6) | Coaxial |
| 61 | 0.75 x 1<br>0.50 x 4 | 20 (0.8) | Coaxial |
| 64 | 0.50 | 2 (0.08) | Single Flexible |
| 65 | 0.50 | 2 (0.08) | Pair Flexible |
| 66 | 1.0 | 2 (0.08) | Single Flexible |
| 67 | 1.0 | 2 (0.08) | Pair Flexible |

| Description | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|
| Cutting Tool for plastic Fiber Optic cable. For use with all cutable cables. One cutter tool is packaged with each fiber optic cable. |   | **57-127** |
|  Molded Fiber Optic Adaptor Kit to be used with Type 42DRF and Type 42MRF Series 5000. |  | **61-6310** |
| Control End Adaptor Kit for 2.3 mm (0.09 in.) OD Plastic Fiber Optic cable. Use with Series 9000, 10,000, 5000 and 6000. |   | **61-6374** **2/package** |
| Control End Adaptor Kit for Series 7000. |  | **129-125-5** **2/package** |
| 1.25 mm outer jacket adaptor for the 42FA and 42FT (included with sensor) and MiniSight, Series 9100 and 10,000 (adaptor not included) |   | **61-6731** |
| 1.0 mm outer jacket adaptor for 45FVL/45FSL | | **61-6742** |
| 2.2 mm outer jacket adaptor for the 42FB (included with sensor) |   | **61-6733** |

# Plastic Fiber Optic Cables

## Accessories

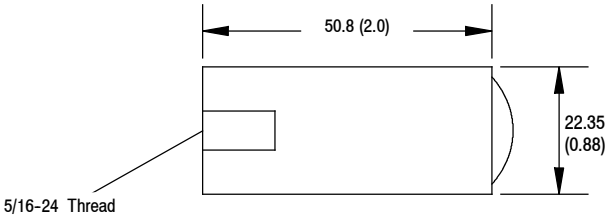
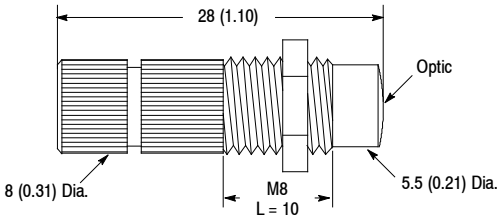
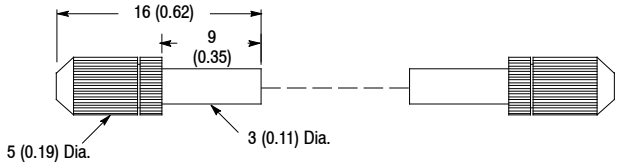
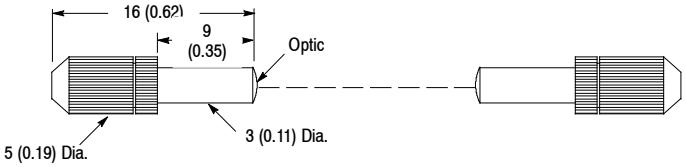
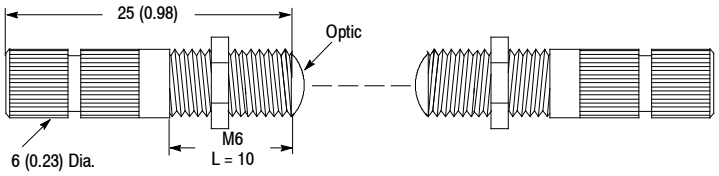
### Lenses (One per package)

| Description | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|
| <br>Range extender lens adaptor for 1 mm (0.04 in.) dia. transmitted beam plastic cable. |  | **63-118** |
| Fixed focus lens adaptor used with reflective cables with 4 mm (0.16 in.) x 0.7 pitch threaded sensing tips.<br>Plastic housing<br>One Cat. No. = one adaptor |  | **60-2646** |
| Right angle lens adaptor used with transmitted beam cables with 4 mm (0.16 in.) x 0.7 pitch threaded sensing tips.<br>Metal housing<br>One Cat. No. = one adaptor |  | **60-2648** |
| Range extender lens adaptor used with transmitted beam cables with 4 mm (0.16 in.) x 0.7 pitch threaded sensing tips.<br>Metal housing<br>One Cat. No. = one adaptor |  | **60-2652** |

## General Specifications

| | |
|---|---|
| **Housing Material** | Nickel-plated brass |
| **Operating Temperature [C (F)]** | -25…+60° (-13…+140°) |
| **Acceptable Fiber** | 2.2 mm (0.08 in.) outer diameter |
| **Fiber Optic Cable** | Bifurcated = 99-854<br>Individual = 99-850 |

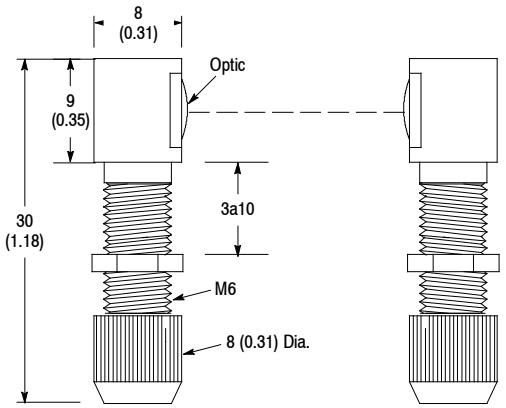
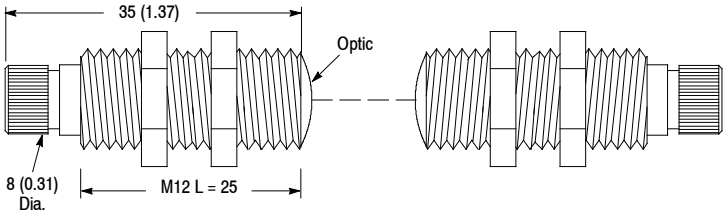
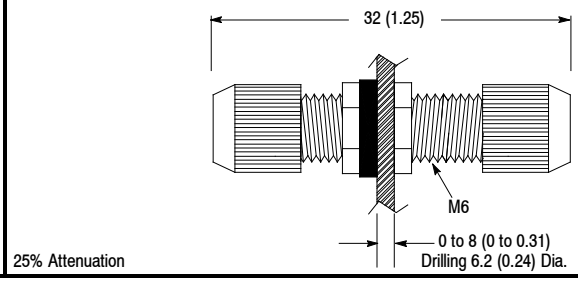
## Approximate Dimensions [mm (in.)]

| Description | Approximate Dimensions [mm (in.)] | Nominal Sensing Distance [mm (in.)] | Cat. No. |
|---|---|---|---|
| Range extending lens for ColorSight 9000 |  | 114 (4.5) | 60-2738 |
| Lens for diffuse sensing. Accepts 2.2 mm plastic bifurcated fiber optic cable.<br>One Cat. No. = one lens assembly |  | 70 (2.75) | 60-2745 |
| Range extending lens for transmitted beam sensing. Accepts 2.2 mm plastic individual fiber optic cable.<br>One Cat. No. = two lens assemblies |  | 200 (7.87) | 60-2746 |
| Range extending lens for transmitted beam sensing. Accepts 2.2 mm plastic individual fiber optic cable.<br>One Cat. No. = two lens assemblies |  | 800 (31.49) | 60-2747 |
| Range extending lens for transmitted beam sensing. Accepts 2.2 mm plastic individual fiber optic cable.<br>One Cat. No. = two lens assemblies |  | 1200 (47.24) | 60-2748 |

# Plastic Fiber Optic Cables

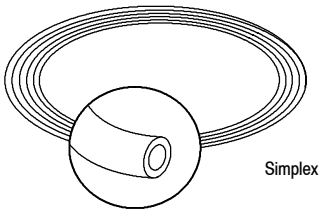
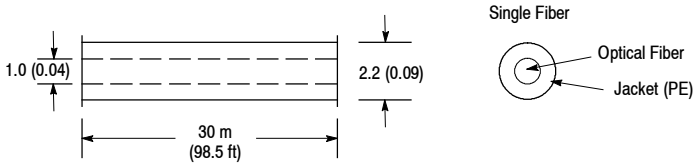
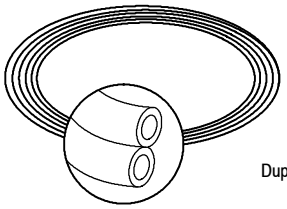
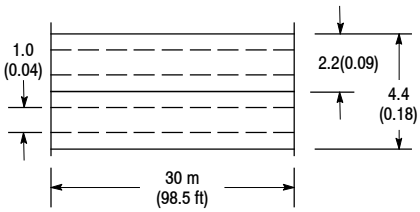
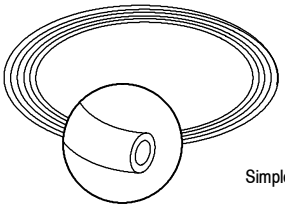
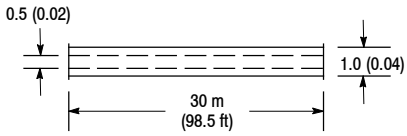
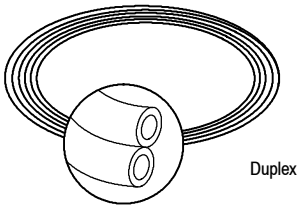
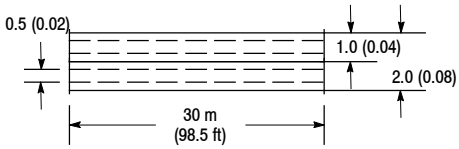
## Fiber Optic Lens Assemblies (Field Attachable)

### Approximate Dimensions [mm (in.)]

| Description | Approximate Dimensions [mm (in.)] | Nominal Sensing Distance [mm (in.)] | Cat. No. |
|---|---|---|---|
| Range extending lens for transmitted beam sensing. Accepts 2.2 mm plastic individual fiber optic cable.<br>One Cat. No. = two lens assemblies |  | 1200 (47.24) | 60-2749 |
| Range extending lens for transmitted beam sensing. Accepts 2.2 mm plastic individual fiber optic cable.<br>One Cat. No. = two lens assemblies |  | 4000 (157.48) | 60-2750 |
| Splicer for single 2.2 mm plastic fiber optic cable<br>One Cat. No. = two splicers |  | — | 60-2751 |

**Note:** Nominal sensing reference is included to aid in the selection of fiber optic lens assemblies.

## Unterminated Plastic Fiber Optic Cables

| Description | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|
|  Simplex |   | **99-850** |
|  Duplex |   | **99-854** |
|  Simplex |   | **99-852** |
|  Duplex |   | **99-853** |

The above cat. nos. are unterminated simplex (individual) and duplex (dual) plastic fibers.

These plastic fiber optic cables can be used with plastic fiber optic sensors and require no control end tip to interface to the sensor.

A cutting tool for these unterminated plastic fiber optic cables is packaged with the fiber cable.

# Fiber Optic Cable Cross Reference

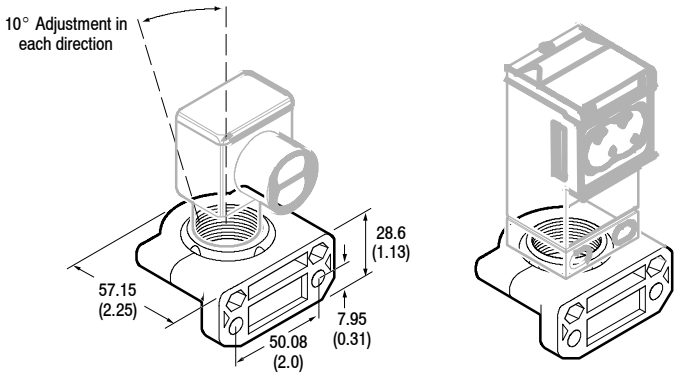
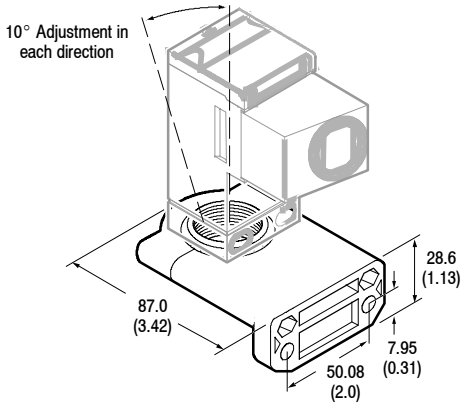
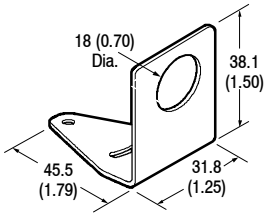
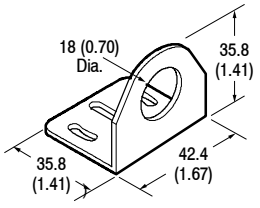
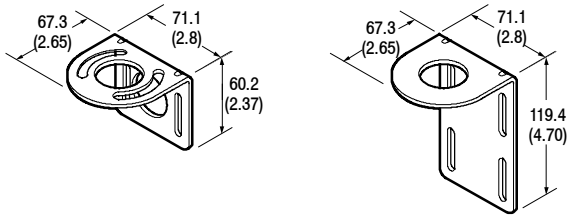
| Cat. No. | Cat. No. |
|---|---|
| 99-1000-1 | 43GR-TAS20ML |
| 99-1003-1 | 43GR-XDB25SL |
| 99-108 | 43PT-PLS52FS |
| 99-109 | 43PT-PLS52GS |
| 99-110 | 43PR-PJS53ZS |
| 99-116-1 | 43GT-MIS15SL |
| 99-161-1 | 43GR-TAB20SS |
| 99-181-1 | 43GT-TWC25SL |
| 99-184-1 | 43GT-2FAS20SL |
| 99-201-1 | 43GR-FOS20ML |
| 99-206-1 | 43GR-FPS20SL |
| 99-214-1 | 43GR-FJS30SL |
| 99-222-1 | 43GR-TMC25SL |
| 99-224-1 | 43GR-TMC15SL |
| 99-238-1 | 43GR-FGS25SL |
| 99-275-1 | 43GR-TFS10ML |
| 99-279-1 | 43GR-MUS10ML |
| 99-283-1 | 43GR-MSC10ML |
| 99-290-1 | 43GR-MHS15SL |
| 99-291-1 | 43GR-MHS15ML |
| 99-294-1 | 43GR-BCA73SL |
| 99-300-1 | 43GR-TBS25SL |
| 99-30-1 | 43GR-FAS25SL |
| 99-301-1 | 43GR-TBS25ML |
| 99-302-1 | 43GR-TBB30SL |
| 99-304-1 | 43GR-TQC25SL |
| 99-308-1 | 43GR-TRC30SL |
| 99-31-1 | 43GR-FAS25ML |
| 99-315-1 | 43GR-TKC25ML |
| 99-32-1 | 43GR-TBB25SL |
| 99-330-1 | 43GR-TTS20SL |
| 99-33-1 | 43GR-TBB25ML |
| 99-34-1 | 43GR-FIS25SL |
| 99-350-1 | 43GR-FRS40SL |
| 99-35-1 | 43GR-FIS25ML |
| 99-36-1 | 43GR-BAA72SL |
| 99-37-1 | 43GR-BAA72ML |
| 99-39-1 | 43GR-MKS00ML |
| 99-400-1 | 43GT-FOS20SL |
| 99-408-1 | 43GT-FPS10SL |
| 99-424-1 | 43GT-TMC15SL |
| 99-426-1 | 43GT-TOC30SL |
| 99-436-1 | 43GT-FAS30SL |
| 99-453-1 | 43GT-TJC30ML |
| 99-458-1 | 43GT-MBS10SL |
| 99-46-1 | 43GR-TXC25SL |

| Cat. No. | Cat. No. |
|---|---|
| 99-461-1 | 43GT-MMS10ML |
| 99-477-1 | 43GT-TFS00ML |
| 99-479-1 | 43GT-MUS10ML |
| 99-487-1 | 43GT-MRS10ML |
| 99-490-1 | 43GT-MHS15SL |
| 99-491-1 | 43GT-MHS15ML |
| 99-494-1 | 43GT-BCA73SL |
| 99-495-1 | 43GT-BCA73ML |
| 99-500-1 | 43GT-TBS25SL |
| 99-50-1 | 43GT-FAS25SL |
| 99-501-1 | 43GT-TBS25ML |
| 99-502-1 | 43GT-TBB30SL |
| 99-504-1 | 43GT-TQC25SL |
| 99-505-1 | 43GT-TQC25ML |
| 99-508-1 | 43GT-TRC30SL |
| 99-51-1 | 43GT-FAS25ML |
| 99-52-1 | 43GT-TBB25SL |
| 99-530-1 | 43GT-TTC20SL |
| 99-53-1 | 43GT-TBB25ML |
| 99-54-1 | 43GT-FIS25SL |
| 99-55-1 | 43GT-FIS25ML |
| 99-56-1 | 43GT-BAA72SL |
| 99-57-1 | 43GT-BAA72ML |
| 99-58-1 | 43GT-MKS00SL |
| 99-59-1 | 43GT-MKS00ML |
| 99-614-1 | 43GR-MQS15SL |
| 99-623-1 | 43GR-2FAS25SL |
| 99-626-1 | 43GT-6TBB15SL |
| 99-643-1 | 43GR-4TBB22SL |
| 99-68-1 | 43GR-MVS00ML |
| 99-69-1 | 43GT-TMC25SL |
| 99-700-1 | 43GR-TBS20MS |
| 99-701-1 | 43GR-TBS15ML |
| 99-702-1 | 43GR-TAS20MS |
| 99-704-1 | 43GR-TAS20SS |
| 99-705-1 | 43GR-TMS25ML |
| 99-706-1 | 43GR-TMS20MS |
| 99-708-1 | 43GR-TQS20MS |
| 99-710-1 | 43GT-TBS15MS |
| 99-714-1 | 43GT-TAS15SS |
| 99-714-1 | 43GT-TAS15SS |
| 99-715-1 | 43GT-TFS10ML |
| 99-716-1 | 43GT-TOS30ML |
| 99-717-1 | 43GT-TQS25ML |
| 99-718-1 | 43GT-TQS15MS |
| 99-720-1 | 43GT-TRS30ML |

| Cat. No. | Cat. No. |
|---|---|
| 99-721-1 | 43GT-MIS15ML |
| 99-722-1 | 43GT-TMS25ML |
| 99-723-1 | 43GT-TMS15MS |
| 99-751-1 | 43GR-XAS10SS |
| 99-752-1 | 43GR-TIS10SS |
| 99-753-1 | 43GR-FTS10SS |
| 99-755-1 | 43GR-TDS10SS |
| 99-794-1 | 43GR-BRA79SL |
| 99-800 | 43PR-NDS59FS |
| 99-801 | 43PR-NDS57ZS |
| 99-802 | 43PR-NAS57ZM |
| 99-803 | 43PR-NAS60FM |
| 99-804 | 43PR-NKS57ZS |
| 99-805 | 43PR-NKS61FS |
| 99-806 | 43PR-NFS53FM |
| 99-808Z | 43PR-NGS53ZM |
| 99-809Z | 43PR-NGS55ZM |
| 99-810 | 43PR-PES53FS |
| 99-811 | 43PR-PFS53FS |
| 99-814 | 43PR-CBS53ZM |
| 99-816 | 43PR-AAS53ZM |
| 99-818 | 43PR-VBS53ZM |
| 99-819 | 43PT-NAS58FS |
| 99-820 | 43PT-NBS56FM |
| 99-821 | 43PT-NBS54FM |
| 99-822 | 43PT-NBS52FM |
| 99-823 | 43PT-PAS52FS |
| 99-825 | 43PT-PCS52FM |
| 99-827 | 43PT-CBS56FS |
| 99-828 | 43PT-SAS56FS |
| 99-833 | 43PR-SCS57ZS |
| 99-838 | 43PR-SBS57ZS |
| 99-85-1 | 43GR-TGB33SL |
| 99-90 | 43PT-NJS56FS |
| 99-900 | 43PR-RAS57ZS |
| 99-91 | 43PT-NJS56GS |
| 99-92 | 43PT-PKS56FS |
| 99-93 | 43PT-PKS56GS |
| 99-94 | 43PR-NES57ZS |
| 99-95 | 43PR-NES57VS |
| 99-951-1 | 43GT-XAS10SS |
| 99-952-1 | 43GT-TIS10SS |
| 99-953-1 | 43GT-FTS10SS |
| 99-955-1 | 43GT-TDS10SS |
| 99-96 | 43PR-PIS57ZS |
| 99-97 | 43PR-PIS57VS |

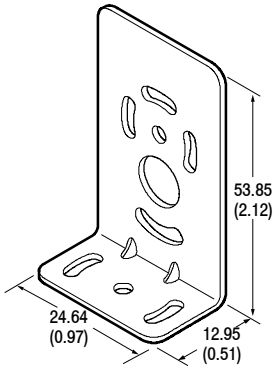
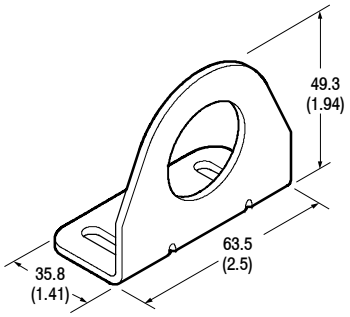
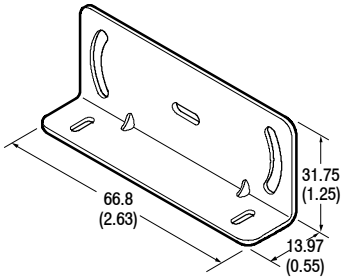
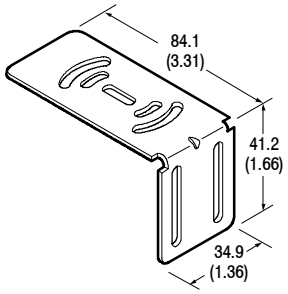
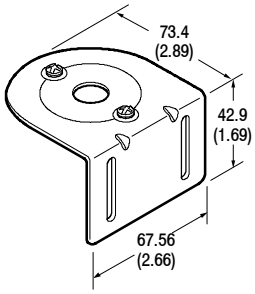


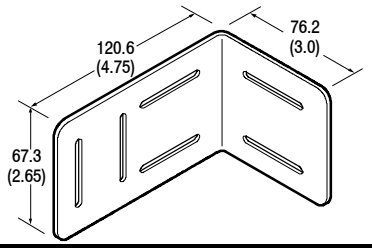
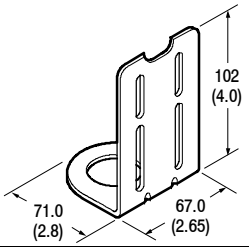
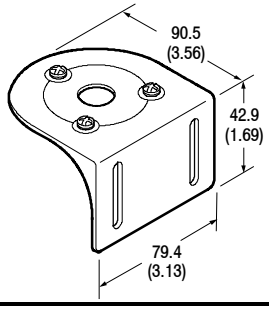
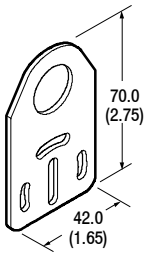
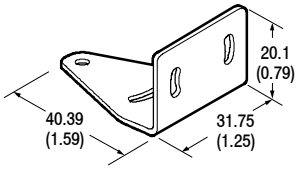
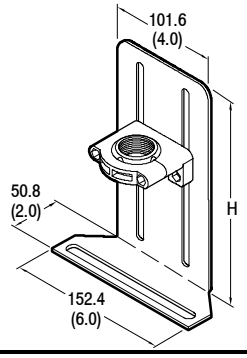
Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Swivel/Tilt bracket allows ±10° vertical and 360° rotation adjustment. | **60-2649** | RightSight |  |
| | **60-2439** | Series 9000<br>Color Sight<br>LaserSight | |
| | **60-2681** | ClearSight 9000 |  |
| | **60-2619** | Series 7000 | |
| | **60-2618** | Series 6000 | |
| Right angle mounting bracket allows 30° horizontal adjustment. | **60-2664** | MiniSight<br>42CA, 42CB |  |
| | **60-2657** | RightSight<br>MiniSight<br>42CA, 42CB |  |
| Right angle mounting bracket permits a 360° rotation adjustment. The Cat. No. 60-2513 bracket has mounting hole patterns compatible with the Cat. No. 60-1785. | **60-2421**<br>**60-2513** | Series 9000<br>ClearSight 9000<br>ColorSight<br>LaserSight |  |

# Accessories

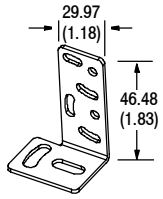
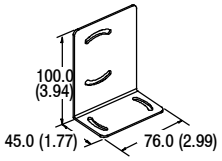
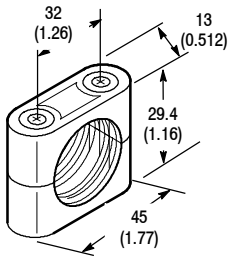
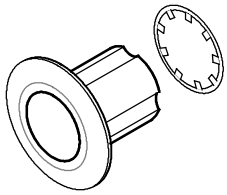
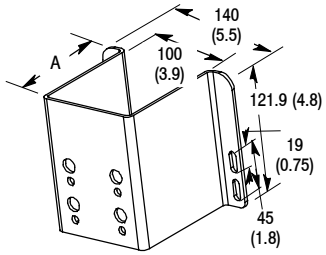
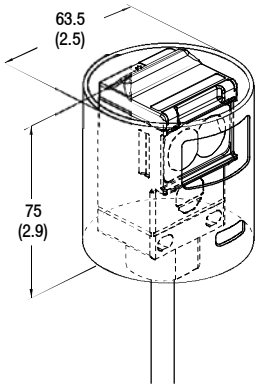
## Mounting Brackets

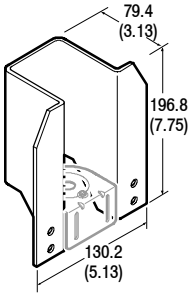
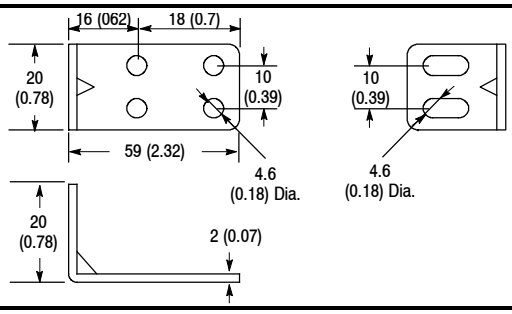
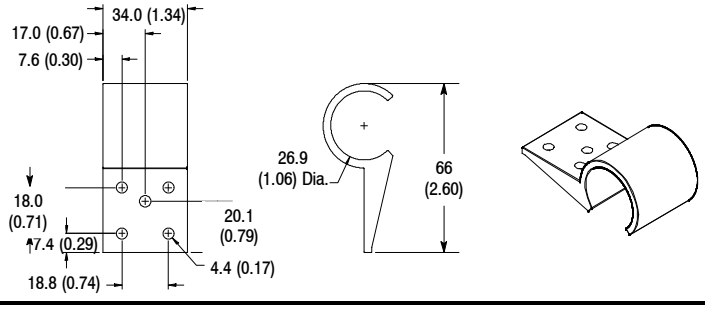
| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Right angle mounting bracket allows 40° horizontal rotation. The Cat. No. 60-2152 permits a 30° horizontal rotation. | **60-2151**<br>**60-2152** | Series 7000 |  |
| Right angle mounting bracket with 25.4 mm (1 in.) knockout for Series 6000 sensor. | **60-2006** | Series 6000 |  |
| Tilt mounting bracket provides 30° vertical height adjustment. | **60-2007** | Series 6000 |  |
| Right angle mounting bracket allows for both horizontal and vertical adjustment. | **60-2008** | Series 6000 |  |
| Right angle mounting bracket provides vertical height and 360° rotation. | **60-1785** | Series 5000 |  |

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Right angle mounting bracket intended for use with Unistrut™ channel provides many vertical and horizontal adjustments. | **60-2014** | Series 5000 |  |
| Right angle mounting bracket allows 360° rotation and has hole patterns to match standard NEMA style limit switches. | **60-2230** | Series 5000 |  |
| Right angle mounting bracket provides 360° rotation. | **60-1479** | Series 4000 |  |
| Straight mounting bracket provides 30° horizontal rotation. | **60-2656** | RightSight<br>MiniSight<br>42CA, 42CB |  |
| Side mounting bracket provides 30° of vertical and 20° of horizontal rotation. | **60-2663** | MiniSight |  |
| Photoelectric sensor vertical height adjustment bracket slotted for any swivel/ tilt bracket. | **60-2721** (2 x 4 in.)<br>**60-2722** (2 x 6 in.)<br>**60-2723** (2 x 8 in.)<br>**60-2724** (2 x 10 in.) | RightSight<br>MiniSight<br>Series 9000<br>ClearSight 9000<br>ColorSight<br>LaserSight |  |

# Accessories

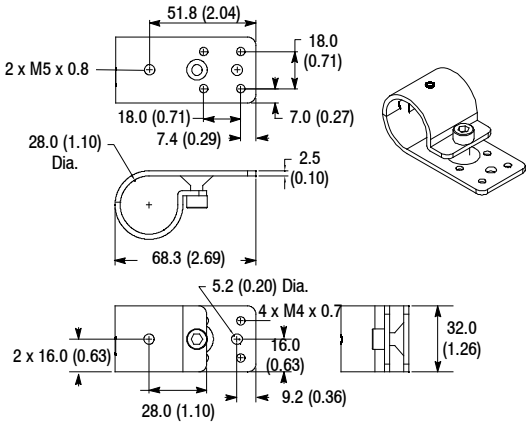
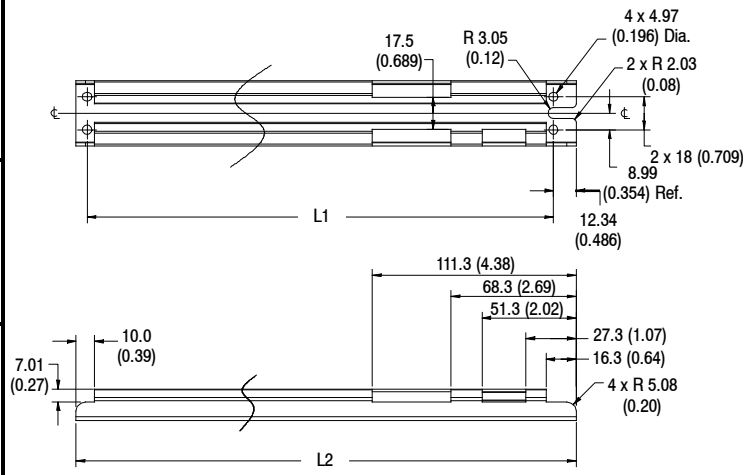
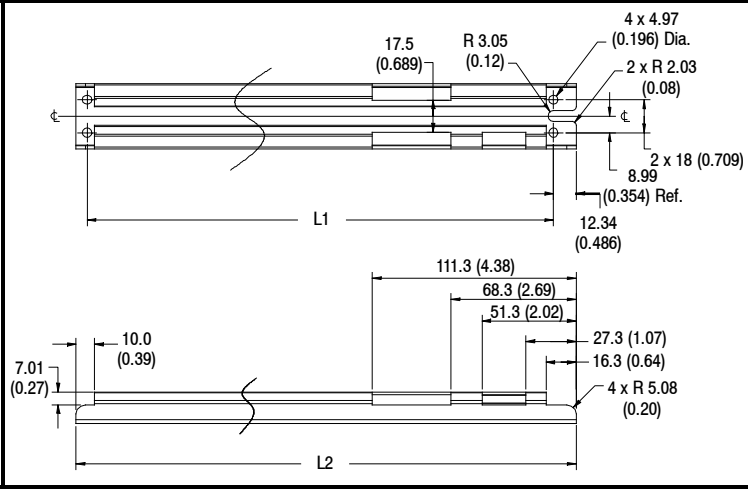
## Mounting Brackets

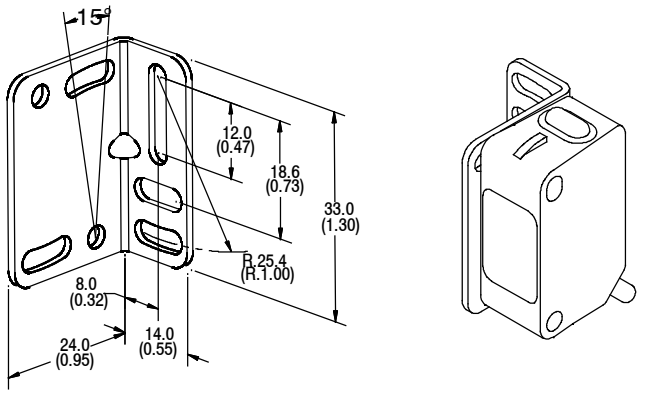
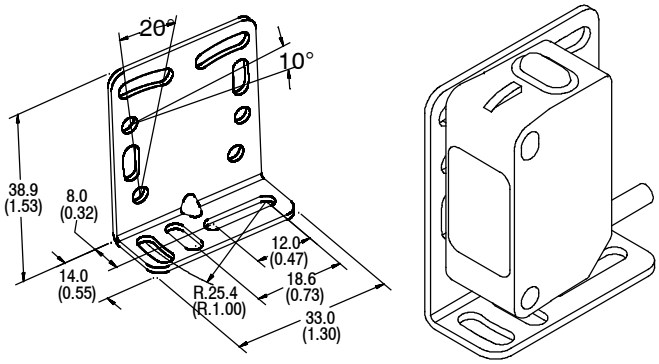
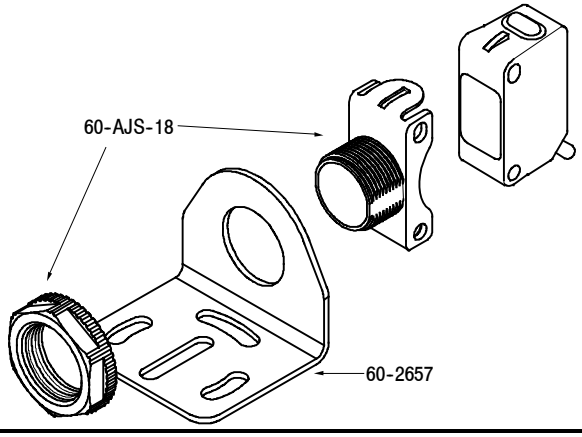
| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Stainless steel mounting bracket | **60-BKTL-SS** | 44B<br>42JS VisiSight |  |
| Mounting bracket | **60-2677** | 45MLD |  |
| Clamp style bracket fits any 18 mm sensor. | **871A-BP18** | RightSight<br>MiniSight<br>42CA, 42CB |  |
| Flush mount adaptor allows any 18 mm sensor to be mounted flush against panel surface. | **60-2590** | RightSight<br>MiniSight<br>42CA, 42CB |  |
| Heavy duty impact bracket of #12 steel can be used with swivel/tilt bracket. | **60-2695**<br>A = 76 mm (3 in.) | RightSight<br>MiniSight<br>Series 9000<br>ColorSight<br>LaserSight |  |
| | **60-2702**<br>A = 117 mm (4.6 in.) | ClearSight 9000 | |
| Heavy duty impact bracket of #12 steel can be used with swivel/tilt bracket. | **60-2725** | Series 9000 |  |

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Heavy duty mounting bracket designed for use in high vibration applications provides both horizontal and vertical height adjustment. | **60-1748** | Series 5000 | |
| Heavy duty impact bracket of #12 steel can be used with the Cat. No. 60-1785 mounting bracket. | **60-2083** | Series 5000 |  |
| Heavy duty impact bracket protects sensor and provides 60° horizontal adjustment. | **60-1665** | Series 4000 | |
| Mounting bracket (included with sensor) | **60-2773** | 45PVA |  |
| Plastic bracket (2 brackets) | **60-2779** | 45PVA |  |

# Accessories

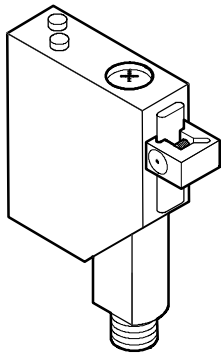
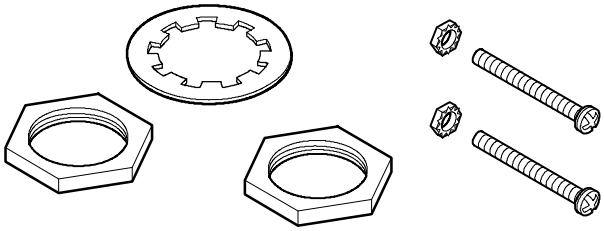
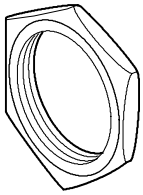
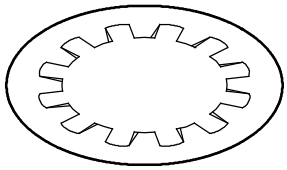
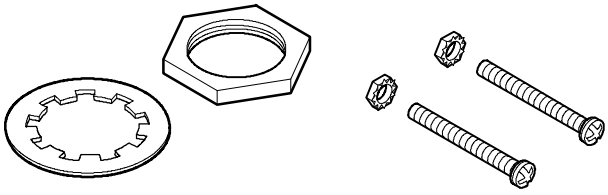
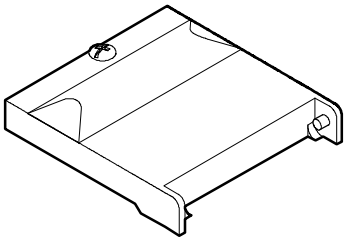
## Mounting Brackets

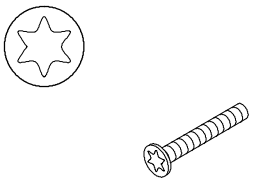
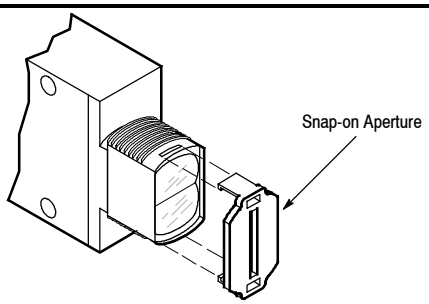
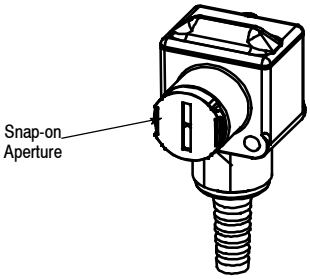
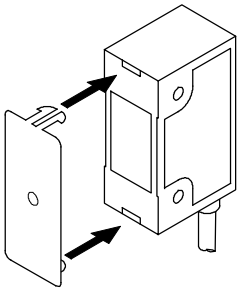
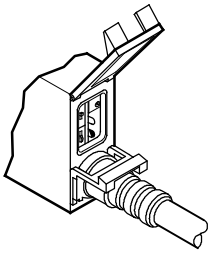
| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Metal brackets (2 brackets) | **60-2772** | 45PVA |  |
| Galvanized steel | **60-2775-1** | 45PVA - 1LEB1-F4 |  |
| Galvanized steel | **60-2776-1** | 45PVA - 1LEB2-F4 | |
| Galvanized steel | **60-2777-1** | 45PVA - 1LEB3-F4 |  |
| Galvanized steel | **60-2778-1** | 45PVA - 1LEB4-F4 |  |

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Mounting bracket | **60-BJS-L1** | 42JS VisiSight |  |
| Mounting bracket | **60-BJS-L2** | 42JS VisiSight |  |
| 18 mm snap-on adaptor | **60-AJS-18** | 42JS VisiSight |  |

# Accessories

## Protective Brackets and Apertures

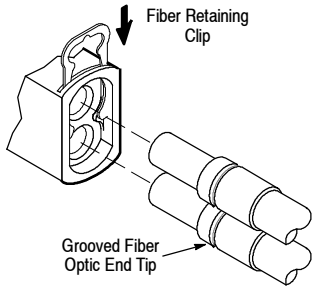
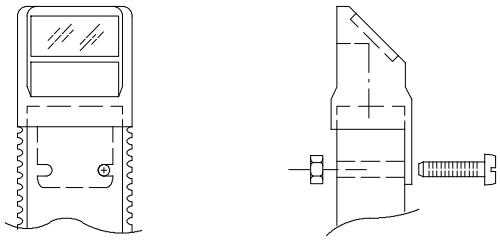
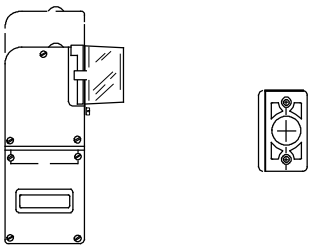
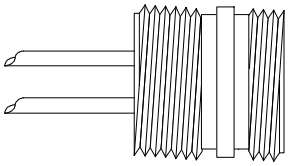
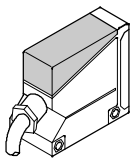
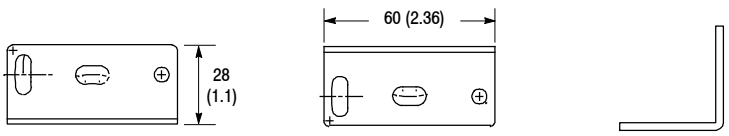
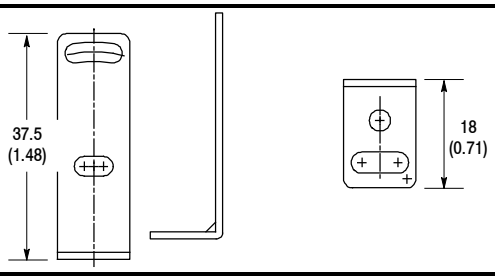
| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Dovetail mounting bracket | **44B-BKT** | 44B<br>45LSP |  |
| 18 mm mounting kit contains lockwasher, nuts, and screws for both body or thru-hole mounting. | **60-2716** | RightSight |  |
| 18 mm mounting nut, plastic (2 each). | **871T-N3** | RightSight<br>MiniSight<br>42CA, 42CB |  |
| 18 mm mounting nut, stainless steel (2 each). | **871T-N4** | RightSight<br>MiniSight<br>42CA, 42CB | |
| 18 mm lockwasher, metal | **871A-LWN18** | RightSight<br>MiniSight<br>42CA, 42CB |  |
| 30 mm mounting kit contains lockwasher, nuts, and screws for both body or thru-hole mounting. | **129-130** | Series 9000<br>ColorSight<br>LaserSight<br>ClearSight 9000 |  |
| Replacement user interface cover. | **60-2620** | Series 9000<br>ColorSight<br>LaserSight<br>ClearSight 9000 |  |

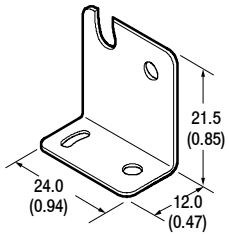
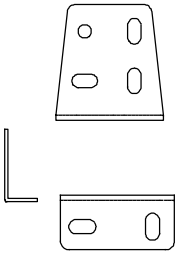
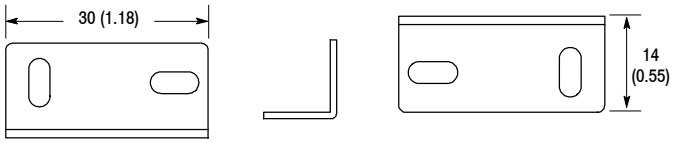
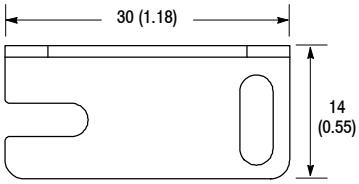
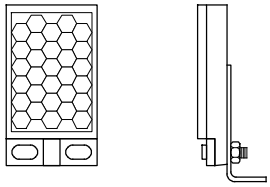
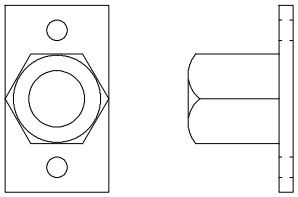
| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Torx screw set to prevent tampering of sensor settings (set contains 25 pieces). Requires Torx screwdriver **57-144**. | **129-135** | Series 9000<br>ColorSight<br>LaserSight<br>ClearSight 9000 |  |
| Torx screwdriver | **57-144** | Series 9000<br>ColorSight<br>LaserSight<br>ClearSight 9000 | |
| Apertures are used on transmitted beam sensing models to decrease the field of view. This is helpful in applications where small targets must be detected with precision. Note that the sensing range will be reduced by as much as 90% when using apertures. Apertures should be fitted to both the source and receiver models for proper operation. Each kit comes with 20 apertures except as noted. | **60-2673** (1 mm)<br>**60-2674** (2 mm)<br>**60-2675** (4 mm)<br>**60-2676** (1, 2, 4 mm)❶ | MiniSight |  |
| | **60-2660** (1 mm)<br>**60-2661** (2 mm)<br>**60-2662** (4 mm)<br>**60-2659** (1, 2, 4 mm)❶ | RightSight |  |
| | **61-6726** (1 mm)<br>**61-6727** (2 mm)<br>**61-6728** (3 mm)<br>**61-6729** (1x5 mm)❷ | 42KB |  |
| Replacement cover and locking clip. | **60-2679** | MiniSight |  |

❶ 4 each per kit
❷ 10 pieces per kit

# Accessories

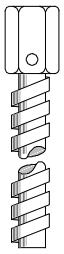
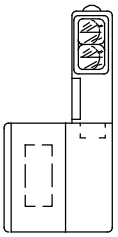
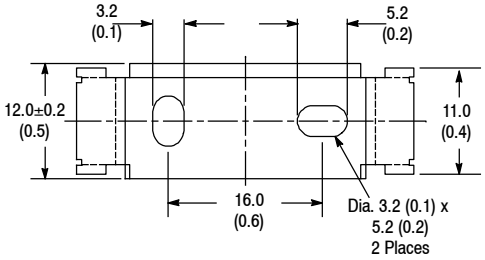
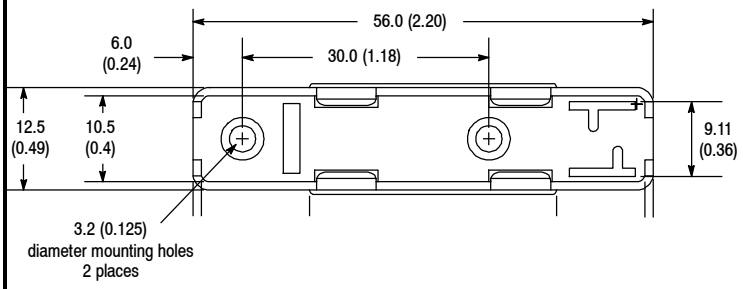
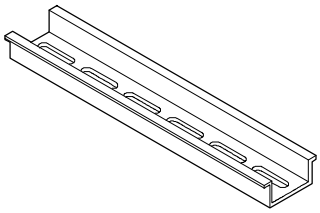
## Protective Brackets and Apertures

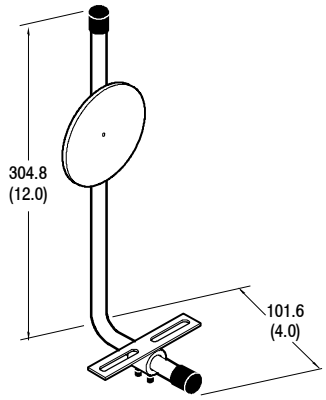
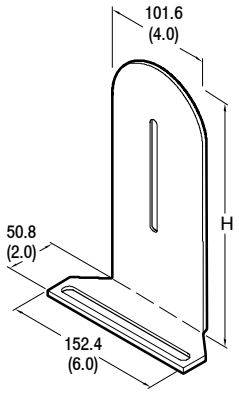
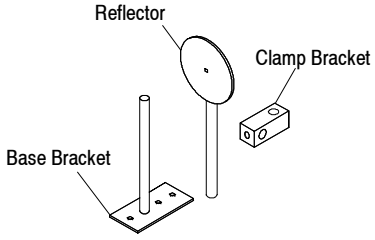
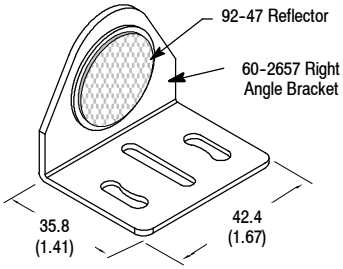
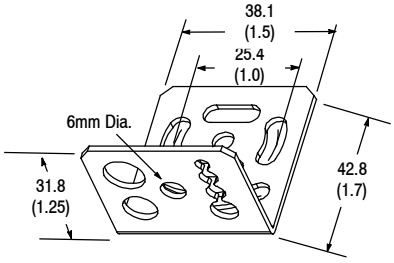
| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Replacement fiber optic retaining clip (set of 5 pieces). | **60-2680** | MiniSight |  |
| Snap on mirror permits side viewing of targets. Only for retroreflective and transmitted beam sensing models and will reduce sensing range by 30%. | **60-2052** | Series 6000 |  |
| Snap on mirror permits side viewing of targets. Only for retroreflective, diffuse, and transmitted beam sensing models and will reduce sensing range by 30%. | **60-1840** | Series 5000 |  |
| 4-pin mini QD receptacle simplifies installation. | **60-2668** | 42BC |  |
| Replacement cover for user interface panel. | **60-2669** | 42BC |  |
| Replacement right angle mounting bracket. | **60-2637** | 42BC |  |
| Replacement mounting bracket side view. | **60-2633** | 42KB |  |

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Replacement mounting bracket end view. | **60-2632** | 42KB |  |
| Replacement mounting bracket. | **60-2635** | 42KC |  |
| Replacement mounting bracket end view. | **60-2634** | 42KC |  |
| Replacement right angle mounting bracket. | **60-2636** | 42BA |  |
| Replacement reflector. | **92-93** | 42KB<br>42KC |  |
| Conduit mounting adaptor permits connection of sensor to 1/2 in. NPT conduit. Gasketed to maintain NEMA 4 rating. | **60-2213** | Series 5000 |  |

# Accessories

## Protective Brackets and Apertures

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Adaptor contains 3 m (10 ft) or armoured cable to protect PVC cable found on Series 5000 cable style bases. | **60-1577** | Series 5000 |  |
| Counter/Totalizer module provides reliable high-speed counting capability and six digit, 5 mm high, LCD display. Battery powered for minimum 5 year life. | **60-2072** | Series 5000 Green Line |  |
| Replacement adaptor permits mounting of sensor to 35 mm DIN rail. | **60-2638** | 42FT<br>45FVL<br>45FSL |  |
| Replacement adaptor permits mounting of sensor to 35 mm DIN rail. | **60-2639** | 42FA |  |
| 35 mm DIN rail (1 m) for mounting sensor and other control equipment. | **64-134** | 42FT<br>45FVL<br>45FSL |  |

| Description | Cat. No. | Used for | Approximate Dimensions [mm (in.)] |
|---|---|---|---|
| Right angle reflector bracket set for mounting up to 3 in. diameter reflectors. | **60-2717** | 92-39<br>92-89<br>92-46<br>92-47<br>92-105<br>92-106 |  |
| Reflector vertical height adjustment bracket for mounting up to 3 in. diameter reflectors. | **60-2718** (2 x 8 in.)<br>**60-2719** (2 x 10 in.)<br>**60-2720** (2 x 12 in.) | 92-39<br>92-89<br>92-46<br>92-47<br>92-105<br>92-106 |  |
| Reflector bracket provides both vertical and horizontal height adjustment. Bracket comes with 3 in. reflector Cat. No. 92-39. | **60-2685** | 92-39<br>92-89<br>92-46<br>92-47<br>92-105<br>92-106 |  |
| Mounting bracket with Cat. No. 92-47 reflector mounted at right angle | **60-2692** | 92-47 |  |
| Right angle mounting bracket for both reflectors and fiber optic cables | **60-2696** | 92-105<br>92-106<br>92-47<br>92-46 |  |

# Accessories

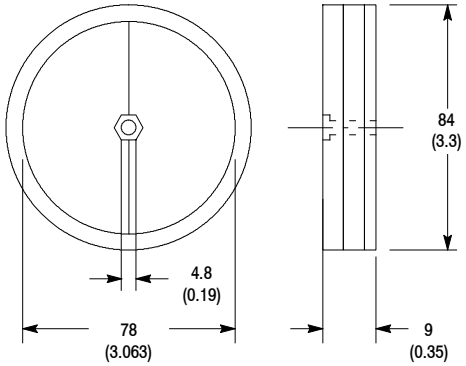
## Reflectors, Reflective Tape

### Specifications

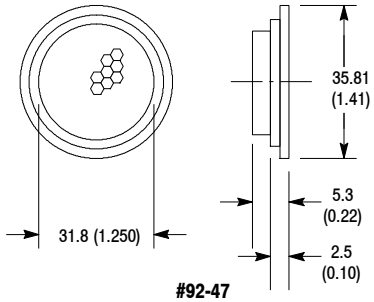
| Cat. No. | 92-39 | 92-124 |
|---|---|---|
| Description | Reflector, 76 mm (3 in.) dia. with center mount hole. (Plastic back) (ABS) | |
| Suitable for Polarized Sensor | Yes | |
| Cube Style | Corner cube | |
| Optimum Range❶ | 150 mm (6 in.)…2 m (80 in.) | |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). | |

| Cat. No. | 92-89 |
|---|---|
| Description | Reflector, 76 mm (3 in.) dia. with center mount hole. (Aluminum back) |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 150 mm (6 in.)…2 m (80 in.) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |

### Approximate Dimensions [mm (in.)]

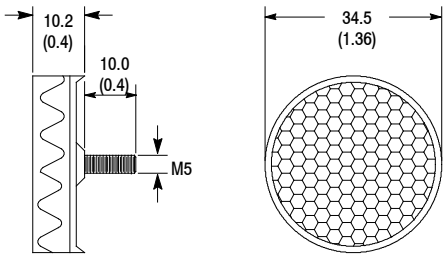



| Cat. No. | 92-47 |
|---|---|
| Description | Reflector, 32 mm (1.25 in.) dia. Requires adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 150 mm (6 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |




#92-47

| Cat. No. | 92-105 |
|---|---|
| Description | Reflector, 32 mm (1.25 in.) dia. with M5 screw |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 150 mm (6 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |



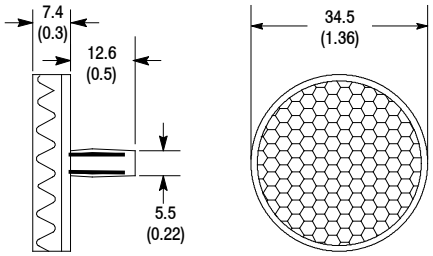

#92-105

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.

## Specifications

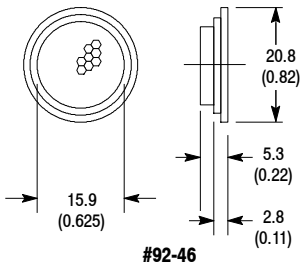
## Approximate Dimensions [mm (in.)]

| Cat. No. | 92-106 |
|---|---|
| Description | Reflector, 32 mm (1.25 in.) dia. with snap fit post |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 150 mm (6 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |



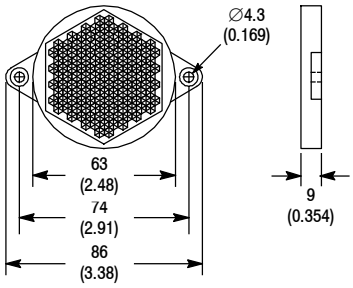
#92-106

| Cat. No. | 92-46 |
|---|---|
| Description | Reflector, 16 mm (0.625 in.) dia. Requires adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 51 mm (2 in.)…150 mm (6 in.) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |



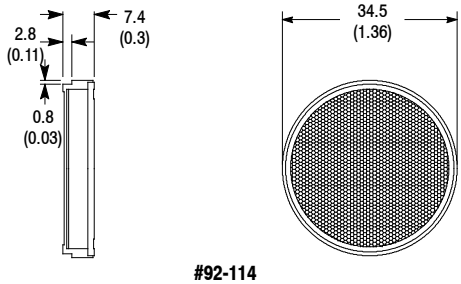
#92-46

| Cat. No. | 92-90 |
|---|---|
| Description | Reflector, 86 mm (3 in.) dia. with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 51 mm (2 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for ClearSight photoelectric sensors and general purpose applications up to 65°C (150°F). |



#92-90

| Cat. No. | 92-114 |
|---|---|
| Description | Reflector, 34 mm (1.35 in.) dia. Requires adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Micro cube |
| Optimum Range❶ | |
| Recommended Application | Ideal for laser-based photoelectric sensors such as LaserSight as well as general purpose applications up to 65°C (150°F). |



#92-114

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.
❷ Cat. Nos. 92-47 and 92-46 can be mounted with adhesive tape (not included).

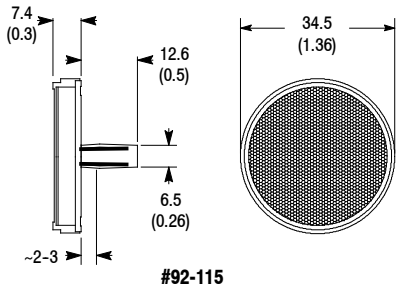
# Accessories

## Reflectors, Reflective Tape

### Specifications

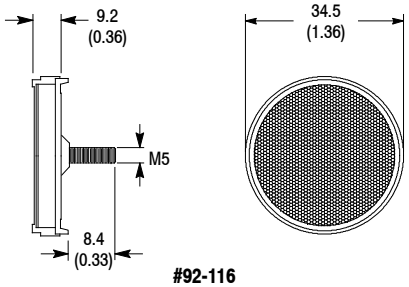
| Cat. No. | 92-115 |
|---|---|
| Description | Reflector, 34 mm (1.35 in.) dia. with snap fit post. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Micro cube |
| Optimum Range❶ | |
| Recommended Application | Ideal for laser-based photoelectric sensors such as LaserSight as well as general purpose applications up to 65°C (150°F). |

### Approximate Dimensions [mm (in.)]



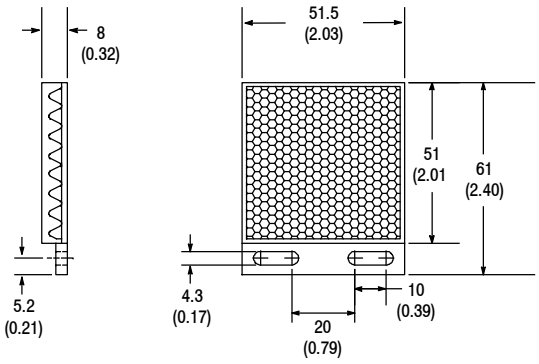

#92-115

| Cat. No. | 92-116 |
|---|---|
| Description | Reflector, 34 mm (1.35 in.) dia. with threaded post. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Micro cube |
| Optimum Range❶ | |
| Recommended Application | Ideal for laser-based photoelectric sensors such as LaserSight as well as general purpose applications up to 65°C (150°F). |



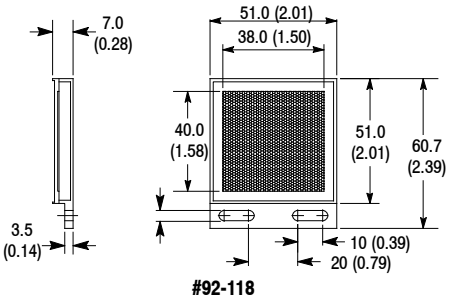

#92-116

| Cat. No. | 92-109 |
|---|---|
| Description | Reflector, 51 x 61 mm (2 x 2.5 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 51 mm (2 in.)…3.0 m (10 ft) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |




#92-109

| Cat. No. | 92-118 |
|---|---|
| Description | Reflector, 51 x 61 mm (2 x 2.5 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Micro cube |
| Optimum Range❶ | |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). The Cat. No. 92-118 is also suitable for laser-based photoelectric sensors such as LaserSight. |



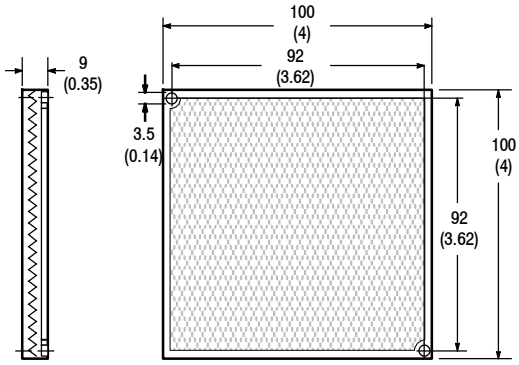

#92-118

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.

## Specifications

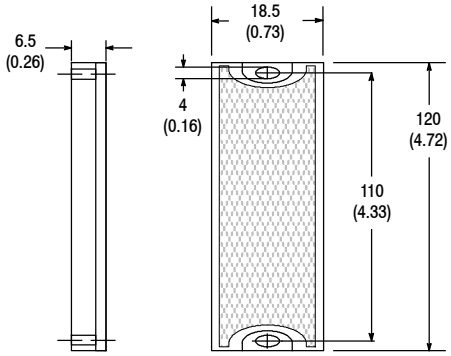
| Cat. No. | 92-108 |
|---|---|
| Description | Reflector, 100 x 100 mm (4 x 4 in.) square with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 150 mm (6 in.)…3.0 m (10 ft) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |

## Approximate Dimensions [mm (in.)]



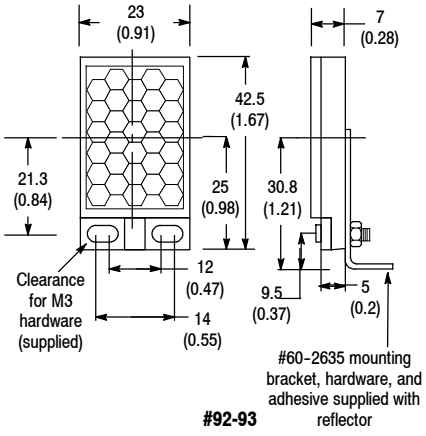

#92-108

| Cat. No. | 92-107 |
|---|---|
| Description | Reflector, 18.5 x 120 mm (0.73 x 4.72 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 51 mm (2 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |




#92-107

| Cat. No. | 92-93 |
|---|---|
| Description | Reflector, 23 x 42.5 mm (0.91 x 1.67 in.) rectangular with mounting tabs and bracket. Right angle bracket and adhesive tape. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | 51 mm (2 in.)…150 mm (6 in.) |
| Recommended Application | Suitable for general purpose applications up to 55°C (130°F). |




#92-93

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.

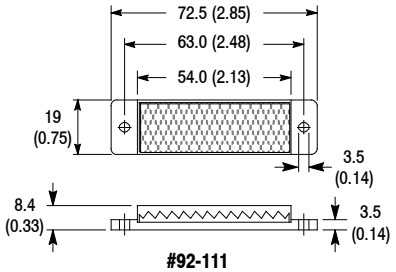
# Accessories

## Reflectors, Reflective Tape

### Specifications

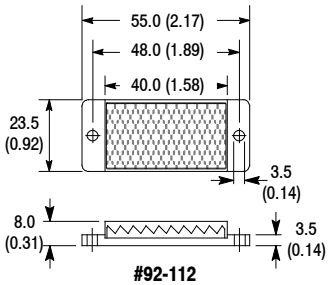
### Approximate Dimensions [mm (in.)]

| Cat. No. | 92-111 |
|---|---|
| Description | Reflector, 19 x 72.5 mm (0.75 x 2.85 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | |
| Recommended Application | Suitable for general purpose applications up to 55°C (130°F). |



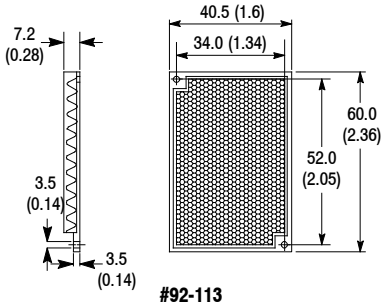
#92-111

| Cat. No. | 92-112 |
|---|---|
| Description | Reflector, 23.5 x 55 mm (0.924 x 2.17 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | |
| Recommended Application | Suitable for general purpose applications up to 55°C (130°F). |



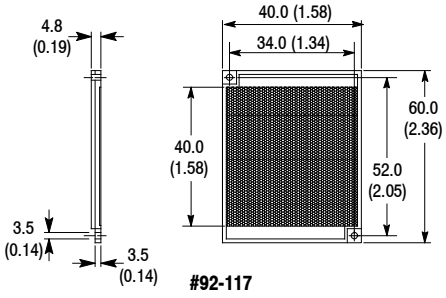
#92-112

| Cat. No. | 92-113 |
|---|---|
| Description | Reflector, 40.5 x 60 mm (1.6 x 2.36 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | |
| Recommended Application | Suitable for general purpose applications up to 55°C (130°F). |



#92-113

| Cat. No. | 92-117 |
|---|---|
| Description | Reflector, 40.5 x 60 mm (1.6 x 2.36 in.) rectangular with mounting tabs. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Micro cube |
| Optimum Range❶ | |
| Recommended Application | Suitable for general purpose applications up to 55°C (130°F). The **92-117** is also suited for laser-based photoelectric sensors such as LaserSight. |



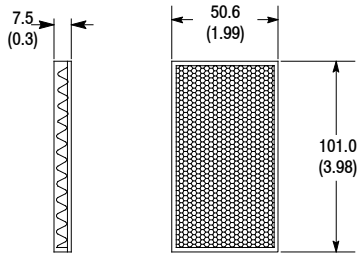
#92-117

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.

## Specifications

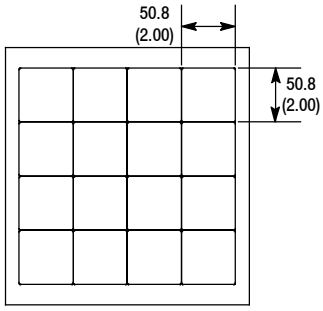
| Cat. No. | 92-119 |
|---|---|
| Description | Reflector, 51 x 101 mm (2 x 4 in.) rectangular with adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Corner cube |
| Optimum Range❶ | |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |

## Approximate Dimensions [mm (in.)]



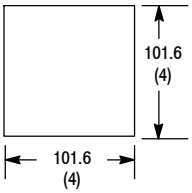

#92-119

| Cat. No. | 92-97 |
|---|---|
| Description | Reflective tape, 51 mm (2 in.) square, sheet of 16 pieces with adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Glass bead |
| Optimum Range❶ | 150 mm (6 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for general purpose applications up to 121°C (250°F). Also suitable for polarized retroreflective sensors. |



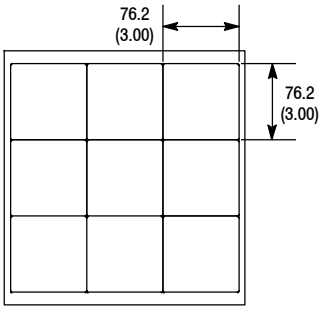

#92-97

| Cat. No. | 92-91 |
|---|---|
| Description | Reflective metal, 100 x 100 mm (4 x 4 in.) square. |
| Suitable for Polarized Sensor | No |
| Cube Style | Glass bead |
| Optimum Range❶ | 150 mm (6 in.)…1.5 m (5 ft) |
| Recommended Application | The Cat. No. 92-91 is intended for use in high temperature applications up to 480°C (900°F) but not with polarized retroreflective sensors. |




#92-91

| Cat. No. | 92-98 |
|---|---|
| Description | Reflective tape, 76 mm (2.75 in.) square, sheet of 9 pieces with adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Glass bead |
| Optimum Range❶ | 150 mm (6 in.)…1.5 m (5 ft) |




#92-98

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.

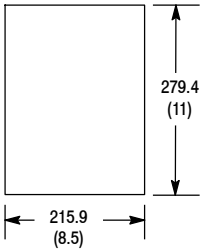
# Accessories

## Reflectors, Reflective Tape

### Specifications

| Cat. No. | 92-104 |
|---|---|
| Description | Reflective tape, 215.9 x 279.4 mm (8.5 x 11 in.) sheet with adhesive backing. |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Glass bead |
| Optimum Range❶ | 200 mm (8 in.)…1.5 m (5 ft) |
| Recommended Application | Suitable for general purpose applications up to 60°C (140°F) with polarized retroreflective sensors. |

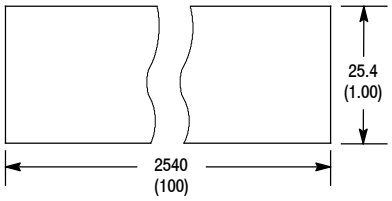
### Approximate Dimensions [mm (in.)]




**#92-104**

| Cat. No. | 92-99 |
|---|---|
| Description | Reflective tape, roll of 25 x 2540 mm (1 x 100 in.). |
| Suitable for Polarized Sensor | Yes |
| Cube Style | Glass bead |
| Optimum Range❶ | 150 mm (6 in.)…1.0 m (40 in.) |
| Recommended Application | Suitable for general purpose applications up to 65°C (150°F). |

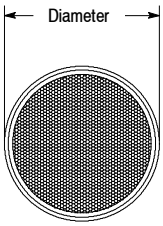
| Cat. No. | 92-100 |
|---|---|
| Description | Reflective tape, 25 x 2540 mm (1 x 100 in.). |
| Suitable for Polarized Sensor | No |
| Cube Style | Glass bead |
| Optimum Range❶ | 150 mm (6 in.)…1.0 m (40 in.) |
| Recommended Application | Suitable for general purpose applications up to 79°C (175°F). |



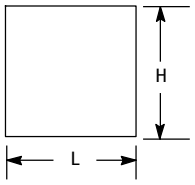

**#92-99 & #92-100**

❶ Optimum range varies with sensor optics. See table on page 1-315 for reflectivity performance.

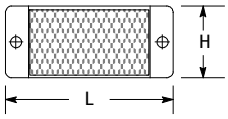
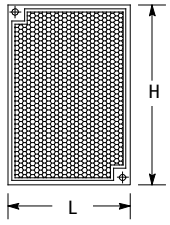
## Round Reflectors

| Diameter [mm (in.)] | Cube Style | Mounting | Temperature | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|
| 76.2 (3) | Corner Cube | Thru-Hole | ≤ 65°C (150°F) |   | **92-39** |
| 76.2 (3) | | | | | **92-89** |
| 31.75 (1.25) | | Adhesive | | | **92-47** |
| 31.75 (1.25) | | M5 Screw | | | **92-105** |
| 31.75 (1.25) | | Snap-Fit | | | **92-106** |
| 31.75 (1.25) | Micro Cube | Adhesive | | | **92-114** |
| 31.75 (1.25) | | Snap-Fit | | | **92-115** |
| 31.75 (1.25) | | M5 Screw | | | **92-116** |
| 19.05 (0.75) | Corner Cube | Adhesive | | | **92-46** |
| 57.15 (2.25) | | Thru-Hole x 2 | | | **92-90** |

## Reflective Tape

| Length x Height [mm (in.)] | Cube Style | Mounting | Temperature | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|
| 50 x 50 (2 x 2) (16 per sheet) | Glass Bead | Adhesive | <121°C (250°F) |   | **92-97** |
| 76 x 76 (3 x 3) (9 per sheet) | | | | | **92-98** |
| 100 x 100 (3.94 x 3.94) | | | <60°C (140°F) | | **92-104** |
| | | | <480°C (900°F) | | **92-91** |
| 2510 x 25 (98.8 x 0.98) (1 roll) | | | ≤ 65°C (150°F) | | **92-99** |
| | | | <79°C (175°F) | | **92-100** |

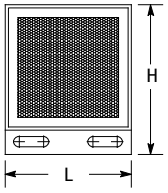
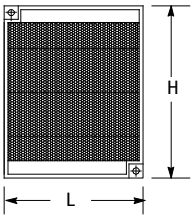
## Rectangular Reflectors

| Length x Height [mm (in.)] | Cube Style | Mounting | Temperature | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|
| 40.5 x 60 (1.59 x 2.36) | Corner Cube | Thru-Hole x 2 | <55°C (130°F) |   **92-112, 92-111, 92-107** | **92-113** |
| 50.6 x 101 (1.99 x 3.98) | | Adhesive | <65°C (150°F) | | **92-119** |
| 18.5 x 120 (0.73 x 4.72) | | Thru-Hole x 2 | | | **92-107** |
| 55 x 23.5 (2.17 x 0.93) | | | <55°C (130°F) |   **92-113, 92-117, 92-119** | **92-112** |
| 72.5 x 19 (2.85 x 0.75) | | | | | **92-111** |
| 42 x 22 (1.65 x 0.87) | | | | | **92-93** |

# Accessories

## Reflectors, Reflective Tape

### Square Reflectors

| Length x Height [mm (in.)] | Cube Style | Mounting | Temperature | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|
| 100 x 100 (3.94 x 3.94) | Corner Cube | Thru-Hole x 2 | ≤ 65°C (150°F) |  92-108, 92-117 | **92-108** |
| 51.5 x 61 (2.08 x 2.40) | | | | | **92-109** |
| 40 x 60 (1.57 x 2.36) | | | | | **92-117** |
| 51 x 60.7 (2.01 x 2.39) | Micro Cube | | |  92-109, 92-118 | **92-118** |

**For more detailed dimensions, please refer to *www.ab.com/e-tools*.**

## Relative Reflectivity

Reflectivity varies with distance and with sensor optics. The table below is designed to be used as a comparison between reflectors. The numbers represent a reflectivity at a given range by a class of sensors relative to the standard 92-39 3 in. round reflector.

The two classes of sensors shown represent optic styles. The standard size optic includes the Series 9000, 10,000, 5000, and 4000.

The miniature optics are used in the smaller sensor families: RightSight™, MiniSight™, 5000, 6000, and 7000 Series.

| Reflector | | Standard Polarized Sensors | | | Miniature Polarized Sensors | | | Laser-Based Sensors | |
|---|---|---|---|---|---|---|---|---|---|
| | | Series 10,000, 9000, 5000, and 4000 | | | RightSight, MiniSight, Series 6000, 7000, and 42xx | | | LaserSight | |
| Cat. No. | Description | 3.0 m (10 ft) | 1.5 m (5 ft) | 0.61 m (2 ft) | 450 mm (18 in.) | 200 mm (8 in.) | 100 mm (4 in.) | 15.2 m (50 ft) | 3.05 m (10 ft) |
| **92-39, 92-89** | Reflector, 3 in. round | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **92-46** | Reflector, 3/4 in. round | — | — | 50 | 50 | 40 | 25 | — | 100 |
| **92-47** | Reflector, 1 1/4 in. round | — | 40 | 100 | 100 | 80 | 30 | — | 90 |
| **92-90** | Reflector, 2 in. hexagon | 70 | 150 | 150 | 350 | 150 | 200 | 130 | 100 |
| **92-91** | Reflective tape, high temperature | — | — | — | — | — | — | — | — |
| **92-93** | Reflector, 3/4 x 1.5 in. rectangular | — | — | 50 | 50 | 50 | 25 | — | 100 |
| **92-97** | Reflector, 2 $in.^2$ | — | 90 | 150 | 200 | 80 | 50 | — | 80 |
| **92-98** | Reflector, 2 3/4 $in.^2$ | — | 100 | 150 | 200 | 80 | 50 | — | 70 |
| **92-99** | Reflective tape, polarized | — | 40 | 70 | 100 | 50 | 30 | — | — |
| **92-100** | Reflective tape, nonpolarized | — | — | — | — | — | — | — | — |
| **92-104** | Reflective tape, 8.5 x 11 in. | 25 | 50 | 50 | 70 | 30 | 40 | — | 70 |
| **92-105** | Reflector, 1 1/4 in. round | — | 40 | 75 | 100 | 120 | 200 | 70 | 90 |
| **92-106** | Reflector, 1 1/4 in. round | — | 40 | 75 | 100 | 120 | 200 | 70 | 90 |
| **92-107** | Reflector, 3/4 x 4 3/4 in. rectangular | — | 50 | 100 | 100 | 60 | 60 | — | 110 |
| **92-108** | Reflector, 4 $in.^2$ square | 250 | 150 | 100 | 120 | 90 | 150 | — | 100 |
| **92-109** | Reflector, 2 $in.^2$ square | 100 | 150 | 100 | 100 | 90 | 150 | 150 | 110 |
| **92-111** | Reflector, 2 x 1, rectangular | 20 | 50 | 90 | 100 | 60 | 100 | — | — |
| **92-112** | Reflector, 2.8 x 3/4 in. rectangular | 20 | 60 | 100 | 100 | 60 | 110 | — | 100 |
| **92-113** | Reflector, 1.6 x 2 1/4 in. rectangular | 90 | 115 | 50 | 90 | 50 | 170 | 210 | 110 |
| **92-114** | Reflector, 1 1/4 in. round | 20 | 70 | 70 | 90 | 20 | — | 110 | 110 |
| **92-115** | Reflector, 1 1/4 in. round | 20 | 70 | 70 | 90 | 20 | — | 110 | 110 |
| **92-116** | Reflector, 1 1/4 in. round | 20 | 70 | 70 | 90 | 20 | — | 110 | 110 |
| **92-117** | Reflector, 1 1/2 x 2 1/4 in. rectangular | 30 | 130 | 140 | 200 | 60 | 50 | 30 | 100 |
| **92-118** | Reflector, 2 x 2 rectangular | 80 | 70 | 50 | 50 | 30 | — | 260 | 90 |

For more information on the theory of retroreflective sensing, see page 1-22. Some variation may be seen across the reflector. Data was measured with reflector rotating to normalize reflectance.

# Notes

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# Quick Selection Guide

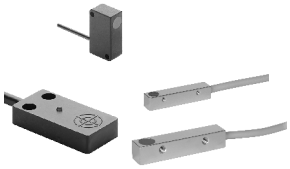
| Specifications | <br>**871TM**<br>**All Stainless Steel** | <br>**872C**<br>**WorldProx General Purpose** | <br>**871T**<br>**Stainless Steel Barrel** | <br>**871TS**<br>**Food and Beverage** |
|---|---|---|---|---|
| **Description** | Tubular Style<br>• Stainless steel face/ threaded stainless steel barrel | Tubular Style<br>• Plastic face/threaded nickel-plated brass barrel<br>• Plastic face/threaded plastic barrel | Tubular Style<br>• All metal sensing: plastic face/threaded stainless steel barrel<br>• Ferrous selective: stainless steel face/ threaded stainless steel barrel | Tubular Style<br>• PPS plastic face/stainless steel 316L barrel<br>• High pressure washdown rated (IP67, IP68 and IP69K) |
| **Features** | • Stainless steel face and barrel<br>• Full mechanical seals (all-metal sensing models)<br>• ToughLink™ or PVC cable styles<br>• Mini, micro or EAC micro QD styles<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models)<br>• Radio frequency interference protection | • Threaded, nickel-plated brass barrel or plastic barrel<br>• 360° visible LED<br>• Cable or quick-disconnect styles<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection | • Threaded stainless steel barrel<br>• Cable or QD styles<br>• Short-circuit protection (DC models)<br>• Overload protection (DC models)<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models) | • Threaded stainless steel 316L barrel<br>• PPS (FDA Certified) plastic face<br>• Standard and extended sensing range<br>• Short circuit protection<br>• Overload protection<br>• False pulse protection<br>• Reverse polarity protection |
| **Diameter** | • 12, 18, 30 mm | • 6.5, 8, 12, 18, 30 mm | • 12, 18 mm | • 12, 18 mm |
| **Available Models** | • DC 3-Wire . . . . . 2-22<br>• DC 3-Wire Extended Sensing . . . . . 2-25<br>• DC 3-Wire Ferrous Selective . . . . . 2-28<br>• DC 3-Wire Nonferrous Selective . . . . . 2-28<br>• DC 3-Wire Submersible . . . . . 2-31<br>• DC 2-Wire . . . . . 2-33<br>• DC 2-Wire Intrinsically Safe . . . . . 2-36<br>• AC/DC 2-Wire . . . . . 2-41<br>• AC/DC 2-Wire PLC Interfacer . . . . . 2-44<br>• DeviceNet™ Sensors . . . . . NO TAG | • DC 3-Wire . . . . . 2-48<br>• DC 3-Wire Short Barrel . . . . . 2-52<br>• DC 3-Wire Extended Sensing . . . . . 2-56<br>• DC 3-Wire Short Barrel with Extended Sensing . . . . . 2-60<br>• DC 3-Wire Long Range . . . . . NEW<br>• DC 3-Wire Plastic Barrel . . . . . 2-64<br>• DC 2-Wire . . . . . 2-67<br>• DC 2-Wire QuadroPlex . . . . . 2-70<br>• DC 4-Wire Complementary Output . . . . . 2-72<br>• AC 2-Wire . . . . . 2-74<br>• AC 2-Wire Extended Sensing 2-77<br>• AC/DC 2-Wire . . . . . 2-80<br>• AC/DC 2-Wire Relay Output . . . . . 2-83 | • DC 3-Wire . . . . . 2-86<br>• AC 2-Wire . . . . . 2-88<br>• AC 4-Wire Ferrous Selective . . . . . 2-90 | • DC 3-Wire . . . . . 2-93 |
| **Connections** | • PVC Cable<br>• ToughLink™ cable<br>• Mini QD<br>• Micro QD | • Cable (PVC)<br>• Mini Quick-Disconnect<br>• Micro Quick-Disconnect<br>• Pico Quick-Disconnect | • Cable (PVC)<br>• Mini QD | • Micro QD |
| **Enclosure** | • Stainless steel face and barrel<br>• NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC529)<br>• 1200 psi (8270 kPa) washdown<br>• IP69K (some models) | • NEMA 1, 2, 3, 4, 6P, 12, 13 IP67 (IEC529)<br>• Nickel-plated brass barrel or plastic barrel, plastic face (PBT) | • NEMA 1, 2, 3, 4, 12, 13 IP67 (IEC529)<br>• 303 Stainless steel barrel | • NEMA 1, 2, 3, 3R, 4, 4X, 12, 13 and IP67, IP68 and IP69K |
| **Additional Info** | • See page 2-21 | • See page 2-47 | • See page 2-85 | • See page 2-93 |



New

| **871Z** **Weld Field Immune** | **871ZT** **Weld Field Immune Equal Sensing** | **871C** **Special Purpose** | **871P** **VersaCube** |
|---|---|---|---|
| Tubular Style<br>• PTFE face/threaded PTFE-coated brass barrel<br>• Thermoset plastic face/ threaded PTFE-coated brass barrel | Tubular Style<br>• PTFE face/threaded ptfe-coated brass barrel | Tubular Style<br>• Plastic face/threaded nickel-plated brass barrel<br>• Plastic face/smooth nickel-plated brass barrel<br>• Plastic face/threaded plastic barrel | Rectangular Style<br>• Plastic housing |
| • Cable or QD styles<br>• PTFE-coated brass barrel<br>• Weld field immunity<br>• Short-circuit, false pulse, overload, and transient noise protection | • Weld field immunity<br>• Equal sensing<br>• PTFE-coated brass barrel<br>• Micro QD<br>• Short-circuit, false pulse, overload, and transient noise protection | • Cable or QD styles<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection | • 5-position sensing head<br>• Rugged burn and weld-slag resistant housing on weld-field immune models<br>• Mini and micro QD styles<br>• Weld field immunity (some models)<br>• Equal sensing (some models)<br>• Short-circuit protection<br>• False pulse protection<br>• Overload protection<br>• Transient noise protection<br>• Reverse polarity protection (DC models) |
| • 12, 18, 30 mm | • 12, 18, 30 mm | • 3, 4, 5, 12, 18, 30 mm | • 40 x 40 x 69 mm |
| • Weld Field Immune DC 3-Wire . . . . . 2-98<br>• Weld Field Immune AC 2-Wire . . . . . 2-100 | • DC 3-Wire Weld Field Immune . 2-104 | • DC 3-Wire Small Diameter . . . . . 2-114<br>• DC 3-Wire Extended Temperature Range . . . . . 2-117<br>• AC 2-Wire Full-Featured . . . . . 2-119<br>• AC 2-Wire Plastic Barrel . . . . . 2-122<br>• NAMUR Intrinsically Safe . . . . . 2-124<br>• Analog Output . . . . . 2-127 | • DC 3-Wire . . . . . 2-130<br>• DC 4-Wire . . . . . 2-133<br>• AC/DC 2-Wire . . . . . 2-134 |
| • Cable (ToughLink™)<br>• Mini QD<br>• Micro QD | • Micro QD | • Cable (PVC or PUR)<br>• Mini Quick-Disconnect<br>• Micro Quick-Disconnect<br>• Pico Quick-Disconnect | • Mini QD<br>• Micro QD |
| • NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13, IP67 (IEC529) PTFE coated housing | | • Varies by product | • NEMA 1, 2, 3, 4, 6, 6P, 12 and 13, IP67 (IEC529), 1200 psi (8270 kPa) washdown<br>• IP69K (some models) |
| • See page 2-97 | • See page 2-104 | • See page 2-113 | • See page 2-129 |

# Quick Selection Guide

| Specifications | <br>**871F**<br>**Flat Pack & Block** | <br>**871L & 872L**<br>**Limit Switch Style** | <br>**802PR**<br>**Limit Switch Style** |  <br>**871FM**<br>**Miniature Flat Pack** |
|---|---|---|---|---|
| **Description** | Flat Pack Style<br>• Plastic body<br>Block Style<br>• Aluminum body | Limit Switch Style<br>• Plastic body/17-position head | Limit Switch Style<br>• Glass-reinforced polyester housing | Miniature Flat Pack Style<br>• Plastic body |
| **Features** | • Cable, conduit, or QD styles<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models) | • 17 sensing head positions (1 top, 16 side)<br>• Conduit or QD styles<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection<br>• Selectable normally open or normally closed output | • Multiple sensing directions<br>• Cable, conduit, or QD styles<br>• Short-circuit protection (AC/DC models)<br>• Overload protection (AC/DC models)<br>• Transient noise protection<br>• False pulse protection<br>• Hazardous location models are available | • Cable or QD styles<br>• Short-circuit protection (DC models)<br>• Overload protection (DC models)<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models) |
| **Diameter** | Flat Pack Style<br>• 80 x 80 x 40 mm<br>Block Style<br>• 50 x 50 x 40 mm<br>40 x 50 x 100 mm | • 40 x 40 x 120 mm | • 42 x 41 x 109 mm | • 5 x 5 x 15 mm<br>• 8 x 8 x 37 mm<br>• 28 x 16 x 11 mm<br>• 25 x 50 x 10 mm<br>• 31 x 18 x 10 mm |
| **Available Models** | • Complementary Output DC 4-Wire Flat Pack . . . . . 2-138<br>• DC Weld Field Immune Flat Pack . 2-141<br>• 2-Wire AC/DC Flat Pack . . . . . 2-146<br>• Weld Field Immune 2-Wire AC/DC Flat Pack . . . . . 2-148<br>• DC 3-Wire Block . . . . . 2-150 | • DC 3-Wire . . . . . 2-154<br>• AC 2-Wire . . . . . 2-156<br>• AC/DC 2-Wire . . . . . 2-156 | • AC/DC 2-Wire . . . . . 2-160<br>• Hazardous Location AC/DC 2-Wire 2-165<br>• AC 2-Wire (High Output) . . . . . 2-167<br>• Hazardous Location AC 2-Wire (High Output) . . . . . 2-171 | • DC 3-Wire . . . . . 2-176<br>• AC 2-Wire . . . . . 2-179 |
| **Connections** | Flat Pack Style<br>• Cable<br>• Mini QD<br>• Micro QD<br>Block Style<br>• Micro QD<br>• Cable | • Mini QD<br>• Micro QD<br>• Conduit/Terminal | • Cable (STO or ToughLink™)<br>• Mini QD<br>• Micro QD<br>• Conduit/Terminal | • Cable (PVC)<br>• Pico QD |
| **Enclosure** | • NEMA 1, 2, 3, 4, 6, 6P, 12 and 13, IP67 (IEC529), 1200 psi (8270 kPa) washdown<br>• IP69K (some models) | • NEMA 3, 4, 6, 12, 13, IP67 (IEC529)<br>Polyloy | • NEMA 1, 2, 3, 4, 4X, 12, 13, IP65 (IEC529)<br>Self extinguishing glass-reinforced polyester body | • NEMA 4, IP67 (IEC529)<br>Plastic |
| **Additional Info** | • See page 2-137 | • See page 2-153 | • See page 2-159 | • See page 2-173 |



New

# Quick Selection Guide

| Specifications | <br>**871P**<br>**Can Sensors** | <br>**871D**<br>**WorldClamp** | <br>**871D**<br>**Cylinder Position** | <br>**871R & 871S**<br>**Ring & Slot Sensors** |
|---|---|---|---|---|
| **Description** | Can Sensor Style<br>• Stainless steel housing/plastic face | On-Clamp Cylinder Position Style<br>• Power clamp and gripper style | In-port Cylinder Position Style<br>• Ceramic face/stainless steel probe assembly | Ring and Slot Style<br>• Plastic and metal housing |
| **Features** | • Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models)<br>• Stainless steel housing | • Superior LED visibility<br>• Weld-field immune<br>• Shielded construction<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models) | • Stainless steel probe with ceramic face<br>• Low profile housing can be rotated 304° after installation without breaking pressure seal<br>• Shielded construction<br>• Weld-field immune<br>• Short-circuit protection<br>• Overload protection<br>• Transient noise protection<br>• False pulse protection<br>• Reverse polarity protection (DC models) | • Cable or micro QD style<br>• Short-circuit protection<br>• Reverse polarity protection |
| **Diameter** | • 76 x 38 x 59 mm<br>• 140 x 44.5 x 59 mm | • 47 x 18 x 18 mm<br>• 55 x 35 x 19 mm<br>• 47 x 18 x 24 mm | • 64 x 48 x 37 mm installed | • 12, 20, 50, and 100 mm<br>• 30 mm |
| **Available Models** | • Short-Range AC 2-Wire Inductive Can . . 2-182<br>• Long-Range AC 2-Wire Inductive Can . . 2-182<br>• Short-Range DC 4-Wire Inductive Can . . 2-184<br>• Long-Range DC 4-Wire Inductive Can . . 2-184<br>• Motion DC 4-Wire Inductive Can . . 2-186 | • DC 4-wire . . . . . 2-190<br>• AC/DC 5-wire . . . . . 2-192 | • DC 3-wire . . . . . 2-196<br>• AC/DC 2-wire . . . . . 2-198 | • 871R DC 3-Wire Ring Style . . . . . 2-202<br>• 871S DC 3-Wire Slot Style . . . . . 2-205 |
| **Connections** | • Cable (PVC)<br>• Mini QD | • Micro QD | • Mini QD<br>• Micro QD | • Cable (PVC)<br>• Micro QD |
| **Enclosure** | • NEMA 1, 3, 4, 4X, 6, 6P, 12, 13, IP67 (IEC529), 1200 psi (8270 kPa) washdown | • IP67 | • NEMA 1, 2, 3, 3R, 4, 6, 12, 13, IP67 (IEC529) | • NEMA 4 IP67 (IEC529) |
| **Additional Info** | • See page 2-181 | • See page 2-189 | • See page 2-195 | • See page 2-201 |

## Weld Field Immune Proximity Sensors


871ZT Weld Field Immune Tubular . . . . . page 2-104
871Z Weld Field Immune Tubular . . . . . page 2-97
871ZC Weld Field Immune Tubular . . . . . page 2-107
871D WorldClamp™ . . . . . page 2-192
871D Cylinder Position Sensor . . . . . page 2-195
871P Weld Field Immune VersaCube . . . . . page 2-129
871F Weld Field Immune Puck Style . . . . . page 2-148


## Hazardous Location Proximity Sensors


871TM 2-Wire DC Intrinsically Safe . . . . . page 2-36
871C NAMUR Intrinsically Safe . . . . . page 2-124
802PR Hazardous Location . . . . . page 2-159


## Ferrous/Nonferrous Selective Proximity Sensors


871TM Ferrous Selective . . . . . page 2-28
871T Ferrous Selective . . . . . page 2-90
871TM Nonferrous Selective . . . . . page 2-28


## Extended Temperature Range Proximity Sensors


871C Extended Temperature . . . . . page 2-117


Other extended temperature range models available as special order items. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for details.

# Technical Definitions and Terminology

**Active Face**: Portion of the sensor from which the electromagnetic field or ultrasonic pulse emanates.

**Axial Approach**: The approach of the target with its center maintained on the reference axis.

**Complementary Outputs**: (N.O. & N.C.) A proximity sensor that features both normally open and normally closed outputs, which can be used simultaneously.

**Correction Factors**: Suggested multiplication factors taking into account variations in the target material composition. When figuring actual sensing distance this factor should be multiplied with the nominal sensing distance.

**Current Consumption**: The current consumed by the proximity switch when the output device is in the off condition.

**Damping Material**: Material which causes a decrease in the strength of the electromagnetic or electrical field produced by the sensing coil.

**Differential Travel (Hysteresis)**: The distance between the operating point and the release point. See Hysteresis.

**Dual Output**: Sensor which has two outputs which may be complementary or may be of a single type (i.e. two normally open or two normally closed).

**Effective Operating Distance**: (Sr) The operating distance of an individual proximity switch measured at stated temperature, voltage, and mounting condition.

**False Pulse**: An undesired change in the state of the output of the proximity switch that lasts for more than two milliseconds.

**Flush Mounting**: A shielded proximity sensor which can be flush mounted in metal up to the plane of the active sensing face.

**Free Zone**: The area around the proximity switch which must be kept free from any damping material.

**Hysteresis**: The difference, in percentage (%), of the nominal sensing distance between the operate (switch on) and release point (switch off) when the target is moving away from the sensors active face. Without sufficient hysteresis a proximity sensor will "chatter" (continuously switch on and off) when there is significant vibration applied to the target or sensor.

**Isolated Output**: An output that is optically separated from the input and other output and independent of the other output to a specified level.

**Isolation Voltage**: Maximum rated voltage between isolated outputs or input and output.

**Lateral Approach**: The approach of the target perpendicular to the reference axis.

**Leakage Current**: Current which flows through the output when the output is in an "off" condition or de-energized. This current is necessary to supply power to the electronics of the sensor.

**LED (Light Emitting Diode)**: Semi-conductor that generates monochromatic light when current flows in the conductive direction. An LED is the standard Light Source for most photoelectric sensors.

**Maximum Inrush Current**: The maximum current level at which the proximity sensor can be operated for a short period of time.

**Maximum Load Current**: The maximum current level at which the proximity sensor can be continuously operated.

**Minimum Load Current**: The minimum amount of current required by the sensor to maintain reliable operation.

**Nonferrous Metal**: Any metal which does not contain iron.

**Normally Closed**: Output opens when an object is detected in the active switching area.

**Normally Open**: Output closes when an object is detected in the active switching area.

**NPN**: The sensor switches the load to the negative terminal. The load should be connected between the sensor output and positive terminal.

**Operating Distance, Assured**: Between 0 and 81% of the rated operating distance for inductive proximity switches.

**Operating Distance, Rated**: The operating distance specified by the manufacturer and used as a reference value. Also known as nominal sensing distance.

**PNP**: The sensor switches the load to the positive terminal. The load should be connected between the sensor output and negative terminal.

**Programmable Output**: (N.O. or N.C.) Output which can be changed from N.O. to N.C. or N.C. to N.O. by way of a switch or jumper wire. Also known as selectable output.

**Repeatability**: The variation of the effective operating distance measured at room temperature and constant supply voltage. It is expressed as a percentage of the sensing distance.

**Residual Voltage**: The voltage across the sensor output while energized and carrying maximum load current.

**Response Time**: The sum of the time needed for a string of electronic circuits to translate a change in light into a change of output status.

**Reverse Polarity Protection**: A circuit that uses a diode to avoid damage to the control in case the polarity of the power supply is accidentally reversed.

**Ripple**: The variance between peak-to-peak values in DC voltage. It is expressed in percentage of rated voltage.

**Sensing Distance**: The distance at which an approaching target activates (changes state of) the proximity output.

**Sensing Range**: The sensing range is the distance within which the sensor will detect a target under fluctuations of temperature and voltage.

**Shielded**: Sensor which can be flush mounted in metal up to the plane of the active sensing face.

**Short Circuit Protection**: (SCP) Sensor protected from damage when a shorted condition exists for an indefinite or defined period of time.

**Sinking**: See NPN.

**Sourcing**: See PNP.

**Switching Frequency**: The maximum number of times per second the sensor can change state (ON and OFF) usually expressed in Hertz (Hz). As measured in DIN EN 50010.

**Target**: Object which activates the sensor.

**Three-Wire Proximity Switch**: An AC or DC proximity sensor with three leads, two of which supply power and a third that switches the load.

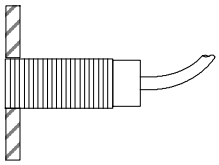
**Two-Wire Proximity Switch**: A proximity sensor which switches a load connected in series to the power supply. Power for the proximity switch is obtained through the load at all times.

**Unshielded**: Sensors which have longer sensing distances and a wider magnetic field but are sensitive to surrounding metal.

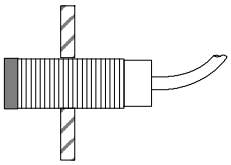
**Voltage Drop**: The maximum voltage drop across a conducting sensor.

**Weld Field Immunity**: (WFI) The ability of a sensor not to false trigger in the presence of strong electromagnetic fields.

**Shielded**



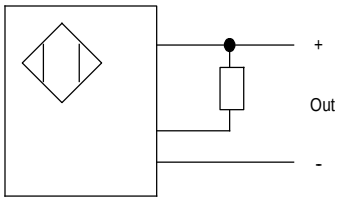
**Unshielded**



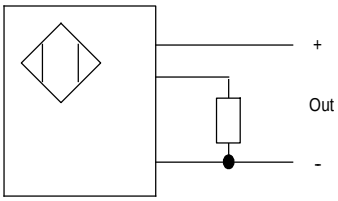
**Normally Open**

**Normally Closed**

**NPN**




**PNP**




**DC** ——

**AC/DC** ⏦

**AC** ∿

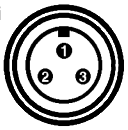
**Connectors**

4-Pin Micro

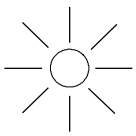
4-Pin Mini

3-Pin Micro

3-Pin Mini

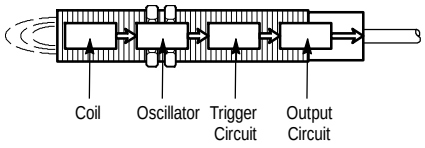



**LED**

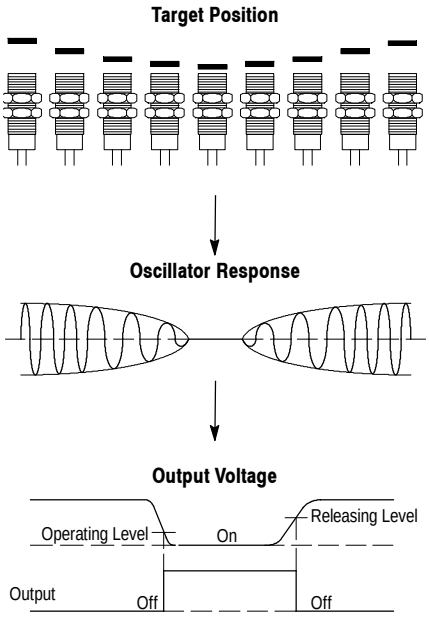


# Notes

## Principles of Operation for Inductive Proximity Sensors

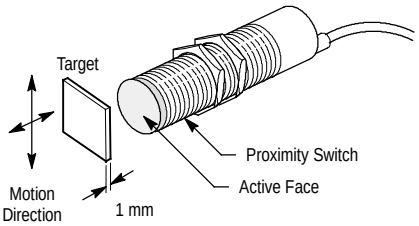



Inductive proximity sensors are designed to operate by generating an electromagnetic field and detecting the eddy current losses generated when ferrous and nonferrous metal target objects enter the field. The sensor consists of a coil on a ferrite core, an oscillator, a trigger-signal level detector and an output circuit. As a metal object advances into the field, eddy currents are induced in the target. The result is a loss of energy and a smaller amplitude of oscillation. The detector circuit then recognizes a specific change in amplitude and generates a signal which will turn the solid-state output "ON" or "OFF."




*A metal target approaching an inductive proximity sensor (above) absorbs energy generated by the oscillator. When the target is in close range, the energy drain stops the oscillator and changes the output state.*

## Standard Target for Inductive Proximity Sensors




The active face of an inductive proximity switch is the surface where a high-frequency electro-magnetic field emerges.

A standard target is a mild steel square, one mm thick, with side lengths equal to the diameter of the active face or three times the nominal switching distance, whichever is greater.

## Target Correction Factors for Inductive Proximity Sensors

To determine the sensing distance for materials other than the standard mild steel, a correction factor is used. The composition of the target has a large effect on sensing distance of inductive proximity sensors. If a target constructed from one of the materials listed is used, multiply the nominal sensing distance by the correction factor listed in order to determine the nominal sensing distance for that target. Note that ferrous-selective sensors will not detect brass, aluminum or copper, while nonferrous selective sensors will not detect steel or ferrous-type stainless steels.

The correction factors listed below can be used as a general guideline. Common materials and their specific correction factors are listed on each product specification page.

(Nominal Sensing Range) x (Correction Factor) = Sensing Range.

**Correction Factors**

| Target Material | Approximate Correction Factor |
|---|---|
| Mild Steel | 1.0 |
| Stainless Steel | 0.85 |
| Brass | 0.50 |
| Aluminum | 0.45 |
| Copper | 0.40 |

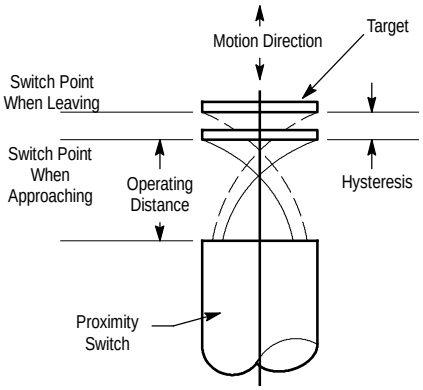
The size and shape of the target may also affect the sensing distance. The following should be used as a general guideline when correcting for the size and shape of a target:

- Flat targets are preferable
- Rounded targets may reduce the sensing distance
- Nonferrous materials usually reduce the sensing distance for all-metal sensing models
- Targets smaller than the sensing face typically reduce the sensing distance
- Targets larger than the sensing face may increase the sensing distance
- Foils may increase the sensing distance

## Hysteresis (Differential Travel)

The difference between the operate and the release points is called hysteresis or differential travel. The amount of target travel required for release after operation must be accounted for when selecting target and sensor locations. Hysteresis is needed to help prevent chattering (turning on and off rapidly) when the sensor is subjected to shock and vibration or when the target is stationary at the nominal sensing distance.

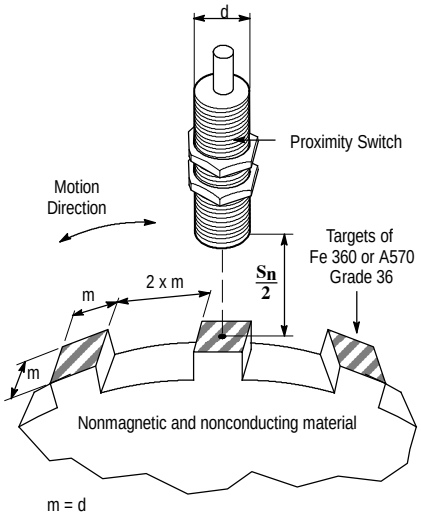
Vibration amplitudes must be smaller than the hysteresis band to avoid chatter.



# Introduction

## Switching Frequency

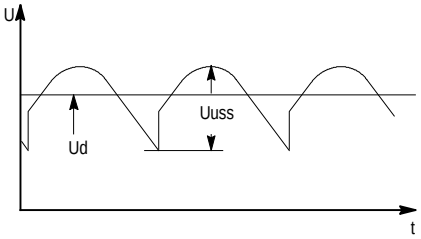
The switching frequency is the maximum speed at which a sensor will deliver discrete individual pulses as the target enters and leaves the sensing field. This value is always dependent on target size, distance from sensing face, speed of target and switch type. This indicates the maximum possible number of switching operations per second. The measuring method for determining switching frequency with standard targets is specified by IEC60947-5-2.




## Ripple

Ripple is the alternating voltage superimposed on the DC voltage (peak to peak) in %.

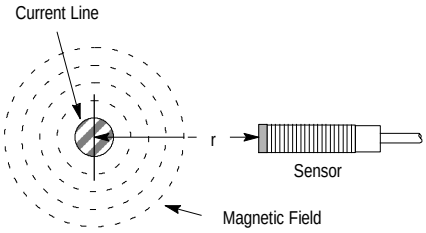
For the operation of DC voltage switches, a filtered DC voltage with a ripple of 10% maximum is required (according to DIN 41755).



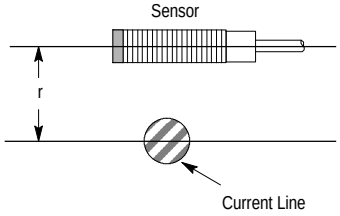

## Mounting Considerations for Weld Field Immune Proximities

Reliable operation is dependent on the strength of the magnetic field and the distance between the current line and the sensor.

**Perpendicular Mounting to the Current Line**




**Parallel Mounting to the Current Line**




Use the following chart or formulas to determine the spacing requirements between the current line and proximity sensor. Select a distance that falls within the safe zone.

- $H = \frac{I}{2\pi r}$
- $B = \frac{H}{0.796}$
- Gauss = 10* B

where:

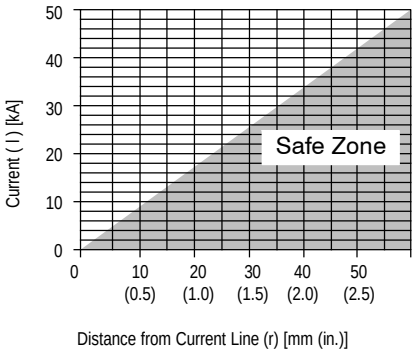
I = welding current (in kA),

H = field strength (in kA/m),

B = flux (in mT), and

r = distance between sensor and current carrying lines (in meters).

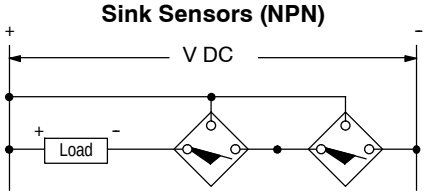
**Weld Field Immunity**



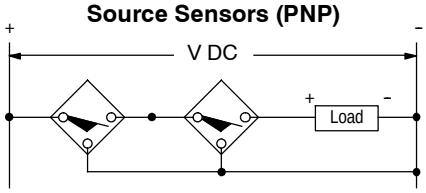

## Series Connected Sensors

Sensors can be connected in series with a load. For proper operation, the load voltage must be less than or equal to the minimum supply voltage minus the voltage drops across the series-connected proximity sensors.

**Wiring Diagram for Series Connected Current Sink Sensors (NPN)**




**Wiring Diagram for Series Connected Current Source Sensors (PNP)**

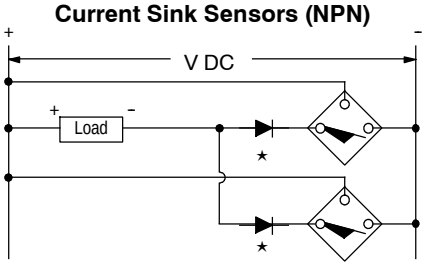


## Parallel Connected Sensors

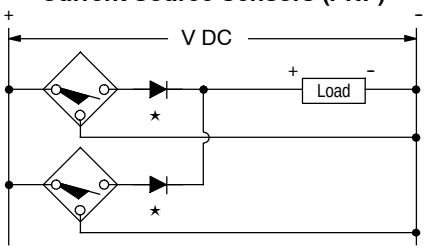
Sensors can be connected in parallel to energize a load. To determine the maximum allowable number of sensors for an application, the sum of the maximum leakage current of the sensors connected in parallel must be less than the maximum OFF-state current of the load device.

**Note:** Care should be taken when designing parallel proximity circuits. If too much leakage current flows into the load it may cause the solid state input to change state or a small relay not to drop out. Sensors connected in parallel do not provide a higher load current capability.

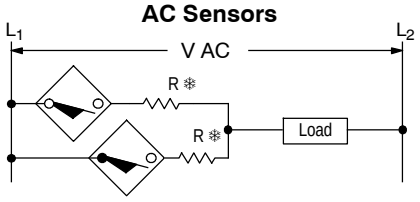
**Wiring Diagram for Parallel Connected Current Sink Sensors (NPN)**




**Wiring Diagram for Parallel Connected Current Source Sensors (PNP)**



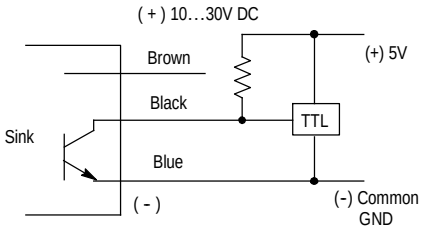

**Wiring Diagram for Parallel Connected AC Sensors**

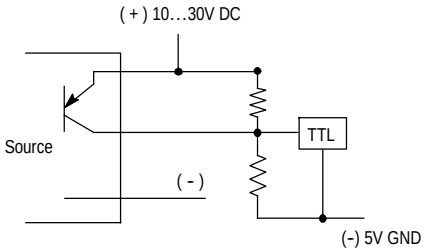



★ Add diode as shown to each output to maintain individual output indicator function.

❄ Add R in series with sensor to maintain minimum voltage when sensor is switching.

## TTL Wiring




**Note:** When using sourcing outputs, ground must be floating and cannot be common, or short circuit will result.

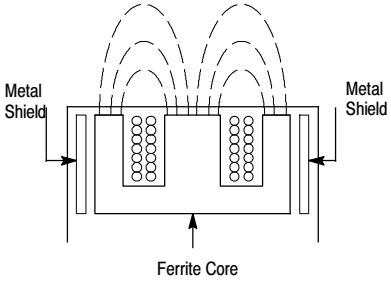
## PLC Wiring

For PLC wiring information for Inductive and Capacitive sensors, refer to publication 871–4.5, June 1996.

# Introduction

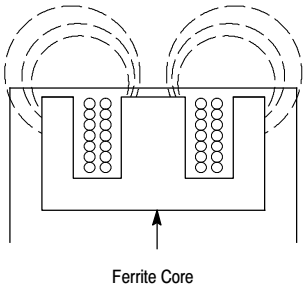
## Shielded vs. Unshielded Inductive Sensors

**Shielded Sensor**




Shielded construction includes a metal band which surrounds the ferrite core and coil arrangement.

**Unshielded Sensor**

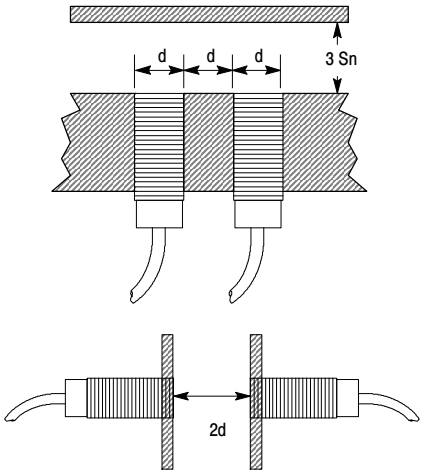



Unshielded sensors do not have this metal band.

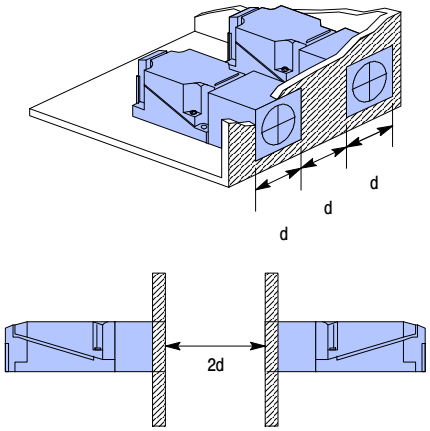
## Spacing Between Shielded Sensors (Flush-Mountable) and Nearby Metal Surfaces

Shielded proximity sensors allow the electro-magnetic field to be concentrated to the front of the sensor face. Shielded construction allows the proximity to be mounted flush in surrounding metal without causing a false trigger.

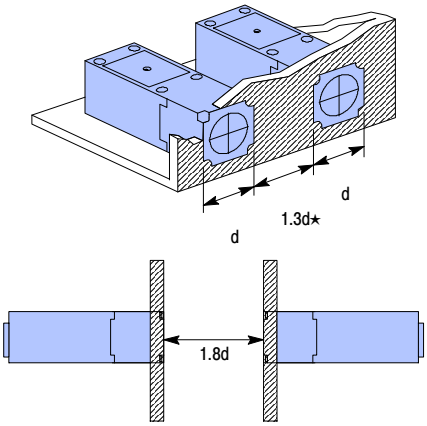
**Tubular Style**



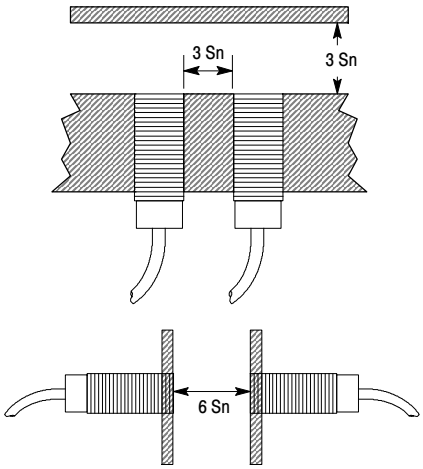

**Limit Switch Style (871L and 872L)**



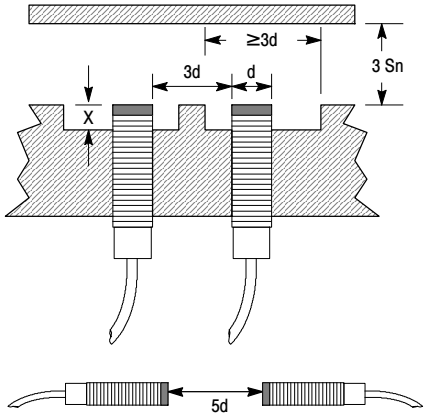

**Limit Switch Style (802PR)**




**Tubular Style Extended Sensing (872C)**




**Tubular Style Long Range Sensing (872C)**




| Housing Diameter | Dimension X |
|---|---|
| 6.5 mm | 1 mm |
| 12 mm | 2 mm |
| 18 mm | 4 mm |
| 30 mm | 6 mm |

d = diameter or width of active sensing face
Sn = nominal sensing distance

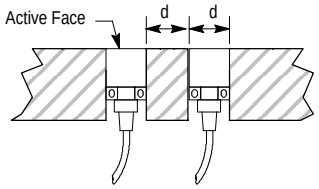
★ 802PR-LB or 802PR-XB can be mounted side by side.

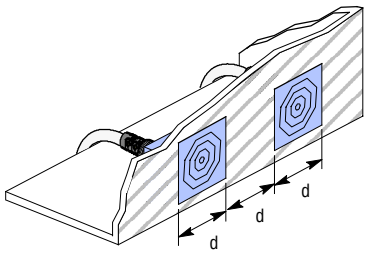


New

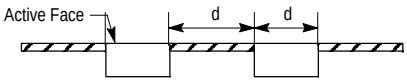
## Spacing Between Shielded Sensors (Flush-Mountable) and Nearby Metal Surfaces (continued)

**Cube Style (871P VersaCube)**

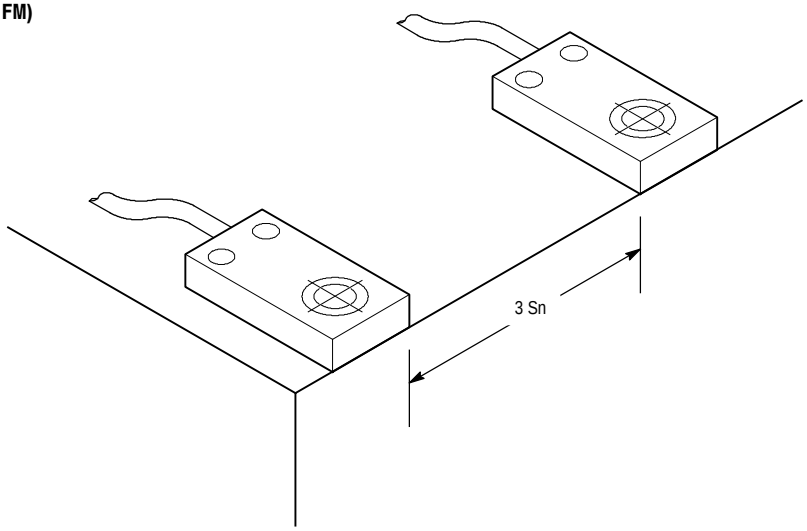



**Flat Pack Style (871F)**




**Miniature Flat Pack Style (871FM)**



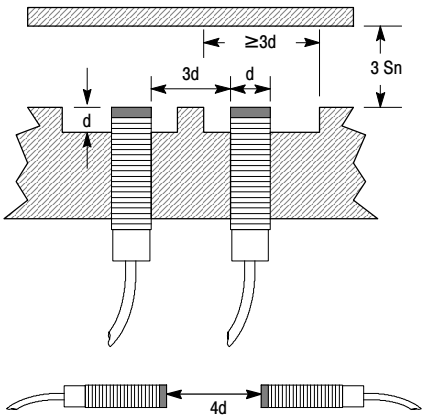

d = diameter or width of active sensing face
Sn = nominal sensing distance

# Introduction

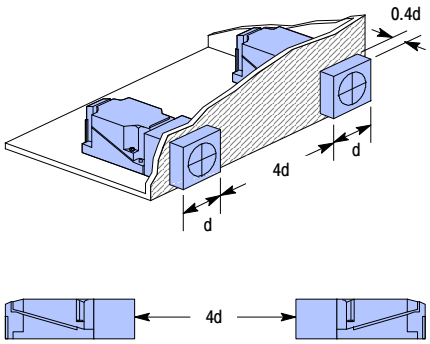
## Spacing Between Unshielded Sensors (Nonflush-Mountable) and Nearby Metal Surfaces

Longer sensing distances can be obtained by using an unshielded sensor. Unshielded proximity sensors require a metal-free zone around the sensing face. Metal immediately opposite the sensing face should be no closer than three times the rated nominal sensing distance of the sensor.

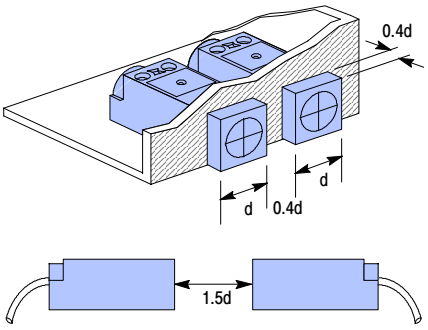
**Tubular Style**



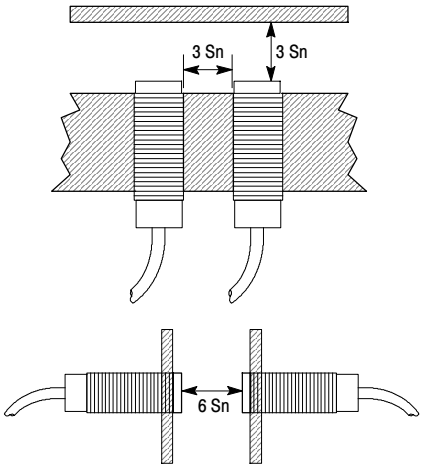

**Limit Switch Style (871L and 872L)**



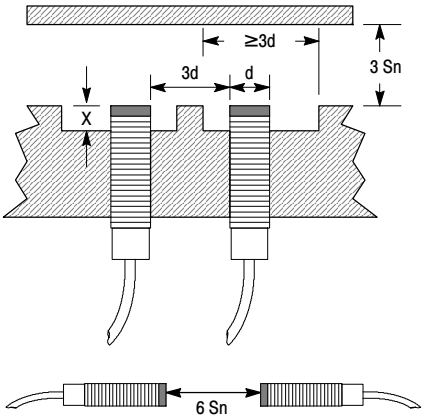

**Limit Switch Style (802PR)**




**Tubular Style Extended Sensing (872C)**




**Tubular Style Long Range Sensing (872C)**



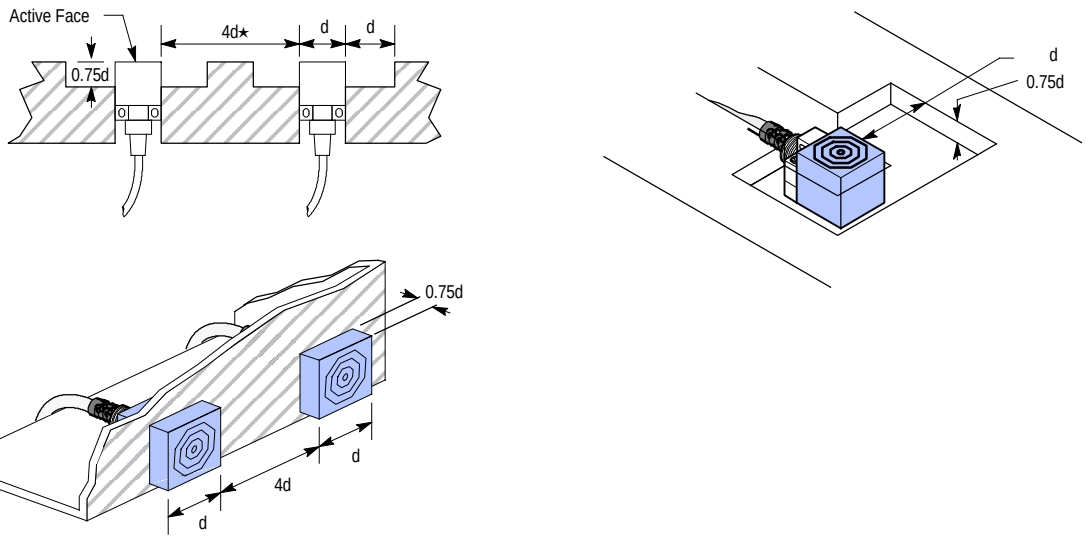

| Housing Diameter | Dimension X |
|---|---|
| 8 mm | 8 mm |
| 12 mm | 13 mm |
| 18 mm | 20 mm |
| 30 mm | 35 mm |



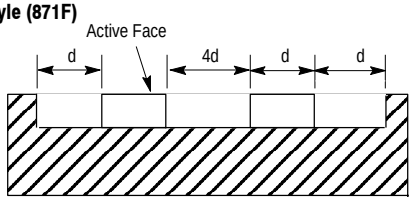
New

## Spacing Between Unshielded Sensors (Nonflush-Mountable) and Nearby Metal Surfaces (continued)

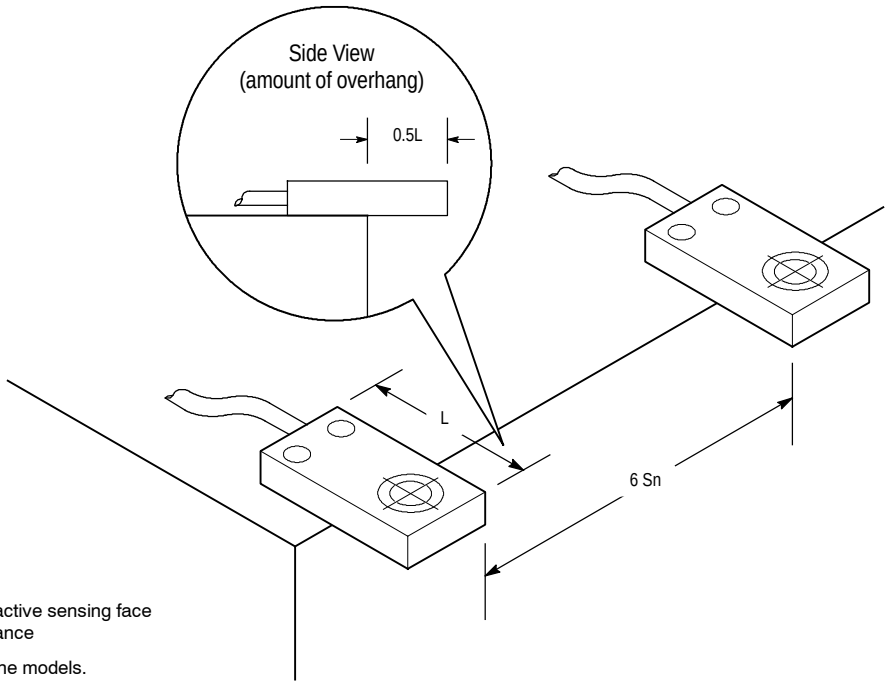
**Cube Style (871P VersaCube)**




**Flat Pack Style (871F)**




**Miniature Flat Pack Style (871FM)**

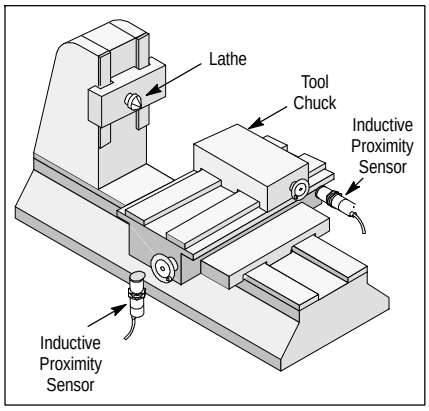



d = diameter or width of active sensing face
Sn = nominal sensing distance

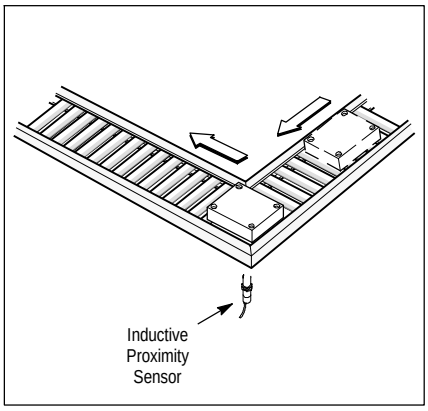
★ 3d for Weld Field Immune models.

# Applications

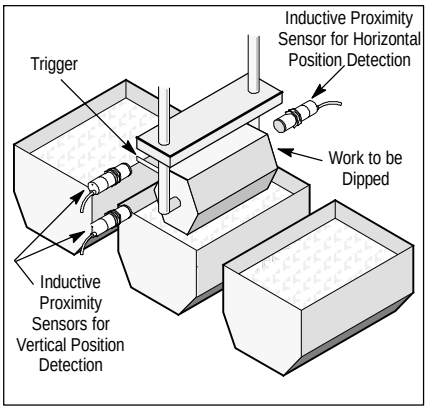
## Machine Tools



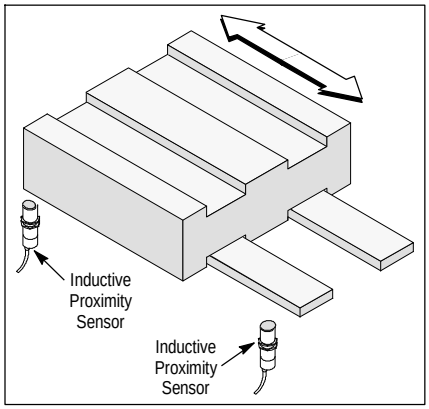

## Plating Line



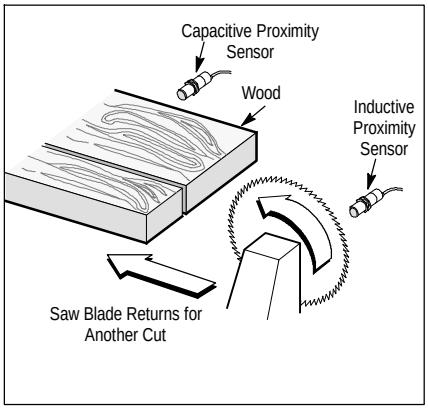

## Plating Line



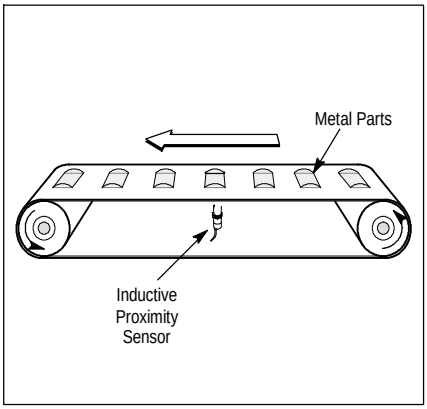

## Grinding Machines



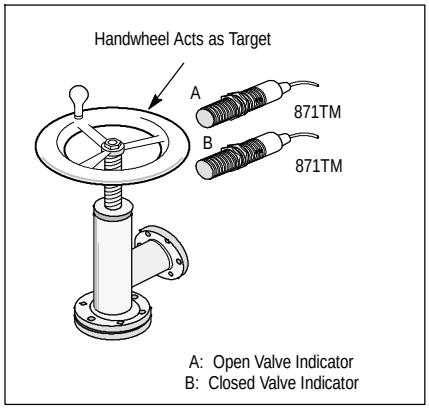

## Wood Industry

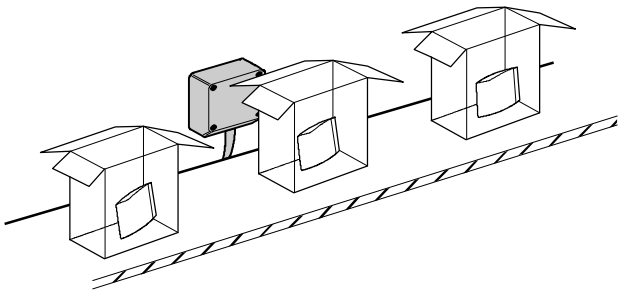



## Conveyor Belts

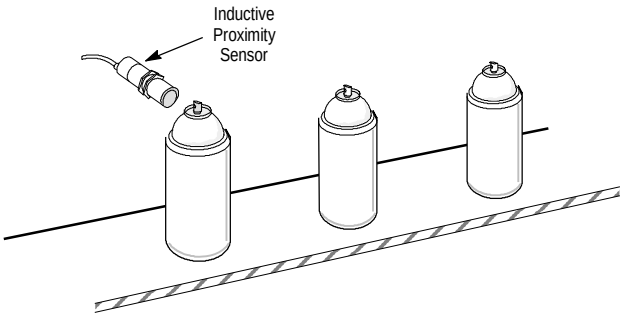



## Petroleum Industry—Valve Position



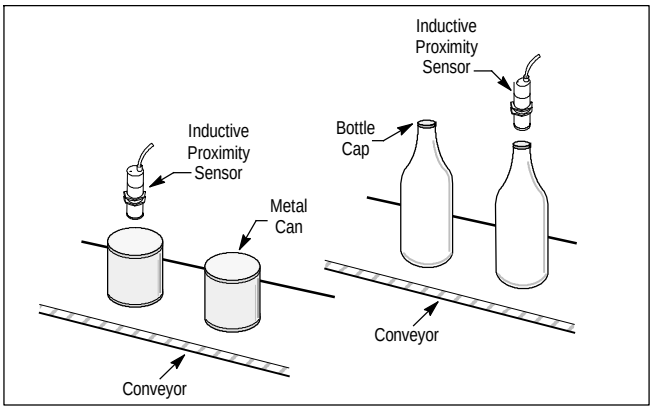


Inductive proximity sensor used to detect a foil seasoning bag inside of a cardboard container.

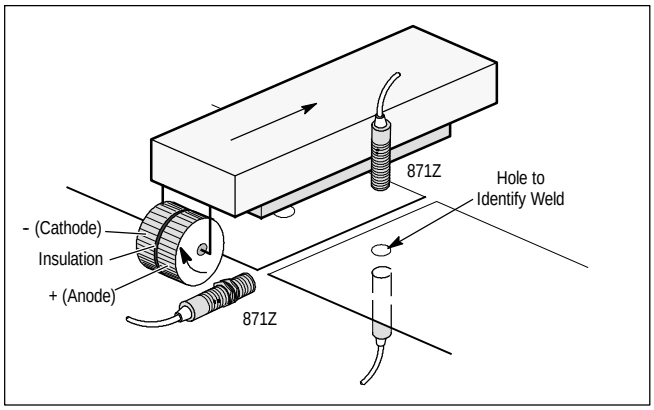



Ferrous selective inductive proximity sensor used to sort ferrous and nonferrous can tops.

## Food Industry

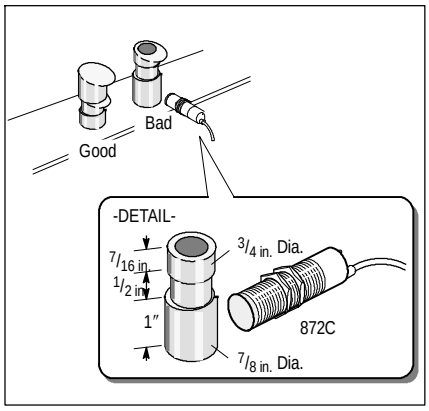



## Stainless Steel Sheet Welder

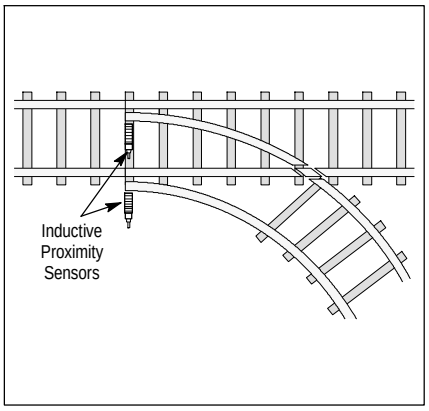


# Applications

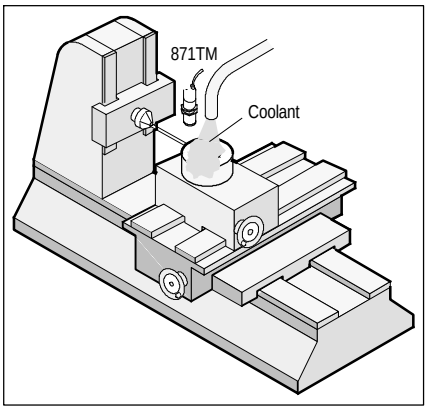
## On Line Parts Sorting



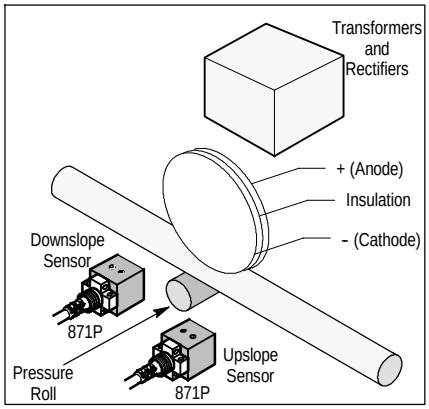

## Railroad Yard Position Sensing



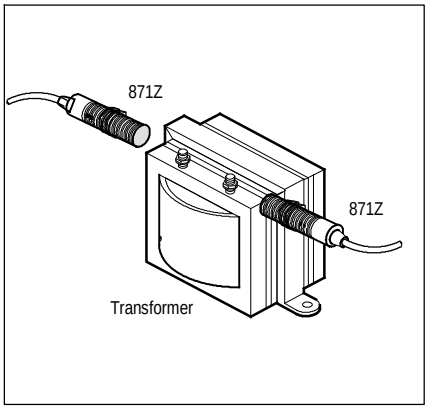

## Coolant Resistant Sensing



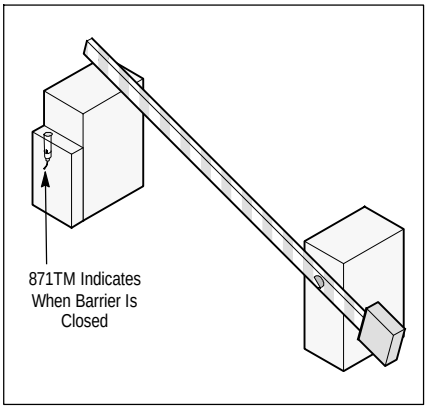

## Up and Downslope Control of Continous Tube Welder



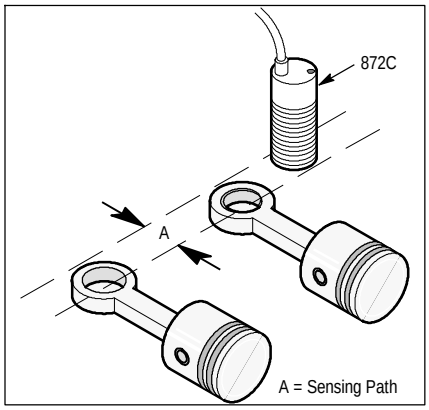

## Nut Placement on Transformer



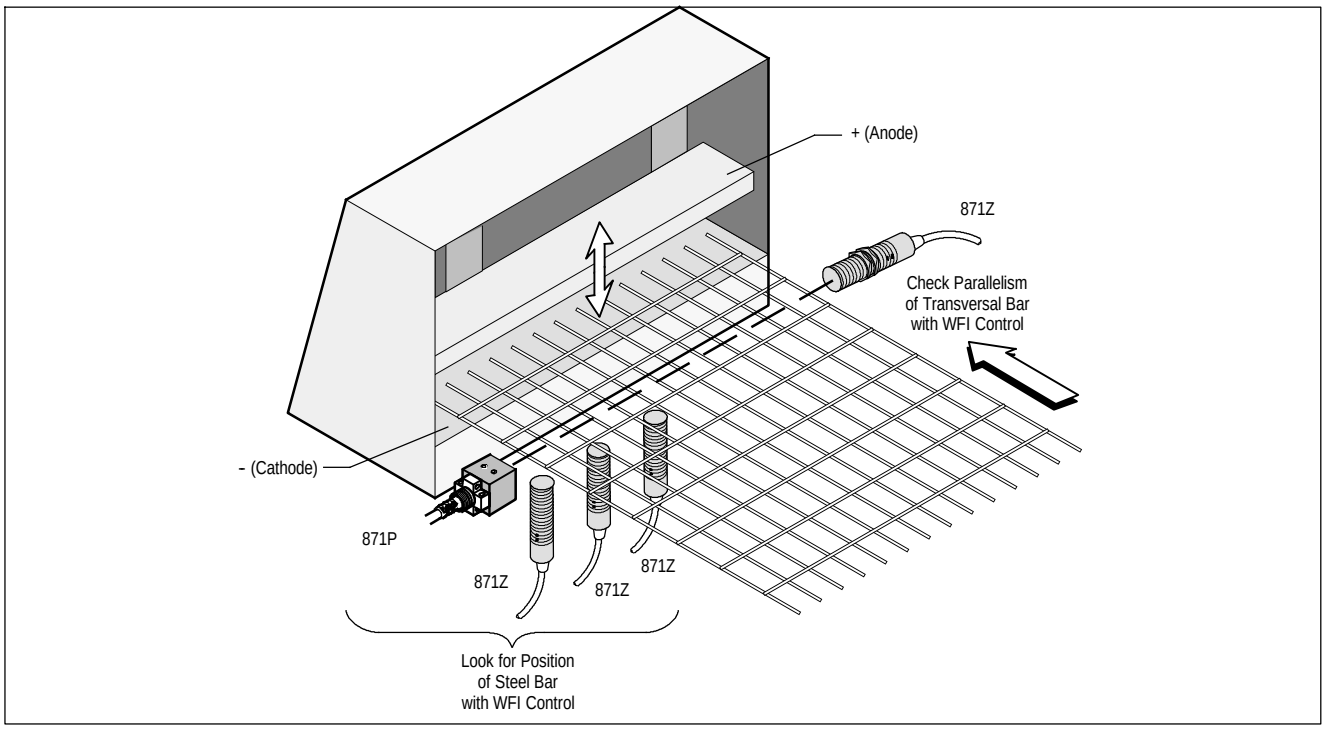

## Closed Barrier Indicator



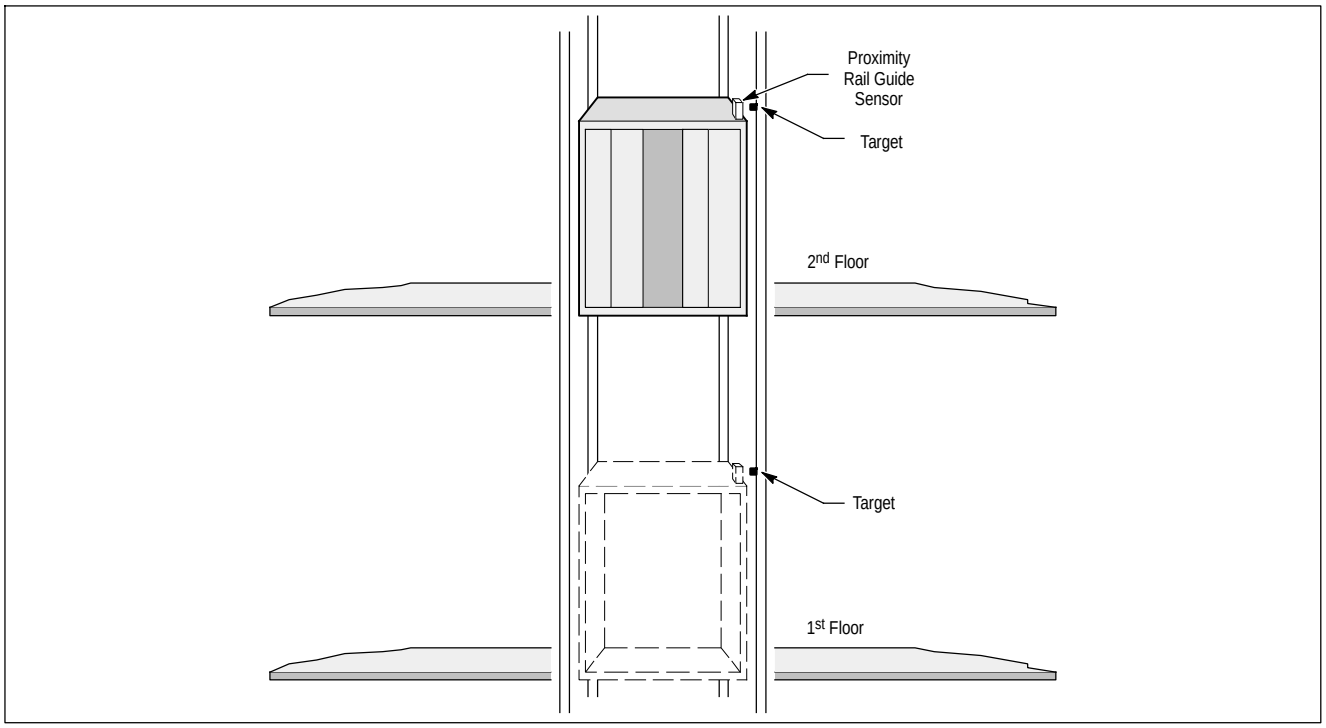

## Detect Presence of Bushing in Piston



## Control Presence of Mild Steel Bars in Grate Welding



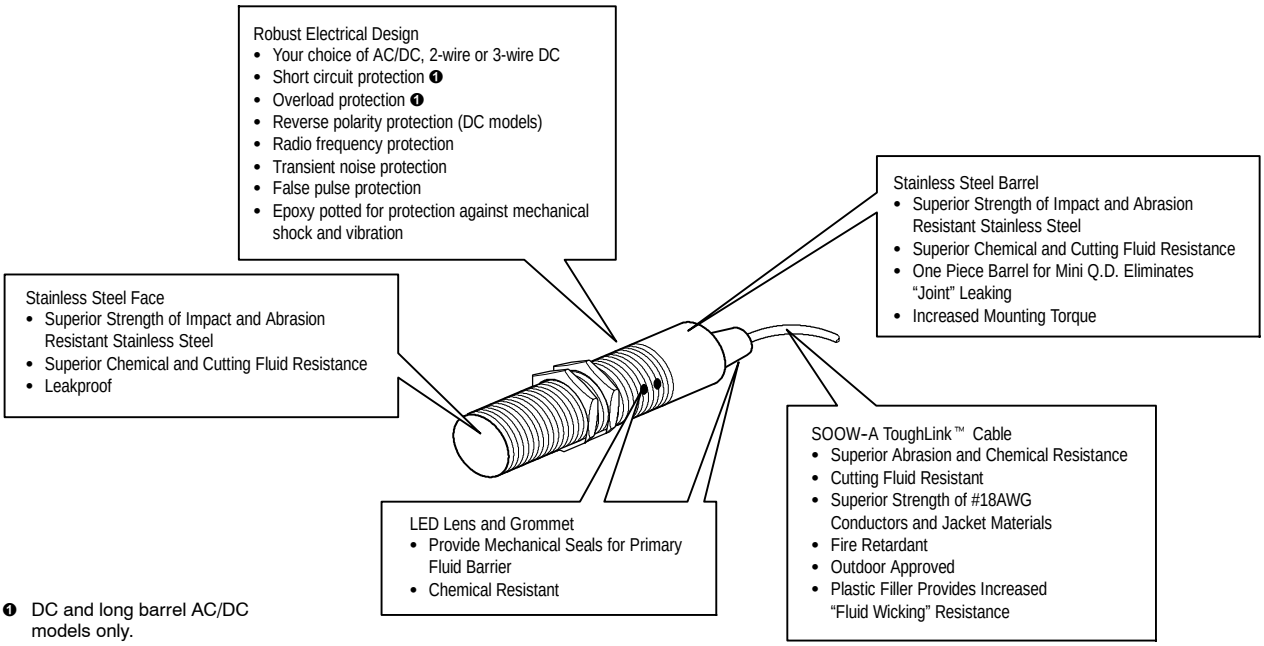

## Elevator Positioning




Rockwell Automation produces rail guide inductive proximity sensors for the positioning of elevator cars. These sensors offer increased accuracy and longer life when compared to typical mechanical switches. They are a cost-effective solution for lowering your repair costs and downtime. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for a proximity sensor tailored to your requirements!

# Applications

## Top 23 Reasons to Use the 871TM




❶ DC and long barrel AC/DC models only.

# Bulletin 871TM

## Stainless Steel Face/Threaded Stainless Steel Barrel

## Description

Designed to reduce your downtime, the Bulletin 871TM is an excellent choice for harsh-environment applications because it stands up to conditions that standard plastic face sensors cannot tolerate. Each sensor is housed by a stainless steel face and barrel which make the front of the sensor leakproof and significantly improve resistance to chemicals, cutting fluid, oils and abrasion. Mechanical seals are provided at all barrel openings. Full epoxy encapsulation provides protection against shock, vibration, and contamination. The electronic circuitry is equipped with transient noise, false pulse, reverse polarity, short-circuit and overload protection.

In addition to standard all-metal sensing models, the 871TM is available in ferrous and nonferrous selective versions that differentiate between iron-based and other metals as well as extended range models for increased sensing distance. For some metals, nonferrous selective sensors can have up to four times the sensing distance of their all-metal sensing equivalents.

Although most carry a NEMA 6P enclosure rating, one style of 871TM is designed particularly for use under temporary submersion and in other extremely wet environments. Its cable grommet is fused directly to the cable jacketing for superior sealing. LEDs have been eliminated to reduce points of possible fluid ingress.

871TM sensors are also available in high- and low-temperature models. Consult your local Rockwell Automation sales office or Allen-Bradley distributor for details.

DeviceNet™ 871TM sensors are also available. These sensors are designed to be connected directly to DeviceNet networks. These models have built-in advanced features and diagnostics such as autobaud, timing options, analog output capability, target too close, target too far, motion detection and teach and learn capabilities.

The Bulletin 871TM is available with Rockwell Automation/Allen-Bradley exclusive ToughLink™ cable, which exceeds SOOW-A ratings and reduces cable failure due to cracking, wearing, melting, or breaking. Other connection options include a PVC cable, mini quick-disconnect, micro quick-disconnect, and EAC micro quick-disconnect.

## Features

- Stainless steel face and barrel
- Full mechanical seals (all-metal sensing models)
- ToughLink™ or PVC cable styles
- Mini, micro or EAC micro quick-disconnect styles
- Short circuit protection ❶
- Overload protection ❶
- Transient noise protection
- False pulse protection
- Reverse polarity protection (DC models)
- Radio frequency interference protection
- UL Listed, CSA Certified, and CE Marked for all applicable directives (most models)

## Styles


DC 3-Wire . . . . . page 2-22
DC 3-Wire Extended Sensing . . . . . page 2-25
DC 3-Wire Ferrous Selective . . . . . page 2-28
DC 3-Wire Nonferrous Selective . . . . . page 2-28
DC 3-Wire Submersible . . . page 2-31
DC 2-Wire . . . . . page 2-33
DC 2-Wire Intrinsically Safe page 2-36
AC/DC 2-Wire . . . . . page 2-41
AC/DC 2-Wire PLC Interfacer . . . . . page 2-44
DeviceNet™ Sensors . . . . page 10-12


## Accessories


Cordsets . . . . . page 8-1
Conduit Adaptors . . . . . page 2-209
Mounting Brackets, Spring Return Style . . . . . page 2-210
Mounting Brackets, Swivel/Tilt Style . . . . . page 2-212
Mounting Brackets, Right Angle Style . . . . . page 2-213
Mounting Brackets, Clamp Style . . . . . page 2-214
End Caps . . . . . page 2-219
Mounting Nuts . . . . . page 2-221
Lock Washers . . . . . page 2-223


## General Information


Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6


❶ Not available on PLC Interfacer models.

# 871TM 3-Wire DC

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

*871TM DC Cable Style*
*12, 18, 30 mm*

*871TM DC Mini*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Short circuit, overload, false pulse, reverse polarity, and transient noise protection
- Normally open or normally closed output
- UL Listed, CSA Certified, and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Capacitive Load | ≤1 μF |
| Leakage Current | ≤10 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1V DC at 200 mA |
| Repeatability | ≤10% at constant temperature |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated (trigger at 340 mA typical) |
| Overload Protection | Incorporated |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC529) all models;<br>1200 psi (8270 kPa) washdown; stainless steel face and barrel;<br>ToughLink™ and micro connector versions are also rated IP69K (IEC 529) |
| Connections | Cable: 2 m (6.5 ft) length<br>A2–3-conductor PVC<br>C2–3-conductor #22AWG ToughLink<br>H2–3-conductor #18 AWG ToughLink<br>Quick-Disconnect: 4-pin mini style<br>4-pin micro style |
| LED | Red: Output Energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.0 |
| Brass | 0.3…0.5 |
| Aluminum | 0.1…0.4 |
| Aluminum ≤0.020 Thick | 0.9…1.1 |
| Copper | 0.4…0.6 |

## Product Selection

| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PVC Cable | ToughLink™ Cable | Mini QD Style | Micro QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | NPN | 75 | 871TM-DH2NN12-A2 | 871TM-DH2NN12-C2 | 871TM-DH2NN12-N4 | 871TM-DH2NN12-D4 |
| | | | | PNP | | 871TM-DH2NP12-A2 | 871TM-DH2NP12-C2 | 871TM-DH2NP12-N4 | **871TM-DH2NP12-D4** |
| | 4 (0.16) | N | | NPN | 70 | 871TM-DH4NN12-A2 | 871TM-DH4NN12-C2 | 871TM-DH4NN12-N4 | 871TM-DH4NN12-D4 |
| | | | | PNP | | 871TM-DH4NP12-A2 | 871TM-DH4NP12-C2 | 871TM-DH4NP12-N4 | **871TM-DH4NP12-D4** |
| | 2 (0.08) | Y | N.C. | NPN | 75 | 871TM-DH2CN12-A2 | 871TM-DH2CN12-C2 | 871TM-DH2CN12-N4 | 871TM-DH2CN12-D4 |
| | | | | PNP | | 871TM-DH2CP12-A2 | 871TM-DH2CP12-C2 | 871TM-DH2CP12-N4 | 871TM-DH2CP12-D4 |
| | 4 (0.16) | N | | NPN | 70 | 871TM-DH4CN12-A2 | 871TM-DH4CN12-C2 | 871TM-DH4CN12-N4 | 871TM-DH4CN12-D4 |
| | | | | PNP | | 871TM-DH4CP12-A2 | 871TM-DH4CP12-C2 | 871TM-DH4CP12-N4 | 871TM-DH4CP12-D4 |
| 18 mm | 5 (0.20) | Y | N.O. | NPN | 60 | 871TM-DH5NN18-A2 | 871TM-DH5NN18-H2 | 871TM-DH5NN18-N4 | **871TM-DH5NN18-D4** |
| | | | | PNP | | 871TM-DH5NP18-A2 | 871TM-DH5NP18-H2 | **871TM-DH5NP18-N4** | **871TM-DH5NP18-D4** |
| | 8 (0.31) | N | | NPN | 40 | 871TM-DH8NN18-A2 | 871TM-DH8NN18-H2 | 871TM-DH8NN18-N4 | **871TM-DH8NN18-D4** |
| | | | | PNP | | 871TM-DH8NP18-A2 | 871TM-DH8NP18-H2 | 871TM-DH8NP18-N4 | **871TM-DH8NP18-D4** |
| | 5 (0.20) | Y | N.C. | NPN | 60 | 871TM-DH5CN18-A2 | 871TM-DH5CN18-H2 | 871TM-DH5CN18-N4 | 871TM-DH5CN18-D4 |
| | | | | PNP | | 871TM-DH5CP18-A2 | 871TM-DH5CP18-H2 | 871TM-DH5CP18-N4 | 871TM-DH5CP18-D4 |
| | 8 (0.31) | N | | NPN | 40 | 871TM-DH8CN18-A2 | 871TM-DH8CN18-H2 | 871TM-DH8CN18-N4 | 871TM-DH8CN18-D4 |
| | | | | PNP | | 871TM-DH8CP18-A2 | 871TM-DH8CP18-H2 | 871TM-DH8CP18-N4 | 871TM-DH8CP18-D4 |
| 30 mm | 10 (0.39) | Y | N.O. | NPN | 40 | 871TM-DH10NN30-A2 | 871TM-DH10NN30-H2 | 871TM-DH10NN30-N4 | 871TM-DH10NN30-D4 |
| | | | | PNP | | 871TM-DH10NP30-A2 | 871TM-DH10NP30-H2 | 871TM-DH10NP30-N4 | **871TM-DH10NP30-D4** |
| | 15 (0.59) | N | | NPN | 30 | 871TM-DH15NN30-A2 | 871TM-DH15NN30-H2 | 871TM-DH15NN30-N4 | 871TM-DH15NN30-D4 |
| | | | | PNP | | 871TM-DH15NP30-A2 | 871TM-DH15NP30-H2 | 871TM-DH15NP30-N4 | **871TM-DH15NP30-D4** |
| | 10 (0.39) | Y | N.C. | NPN | 40 | 871TM-DH10CN30-A2 | 871TM-DH10CN30-H2 | 871TM-DH10CN30-N4 | 871TM-DH10CN30-D4 |
| | | | | PNP | | 871TM-DH10CP30-A2 | 871TM-DH10CP30-H2 | 871TM-DH10CP30-N4 | 871TM-DH10CP30-D4 |
| | 15 (0.59) | N | | NPN | 30 | 871TM-DH15CN30-A2 | 871TM-DH15CN30-H2 | 871TM-DH15CN30-N4 | 871TM-DH15CN30-D4 |
| | | | | PNP | | 871TM-DH15CP30-A2 | 871TM-DH15CP30-H2 | 871TM-DH15CP30-N4 | 871TM-DH15CP30-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | | 889N-F4AFC-6F | 889D-F4AC-2 |

## QD Cordsets and Accessories

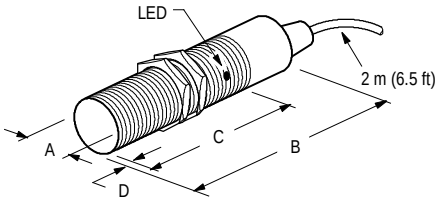
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 871TM 3-Wire DC

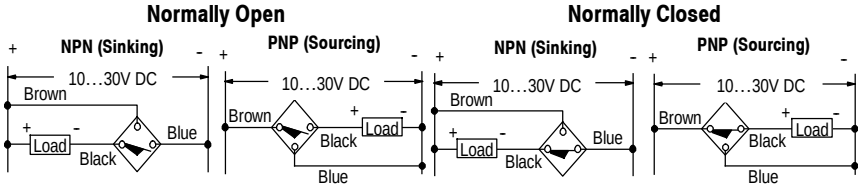
## Stainless Steel Face/Threaded Short Stainless Steel Barrel

### Approximate Dimensions [mm (in.)]

#### Cable Style

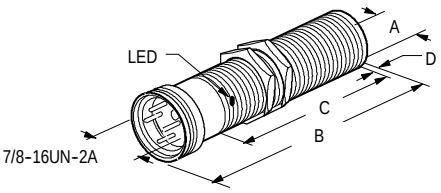


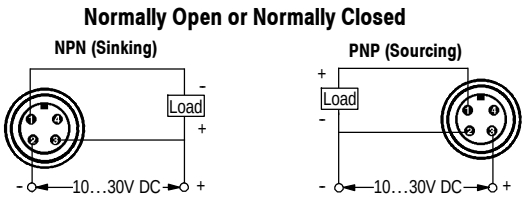

### Wiring Diagrams




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 49.8 (1.96) | 26.4 (1.04) | 2.5 (0.10) |
| | N | | | 19.5 (0.77) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 55.4 (2.18) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 57.9 (2.28) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

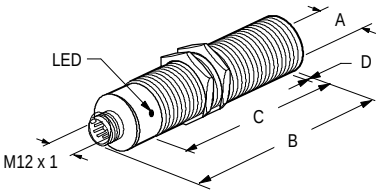
#### Mini QD Style

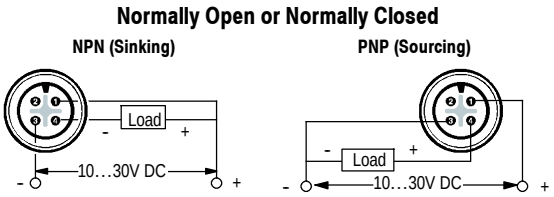



| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 63.5 (2.50) | 25.4 (1.00) | 2.5 (0.10) |
| | N | | | 18.5 (0.73) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 56.1 (2.21) | 35.1 (1.38) | 2.5 (0.10) |
| | N | | | 29.2 (1.15) | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 68.1 (2.68) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

#### Micro QD Style




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 61.0 (2.40) | 26.4 (1.04) | 2.5 (0.10) |
| | N | | | 28 (1.10) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 65.0 (2.56) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 66.3 (2.61) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

# 871TM 3-Wire DC Extended Sensing

## Stainless Steel Face/Threaded Stainless Steel Barrel

*871TM DC Cable Style*
*8 mm*

*871TM DC Micro*
*Quick-Disconnect Style*
*12 mm*

*871TM DC Micro*
*Quick-Disconnect Style*
*18 mm*

*871TM DC Micro*
*Quick-Disconnect Style*
*30 mm*

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Capacitive Load | ≤1 μF |
| Leakage Current | ≤0.1 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.0V DC at 200 mA |
| Repeatability | ≤5% at constant temperature |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated (trigger at 340 mA typical) |
| Overload Protection | Incorporated |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | IP67 |
| Connections | Cable: 2 m (6.5 ft) length PUR<br>Quick Disconnect: 4-pin micro style<br>3-pin pico style |
| LED | Yellow: Output energized/360° LED visibility; flashing LED indicates target located between 80…100% of rated sensing distance |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel (1 mm thick) | 0.1 |
| Brass | 1.2 |
| Aluminum | 1.0 |
| Copper | 0.8 |

## Features

- 3-wire operation
- 3-conductor, 4-pin connection
- 10…30V DC
- Short circuit, overload, false pulse, reverse polarity, and transient noise protection
- Normally open or normally closed output
- Equal sensing for both steel and aluminum
- cULus Listed and CE Marked for all applicable directives

| | |
|---|---|
| **IMPORTANT** | Due to the extended sensing capabilities of these products, special mounting/installation considerations may be necessary, please refer to publication 871TM-UM001A-EN-P. |

# 871TM 3-Wire DC Extended Sensing

## Stainless Steel Face/Threaded Stainless Steel Barrel

### Product Selection

| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Max Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | PUR Cable Style | Micro QD Style | Pico QD Style |
| 8 mm | 3 (0.12) | Y | N.O. | NPN | ≤ 700 | 871TM-M3NN8-J2 | 871TM-M3NN8-D4 | 871TM-M3NN8-P3 |
| | | | | PNP | | 871TM-M3NP8-J2 | 871TM-M3NP8-D4 | 871TM-M3NP8-P3 |
| | 6 (0.23) | N | | NPN | | 871TM-N6NN8-J2 | 871TM-N6NN8-D4 | 871TM-N6NN8-P3 |
| | | | | PNP | | 871TM-N6NP8-J2 | 871TM-N6NP8-D4 | 871TM-N6NP8-P3 |
| | 3 (0.12) | Y | N.C. | NPN | | 871TM-M3CN8-J2 | 871TM-M3CN8-D4 | 871TM-M3CN8-P3 |
| | | | | PNP | | 871TM-M3CP8-J2 | 871TM-M3CP8-D4 | 871TM-M3CP8-P3 |
| | 6 (0.23) | N | | NPN | | 871TM-N6CN8-J2 | 871TM-N6CN8-D4 | 871TM-M6CN8-P3 |
| | | | | PNP | | 871TM-N6CP8-J2 | 871TM-N6CP8-D4 | 871TM-N6CP8-P3 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft) PUR | | | | | | | 889D-F4AC-2 | 889P-F3AB-2 |

| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Max Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | PUR Cable Style | Micro QD Style |
| 12 mm | 6 (0.23) | Y | N.O. | NPN | 400 | 871TM-M6NN12-A2 | 871TM-M6NN12-D4 |
| | | | | PNP | | 871TM-M6NP12-A2 | **871TM-M6NP12-D4** |
| | 10 (0.39) | N | | NPN | | 871TM-N10NN12-A2 | 871TM-N10NN12-D4 |
| | | | | PNP | | 871TM-N10NP12-A2 | **871TM-N10NP12-D4** |
| | 6 (0.23) | Y | N.C. | NPN | | 871TM-M6CN12-A2 | 871TM-M6CN12-D4 |
| | | | | PNP | | 871TM-M6CP12-A2 | 871TM-M6CP12-D4 |
| | 10 (0.39) | N | | NPN | | 871TM-N10CN12-A2 | 871TM-N10CN12-D4 |
| | | | | PNP | | 871TM-N10CP12-A2 | 871TM-N10CP12-D4 |
| 18 mm | 10 (0.39) | Y | N.O. | NPN | 200 | 871TM-M10NN18-A2 | 871TM-M10NN18-D4 |
| | | | | PNP | | 871TM-M10NP18-A2 | **871TM-M10NP18-D4** |
| | 20 (0.79) | N | | NPN | | 871TM-N20NN18-A2 | 871TM-N20NN18-D4 |
| | | | | PNP | | 871TM-N20NP18-A2 | 871TM-N20NP18-D4 |
| | 10 (0.39) | Y | N.C. | NPN | | 871TM-M10CN18-A2 | 871TM-M10CN18-D4 |
| | | | | PNP | | 871TM-M10CP18-A2 | 871TM-M10CP18-D4 |
| | 20 (0.79) | N | | NPN | | 871TM-N20CN18-A2 | 871TM-N20CN18-D4 |
| | | | | PNP | | 871TM-N20CP18-A2 | 871TM-N20CP18-D4 |
| 30 mm | 20 (0.79) | Y | N.O. | NPN | 80 | 871TM-M20NN30-A2 | 871TM-M20NN30-D4 |
| | | | | PNP | | 871TM-M20NP30-A2 | **871TM-M20NP30-D4** |
| | 40 (1.57) | N | | NPN | | 871TM-N40NN30-A2 | 871TM-N40NN30-D4 |
| | | | | PNP | | 871TM-N40NP30-A2 | 871TM-N40NP30-D4 |
| | 20 (0.79) | Y | N.C. | NPN | | 871TM-M20CN30-A2 | 871TM-M20CN30-D4 |
| | | | | PNP | | 871TM-M20CP30-A2 | 871TM-M20CP30-D4 |
| | 40 (1.57) | N | | NPN | | 871TM-N40CN30-A2 | 871TM-N40CN30-D4 |
| | | | | PNP | | 871TM-N40CP30-A2 | 871TM-N40CP30-D4 |
| Recommended Standard QD Cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4AC-2 |

### QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |



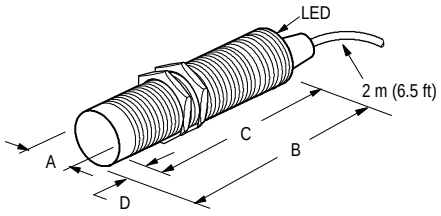
Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

# 871TM 3-Wire DC Extended Sensing

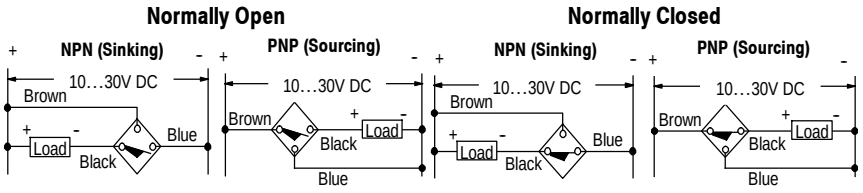
## Stainless Steel Face/Threaded Stainless Steel Barrel

## Approximate Dimensions [mm (in.)]

### Cable Style

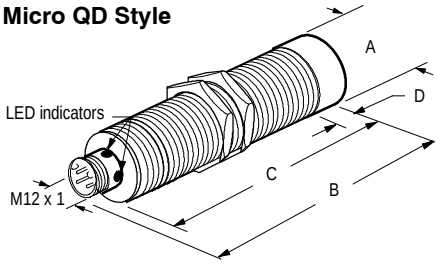


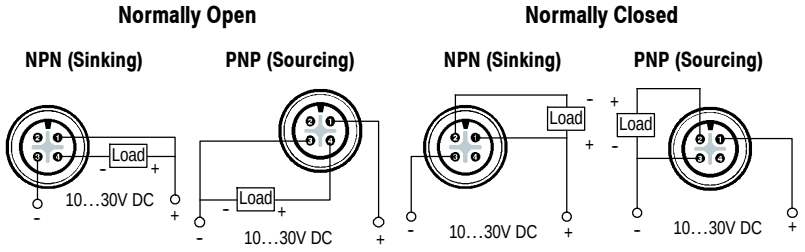

## Wiring Diagrams




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M8 X 1 | Y | 8.0 (0.31) | 45 (1.76) | 45 (1.76) | — |
| | N | | | 41 (1.61) | 4 (0.16) |
| M12 X 1 | Y | 12.0 (0.47) | 50 (1.96) | 50 (1.96) | — |
| | N | | | 45 (1.77) | 5 (0.19) |
| M18 X 1 | Y | 18.0 (0.71) | | 50 (1.96) | — |
| | N | | | 43 (1.69) | 7 (0.27) |
| M30 X 1.5 | Y | 30.0 (1.18) | | 50 (1.96) | — |
| | N | | | 40 (1.57) | 10 (0.39) |

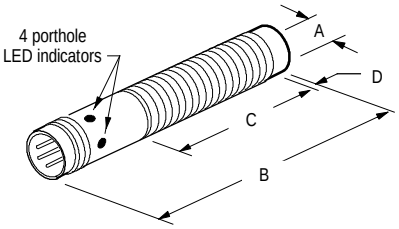
### Micro QD Style

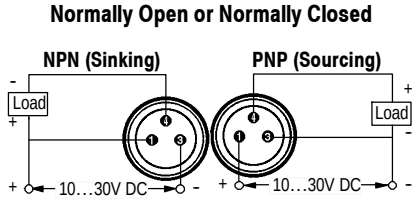



| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M8 X 1 | Y | 8.0 (0.31) | 66 (2.59) | 46 (1.81) | — |
| | N | | | 42 (1.65) | 4 (0.16) |
| M12 X 1 | Y | 12.0 (0.47) | 60 (2.36) | 41 (1.61) | — |
| | N | | | 36 (1.42) | 5 (0.20) |
| M18 X 1 | Y | 18.0 (0.71) | 63.5 (2.5) | 42.5 (1.67) | — |
| | N | | | 35.5 (1.40) | 7 (0.28) |
| M30 X 1.5 | Y | 30.0 (1.18) | 63.5 (2.5) | 42.5 (1.67) | — |
| | N | | | 32.5 (1.28) | 10 (0.39) |

### Pico QD Style




| Thread Size | Smooth Diameter | Shielded | [mm (in.)] A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 X 1 | — | Y | 8.0 (0.31) | 60 (2.35) | 45.5 (1.79) | — |
| | | N | | | 41.5 (1.63) | 4.0 (0.16) |

# 871TM 3-Wire DC Ferrous or Nonferrous Selective

## Stainless Steel Face/Threaded Stainless Steel Barrel

*871TM DC Cable Style*
*12, 18, 30 mm*

*871TM DC Mini*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Ferrous or nonferrous selective sensing
- Short circuit, overload, false pulse, reverse polarity, and transient noise protection
- Normally open or normally closed output
- UL Listed, CSA Certified, and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Capacitive Load | ≤1 μF |
| Leakage Current | ≤10 mA |
| Operating Voltage | 10…30 V DC |
| Voltage Drop | ≤1V DC at 200 mA |
| Repeatability | ≤10% at constant temperature |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated (trigger at 340 mA typical) |
| Overload Protection | Incorporated |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13 IP67 (IEC529) all models;<br>1200 psi (8270 kPa) washdown; stainless steel face and barrel;<br>ToughLink™ and micro connector versions are also rated IP69K (IEC 529) |
| Connections | Cable: 2 m (6.5 ft) length<br>A2–3-conductor PVC<br>C2–3-conductor #22 AWG ToughLink™<br>H2–3-conductor #18 AWG ToughLink<br>Quick-Disconnect: 4-pin mini style<br>4-pin micro style |
| LEDs | Red: Output Energized<br>Green: Power/Short Circuit (flashing)—18 mm models only |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor | |
|---|---|---|
| | Ferrous Selective | Nonferrous Selective |
| Steel | 1.0 | 0.0 |
| Stainless Steel | 0…1.0❶ | 0…1.0❶ |
| Brass | 0.0 | 1.0 |
| Aluminum | 0.0 | 1.0 |
| Aluminum >0.003 Thick | 0.0 | 1.0 |
| Copper | 0.0 | 1.0 |

❶ Variation due to differences in alloy composition.



New

# 871TM 3-Wire DC Ferrous or Nonferrous Selective

## Stainless Steel Face/Threaded Stainless Steel Barrel

## Product Selection

| Barrel Dia. [mm] | Nominal Sensing Distance [mm (in.)] | Shield | Output Config. | | Switching Freq. [Hz] | Target Type | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | PVC Cable | ToughLink™ Cable | Mini QD | Micro QD |
| 12 | 1 (0.04) | Yes | N.O. | PNP | 25 | Ferrous | 871TM-DF1NP12-A2 | 871TM-DF1NP12-C2 | 871TM-DF1NP12-N4 | 871TM-DF1NP12-D4 |
| | | | | NPN | | | — | 871TM-DF1NN12-C2 | 871TM-DF1NN12-N4 | 871TM-DF1NN12-D4 |
| | | | N.C. | PNP | | | — | — | 871TM-DF1CP12-N4 | 871TM-DF1CP12-D4 |
| | | | | NPN | | | — | — | 871TM-DF1CN12-N4 | 871TM-DF1CN12-D4 |
| 18 | 3 (0.12) | | N.O. | PNP | 10 | Ferrous | — | 871TM-DF3NP18-H2 | 871TM-DF3NP18-N4 | 871TM-DF3NP18-D4 |
| | | | | NPN | | | — | 871TM-DF3NN18-H2 | 871TM-DF3NN18-N4 | — |
| | | | N.C. | PNP | | | — | — | 871TM-DF3CP18-N4 | 871TM-DF3CP18-D4 |
| | 5 (0.20) | | N.O. | PNP | 20 | Nonferrous | 871TM-DN5NP18-A2 | 871TM-DN5NP18-H2 | 871TM-DN5NP18-N4 | 871TM-DN5NP18-D4 |
| | | | N.C. | | | | — | — | — | 871TM-DN5CP18-D4 |
| 30 | 10 (0.39) | | N.O. | PNP | 15 | Nonferrous | 871TM-DN10NP30-A2 | 871TM-DN10NP30-H2 | 871TM-DN10NP30-N4 | 871TM-DN10NP30-D4 |
| | | | N.C. | | | | — | — | — | 871TM-DN10CP30-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | | | 889N-F4AFC-6F | 889D-F4AC-2 |

## QD Cordsets and Accessories

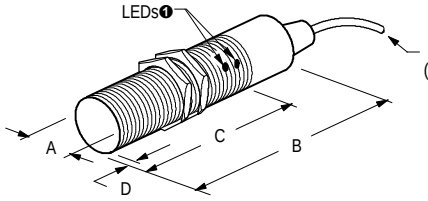
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 871TM 3-Wire DC Ferrous or Nonferrous Selective

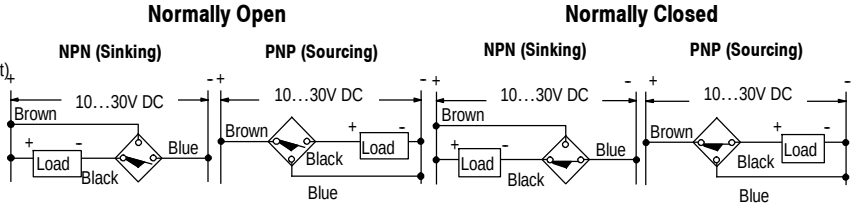
## Stainless Steel Face/Threaded Stainless Steel Barrel

### Approximate Dimensions [mm (in.)]

#### Cable Style



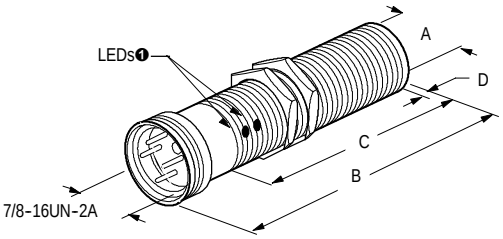

### Wiring Diagrams

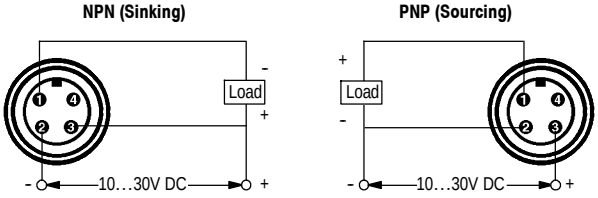



❶ Available for 18 mm models only

| Thread Size | Shielded | Target Type | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|---|
| M12 X 1 | Y | Ferrous | 12.0 (0.47) | 51.0 (2.01) | 27.5 (1.08) | — |
| M18 X 1 | | Ferrous | 18.0 (0.71) | 76.8 (3.02) | 65.0 (2.56) | — |
| | | Nonferrous | 18.0 (0.71) | 74.7 (2.94) | 60.0 (2.36) | 2.5 (0.10) |
| M30 X 1.5 | | Nonferrous | 30.0 (1.18) | 77.5 (3.05) | 63.0 (2.48) | 2.5 (0.10) |

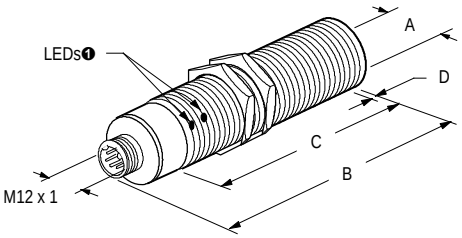
#### Mini QD Style

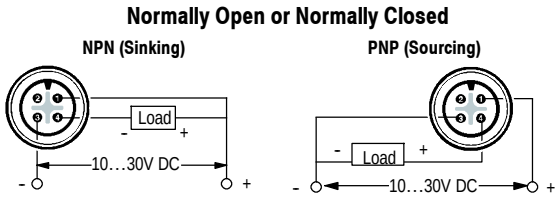



| Thread Size | Shielded | Target Type | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|---|
| M12 X 1 | Y | Ferrous | 12.0 (0.47) | 61.3 (2.45) | 30.4 (1.20) | — |
| M18 X 1 | | Ferrous | 18.0 (0.71) | 78.5 (3.14) | 60.0 (2.40) | — |
| | | Nonferrous | 18.0 (0.71) | 76.6 (3.02) | 54.9 (2.16) | 2.5 (0.10) |
| M30 X 1.5 | | Nonferrous | 30.0 (1.18) | 86.0 (3.39) | 63.5 (2.50) | 2.5 (0.10) |

#### Micro QD Style




❶ Available for 18 mm models only

| Thread Size | Shielded | Target Type | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|---|
| M12 X 1 | Y | Ferrous | 12.0 (0.47) | 62.3 (2.45) | 30.4 (1.20) | 0.9 (0.04) |
| M18 X 1 | | Ferrous | 18.0 (0.71) | 85.0 (3.35) | 65.5 (2.58) | 2.0 (0.08) |
| | | Nonferrous | 18.0 (0.71) | 84.3 (3.32) | 60.0 (2.36) | 2.5 (0.10) |
| M30 X 1.5 | Y | Nonferrous | 30.0 (1.18) | 85.5 (3.37) | 63.0 (2.48) | 2.5 (0.10) |



New

# 871TM 3-Wire DC Submersible

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

*871TM DC Cable Style*
*18 mm*

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Short circuit, overload, false pulse, reverse polarity and transient noise protection
- Normally open or normally closed output
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Capacitive Load | ≤ 1μF |
| Leakage Current | ≤10 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1V DC at 200 mA |
| Repeatability | ≤1% at constant temperature |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated (trigger at 340 mA typical) |
| Overload Protection | Incorporated |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP68 (IEC529) and IP69K (IEC 529); 1200 psi (8270 kPa) washdown; stainless steel face and barrel; |
| Connections | Cable: 5 m (16.4 ft) length<br>3-conductor #18 AWG ToughLink |
| LED | None |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.0 |
| Brass | 0.3…0.5 |
| Aluminum | 0.1…0.4 |
| Aluminum ≤0.020 Thick | 0.9…1.1 |
| Copper | 0.4…0.6 |

# 871TM 3-Wire DC Submersible

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

### Product Selection

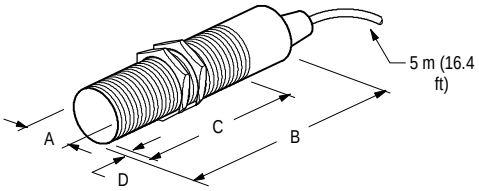
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. Cable Style |
|---|---|---|---|---|---|---|
| 18 mm | 5 (0.20) | Y | N.O. | NPN | 60 | 871TM-DX14 |
| | | | | PNP | | 871TM-DX15 |
| | 8 (0.31) | N | | NPN | 40 | 871TM-DX16 |
| | | | | PNP | | 871TM-DX09 |
| | 5 (0.20) | Y | N.C. | NPN | 60 | 871TM-DX17 |
| | | | | PNP | | 871TM-DX18 |
| | 8 (0.31) | N | | NPN | 40 | 871TM-DX19 |
| | | | | PNP | | 871TM-DX20 |

### QD Cordsets and Accessories

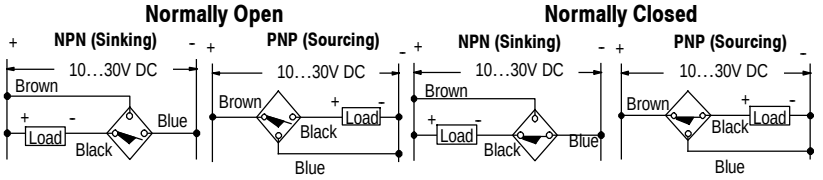
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

### Approximate Dimensions [mm (in.)]

**Cable Style**




### Wiring Diagrams




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M18 X 1 | Y | 18.0 (0.71) | 55.4 (2.18) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |

*871TM DC Cable Style*
*12, 18, 30 mm*

*871TM DC Mini*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 2-wire operation
- 2-conductor or 4-pin connection
- 10…30V DC
- Normally open or normally closed output
- Short circuit, overload, false pulse, reverse polarity, and transient noise protection
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤25 mA |
| Minimum Load Current | 2 mA |
| Leakage Current | ≤0.9 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤8V |
| Repeatability | 10% typical |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6P, 12, 13; IP67 (IEC 529) all models;<br>1200 psi (8270 kPa) washdown; stainless steel face and barrel;<br>ToughLink™ and micro connector versions are also rated IP69K (IEC 529) |
| Connections | Cable: 2 m (6.5 ft) length<br>A2—2-conductor #22 AWG PVC<br>C2—2-conductor #22 AWG ToughLink<br>H2—2-conductor #18 AWG ToughLink<br>Quick-Disconnect: 4-pin mini style<br>4-pin micro style |
| LED | Red: Output energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g,11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.0 |
| Brass | 0.3…0.5 |
| Aluminum | 0.1…0.4 |
| Aluminum ≤0.020 Thick | 0.9…1.1 |
| Copper | 0.4…0.6 |

# 871TM 2-Wire DC

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

## Product Selection

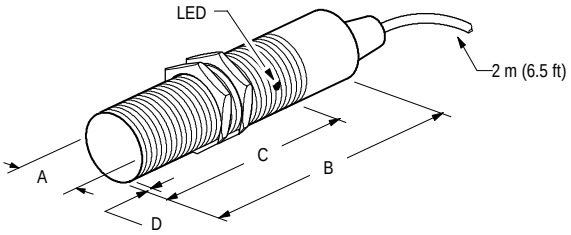
| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | PVC Cable | ToughLink™ Cable | Mini QD Style | Micro QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | 75 | 871TM-DH2NE12-A2 | 871TM-DH2NE12-C2 | 871TM-DH2NE12-N4 | **871TM-DH2NE12-D4** |
| | 4 (0.16) | N | | | 871TM-DH4NE12-A2 | 871TM-DH4NE12-C2 | 871TM-DH4NE12-N4 | 871TM-DH4NE12-D4 |
| | 2 (0.08) | Y | N.C. | 70 | 871TM-DH2CE12-A2 | 871TM-DH2CE12-C2 | 871TM-DH2CE12-N4 | 871TM-DH2CE12-D4 |
| | 4 (0.16) | N | | | 871TM-DH4CE12-A2 | 871TM-DH4CE12-C2 | 871TM-DH4CE12-N4 | 871TM-DH4CE12-D4 |
| 18 mm | 5 (0.20) | Y | N.O. | 60 | 871TM-DH5NE18-A2 | 871TM-DH5NE18-H2 | 871TM-DH5NE18-N4 | 871TM-DH5NE18-D4 |
| | 8 (0.31) | N | | | 871TM-DH8NE18-A2 | 871TM-DH8NE18-H2 | 871TM-DH8NE18-N4 | 871TM-DH8NE18-D4 |
| | 5 (0.20) | Y | N.C. | 40 | 871TM-DH5CE18-A2 | 871TM-DH5CE18-H2 | 871TM-DH5CE18-N4 | 871TM-DH5CE18-D4 |
| | 8 (0.31) | N | | | 871TM-DH8CE18-A2 | 871TM-DH8CE18-H2 | 871TM-DH8CE18-N4 | 871TM-DH8CE18-D4 |
| 30 mm | 10 (0.39) | Y | N.O. | 40 | 871TM-DH10NE30-A2 | 871TM-DH10NE30-H2 | 871TM-DH10NE30-N4 | 871TM-DH10NE30-D4 |
| | 15 (0.59) | N | | | 871TM-DH15NE30-A2 | 871TM-DH15NE30-H2 | 871TM-DH15NE30-N4 | 871TM-DH15NE30-D4 |
| | 10 (0.39) | Y | N.C. | 30 | 871TM-DH10CE30-A2 | 871TM-DH10CE30-H2 | 871TM-DH10CE30-N4 | 871TM-DH10CE30-D4 |
| | 15 (0.59) | N | | | 871TM-DH15CE30-A2 | 871TM-DH15CE30-H2 | 871TM-DH15CE30-N4 | 871TM-DH15CE30-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | 889N-F4AFC-6F | 889D-F4AC-2 |

## QD Cordsets and Accessories

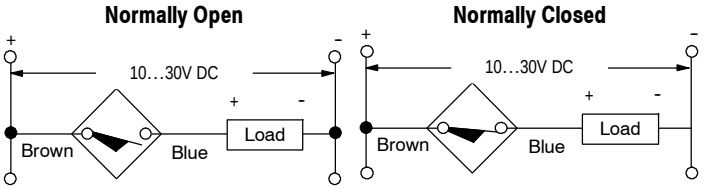
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions [mm (in.)]

**Cable Style**




## Wiring Diagrams




**Note**: Load can be switched to brown wire

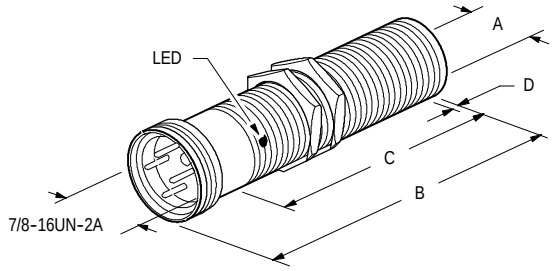
| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 49.8 (1.96) | 26.4 (1.04) | 2.5 (0.10) |
| | N | | | 19.5 (0.77) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 55.4 (2.18) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 57.9 (2.28) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

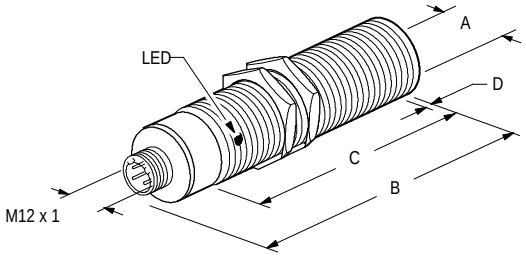
## Approximate Dimensions [mm (in.)] (continued)

### Mini Quick-Disconnect Style




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 63.5 (2.50) | 25.4 (1.00) | 2.5 (0.10) |
| | N | | | 18.5 (0.73) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 56.1 (2.21) | 35.1 (1.38) | 2.5 (0.10) |
| | N | | | 29.2 (1.15) | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 68.1 (2.68) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

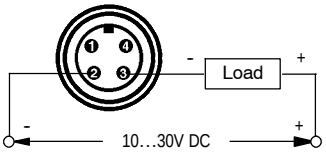
### Micro Quick-Disconnect Style




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 61.0 (2.40) | 26.4 (1.04) | 2.5 (0.10) |
| | N | | | 19.6 (0.77) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 65.0 (2.56) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 66.3 (2.61) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

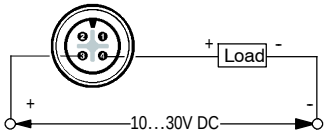
## Wiring Diagrams

**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 2.

**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 3.

# 871TM Intrinsically Safe, 2-Wire DC

## Stainless Steel Face and Barrel

*871TM Intrinsically Safe*
*Cable Style*

*871TM Intrinsically Safe*
*Micro Quick-Disconnect Style*

## Description

These special 871TM models are approved as Intrinsically Safe for use in hazardous areas. These special models are designed for use in Division 1, 2; Class I, II, III; Groups A, B, C, D, E, F, G areas when used in conjunction with an appropriate Intrinsically Safe approved zener diode barrier. Recommended barriers are available from Rockwell Automation/Allen-Bradley. These approved units can also be used in Division 2 locations without a barrier.

## Features

- 2-wire operation
- 2-conductor or 4-pin connection
- 10…31.5V DC
- Normally open output
- Short circuit, overload, false pulse, transient noise, and reverse polarity protection
- FM and CSA entity approved
- UL Listed for use in non-hazardous locations

## Specifications

| | |
|---|---|
| Outputs | N.O. |
| Load Current, Max. | 25 mA |
| Load Current, Min. | 2 mA |
| Leakage Current | ≤1.0 mA |
| Operating Voltage | 10…31.5V DC |
| Voltage Drop | ≤8V DC |
| Repeatability | 10% typical |
| Hysteresis | 10% typical |
| Protection Type | False pulse, transient noise, reverse polarity, short circuit, overload |
| Certifications | FM and CSA Approved for:<br>-Class I, II, III; Divisions 1, 2; Groups A, B, C, D, E, F, G when used in conjunction with an approved intrinsic safety barrier<br>-Class I, II, III; Division 2; Groups A, B, C, D, E, F, G without intrinsic safety barrier<br>UL Listed for use in non-hazardous locations<br>(See control drawing 75001-437 for approval details and wiring diagrams)★ |
| Enclosure Type Rating | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529) all models; 1200 psi (8270 kPa) washdown; stainless steel face and barrel; ToughLink™ and micro connector versions are also rated IP69K (IEC 529) |
| Connection Type | Cable: 2 m (6.5 ft) length, A2 - 2 conductor #22 AWG PVC, C2 - 2 conductor #22 AWG ToughLink, H2 - 2 conductor #18 AWG ToughLink;<br>Quick Disconnect: 4-pin micro style |
| Indicator LEDs | Red: Output Energized |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

★ See page 2-39.

### Correction Factors

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.0 |
| Brass | 0.3…0.5 |
| Aluminum | 0.1…0.4 |
| Aluminum ≤0.020 Thick | 0.9…1.1 |
| Copper | 0.4…0.6 |

### Entity Parameters

| Sensor | | | Barrier |
|---|---|---|---|
| $V_{max}$ | 31.5V | ≥ | $V_t$ |
| $I_{max}$ | 130 mA | ≥ | $I_t$ |
| $P_{max}$ | 1.25 W | ≥ | $P_t$ |
| $C_i$ | 0 µF | ≤ | $C_a$ |
| $L_i$ | 0 mH | ≤ | $L_a$ |

**ATTENTION**

Operating parameters must be adhered to.



New



Allen-Bradley

# 871TM Intrinsically Safe, 2-Wire DC

## Stainless Steel Face and Barrel

## Product Selection

| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | PVC Cable | ToughLink™ Cable | Micro QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | 75 | 871TM-DR2NE12-A2 | 871TM-DR2NE12-C2 | 871TM-DR2NE12-D4 |
| | 4 (0.16) | N | | | 871TM-DR4NE12-A2 | 871TM-DR4NE12-C2 | 871TM-DR4NE12-D4 |
| 18 mm | 5 (0.20) | Y | | 60 | 871TM-DR5NE18-A2 | 871TM-DR5NE18-H2 | 871TM-DR5NE18-D4 |
| | 8 (0.31) | N | | | 871TM-DR8NE18-A2 | 871TM-DR8NE18-H2 | 871TM-DR8NE18-D4 |
| 30 mm | 10 (0.39) | Y | | 40 | 871TM-DR10NE30-A2 | 871TM-DR10NE30-H2 | 871TM-DR10NE30-D4 |
| | 15 (0.59) | N | | | 871TM-DR15NE30-A2 | 871TM-DR15NE30-H2 | 871TM-DR15NE30-D4 |
| Recommended Standard QD Cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4LC-2 ❶ |

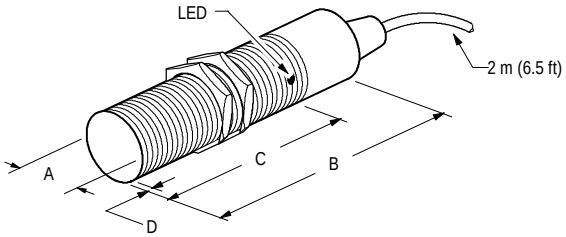
❶ Intrinsically Safe wiring labels 897H-L1 or 897H-L2 must be applied every 7.6 m (25 ft).

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Zener Diode Barriers | NO TAG |
| Intrinsically Safe Wiring Labels | 12-8 |

## Approximate Dimensions [mm (in.)]

### Cable Style




| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 x 1 | Y | 12.0 (0.47) | 72.1 (2.84) | 38.4 (1.51) | 2.5 (0.10) |
| | N | | | 31.5 (1.24) | 9.4 (0.37) |
| M18 x 1 | Y | 18.0 (0.71) | 74.7 (2.94) | 60.0 (2.36) | 2.5 (0.10) |
| | N | | | 48.2 (1.90) | 14.4 (0.56) |
| M30 x 1.5 | Y | 30.0 (1.18) | 77.2 (3.04) | 61.3 (2.41) | 2.5 (0.10) |
| | N | | | 41.6 (1.64) | 17.9 (0.70) |

## Wiring Diagrams

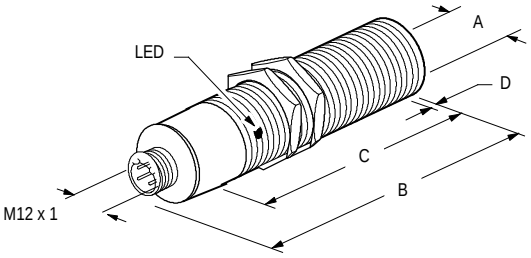
See pages 2-39 and 2-40.

# 871TM Intrinsically Safe, 2-Wire DC

## Stainless Steel Face and Barrel

### Approximate Dimensions [mm (in.)]

**Micro QD Style**




### Wiring Diagrams

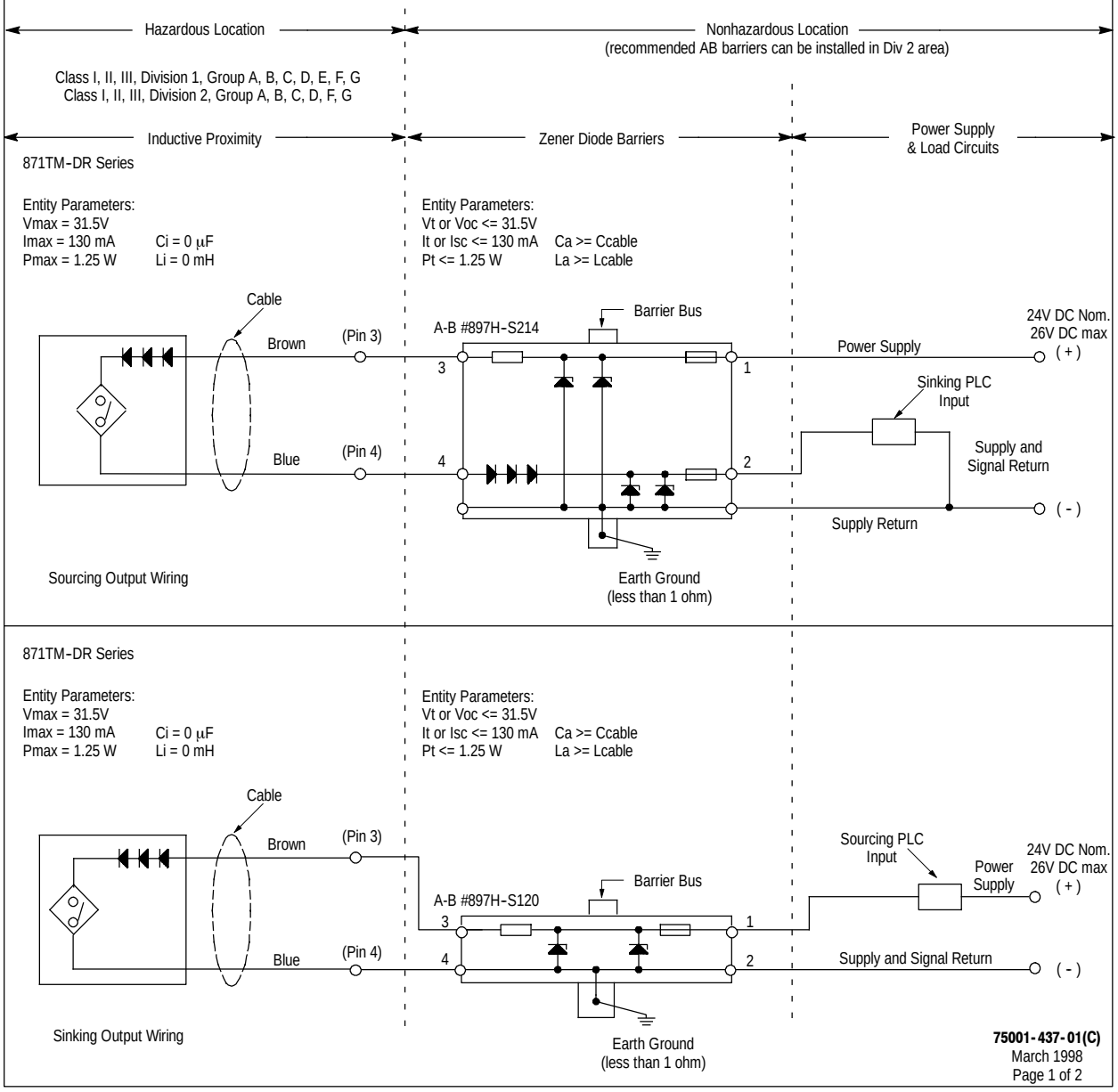
See pages 2-39 and 2-40.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 x 1 | Y | 12.0 (0.47) | 72.1 (2.84) | 38.4 (1.51) | 2.5 (0.10) |
| | N | | | 31.5 (1.24) | 9.4 (0.37) |
| M18 x 1 | Y | 18.0 (0.71) | 74.7 (2.94) | 60.0 (2.36) | 2.5 (0.10) |
| | N | | | 48.2 (1.90) | 14.4 (0.56) |
| M30 x 1.5 | Y | 30.0 (1.18) | 77.2 (3.04) | 61.3 (2.41) | 2.5 (0.10) |
| | N | | | 41.6 (1.64) | 17.9 (0.70) |

## Inductive Proximity Sensors

### Division 1 Installation Wiring Diagrams

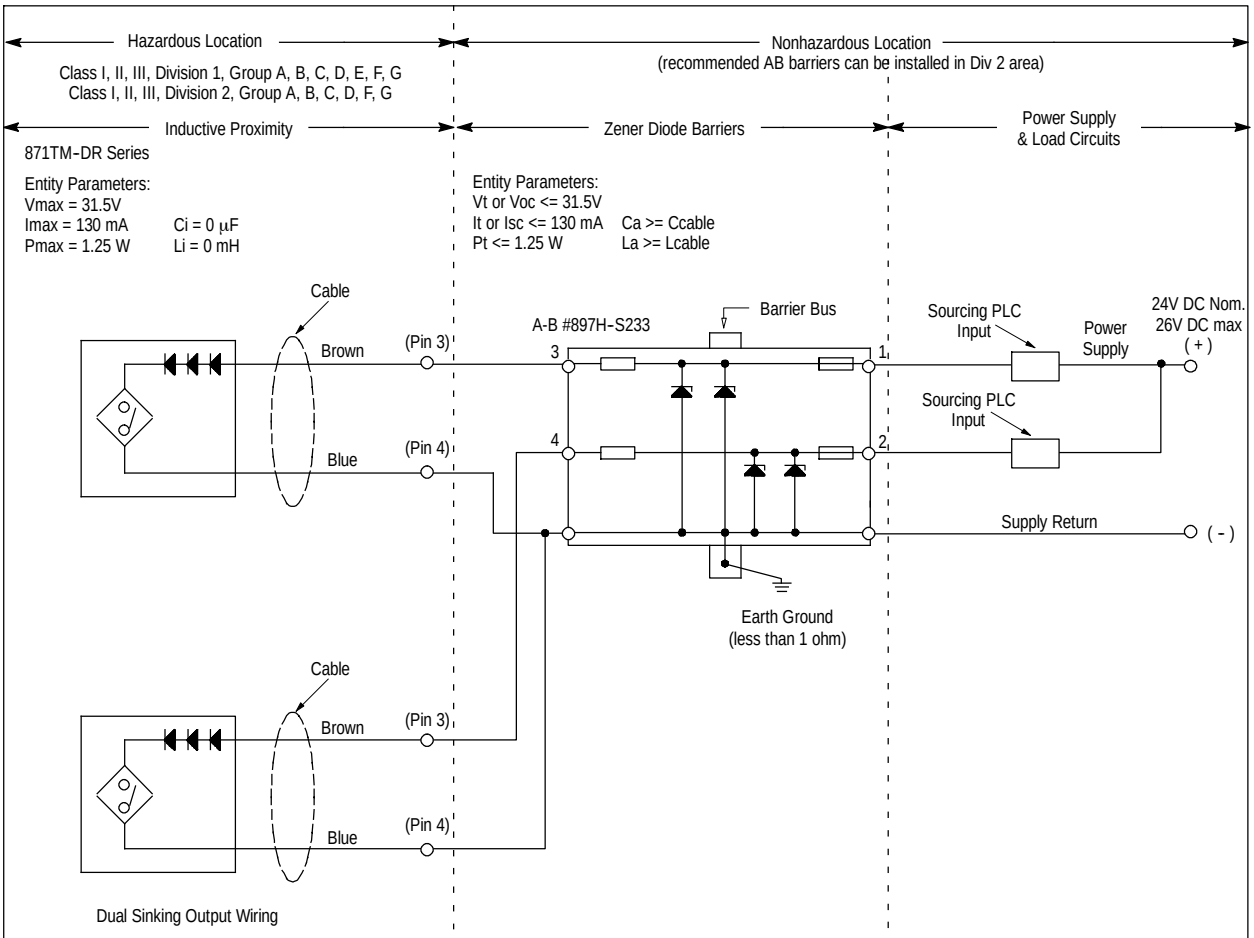
Rockwell Automation Cat. No.: 871TM-DRaNEb-c
where:
a = nominal operating distance [2, 5, or 10 (mm, shielded); 4, 8, or 15 (mm, unshielded)]
b = 12, 18, or 30 (mm, housing diameter)
c = A2 (2 meter PVC cable), D4 (4-pin micro connector), C2 (2 meter ToughLink™ cable -12 mm), or H2 (2 meter ToughLink cable -18 and 30 mm)




| ATTENTION | |
|---|---|
| | Operating parameters must be adhered to. |

## Inductive Proximity Sensors

### Division 1 Installation Wiring Diagrams (continued)




**Factory Mutual Installation Notes**:

❶ Installation must be in accordance with the National Electrical Code® (NFPA 70, Article 504), ANSI/ISA-RP12.6, and the manufacturer's instructions.
❷ If the electrical parameters of the cable used are unknown, the following values may be used: Capacitance - 60 pF/ft.; Inductance - 0.20 µH/ft.
❸ The wiring between each Inductive Proximity Sensor and its corresponding channel of the dual-channel barrier is a separate intrinsically safe circuit. Each of the two separate intrinsically safe circuits shall be in separate cables or shall be separated from each other as specified in NEC 504-30. The supply return conductors may be connected at the barrier's grounding terminal.
❹ The Barrier bus must be insulated from other grounded metal. Use DIN Rail Mounting Kit, Rockwell Automation #64-136.
❺ The maximum nonhazardous location voltage must not exceed 250V AC or DC.
❻ Barriers are not required for Division 2 (31.5V DC max.). Division 2 applications must be installed in accordance with the NEC.
❼ WARNING: Substitution of components may impair Intrinsic Safety.
❽ No revision to drawing without prior FMRC approval.

**Canadian Standards Association Installation Notes**:

❶ Installation must be in accordance with the Canadian Electrical Code (Part I), ANSI/ISA-RP12.6, and the manufacturer's instructions.
❷ If the electrical parameters of the cable used are unknown, the following values may be used: Capacitance - 60 pF/ft.; Inductance - 0.20 µH/ft.
❸ The wiring between each Inductive Proximity Sensor and its corresponding channel of the dual-channel barrier is a separate intrinsically safe circuit. Each of the two separate intrinsically safe circuits shall be in separate cables or shall be separated from each other as specified in CEC. The supply return conductors may be connected at the barrier's grounding terminal.
❹ The Barrier bus must be insulated from other grounded metal. Use DIN Rail Mounting Kit, Allen-Bradley #64-136.
❺ The maximum nonhazardous location voltage must not exceed 250V AC or DC.
❻ Barriers are not required for Division 2 (31.5V DC max.). Division 2 applications must be installed in accordance with the CEC.
❼ In Division 2 applications without barriers observe the following warnings:
WARNING: EXPLOSION HAZARD. Do not disconnect equipment unless power has been switched off or the area is known to be nonhazardous.
❽ WARNING: Substitution of components may impair Intrinsic Safety.
❾ No revision to drawing without prior CSA approval.

**75001-437-01(C)**
March 1998
Page 2 of 2

**ATTENTION**

These parameters must be adhered to.

*871TM AC/DC Cable Style*
*12, 18, 30 mm*

*871TM AC/DC Mini*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM AC/DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM AC/DC EAC Micro*
*Quick-Disconnect Style*
*12 mm*

## Features

- 2-wire operation
- 2-conductor, 3-conductor, 3-pin or 4-pin connection
- 20…250V AC/DC
- Normally open or normally closed output
- Short-circuit, false pulse, overload, and transient noise protection
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 & 30 mm |
|---|---|---|
| Load Current | 5…200 mA | 5…250 mA |
| Inrush Current (1 cycle) | ≤2 A | ≤4 A |
| Leakage Current | ≤1.9 mA @ 120V AC | |
| Operating Voltage | 20…250V AC/DC | |
| Voltage Drop | ≤10V @ 5…200 mA | ≤10V @ 5…250 mA |
| Repeatability | ≤10% at constant temperature | |
| Hysteresis | 7% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Short-Circuit Protection | Trigger @ 5 A typical | Trigger @ 8 A typical |
| Overload Protection | Trigger @ 260 mA typical | Trigger @ 320 mA typical |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13 IP67 (IEC 529) all models;<br>1200 psi (8270 kPa) washdown; stainless steel face and barrel;<br>ToughLink™ and micro connector versions are also rated IP69K (IEC 529) | |
| Connections | Cable: 2 m (6.5 ft) length<br>A2—2-conductor #22 AWG PVC<br>C2—2-conductor #22 AWG ToughLink<br>H2—3-conductor #18 AWG ToughLink<br>Quick-Disconnect: 3-pin mini style<br>3-pin micro style<br>4-pin EAC micro style | |
| LEDs | Red: Output energized<br>Green: Power<br>Short circuit: Red and green flashing | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g,11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.0 |
| Brass | 0.3…0.5 |
| Aluminum | 0.1…0.4 |
| Aluminum ≤0.020 Thick | 0.9…1.1 |
| Copper | 0.4…0.6 |

# 871TM 2-Wire AC/DC

## Stainless Steel Face/Threaded Stainless Steel Barrel

## Product Selection

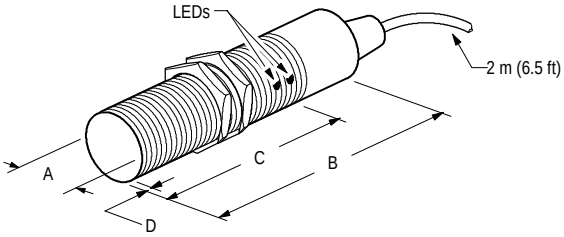
| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PVC Cable | ToughLink™ Cable | Mini QD Style | Micro QD Style | EAC Micro QD Style |
| 12 mm | 3 (0.12) | Y | N.O. | 35 | 871TM-B3N12-A2 | 871TM-B3N12-C2 | 871TM-B3N12-N3 | **871TM-B3N12-R3** | — |
| | | | N.C. | 30 | 871TM-B3C12-A2 | 871TM-B3C12-C2 | 871TM-B3C12-N3 | 871TM-B3C12-R3 | — |
| | 4 (0.16) | N | N.O. | 20 | 871TM-B4N12-A2 | 871TM-B4N12-C2 | 871TM-B4N12-N3 | **871TM-B4N12-R3** | 871TM-B4N12-B4 |
| | | | N.C. | 15 | 871TM-B4C12-A2 | 871TM-B4C12-C2 | 871TM-B4C12-N3 | 871TM-B4C12-R3 | — |
| 18 mm | 5 (0.20) | Y | N.O. | 20 | **871TM-B5N18-A2** | **871TM-B5N18-H2** | **871TM-B5N18-N3** | **871TM-B5N18-R3** | — |
| | | | N.C. | 15 | 871TM-B5C18-A2 | 871TM-B5C18-H2 | 871TM-B5C18-N3 | 871TM-B5C18-R3 | — |
| | 8 (0.31) | N | N.O. | 15 | 871TM-B8N18-A2 | **871TM-B8N18-H2** | **871TM-B8N18-N3** | **871TM-B8N18-R3** | — |
| | | | N.C. | 12 | 871TM-B8C18-A2 | 871TM-B8C18-H2 | 871TM-B8C18-N3 | 871TM-B8C18-R3 | — |
| 30 mm | 10 (0.39) | Y | N.O. | 15 | **871TM-B10N30-A2** | 871TM-B10N30-H2 | **871TM-B10N30-N3** | **871TM-B10N30-R3** | — |
| | | | N.C. | 12 | 871TM-B10C30-A2 | 871TM-B10C30-H2 | 871TM-B10C30-N3 | 871TM-B10C30-R3 | — |
| | 15 (0.59) | N | N.O. | 12 | **871TM-B15N30-A2** | **871TM-B15N30-H2** | **871TM-B15N30-N3** | **871TM-B15N30-R3** | — |
| | | | N.C. | 10 | 871TM-B15C30-A2 | 871TM-B15C30-H2 | 871TM-B15C30-N3 | 871TM-B15C30-R3 | — |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 | 889B-F3AC-2 |

## QD Cordsets and Accessories

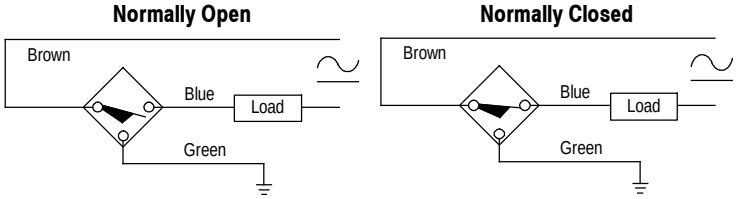
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions [mm (in.)]

### Cable Style




## Wiring Diagrams

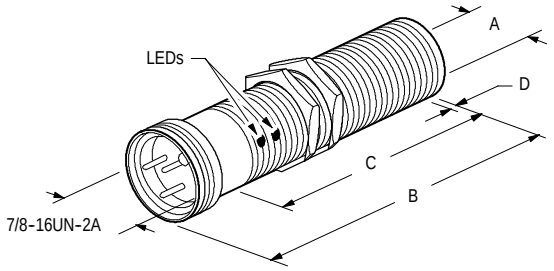



**Note 1:** No green wire on 12 mm and on sensors with PVC cable (-A2). Attach housing to ground.
**Note 2:** Load can be switched to brown wire.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 x 1 | Y | 12.0 (0.47) | 72.1 (2.84) | 38.4 (1.51) | 2.5 (0.10) |
| | N | | | 31.5 (1.24) | 9.4 (0.37) |
| M18 x 1 | Y | 18.0 (0.71) | 74.7 (2.94) | 60.0 (2.36) | 2.5 (0.10) |
| | N | | | 48.2 (1.90) | 14.4 (0.56) |
| M30 x 1.5 | Y | 30.0 (1.18) | 77.2 (3.04) | 61.3 (2.41) | 2.5 (0.10) |
| | N | | | 41.6 (1.64) | 17.9 (0.70) |

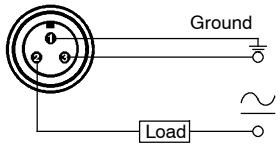
## Approximate Dimensions [mm (in.)] (continued)

### Mini Quick-Disconnect Style




## Wiring Diagrams

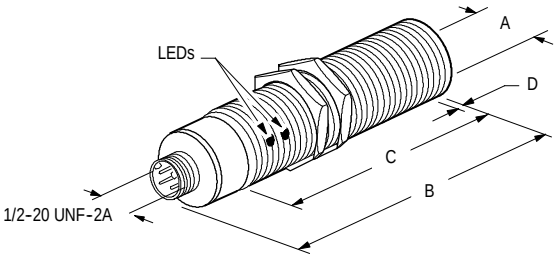
**Normally Open or Normally Closed**



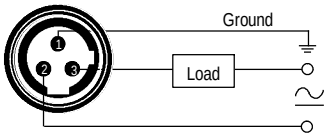

**Note 1:** No ground pin on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to pin 3.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 85.6 (3.37) | 37.8 (1.49) | 2.5 (0.10) |
| | N | | | 31.7 (1.25) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 76.6 (3.02) | 54.9 (2.16) | 2.5 (0.10) |
| | N | | | 43.1 (1.70) | 14.4 (0.56) |
| M30 X 1.5 | Y | 30.0 (1.18) | 86.4 (3.40) | 61.3 (2.41) | 2.5 (0.10) |
| | N | | | 41.6 (1.64) | 17.9 (0.70) |

### Micro Quick-Disconnect Style



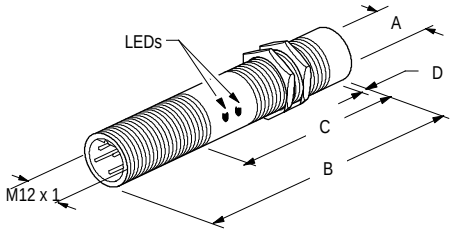

**Normally Open or Normally Closed**



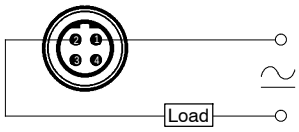

**Note 1:** No ground pin on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to pin 2.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 87.3 (3.44) | 38.4 (1.51) | 2.5 (0.10) |
| | N | 12.0 (0.47) | 87.3 (3.44) | 31.5 (1.24) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 84.3 (3.32) | 60.0 (2.36) | 2.5 (0.10) |
| | N | 18.0 (0.71) | 84.3 (3.32) | 48.2 (1.90) | 14.4 (0.56) |
| M30 X 1.5 | Y | 30.0 (1.18) | 85.7 (3.37) | 61.3 (2.41) | 2.5 (0.10) |
| | N | 30.0 (1.18) | 85.7 (3.37) | 46.1 (1.81) | 17.9 (0.70) |

### EAC Micro Quick-Disconnect Style




**Normally Open**




**Note 1:** No ground pin. Attach housing to ground.
**Note 2:** Load can be switched to pin 2.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | N | 12.0 (0.47) | 83.0 (3.27) | 31.7 (1.25) | 9.4 (0.37) |

# 871TM 2-Wire AC/DC PLC Interfacer

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

*871TM AC/DC Cable Style*
*12, 18, 30 mm*

*871TM AC/DC Mini*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM AC/DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871TM AC/DC EAC Micro*
*Quick-Disconnect Style*
*12 mm*

## Features

- Designed for low load current PLC, I/O, and PC applications
- 2-wire operation
- 2-conductor, 3-pin or 4-pin connection
- 20…250V AC/DC
- Normally open or normally closed output
- False pulse, transient noise, and radio frequency protection
- UL Listed, CSA Certified, and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | 2…25 mA |
| Leakage Current | ≤0.9 mA at 24V DC<br>≤1.7 mA at 20…120V AC/DC;<br>≤2.5 mA at 121…250V AC/DC |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | ≤8V at 25 mA DC<br>≤10V at 25 mA AC |
| Repeatability | 10% typical |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Radio Frequency Protection | 10V per meter<br>Frequency range 20…1000MHz |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13, IP67 (IEC 529) all models;<br>1200 psi (8270 kPa) washdown; stainless steel face and barrel;<br>ToughLink™ and micro connector versions are also rated IP69K (IEC 529) |
| Connections | Cable: 2 m (6.5 ft) length<br>A2—2-conductor #22 AWG PVC<br>C2—2-conductor #22 AWG ToughLink<br>H2—2-conductor #18 AWG ToughLink<br>Quick-Disconnect: 3-pin mini style<br>3-pin micro style<br>4-pin EAC micro style |
| LED | Red: Output energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.8…1.0 |
| Brass | 0.4…0.7 |
| Aluminum | 0.4…0.7 |
| Copper | 0.2…0.5 |

# 871TM 2-Wire AC/DC PLC Interfacer

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

## Product Selection

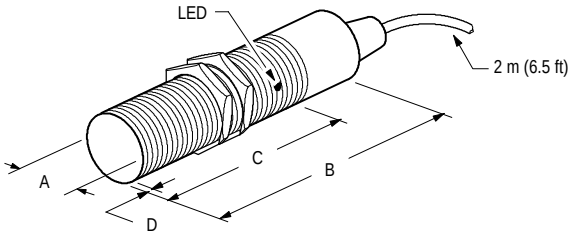
| Barrel Dia. [mm] | Nominal Sensing Distance [mm (in.)] | Shield | Output Config. | Switching Freq. [Hz] | Cat. No. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | PVC Cable | ToughLink™ Cable | Mini QD Style | Micro QD Style | EAC Micro QD Style |
| 12 | 2 (0.08) | Yes | N.O. | 75 | 871TM-BH2N12-A2 | 871TM-BH2N12-C2 | 871TM-BH2N12-N3 | 871TM-BH2N12-R3 | 871TM-BH2N12-B4 |
| | 4 (0.16) | No | | 35 | 871TM-BH4N12-A2 | 871TM-BH4N12-C2 | 871TM-BH4N12-N3 | 871TM-BH4N12-R3 | — |
| | 2 (0.08) | Yes | N.C. | 75 | — | — | — | 871TM-BH2C12-R3 | — |
| | 4 (0.16) | No | | 35 | — | — | — | 871TM-BH4C12-R3 | — |
| 18 | 5 (0.20) | Yes | N.O. | 65 | 871TM-BH5N18-A2 | 871TM-BH5N18-H2 | 871TM-BH5N18-N3 | 871TM-BH5N18-R3 | — |
| | 8 (0.31) | No | | 30 | 871TM-BH8N18-A2 | 871TM-BH8N18-H2 | 871TM-BH8N18-N3 | 871TM-BH8N18-R3 | — |
| | 5 (0.20) | Yes | N.C. | 65 | — | — | — | 871TM-BH5C18-R3 | — |
| | 8 (0.31) | No | | 30 | — | — | — | 871TM-BH8C18-R3 | — |
| 30 | 10 (0.39) | Yes | N.O. | 45 | 871TM-BH10N30-A2 | 871TM-BH10N30-H2 | 871TM-BH10N30-N3 | 871TM-BH10N30-R3 | — |
| | 15 (0.59) | No | | 20 | 871TM-BH15N30-A2 | 871TM-BH15N30-H2 | 871TM-BH15N30-N3 | 871TM-BH15N30-R3 | — |
| | 10 (0.39) | Yes | N.C. | 45 | 871TM-BH10C30-A2 | 871TM-BH10C30-H2 | 871TM-BH10C30-N3 | 871TM-BH10C30-R3 | — |
| | 15 (0.59) | No | | 20 | 871TM-BH15C30-A2 | 871TM-BH15C30-H2 | 871TM-BH15C30-N3 | 871TM-BH15C30-R3 | — |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 | 889B-F3AC-2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

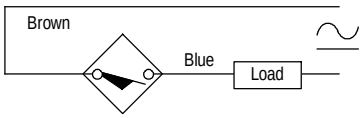
## Approximate Dimensions [mm (in.)]

### Cable Style




## Wiring Diagrams

### Normally Open




**Note 1:** Attach housing to ground.
**Note 2:** Load can be switched to brown wire.

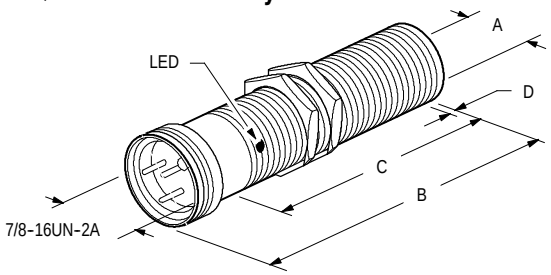
| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 49.8 (1.96) | 26.4 (1.04) | 2.5 (0.10) |
| | N | | | 19.5 (0.77) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 55.4 (2.18) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 57.9 (2.28) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

# 871TM 2-Wire AC/DC PLC Interfacer

## Stainless Steel Face/Threaded Short Stainless Steel Barrel

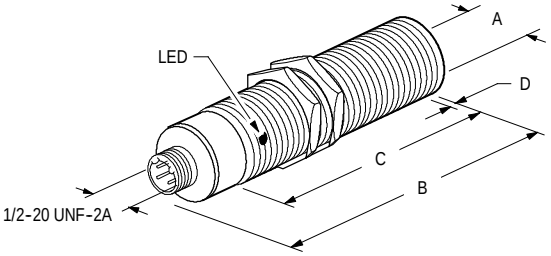
## Approximate Dimensions [mm (in.)] (continued)

### Mini Quick-Disconnect Style



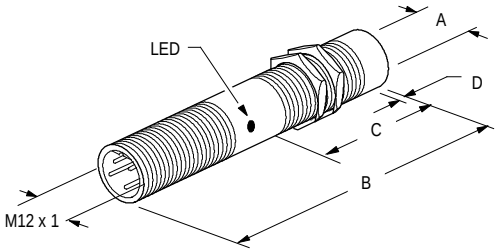

| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 63.5 (2.50) | 25.4 (1.00) | 2.5 (0.10) |
| | N | | | 18.5 (0.73) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 56.1 (2.21) | 35.1 (1.38) | 2.5 (0.10) |
| | N | | | 29.2 (1.15) | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 68.1 (2.68) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

### Micro Quick-Disconnect Style




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 61.0 (2.40) | 26.4 (1.04) | 2.5 (0.10) |
| | N | | | 19.6 (0.77) | 9.4 (0.37) |
| M18 X 1 | Y | 18.0 (0.71) | 65.0 (2.56) | 41.7 (1.64) | 2.5 (0.10) |
| | N | | | | 14.5 (0.57) |
| M30 X 1.5 | Y | 30.0 (1.18) | 66.3 (2.61) | 41.9 (1.65) | 2.5 (0.10) |
| | N | | | 39.4 (1.55) | 18.0 (0.71) |

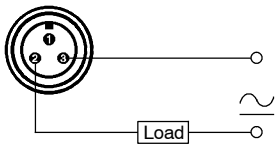
### EAC Micro Quick-Disconnect Style




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 61.0 (2.40) | 26.4 (1.04) | 2.5 (0.10) |

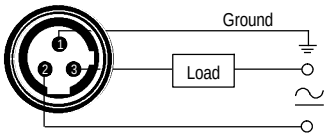
## Wiring Diagrams

**Normally Open**



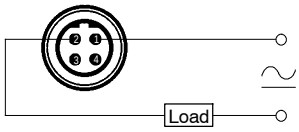

**Note 1:** Attach housing to ground.
**Note 2:** Load can be switched to pin 3.

**Normally Open**




**Note 1:** Attach housing to ground.
**Note 2:** Load can be switched to pin 2.

**Normally Open**




**Note 1:** No ground pin. Attach housing to ground.
**Note 2:** Load can be switched to pin 2.

## Description

Bulletin 872C WorldProx inductive proximity sensors are self-contained, general purpose, solid-state devices designed to sense the presence of ferrous and nonferrous metal objects without touching them.

The switch body consists of a plastic face and a nickel-plated brass barrel. 3-Wire DC models offer an optional stainless steel or plastic switch body, both with a plastic face. It meets NEMA 1, 2, 3, 4, 6P, 12, 13 and IP67 (IEC529) enclosure standards. The electronic circuitry is fully potted for protection against shock, vibration, and contamination.

All models have a 360° visible LED. Cable models have a transluscent end cap which glows when the LED indicator is on, and is visible from almost every angle. Quick-disconnect models have a four porthole LED design for better visibility from most angles. In addition to making installation easier, 360° visibility may facilitate troubleshooting.

These sensors are available in 6.5, 8, 12, 18 and 30 mm diameters. Connection options for 3-wire sensors include PVC or PUR cable jacket and mini, micro, and pico quick-disconnect style. Three-wire DC cable style sensors are available with 2, 5, or 10 m PVC or PUR cables (2 m PVC is standard).

## Features

- Threaded nickel-plated brass barrel (optional stainless steel barrel)
- Threaded platic barrel (3-wire DC only)
- 360° visible LED
- Cable or quick-disconnect styles
- Short circuit protection
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection
- cULus Listed and CE Marked for all applicable directives

## Styles

DC 3-Wire . . . . . page 2-48
DC 3-Wire Short Barrel . . . . page 2-52
DC 3-Wire Extended Sensing . . . . . page 2-56
DC 3-Wire Short Barrel with Extended Sensing . . . . . page 2-60
DC 3-Wire Long Range Sensing . . . . . page NEW
DC 3-Wire Plastic Barrel . . . page 2-64
DC 3-Wire Plastic Barrel with Extended Sensing . . . . page NEW
DC 2-Wire . . . . . page 2-67
DC 2-Wire QuadroPlex . . . . page 2-70
DC 4-Wire Complementary Output . . . . page 2-72
AC 2-Wire . . . . . page 2-74
AC 2-Wire Extended Sensing . . . . . page 2-77
AC/DC 2-Wire . . . . . page 2-80
AC/DC 2-Wire Relay Output . . . . . page 2-83

## QD Cordsets and Accessories

Cordsets . . . . . page 8-1
Mounting Bracket, Spring Return Style . . . . . page 2-210
Mounting Bracket, Swivel/Tilt Style . . . . . page 2-212
Mounting Bracket, Right Angle Style . . . . . page 2-213
Mounting Bracket, Clamp Style . . . . . page 2-214
End Caps . . . . . page 2-220
Mounting Nuts . . . . . page 2-221
Lock Washers . . . . . page 2-223

## General Information

Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6

# 872C/872CT WorldProx™ 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

DC Micro Quick-Disconnect Style
8, 12, 18, and 30 mm

DC Pico Quick-Disconnect Style
6.5, 8, 12, and 18 mm

DC Mini Quick-Disconnect Style
18 & 30 mm

DC Cable Style
6.5, 8, 12, 18, and 30 mm

Pigtail Cable with Integral Micro QD Connector
8, 12, 18, and 30 mm

## Features

- 3-wire operation
- 3-conductor PVC or PUR cable jacket (PVC standard)
- 3- or 4-pin connection for pico, micro, and mini connectors
- PVC and PUR cable available in 2, 5, and 10 m cable lengths (2 m standard)
- Pigtail cable in PVC with integral micro QD connector available in 0.2, 0.5, and 1.0 m cable lengths
- 10…30V DC
- Normally open or normally closed
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- cULus Listed (8, 12, 18, and 30 mm models only) and CE Marked (all models) for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.8V |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse on power, transient noise, reverse polarity, short circuit, and overload |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6P, 12, 13, IP 67 (IEC 529) |
| Housing Material | Nickel-plated brass barrel, plastic face (PBT)<br>Optional stainless steel 304 barrel, plastic face (PBT) |
| Connections | Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.4 mm (0.175 in.) diameter; 3-conductor #26 AWG PVC or PUR;<br>Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, Integral 4-pin micro QD<br>Quick-Disconnect: 4-pin mini, 4-pin micro or 3-pin pico style |
| LED | Amber: output energized, 360° visibility |
| Operating Temperature [C (F)], Min | -25…70° (-13…158°) |
| Shock | 30 g, 11 ms half-sine |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |



New

## Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. Cable Style | Mini QD Style | Micro QD Style | Pico QD Style |
|---|---|---|---|---|---|---|---|---|---|
| 6.5 | 2 (0.08) | Yes | N.O. | NPN | 2000 | 872C-MM1NN7-E2 | — | — | 872C-MM1NN7-P3 |
| | | | | PNP | | 872C-MM1NP7-E2 | — | — | 872C-MM1NP7-P3 |
| | | | N.C. | NPN | | 872C-MM1CN7-E2 | — | — | 872C-MM1CN7-P3 |
| | | | | PNP | | 872C-MM1CP7-E2 | — | — | 872C-MM1CP7-P3 |
| 8 | 2 (0.08) | Yes | N.O. | NPN | 2500 | ★ **872C-D2NN8-E2** | — | ★ **872C-D2NN8-D4** | ★ **872C-D2NN8-P3** |
| | | | | PNP | | ★ **872C-D2NP8-E2** | — | ★ **872C-D2NP8-D4** | ★ **872C-D2NP8-P3** |
| | | | N.C. | NPN | | ★ 872C-D2CN8-E2 | — | ★ 872C-D2CN8-D4 | ★ 872C-D2CN8-P3 |
| | | | | PNP | | ★ 872C-D2CP8-E2 | — | ★ 872C-D2CP8-D4 | ★ 872C-D2CP8-P3 |
| | 3 (0.12) | No | N.O. | NPN | | ★ 872C-D3NN8-E2 | — | ★ 872C-D3NN8-D4 | ★ 872C-D3NN8-P3 |
| | | | | PNP | | ★ **872C-D3NP8-E2** | — | ★ **872C-D3NP8-D4** | ★ **872C-D3NP8-P3** |
| | | | N.C. | NPN | | ★ 872C-D3CN8-E2 | — | ★ 872C-D3CN8-D4 | ★ 872C-D3CN8-P3 |
| | | | | PNP | | ★ 872C-D3CP8-E2 | — | ★ 872C-D3CP8-D4 | ★ 872C-D3CP8-P3 |
| 12 | 3 (0.12) | Yes | N.O. | NPN | 1300 | ★ **872C-D3NN12-E2** | — | ★ **872C-D3NN12-D4** | ★ 872C-D3NN12-P3 |
| | | | | PNP | | ★ **872C-D3NP12-E2** | — | ★ **872C-D3NP12-D4** | ★ 872C-D3NP12-P3 |
| | | | N.C. | NPN | | ★ 872C-D3CN12-E2 | — | ★ 872C-D3CN12-D4 | ★ 872C-D3CN12-P3 |
| | | | | PNP | | ★ 872C-D3CP12-E2 | — | ★ **872C-D3CP12-D4** | ★ 872C-D3CP12-P3 |
| | 4 (0.16) | No | N.O. | NPN | | ★ 872C-D4NN12-E2 | — | ★ **872C-D4NN12-D4** | ★ 872C-D4NN12-P3 |
| | | | | PNP | | ★ **872C-D4NP12-E2** | — | ★ **872C-D4NP12-D4** | ★ 872C-D4NP12-P3 |
| | | | N.C. | NPN | | ★ 872C-D4CN12-E2 | — | ★ 872C-D4CN12-D4 | ★ 872C-D4CN12-P3 |
| | | | | PNP | | ★ 872C-D4CP12-E2 | — | ★ **872C-D4CP12-D4** | ★ 872C-D4CP12-P3 |
| 18 | 5 (0.2) | Yes | N.O. | NPN | 1500 | ★ **872C-D5NN18-E2** | ★ 872C-D5NN18-N4 | ★ 872C-D5NN18-D4 | ★ 872C-D5NN18-P3 |
| | | | | PNP | | ★ **872C-D5NP18-E2** | ★ 872C-D5NP18-N4 | ★ **872C-D5NP18-D4** | ★ 872C-D5NP18-P3 |
| | | | N.C. | NPN | | ★ 872C-D5CN18-E2 | ★ 872C-D5CP18-N4 | ★ 872C-D5CN18-D4 | ★ 872C-D5CN18-P3 |
| | | | | PNP | | ★ 872C-D5CP18-E2 | ★ 872C-D5CP18-N4 | ★ 872C-D5CP18-D4 | ★ 872C-D5CP18-P3 |
| | 8 (0.31) | No | N.O. | NPN | | ★ 872C-D8NN18-E2 | ★ 872C-D8NN18-N4 | ★ 872C-D8NN18-D4 | ★ 872C-D8NN18-P3 |
| | | | | PNP | | ★ **872C-D8NP18-E2** | ★ 872C-D8NP18-N4 | ★ **872C-D8NP18-D4** | ★ 872C-D8NP18-P3 |
| | | | N.C. | NPN | | ★ 872C-D8CN18-E2 | ★ 872C-D8CN18-N4 | ★ 872C-D8CN18-D4 | ★ 872C-D8CN18-P3 |
| | | | | PNP | | ★ 872C-D8CP18-E2 | ★ 872C-D8CP18-N4 | ★ 872C-D8CP18-D4 | ★ 872C-D8CP18-P3 |
| 30 | 10 (0.39) | Yes | N.O. | NPN | 1000 | ★ 872C-D10NN30-E2 | ★ 872C-D10NN30-N4 | ★ 872C-D10NN30-D4 | — |
| | | | | PNP | | ★ **872C-D10NP30-E2** | ★ **872C-D10NP30-N4** | ★ **872C-D10NP30-D4** | — |
| | | | N.C. | NPN | | ★ 872C-D10CN30-E2 | ★ 872C-D10CN30-N4 | ★ 872C-D10CN30-D4 | — |
| | | | | PNP | | ★ 872C-D10CP30-E2 | ★ 872C-D10CP30-N4 | ★ 872C-D10CP30-N4 | — |
| | 15 (0.59) | No | N.O. | NPN | | ★ 872C-D15NN30-E2 | ★ 872C-D15NN30-N4 | ★ 872C-D15NN30-D4 | — |
| | | | | PNP | | ★ **872C-D15NP30-E2** | ★ 872C-D15NP30-N4 | ★ **872C-D15NP30-D4** | — |
| | | | N.C. | PNP | | ★ 872C-D15CN30-E2 | ★ 872C-D15CN30-N4 | ★ 872C-D15CN30-D4 | — |
| | | | | PNP | | ★ 872C-D15CP30-E2 | ★ 872C-D15CP30-N4 | ★ 872C-D15CP30-D4 | — |
| Recommended mating cable, 2 m (6.5 ft). See the *On-Machine Connectivity* catalog for details and additional lengths. | | | | | | — | 889N-F4AFC-6F | 889D-F4AFC-2 | 889P-F3AB-2 |

★ Cat. no. listed is for a standard nickel-plated brass barrel. For a stainless steel barrel, add a **T** to the cat. no. **Example:** Cat. No. 872C-D4NN12-E2 becomes Cat. No. 872C**T**-D4NN12-E2.

**Note:** Preferred availability designation in table above applies to nickel-plated brass model only.

### Cable Options (8, 12, 18, and 30 mm sensors only)

**E2** at the end of cat. no. designates PVC cable 2 m in length. Replace **E2** with **E5** or **E10** for 5 or 10 m length.
For polyurethane cable replace **E2** with **J2**, **J5**, or **J10** for 2, 5, or 10 m length.
For PVC pigtail cable with integral micro QD style connector (4-pin DC male) replace **E2** with **FD02**, **FD05**, or **FD10** for 0.2, 0.5, or 1.0 m length.

| Cable Length | PVC | PUR |
|---|---|---|
| 2 m | E2 | J2 |
| 5 m | E5 | J5 |
| 10 m | E10 | J10 |

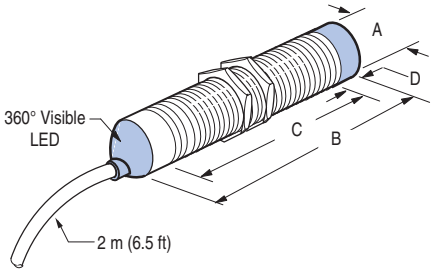
| Pigtail Cable Length | PVC |
|---|---|
| 0.2 m | FD02 |
| 0.5 m | FD05 |
| 1.0 m | FD10 |

# 872C/872CT WorldProx™ 3-Wire DC

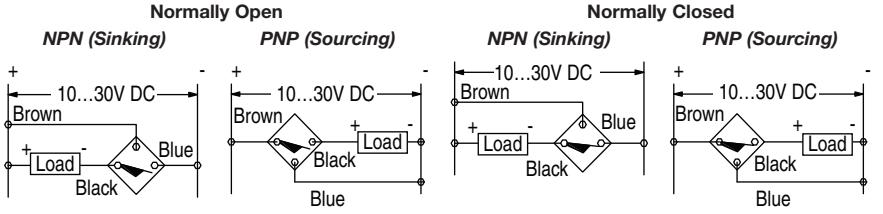
## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Approximate Dimensions—mm (in)

Cable Style

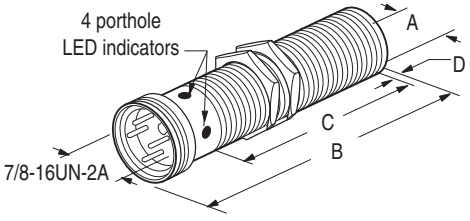


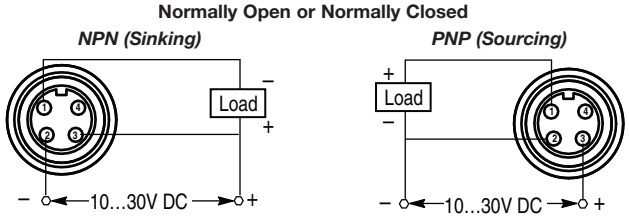

### Wiring Diagrams




| Thread Size | Barrel Type | Smooth Diameter | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|---|
| — | Nickel-plated brass | 6.5 | Y | 6.50 (0.26) | 33.0 (1.30) | — | — |
| M8 x 1 | Nickel-plated brass and stainless steel | — | Y | 8.00 (0.31) | 32.8 (1.29) | 30.2 (1.19) | — |
| | | | N | | 36.8 (1.45) | | 4.10 (0.16) |
| M12 x 1 | | — | Y | 12.0 (0.47) | 50.8 (2.00) | 46.7 (1.84) | — |
| | | | N | | 58.9 (2.32) | | 8.10 (0.32) |
| M18 x 1 | | — | Y | 18.0 (0.71) | 50.8 (2.00) | 46.7 (1.84) | — |
| | | | N | | 63.0 (2.48) | | 12.2 (0.48) |
| M30 x 1 | | — | Y | 30.0 (1.18) | 50.8 (2.00) | 47.7 (1.88) | — |
| | | | N | | 63.0 (2.48) | | 12.2 (0.48) |

Mini QD Style



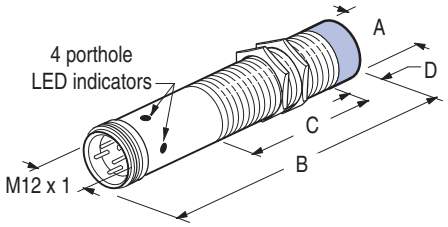

| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M18 x 1 | Nickel-plated brass and stainless steel | Y | 18.0 (0.71) | 63.5 (2.50) | 35.1 (1.38) | — |
| | | N | | 75.7 (2.98) | | 12.2 (0.48) |
| M30 X 1.5 | Nickel-plated brass | Y | 30.0 (1.18) | 63.5 (2.50) | 38.1 (1.50) | — |
| | | N | | 75.7 (2.98) | | 12.2 (0.48) |
| | Stainless steel | Y | | 64.3 (2.53) | 47.8 (1.88) | — |
| | | N | | 76.5 (3.01) | | 12.2 (0.48) |



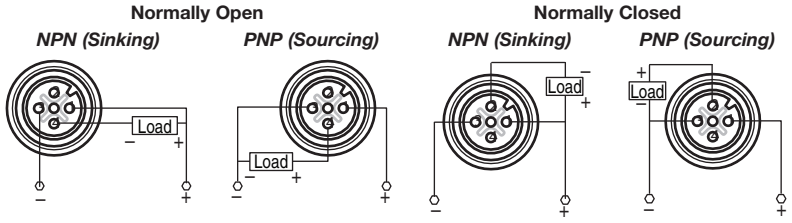
New

## Approximate Dimensions—mm (in)

### Micro QD Style

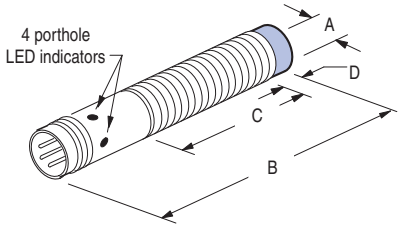


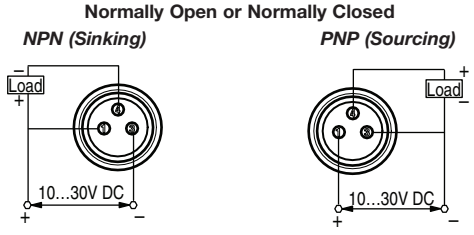

### Wiring Diagrams




| Thread Size | Barrel Type | Shielded | mm (inches) | | | |
|---|---|---|---|---|---|---|
| | | | A | B (max) | C (min) | D (max) |
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 58.7 (2.31) | 27.7 (1.09) | — |
| | | N | | 62.7 (2.47) | | 4.00 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 64.3 (2.53) | 38.1 (1.50) | — |
| | | N | | 72.4 (2.85) | | 8.10 (0.32) |
| M18 x 1 | | Y | 18.0 (0.71) | 64.3 (2.53) | 38.1 (1.50) | — |
| | | N | | 76.5 (3.01) | | 12.2 (0.48) |
| M30 X 1.5 | | Y | 30.0 (1.18) | 64.3 (2.53) | 47.75 (1.88) | — |
| | | N | | 76.5 (3.01) | | 12.2 (0.48) |

### Pico QD Style




| Thread Size | Barrel Type | Smooth Diameter | Shielded | mm (inches) | | | |
|---|---|---|---|---|---|---|---|
| | | | | A | B (max) | C (min) | D (max) |
| — | Nickel-plated brass | 6.5 | Y | 6.50 (0.26) | 49.0 (1.93) | — | — |
| M8 x 1 | Nickel-plated brass and stainless steel | — | Y | 8.00 (0.31) | 49.5 (1.95) | 34.0 (1.34) | — |
| | | | N | | 53.6 (2.11) | | 4.10 (0.16) |
| M12 x 1 | | — | Y | 12.0 (0.47) | 63.5 (2.50) | 47.5 (1.87) | — |
| | | | N | | 71.6 (2.82) | | 8.10 (0.32) |
| M18 x 1 | | — | Y | 18.0 (0.71) | 63.5 (2.50) | 47.5 (1.87) | — |
| | | | N | | 75.7 (2.98) | | 12.2 (0.48) |

# 872C/872CT WorldProx™ Short Barrel 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

DC Micro Quick-Disconnect Style
8, 12, 18, and 30 mm

DC Pico Quick-Disconnect Style
8, 12, and 18 mm

DC Mini Quick-Disconnect Style
18 & 30 mm

DC Cable Style
8, 12, 18, and 30 mm

Pigtail Cable with Integral Micro QD Connector
8, 12, 18, and 30 mm

## Features

- 3 wire operation
- 3 conductor PVC or PUR cable jacket (PVC standard)
- 3 or 4 pin connection for pico, micro, and mini connectors
- PVC and PUR cable available in 2, 5, and 10 m cable lengths (2 m standard)
- Pigtail cable in PVC with integral micro QD connector available in 0.2, 0.5, and 1.0 m cable lengths
- 10…30V DC
- Normally open or normally closed
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.8V |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse on power, transient noise, reverse polarity, short circuit, and overload |
| Certifications | UL Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6P, 12, 13, IP 67 (IEC 529) |
| Housing Material | Nickel-plated brass barrel, plastic face (PBT);<br>Optional stainless steel 304 barrel, plastic face (PBT) |
| Connections | Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.4 mm (0.175 in.) diameter; 3-conductor #26 AWG PVC or PUR;<br>Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, Integral 4-pin micro QD<br>Quick-Disconnect: 4-pin mini, 4-pin micro or 3-pin pico style |
| Status Indicator | Amber: Output energized, 360° visibility |
| Operating Temperature [C (F)], Min | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |



New

# 872C/872CT WorldProx™ Short Barrel 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style★ | Mini QD Style★ | Micro QD Style★ | Pico QD Style★ |
| 8 | 2 (0.08) | Yes | N.O. | NPN | 2500 | 872C-DH2NN8-E2 | — | 872C-DH2NN8-D4 | 872C-DH2NN8-P3 |
| | | | | PNP | | 872C-DH2NP8-E2 | — | 872C-DH2NP8-D4 | 872C-DH2NP8-P3 |
| | | | N.C. | NPN | | 872C-DH2CN8-E2 | — | 872C-DH2CN8-D4 | 872C-DH2CN8-P3 |
| | | | | PNP | | 872C-DH2CP8-E2 | — | 872C-DH2CP8-D4 | 872C-DH2CP8-P3 |
| | 3 (0.12) | No | N.O. | NPN | | 872C-DH3NN8-E2 | — | 872C-DH3NN8-D4 | 872C-DH3NN8-P3 |
| | | | | PNP | | 872C-DH3NP8-E2 | — | 872C-DH3NP8-D4 | 872C-DH3NP8-P3 |
| | | | N.C. | NPN | | 872C-DH3CN8-E2 | — | 872C-DH3CN8-D4 | 872C-DH3CN8-P3 |
| | | | | PNP | | 872C-DH3CP8-E2 | — | 872C-DH3CP8-D4 | 872C-DH3CP8-P3 |
| 12 | 3 (0.12) | Yes | N.O. | NPN | 1300 | 872C-DH3NN12-E2 | — | **872C-DH3NN12-D4** | 872C-DH3NN12-P3 |
| | | | | PNP | | **872C-DH3NP12-E2** | — | **872C-DH3NP12-D4** | 872C-DH3NP12-P3 |
| | | | N.C. | NPN | | **872C-DH3CN12-E2** | — | 872C-DH3CN12-D4 | 872C-DH3CN12-P3 |
| | | | | PNP | | 872C-DH3CP12-E2 | — | 872C-DH3CP12-D4 | 872C-DH3CP12-P3 |
| | 4 (0.16) | No | N.O. | NPN | | 872C-DH4NN12-E2 | — | **872C-DH4NN12-D4** | 872C-DH4NN12-P3 |
| | | | | PNP | | **872C-DH4NP12-E2** | — | **872C-DH4NP12-D4** | 872C-DH4NP12-P3 |
| | | | N.C. | NPN | | 872C-DH4CN12-E2 | — | 872C-DH4CN12-D4 | 872C-DH4CN12-P3 |
| | | | | PNP | | 872C-DH4CP12-E2 | — | 872C-DH4CP12-D4 | 872C-DH4CP12-P3 |
| 18 | 5 (0.2) | Yes | N.O. | NPN | 1500 | 872C-DH5NN18-E2 | 872C-DH5NN18-N4 | 872C-DH5NN18-D4 | 872C-DH5NN18-P3 |
| | | | | PNP | | **872C-DH5NP18-E2** | 872C-DH5NP18-N4 | **872C-DH5NP18-D4** | 872C-DH5NP18-P3 |
| | | | N.C. | NPN | | 872C-DH5CN18-E2 | 872C-DH5CN18-N4 | 872C-DH5CN18-D4 | 872C-DH5CP18-P3 |
| | | | | PNP | | 872C-DH5CP18-E2 | 872C-DH5CP18-N4 | 872C-DH5CP18-D4 | 872C-DH5CN18-P3 |
| | 8 (0.32) | No | N.O. | NPN | | 872C-DH8NN18-E2 | 872C-DH8NN18-N4 | 872C-DH8NN18-D4 | 872C-DH8NN18-P3 |
| | | | | PNP | | 872C-DH8NP18-E2 | 872C-DH8NP18-N4 | **872C-DH8NP18-D4** | 872C-DH8NP18-P3 |
| | | | N.C. | NPN | | 872C-DH8CN18-E2 | 872C-DH8CN18-N4 | 872C-DH8CN18-D4 | 872C-DH8CN18-P3 |
| | | | | PNP | | 872C-DH8CP18-E2 | 872C-DH8CP18-N4 | 872C-DH8CP18-D4 | 872C-DH8CP18-P3 |
| 30 | 10 (0.39) | Yes | N.O. | NPN | 1000 | 872C-DH10NN30-E2 | 872C-DH10NN30-N4 | 872C-DH10NN30-D4 | — |
| | | | | PNP | | 872C-DH10NP30-E2 | 872C-DH10NP30-N4 | **872C-DH10NP30-D4** | — |
| | | | N.C. | NPN | | 872C-DH10CN30-E2 | 872C-DH10CN30-N4 | 872C-DH10CN30-D4 | — |
| | | | | PNP | | 872C-DH10CP30-E2 | 872C-DH10CP30-N4 | 872C-DH10CP30-D4 | — |
| | 15 (0.59) | No | N.O. | NPN | | 872C-DH15NN30-E2 | 872C-DH15NN30-N4 | 872C-DH15NN30-D4 | — |
| | | | | PNP | | 872C-DH15NP30-E2 | 872C-DH15NP30-N4 | **872C-DH15NP30-D4** | — |
| | | | N.C. | NPN | | 872C-DH15CN30-E2 | 872C-DH15CN30-N4 | 872C-DH15CN30-D4 | — |
| | | | | PNP | | **872C-DH15CP30-E2** | 872C-DH15CP30-N4 | 872C-DH15CP30-D4 | — |
| Recommended mating cable, 2 m (6.5 ft). (See *On-Machine Connectivity* catalog for details and additional lengths). | | | | | | — | 889N-F4AFC-6F | 889D-F4AC-2 | 889P-F3AB-2 |

★ Cat. no. listed is for a standard nickel-plated brass barrel. For a stainless steel barrel, add a **T** to the cat. no. **Example:** Cat. No. 872C-DH4NP12-E2 becomes Cat. No. 872C**T**-DH4NP12-E2.

**Note:** Preferred availability designation in table above applies to nickel-plated brass model only.

### Cable Options

**E2** at the end of cat. no. designates PVC cable 2 m in length. Replace **E2** with **E5** or **E10** for 5 or 10 m length.
For polyurethane cable replace **E2** with **J2**, **J5**, or **J10** for 2, 5, or 10 m length.
For PVC pigtail cable with integral micro QD style connector (4-pin DC male) replace **E2** with **FD02**, **FD05**, or **FD10** for 0.2, 0.5, or 1.0 m length.

| Cable Length | PVC | PUR |
|---|---|---|
| 2 m | E2 | J2 |
| 5 m | E5 | J5 |
| 10 m | E10 | J10 |

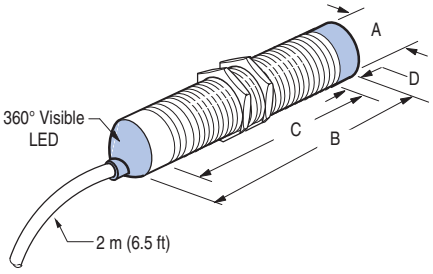
| Pigtail Cable Length | PVC |
|---|---|
| 0.2 m | FD02 |
| 0.5 m | FD05 |
| 1.0 m | FD10 |

# 872C/872CT WorldProx™ Short Barrel 3-Wire DC

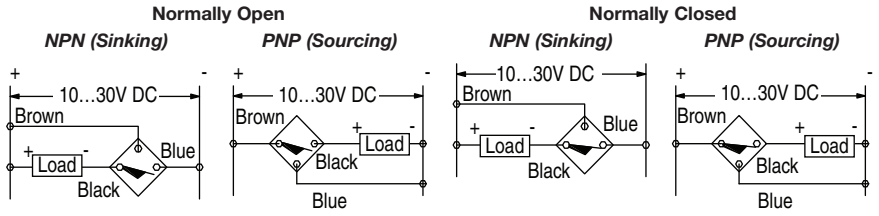
## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Approximate Dimensions—mm (in)

Cable Style

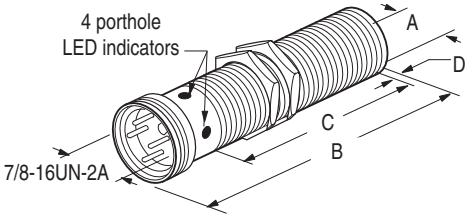


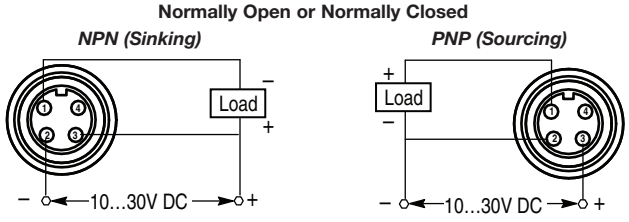

### Wiring Diagrams




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 26.7 (1.05) | 24.1 (0.95) | — |
| | | N | | 30.7 (1.21) | | 4.10 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 34.8 (1.37) | 31.8 (1.25) | — |
| | | N | | 42.9 (1.69) | | 8.10 (0.32) |
| M18 x 1 | | Y | 18.0 (0.71) | 34.8 (1.37) | | — |
| | | N | | 47.0 (1.85) | | 12.2 (0.48) |
| M30 x 1 | Nickel-plated brass | Y | 30.0 (1.18) | 34.8 (1.37) | | — |
| | | N | | 47.0 (1.85) | | 12.2 (0.48) |
| | Stainless steel | Y | | 37.3 (1.47) | 34.3 (1.35) | — |
| | | N | | 49.5 (1.95) | | 12.2 (0.48) |

Mini QD Style



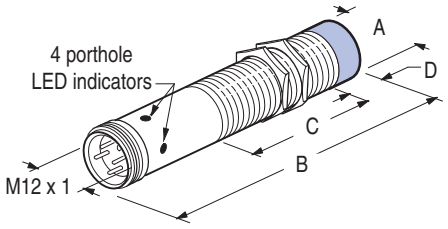

| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M18 x 1 | Nickel-plated brass and stainless steel | Y | 18.0 (0.71) | 47.5 (1.87) | 24.2 (0.95) | — |
| | | N | | 59.7 (2.35) | | 12.2 (0.48) |
| M30 X 1.5 | Nickel-plated brass | Y | 30.0 (1.18) | 47.5 (1.87) | 26.4 (1.04) | — |
| | | N | | 59.7 (2.35) | | 12.2 (0.48) |
| | Stainless steel | Y | | 50.8 (2.00) | 34.3 (1.35) | — |
| | | N | | 63.0 (2.48) | | 12.2 (0.48) |



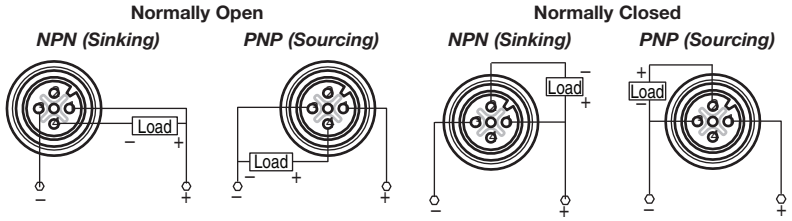
New

## Approximate Dimensions—mm (in)

### Micro QD Style

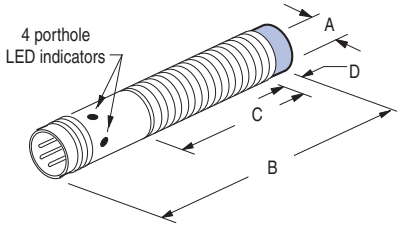


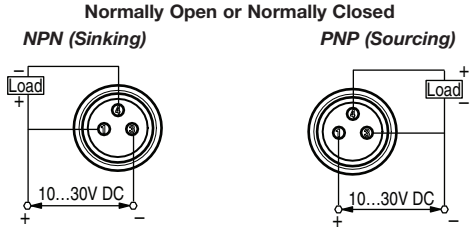

### Wiring Diagrams




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 45.2 (1.78) | 20.1 (0.79) | — |
| | | N | | 49.3 (1.94) | | 4.10 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 48.3 (1.90) | 27.4 (1.08) | — |
| | | N | | 56.4 (2.22) | | 8.10 (0.32) |
| M18 x 1 | Nickel-plated brass | Y | 18.0 (0.71) | 49.5 (1.95) | 26.4 (1.04) | — |
| | | N | | 61.7 (2.43) | | 12.2 (0.48) |
| | Stainless steel | Y | | 48.3 (1.90) | 31.8 (1.25) | — |
| | | N | | 60.5 (2.38) | | 12.2 (0.48) |
| M30 X 1.5 | Nickel-plated brass and stainless steel | Y | 30.0 (1.18) | 50.8 (2.00) | 31.8 (1.25) | — |
| | | N | | 63.2 (2.49) | | 12.2 (0.48) |

### Pico QD Style




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 44.5 (1.75) | 29.0 (1.14) | — |
| | | N | | 48.5 (1.91) | | 4.10 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 45.2 (1.78) | 29.2 (1.15) | — |
| | | N | | 53.3 (2.10) | | 8.10 (0.32) |
| M18 x 1 | | Y | 18.0 (0.71) | 47.5 (1.87) | 31.5 (1.24) | — |
| | | N | | 59.7 (2.35) | | 12.2 (0.48) |

# 872C/872CT WorldProx™ Extended Sensing 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

DC Micro Quick-Disconnect Style
8, 12, 18, and 30 mm

DC Pico Quick-Disconnect Style
6.5, 8, 12, and 18 mm

DC Mini Quick-Disconnect Style
18 & 30 mm

DC Cable Style
6.5, 8, 12, 18, and 30 mm

Pigtail Cable with Integral Micro QD Connector
8, 12, 18, and 30 mm

## Features

- 3-wire operation
- 3-conductor PVC or PUR cable jacket (PVC standard)
- 3- or 4-pin connection for pico, micro, and mini connectors
- PVC and PUR cable available in 2, 5, and 10 m cable lengths (2 m standard)
- Pigtail cable in PVC with integral micro QD connector available in 0.2, 0.5, and 1.0 m cable lengths
- 10…30V DC
- Normally open or normally closed
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.8V |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse on power, transient noise, reverse polarity, short circuit, and overload |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6P, 12, 13, IP 67 (IEC 529) |
| Housing Material | Nickel-plated brass barrel, plastic face (PBT)<br>Optional stainless steel 304 barrel, plastic face (PBT) |
| Connections | Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.4 mm (0.175 in.) diameter; 3-conductor #26 AWG PVC or PUR;<br>Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, Integral 4-pin micro QD<br>Quick-Disconnect: 4-pin mini, 4-pin micro or 3-pin pico style |
| LED | Amber: output energized, 360° visibility |
| Operating Temperature [C (F)], Min | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms half-sine |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.5…0.6 |
| Aluminum | 0.5…0.6 |
| Copper | 0.4…0.5 |

## QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |



New

# 872C/872CT WorldProx™ Extended Sensing 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style★ | Mini QD Style★ | Micro QD Style★ | Pico QD Style★ |
| 8 | 3 (0.12) | Yes | N.O. | NPN | 2500 | 872C-M3NN8-E2 | — | 872C-M3NN8-D4 | 872C-M3NN8-P3 |
| | | | | PNP | | 872C-M3NP8-E2 | — | 872C-M3NP8-D4 | 872C-M3NP8-P3 |
| | | | N.C. | NPN | | 872C-M3CN8-E2 | — | 872C-M3CN8-D4 | 872C-M3CN8-P3 |
| | | | | PNP | | 872C-M3CP8-E2 | — | 872C-M3CP8-D4 | 872C-M3CP8-P3 |
| | 4 (0.16) | No | N.O. | NPN | | 872C-N4NN8-E2 | — | 872C-N4NN8-D4 | 872C-N4NN8-P3 |
| | | | | PNP | | 872C-N4NP8-E2 | — | 872C-N4NP8-D4 | 872C-N4NP8-P3 |
| | | | N.C. | NPN | | 872C-N4CN8-E2 | — | 872C-N4CN8-D4 | 872C-N4CN8-P3 |
| | | | | PNP | | 872C-N4CP8-E2 | — | 872C-N4CP8-D4 | 872C-N4CP8-P3 |
| 12 | 4 (0.16) | Yes | N.O. | NPN | 1300 | 872C-M4NN12-E2 | — | 872C-M4NN12-D4 | 872C-M4NN12-P3 |
| | | | | PNP | | 872C-M4NP12-E2 | — | **872C-M4NP12-D4** | 872C-M4NP12-P3 |
| | | | N.C. | NPN | | 872C-M4CN12-E2 | — | 872C-M4CN12-D4 | 872C-M4CN12-P3 |
| | | | | PNP | | 872C-M4CP12-E2 | — | 872C-M4CP12-D4 | 872C-M4CP12-P3 |
| | 8 (0.31) | No | N.O. | NPN | | 872C-N8NN12-E2 | — | 872C-N8NN12-D4 | 872C-N8NN12-P3 |
| | | | | PNP | | 872C-N8NP12-E2 | — | **872C-N8NP12-D4** | 872C-N8NP12-P3 |
| | | | N.C. | NPN | | 872C-N8CN12-E2 | — | 872C-N8CN12-D4 | 872C-N8CN12-P3 |
| | | | | PNP | | 872C-N8CP12-E2 | — | 872C-N8CP12-D4 | 872C-N8CP12-P3 |
| 18 | 8 (0.31) | Yes | N.O. | NPN | 1500 | 872C-M8NN18-E2 | 872C-M8NN18-N4 | 872C-M8NN18-D4 | 872C-M8NN18-P3 |
| | | | | PNP | | **872C-M8NP18-E2** | 872C-M8NP18-N4 | **872C-M8NP18-D4** | 872C-M8NP18-P3 |
| | | | N.C. | NPN | | 872C-M8CN18-E2 | 872C-M8CN18-N4 | 872C-M8CN18-D4 | 872C-M8CN18-P3 |
| | | | | PNP | | 872C-M8CP18-E2 | 872C-M8CP18-N4 | 872C-M8CP18-D4 | 872C-M8CP18-P3 |
| | 12 (0.47) | No | N.O. | NPN | | 872C-N12NN18-E2 | 872C-N12NN18-N4 | 872C-N12NN18-D4 | 872C-N12NN18-P3 |
| | | | | PNP | | 872C-N12NP18-E2 | 872C-N12NP18-N4 | **872C-N12NP18-D4** | 872C-N12NP18-P3 |
| | | | N.C. | NPN | | 872C-N12CN18-E2 | 872C-N12CN18-N4 | 872C-N12CN18-D4 | 872C-N12CN18-P3 |
| | | | | PNP | | 872C-N12CP18-E2 | 872C-N12CP18-N4 | 872C-N12CP18-D4 | 872C-N12CP18-P3 |
| 30 | 15 (0.59) | Yes | N.O. | NPN | 1000 | 872C-M15NN30-E2 | 872C-M15NN30-N4 | 872C-M15NN30-D4 | — |
| | | | | PNP | | **872C-M15NP30-E2** | 872C-M15NP30-N4 | **872C-M15NP30-D4** | — |
| | | | N.C. | NPN | | 872C-M15CN30-E2 | 872C-M15CN30-N4 | 872C-M15CN30-D4 | — |
| | | | | PNP | | 872C-M15CP30-E2 | 872C-M15CP30-N4 | 872C-M15CP30-D4 | — |
| | 20 (0.79) | No | N.O. | NPN | | 872C-N20NN30-E2 | 872C-N20NN30-N4 | 872C-N20NN30-D4 | — |
| | | | | PNP | | 872C-N20NP30-E2 | 872C-N20NP30-N4 | **872C-N20NP30-D4** | — |
| | | | N.C. | NPN | | 872C-N20CN30-E2 | 872C-N20CN30-N4 | 872C-N20CN30-D4 | — |
| | | | | PNP | | 872C-N20CP30-E2 | 872C-N20CP30-N4 | 872C-N20CP30-D4 | — |
| Recommended mating cable, 2 m (6.5 ft). See the *On-Machine Connectivity* catalog for details and additional lengths. | | | | | | — | 889N-F4AFC-6F | 889D-F4AFC-2 | 889P-F3AB-2 |

★ Cat. no. listed is for a standard nickel-plated brass barrel. For a stainless steel barrel, add a **T** to the cat. no. **Example:** Cat. No. 872C-M3NN8-E2 becomes Cat. No. 872C**T**-M3NN8-E2.

**Note:** Preferred availability designation in table above applies to nickel-plated brass model only.

### Cable Options

**E2** at the end of cat. no. designates PVC cable 2 m in length. Replace **E2** with **E5** or **E10** for 5 or 10 m length.
For polyurethane cable replace **E2** with **J2**, **J5**, or **J10** for 2, 5, or 10 m length.
For PVC pigtail cable with integral micro QD style connector (4-pin DC male) replace **E2** with **FD02**, **FD05**, or **FD10** for 0.2, 0.5, or 1.0 m length.

| Cable Length | PVC | PUR |
|---|---|---|
| 2 m | E2 | J2 |
| 5 m | E5 | J5 |
| 10 m | E10 | J10 |

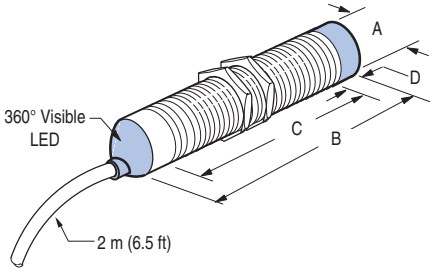
| Pigtail Cable Length | PVC |
|---|---|
| 0.2 m | FD02 |
| 0.5 m | FD05 |
| 1.0 m | FD10 |

# 872C/872CT WorldProx™ Extended Sensing 3-Wire DC

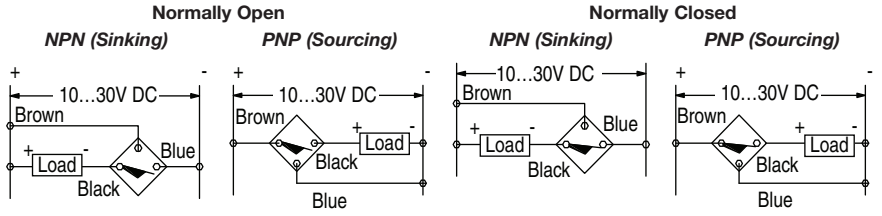
## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Approximate Dimensions—mm (in)

Cable Style

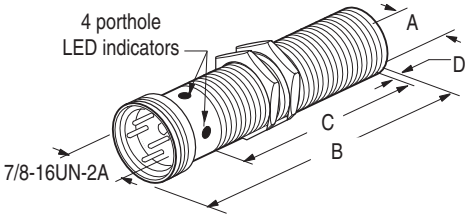


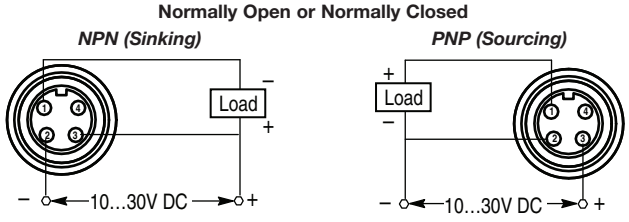

### Wiring Diagrams




| Thread Size | Barrel Type | Smooth Diameter | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | — | Y | 8.00 (0.31) | 32.8 (1.29) | 30.2 (1.19) | — |
| | | | N | | 36.8 (1.45) | | 4.10 (0.16) |
| M12 x 1 | | — | Y | 12.0 (0.47) | 50.8 (2.00) | 46.7 (1.84) | — |
| | | | N | | 58.9 (2.32) | | 8.10 (0.32) |
| M18 x 1 | | — | Y | 18.0 (0.71) | 50.8 (2.00) | 46.7 (1.84) | — |
| | | | N | | 63.0 (2.48) | | 12.2 (0.48) |
| M30 x 1 | | — | Y | 30.0 (1.18) | 50.8 (2.00) | 47.7 (1.88) | — |
| | | | N | | 63.0 (2.48) | | 12.2 (0.48) |

Mini QD Style



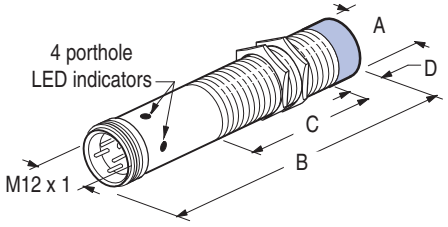

| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M18 x 1 | Nickel-plated brass and stainless steel | Y | 18.0 (0.71) | 63.5 (2.50) | 35.1 (1.38) | — |
| | | N | | 75.7 (2.98) | | 12.2 (0.48) |
| M30 X 1.5 | Nickel-plated brass | Y | 30.0 (1.18) | 63.5 (2.50) | 38.1 (1.50) | — |
| | | N | | 75.7 (2.98) | | 12.2 (0.48) |
| | Stainless steel | Y | | 64.3 (2.53) | 47.8 (1.88) | — |
| | | N | | 76.5 (3.01) | | 12.2 (0.48) |



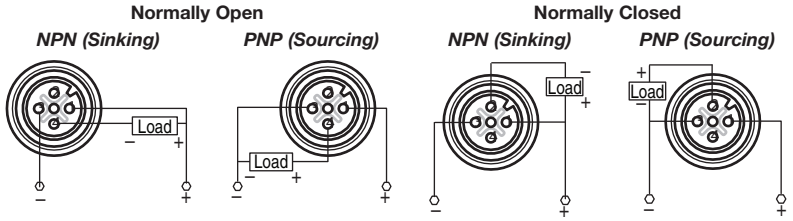
New

## Approximate Dimensions—mm (in)

### Micro QD Style

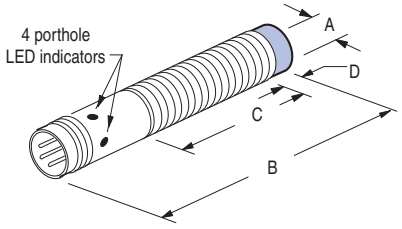


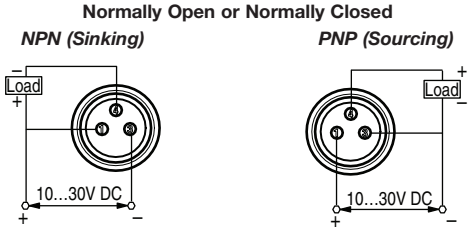

### Wiring Diagrams




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 58.7 (2.31) | 27.7 (1.09) | — |
| | | N | | 62.7 (2.47) | | 4.00 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 64.3 (2.53) | 38.1 (1.50) | — |
| | | N | | 72.4 (2.85) | | 8.10 (0.32) |
| M18 x 1 | | Y | 18.0 (0.71) | 64.3 (2.53) | 38.1 (1.50) | — |
| | | N | | 76.5 (3.01) | | 12.2 (0.48) |
| M30 X 1.5 | | Y | 30.0 (1.18) | 64.3 (2.53) | 47.75 (1.88) | — |
| | | N | | 76.5 (3.01) | | 12.2 (0.48) |

### Pico QD Style




| Thread Size | Barrel Type | Smooth Diameter | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | — | Y | 8.00 (0.31) | 49.5 (1.95) | 34.0 (1.34) | — |
| | | | N | | 53.6 (2.11) | | 4.10 (0.16) |
| M12 x 1 | | — | Y | 12.0 (0.47) | 63.5 (2.50) | 47.5 (1.87) | — |
| | | | N | | 71.6 (2.82) | | 8.10 (0.32) |
| M18 x 1 | | — | Y | 18.0 (0.71) | 63.5 (2.50) | 47.5 (1.87) | — |
| | | | N | | 75.7 (2.98) | | 12.2 (0.48) |

# 872C/872CT WorldProx™ Short Barrel Extended Sensing 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

DC Micro Quick-Disconnect Style
8, 12, 18, and 30 mm

DC Pico Quick-Disconnect Style
8, 12, and 18 mm

DC Mini Quick-Disconnect Style
18 & 30 mm

DC Cable Style
8, 12, 18, and 30 mm

Pigtail Cable with Integral Micro QD Connector
8, 12, 18, and 30 mm

## Features

- 3 wire operation
- 3 conductor PVC or PUR cable jacket (PVC standard)
- 3 or 4 pin connection for pico, micro, and mini connectors
- PVC and PUR cable available in 2, 5, and 10 m cable lengths (2 m standard)
- Pigtail cable in PVC with integral micro QD connector available in 0.2, 0.5, and 1.0 m cable lengths
- 10…30V DC
- Normally open or normally closed
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.8V |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse on power, transient noise, reverse polarity, short circuit, and overload |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6P, 12, 13, IP 67 (IEC 529) |
| Housing Material | Nickel-plated brass barrel, plastic face (PBT);<br>Optional stainless steel 304 barrel, plastic face (PBT) |
| Connections | Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.4 mm (0.175 in.) diameter; 3-conductor #26 AWG PVC or PUR;<br>Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, Integral 4-pin micro QD<br>Quick-Disconnect: 4-pin mini, 4-pin micro or 3-pin pico style |
| Status Indicator | Amber: Output energized, 360° visibility |
| Operating Temperature [C (F)], Min | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |



New

# 872C/872CT WorldProx™ Short Barrel Extended Sensing 3-Wire DC

## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style★ | Mini QD Style★ | Micro QD Style★ | Pico QD Style★ |
| 8 | 3 (0.12) | Yes | N.O. | NPN | 2500 | 872C-MH3NN8-P3 | — | 872C-MH3NN8-D4 | 872C-MH3NN8-P3 |
| | | | | PNP | | 872C-MH3NP8-E2 | — | **872C-MH3NP8-D4** | 872C-MH3NP8-P3 |
| | | | N.C. | NPN | | 872C-MH3CN8-E2 | — | 872C-MH3CN8-D4 | 872C-MH3CN8-P3 |
| | | | | PNP | | 872C-MH3CP8-E2 | — | 872C-MH3CP8-D4 | 872C-MH3CP8-P3 |
| | 4 (0.16) | No | N.O. | NPN | | 872C-NH4NN8-E2 | — | 872C-NH4NN8-D4 | 872C-NH4NN8-P3 |
| | | | | PNP | | 872C-NH4NP8-E2 | — | 872C-NH4NP8-D4 | 872C-NH4NP8-P3 |
| | | | N.C. | NPN | | 872C-NH4CN8-E2 | — | 872C-NH4CN8-D4 | 872C-NH4CN8-P3 |
| | | | | PNP | | 872C-NH4CP8-E2 | — | 872C-NH4CP8-D4 | 872C-NH4CP8-P3 |
| 12 | 4 (0.16) | Yes | N.O. | NPN | 1300 | 872C-MH4NN12-E2 | — | 872C-MH4NN12-D4 | 872C-MH4NN12-P3 |
| | | | | PNP | | 872C-MH4NP12-E2 | — | **872C-MH4NP12-D4** | 872C-MH4NP12-P3 |
| | | | N.C. | NPN | | 872C-MH4CN12-E2 | — | 872C-MH4CN12-D4 | 872C-MH4CN12-P3 |
| | | | | PNP | | 872C-MH4CP12-E2 | — | 872C-MH4CP12-D4 | 872C-MH4CP12-P3 |
| | 8 (0.32) | No | N.O. | NPN | | 872C-NH8NN12-E2 | — | 872C-NH8NN12-D4 | 872C-NH8NN12-P3 |
| | | | | PNP | | 872C-NH8NP12-E2 | — | **872C-NH8NP12-D4** | 872C-NH8NP12-P3 |
| | | | N.C. | NPN | | 872C-NH8CN12-E2 | — | 872C-NH8CN12-D4 | 872C-NH8CN12-P3 |
| | | | | PNP | | 872C-NH8CP12-E2 | — | 872C-NH8CP12-D4 | 872C-NH8CP12-P3 |
| 18 | 8 (0.32) | Yes | N.O. | NPN | 1500 | 872C-MH8NN18-E2 | 872C-MH8NN18-N4 | 872C-MH8NN18-D4 | 872C-MH8NN18-P3 |
| | | | | PNP | | 872C-MH8NP18-E2 | 872C-MH8NP18-N4 | 872C-MH8NP18-D4 | 872C-MH8NP18-P3 |
| | | | N.C. | NPN | | 872C-MH8CN18-E2 | 872C-MH8CN18-N4 | 872C-MH8CN18-D4 | 872C-MH8CN18-P3 |
| | | | | PNP | | 872C-MH8CP18-E2 | 872C-MH8CP18-N4 | 872C-MH8CP18-D4 | 872C-MH8CP18-P3 |
| | 12 (0.47) | No | N.O. | NPN | | 872C-NH12NN18-E2 | 872C-NH12NN18-N4 | 872C-NH12NN18-D4 | 872C-NH12NN18-P3 |
| | | | | PNP | | 872C-NH12NP18-E2 | 872C-NH12NP18-N4 | 872C-NH12NP18-D4 | 872C-NH12NP18-P3 |
| | | | N.C. | NPN | | 872C-NH12CN18-E2 | 872C-NH12CN18-N4 | 872C-NH12CN18-D4 | 872C-NH12CN18-P3 |
| | | | | PNP | | 872C-NH12CP18-E2 | 872C-NH12CP18-N4 | 872C-NH12CP18-D4 | 872C-NH12CP18-P3 |
| 30 | 15 (0.59) | Yes | N.O. | NPN | 1000 | 872C-MH15NN30-E2 | 872C-MH15NN30-N4 | 872C-MH15NN30-D4 | — |
| | | | | PNP | | 872C-MH15NP30-E2 | 872C-MH15NP30-N4 | **872C-MH15NP30-D4** | — |
| | | | N.C. | NPN | | 872C-MH15CN30-E2 | 872C-MH15CN30-N4 | 872C-MH15CN30-D4 | — |
| | | | | PNP | | 872C-MH15CP30-E2 | 872C-MH15CP30-N4 | 872C-MH15CP30-D4 | — |
| | 20 (0.79) | No | N.O. | NPN | | 872C-NH20NN30-E2 | 872C-NH20NN30-N4 | 872C-NH20NN30-D4 | — |
| | | | | PNP | | 872C-NH20NP30-E2 | 872C-NH20NP30-N4 | 872C-NH20NP30-D4 | — |
| | | | N.C. | NPN | | 872C-NH20CN30-E2 | 872C-NH20CN30-N4 | 872C-NH20CN30-D4 | — |
| | | | | PNP | | 872C-NH20CP30-E2 | 872C-NH20CP30-N4 | 872C-NH20CP30-D4 | — |
| Recommended mating cable, 2 m (6.5 ft). (See *On-Machine Connectivity* catalog for details and additional lengths). | | | | | | — | 889N-F4AFC-6F | 889D-F4AC-2 | 889P-F3AB-2 |

★ Cat. no. listed is for a standard nickel-plated brass barrel. For a stainless steel barrel, add a **T** to the cat. no. **Example:** Cat. No. 872C-MH3NN8-P3 becomes Cat. No. 872C**T**-MH3NN8-P3.

**Note:** Preferred availability designation in table above applies to nickel-plated brass model only.

### Cable Options

**E2** at the end of cat. no. designates PVC cable 2 m in length. Replace **E2** with **E5** or **E10** for 5 or 10 m length.
For polyurethane cable replace **E2** with **J2**, **J5**, or **J10** for 2, 5, or 10 m length.
For PVC pigtail cable with integral micro QD style connector (4-pin DC male) replace **E2** with **FD02**, **FD05**, or **FD10** for 0.2, 0.5, or 1.0 m length.

| Cable Length | PVC | PUR |
|---|---|---|
| 2 m | E2 | J2 |
| 5 m | E5 | J5 |
| 10 m | E10 | J10 |

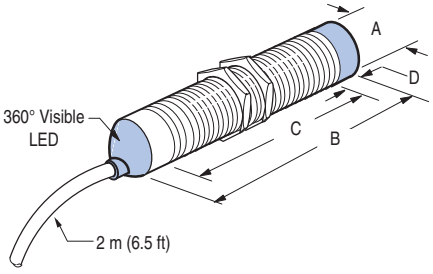
| Pigtail Cable Length | PVC |
|---|---|
| 0.2 m | FD02 |
| 0.5 m | FD05 |
| 1.0 m | FD10 |

# 872C/872CT WorldProx™ Short Barrel Extended Sensing 3-Wire DC

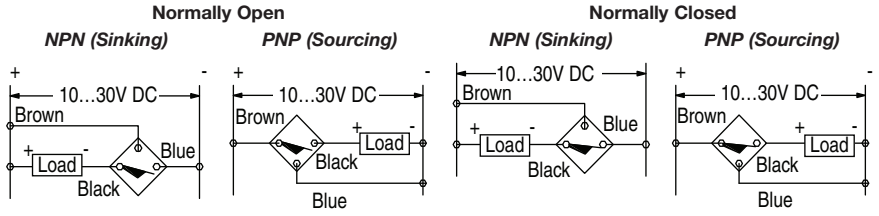
## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Approximate Dimensions—mm (in)

Cable Style

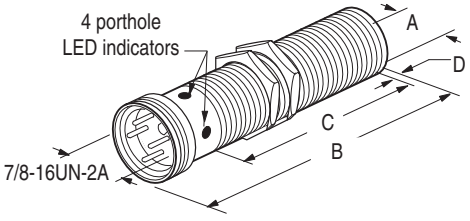


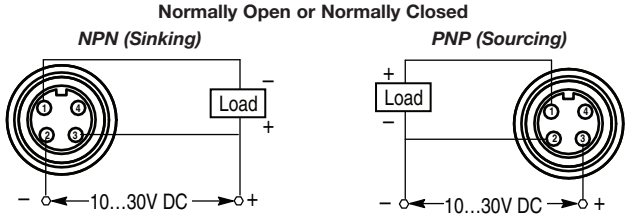

### Wiring Diagrams




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 26.7 (1.05) | 24.1 (0.95) | — |
| | | N | | 30.7 (1.21) | | 4.10 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 34.8 (1.37) | 31.8 (1.25) | — |
| | | N | | 42.9 (1.69) | | 8.10 (0.32) |
| M18 x 1 | | Y | 18.0 (0.71) | 34.8 (1.37) | | — |
| | | N | | 47.0 (1.85) | | 12.2 (0.48) |
| M30 x 1 | Nickel-plated brass | Y | 30.0 (1.18) | 34.8 (1.37) | | — |
| | | N | | 47.0 (1.85) | | 12.2 (0.48) |
| | Stainless steel | Y | | 37.3 (1.47) | 34.3 (1.35) | — |
| | | N | | 49.5 (1.95) | | 12.2 (0.48) |

### Mini QD Style




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M18 x 1 | Nickel-plated brass and stainless steel | Y | 18.0 (0.71) | 47.5 (1.87) | 24.2 (0.95) | — |
| | | N | | 59.7 (2.35) | | 12.2 (0.48) |
| M30 X 1.5 | Nickel-plated brass | Y | 30.0 (1.18) | 47.5 (1.87) | 26.4 (1.04) | — |
| | | N | | 59.7 (2.35) | | 12.2 (0.48) |
| | Stainless steel | Y | | 50.8 (2.00) | 34.3 (1.35) | — |
| | | N | | 63.0 (2.48) | | 12.2 (0.48) |



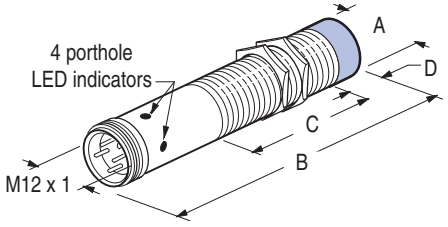
New

# 872C/872CT WorldProx™ Short Barrel Extended Sensing 3-Wire DC

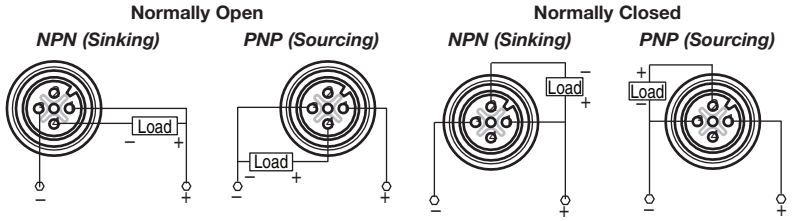
## Plastic Face/ Threaded Nickel-Plated Brass or Stainless Steel Barrel

### Approximate Dimensions—mm (in)

#### Micro QD Style

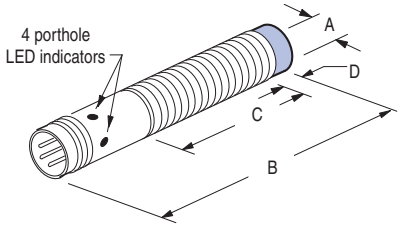


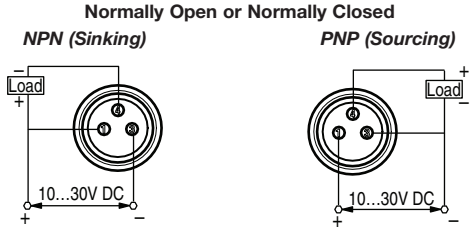

### Wiring Diagrams




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 45.2 (1.78) | 20.1 (0.79) | — |
| | | N | | 49.3 (1.94) | | 4.10 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 48.3 (1.90) | 27.4 (1.08) | — |
| | | N | | 56.4 (2.22) | | 8.10 (0.32) |
| M18 x 1 | Nickel-plated brass | Y | 18.0 (0.71) | 49.5 (1.95) | 26.4 (1.04) | — |
| | | N | | 61.7 (2.43) | | 12.2 (0.48) |
| | Stainless steel | Y | | 48.3 (1.90) | 31.8 (1.25) | — |
| | | N | | 60.5 (2.38) | | 12.2 (0.48) |
| M30 X 1.5 | Nickel-plated brass and stainless steel | Y | 30.0 (1.18) | 50.8 (2.00) | 31.8 (1.25) | — |
| | | N | | 63.2 (2.49) | | 12.2 (0.48) |

#### Pico QD Style




| Thread Size | Barrel Type | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|---|
| M8 x 1 | Nickel-plated brass and stainless steel | Y | 8.00 (0.31) | 44.5 (1.75) | 29.0 (1.14) | — |
| | | N | | 48.5 (1.91) | | 4.10 (0.16) |
| M12 x 1 | | Y | 12.0 (0.47) | 45.2 (1.78) | 29.2 (1.15) | — |
| | | N | | 53.3 (2.10) | | 8.10 (0.32) |
| M18 x 1 | | Y | 18.0 (0.71) | 47.5 (1.87) | 31.5 (1.24) | — |
| | | N | | 59.7 (2.35) | | 12.2 (0.48) |

# 872C WorldProx™ Long Range Sensing 3-Wire DC

## Plastic Face/ Threaded Chrome-Plated Brass Barrel

872C DC Micro Style
6.5, 8, 12, 18, and 30 mm

872C DC Pico Style
6.5 & 8 mm

## Features

- Up to three times the sensing range of standard range inductive proximity sensors
- 3- or 4-pin connection for pico and micro connectors
- 10…30V DC
- Normally open output
- IP67 enclosure rating
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

| | |
|---|---|
| **IMPORTANT** | Special mounting and installation considerations may be necessary due to the long-range sensing capabilities of these products. The Introduction and Application section of the catalog should be used as a guideline. Please refer to pages 2-12 and 2-14. |

## Specifications

| | |
|---|---|
| Load Current, DC, Max. | ≤200 mA |
| Leakage Current | ≤0.1 mA |
| Operating voltage range | 10…30V DC |
| Sensor Voltage Drop | ≤2V |
| Repeatability | ≤5% |
| Hysteresis | 10% typical |
| Reverse Polarity Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6P, 12, 13, IP67 (IEC 529)<br>Chrome-plated brass barrel, plastic face (PBT) |
| Connections | Quick-disconnect: 4-pin micro style<br>3-pin pico style |
| LED | Amber: output energized, 360° visibility |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.6…0.8 |
| Brass | 0.3…0.6 |
| Aluminum | 0.3…0.5 |
| Copper | 0.2…0.5 |

## QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 872C WorldProx™ Long Range Sensing 3-Wire DC

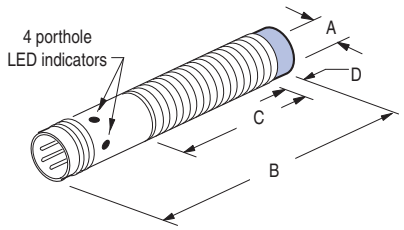
## Plastic Face/ Threaded Chrome-Plated Brass Barrel

### Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency (Hz) | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Micro QD Style | Pico QD Style |
| 6.5 | 3 (0.12) | Yes | N.O. | NPN | 1000 | 872C-M3NN7-D4 | 872C-M3NN7-P3 |
| | | | | PNP | | 872C-M3NP7-D4 | 872C-M3NP7-P3 |
| 8 | 6 (0.23) | No | N.O. | NPN | 500 | 872C-N6NN8-D4 | 872C-N6NN8-P3 |
| | | | | PNP | | 872C-N6NP8-D4 | 872C-N6NP8-P3 |
| 12 | 6 (0.23) | Yes | N.O. | NPN | 800 | 872C-M6NN12-D4 | — |
| | | | | PNP | | 872C-M6NP12-D4 | — |
| | 10 (0.39) | No | N.O. | NPN | 400 | 872C-N10NN12-D4 | — |
| | | | | PNP | | 872C-N10NP12-D4 | — |
| 18 | 12 (0.47) | Yes | N.O. | NPN | 500 | 872C-M12NN18-D4 | — |
| | | | | PNP | | 872C-M12NP18-D4 | — |
| | 20 (0.79) | No | N.O. | NPN | 200 | 872C-N20NN18-D4 | — |
| | | | | PNP | | 872C-N20NP18-D4 | — |
| 30 | 22 (0.86) | Yes | N.O. | NPN | 200 | 872C-M22NN30-D4 | — |
| | | | | PNP | | 872C-M22NP30-D4 | — |
| | 40 (1.57) | No | N.O. | NPN | 100 | 872C-N40NN30-D4 | — |
| | | | | PNP | | 872C-N40NP30-D4 | — |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889D-F4AC-2 | 889P-F3AB-2 |

### Approximate Dimensions—mm (in)

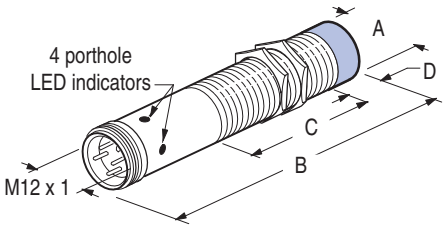
#### Pico QD Style



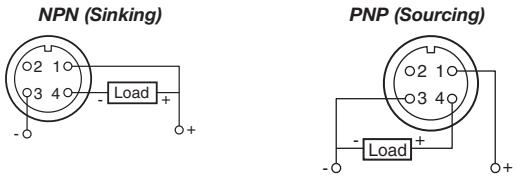

**Normally Open or Normally Closed**

| Thread Size | Smooth Diameter [mm] | Shielded | mm (inches) | | | |
|---|---|---|---|---|---|---|
| | | | A | B (max) | C (min) | D (max) |
| — | 6.5 | Y | 6.5 (0.26) | 60 (2.36) | — | — |
| M8 x 1 | — | N | 8.0 (0.31) | 60 (2.36) | 41.5 (1.63) | 4 (0.15) |

#### Micro QD Style




**Normally Open**




| Thread Size | Smooth Diameter [mm] | Shielded | mm (inches) | | | |
|---|---|---|---|---|---|---|
| | | | A | B (max) | C (min) | D (max) |
| — | 6.5 | Y | 6.5 (0.26) | 66 (2.59) | — | — |
| M8 x 1 | — | N | 8 (0.31) | 66 (2.59) | 40 (1.57) | 4 (0.15) |
| M12 x 1 | — | Y | 12 (0.47) | 60 (2.36) | 40 (1.57) | — |
| | | N | | | 35.3 (1.38) | 5.7 (0.22) |
| M18 x 1 | — | Y | 18 (0.71) | 63.5 (2.5) | 42 (1.65) | — |
| | | N | | | 32 (1.25) | 10 (0.39) |
| M30 X 1.5 | — | Y | 30 (1.18) | 73.5 (2.89) | 52 (2.04) | — |
| | | N | | | 42 (1.65) | 10 (0.39) |

# 872CP WorldProx™ 3-Wire DC

## Plastic Face/ Threaded Plastic Barrel

*872CP DC Cable Style*
*12, 18, and 30 mm*

*872CP DC Micro Quick Disconnect Style*
*12, 18, and 30 mm*

*Pigtail Cable with Integral Micro QD Connector*
*12, 18, and 30 mm*

### Features

- 3 wire operation
- 3 conductor connection
- 10…30V DC
- Normally open or normally closed output
- Transient noise, short circuit, and reverse polarity protection
- Cable and micro quick disconnect models
- PVC and PUR cable available in 2, 5, and 10 m cable lengths (2 m standard)
- Pigtail cable in PVC with integral micro QD connector available in 0.2, 0.5, and 1.0 m cable lengths
- cULus Listed and CE Marked for all applicable directives

### Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.8V all models |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | Transient noise protection, reverse polarity protection, short circuit protection, overload protection, false pulse protection |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 4X, 6P, 12, 13; IP67 (IEC 529) |
| Housing Material | Plastic barrel (Valox) |
| Connections | Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.4 mm (0.175 in.) diameter 3-conductor #26 AWG PVC or PUR<br>Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, Integral 4-pin micro QD<br>Quick Disconnect: 4-pin micro style |
| LED | Amber: output energized, 360° visibility |
| Operating Temperature [C (F)], Min | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

### Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |

### QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |



New

## Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency (Hz) | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style |
| 12 | 3 (0.12) | Yes | N.O. | NPN | 2000 | 872CP-D3NN12-E2 | 872CP-D3NN12-D4 |
| | | | | PNP | | 872CP-D3NP12-E2 | **872CP-D3NP12-D4** |
| | | | N.C. | NPN | | 872CP-D3CN12-E2 | 872CP-D3CN12-D4 |
| | | | | PNP | | 872CP-D3CP12-E2 | 872CP-D3CP12-D4 |
| | 4 (0.16) | No | N.O. | NPN | | **872CP-D4NN12-E2** | **872CP-D4NN12-D4** |
| | | | | PNP | | **872CP-D4NP12-E2** | **872CP-D4NP12-D4** |
| | | | N.C. | NPN | | 872CP-D4CN12-E2 | 872CP-D4CN12-D4 |
| | | | | PNP | | 872CP-D4CP12-E2 | 872CP-D4CP12-D4 |
| 18 | 5 (0.2) | Yes | N.O. | NPN | | **872CP-D5NN18-E2** | **872CP-D5NN18-D4** |
| | | | | PNP | | **872CP-D5NP18-E2** | **872CP-D5NP18-D4** |
| | | | N.C. | NPN | | 872CP-D5CN18-E2 | 872CP-D5CN18-D4 |
| | | | | PNP | | 872CP-D5CP18-E2 | 872CP-D5CP18-D4 |
| | 8 (0.31) | No | N.O. | NPN | | **872CP-D8NN18-E2** | **872CP-D8NN18-D4** |
| | | | | PNP | | **872CP-D8NP18-E2** | **872CP-D8NP18-D4** |
| | | | N.C. | NPN | | 872CP-D8CN18-E2 | 872CP-D8CN18-D4 |
| | | | | PNP | | 872CP-D8CP18-E2 | 872CP-D8CP18-D4 |
| 30 | 10 (0.39) | Yes | N.O. | NPN | | 872CP-D10NN30-E2 | 872CP-D10NN30-D4 |
| | | | | PNP | | 872CP-D10NP30-E2 | **872CP-D10NP30-D4** |
| | | | N.C. | NPN | | 872CP-D10CN30-E2 | 872CP-D10CN30-D4 |
| | | | | PNP | | 872CP-D10CP30-E2 | 872CP-D10CP30-D4 |
| | 15 (0.59) | No | N.O. | NPN | | **872CP-D15NN30-E2** | 872CP-D15NN30-D4 |
| | | | | PNP | | **872CP-D15NP30-E2** | **872CP-D15NP30-D4** |
| | | | N.C. | NPN | | 872CP-D15CN30-E2 | 872CP-D15CN30-D4 |
| | | | | PNP | | 872CP-D15CP30-E2 | 872CP-D15CP30-D4 |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | — | 889D-F4AC-2 |

### Cable Options

**E2** at the end of cat. no. designates PVC cable 2 m in length. Replace **E2** with **E5** or **E10** for 5 or 10 m length.
For polyurethane cable replace **E2** with **J2**, **J5**, or **J10** for 2, 5, or 10 m length.
For PVC pigtail cable with integral micro QD style connector (4-pin DC male) replace **E2** with **FD02**, **FD05**, or **FD10** for 0.2, 0.5, or 1.0 m length.

| Cable Length | PVC | PUR |
|---|---|---|
| 2 m | E2 | J2 |
| 5 m | E5 | J5 |
| 10 m | E10 | J10 |

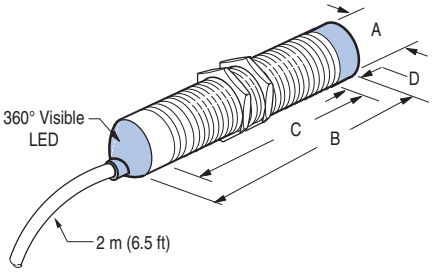
| Pigtail Cable Length | PVC |
|---|---|
| 0.2 m | FD02 |
| 0.5 m | FD05 |
| 1.0 m | FD10 |

# 872CP WorldProx™ 3-Wire DC

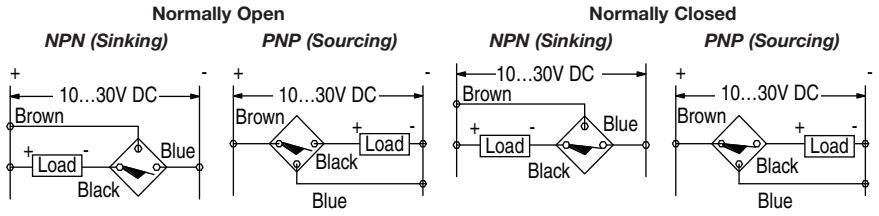
## Plastic Face/ Threaded Plastic Barrel

### Approximate Dimensions—mm (in)

Cable Style

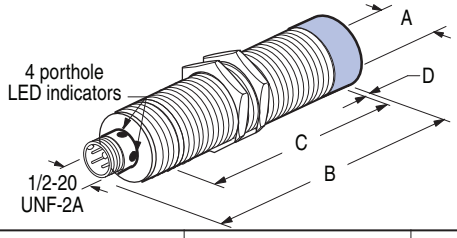


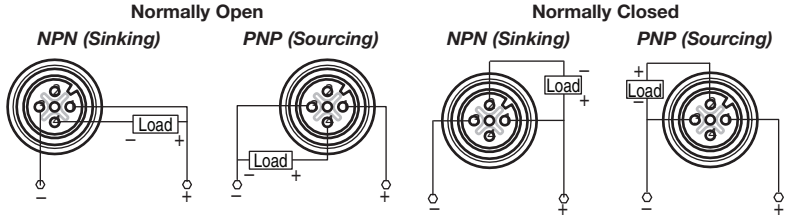

### Wiring Diagrams




| Thread Size | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|
| M12 x 1 | Y | 12.0 (0.47) | 51.6 (2.03) | 44.7 (1.76) | 2.00 (0.08) |
| | N | | | | |
| M18 x 1 | Y | 18.0 (0.71) | | 46.2 (1.82) | |
| | N | | | | |
| M30 x 1.5 | Y | 30.0 (1.18) | | | |
| | N | | | | |

Micro QD Style




| Thread Size | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|
| M12 x 1 | Y | 12.0 (0.47) | 64.3 (2.53) | 41.4 (1.63) | 2.00 (0.08) |
| | N | | | | |
| M18 x 1 | Y | 18.0 (0.71) | 71.3 (2.80) | 46.2 (1.82) | |
| | N | | | | |
| M30 X 1.5 | Y | 30.0 (1.18) | | | |
| | N | | | | |



New



Allen-Bradley

# 872CP WorldProx™ Extended Sensing 3-Wire DC

## Plastic Face/ Threaded Plastic Barrel

872CP DC Cable Style
12, 18, and 30 mm

872CP DC Micro Quick Disconnect Style
12, 18, and 30 mm

Pigtail Cable with Integral Micro QD Connector
12, 18, and 30 mm

## Features

- 3 wire operation
- 3 conductor connection
- 10…30V DC
- Normally open or normally closed output
- Transient noise, short circuit, and reverse polarity protection
- Cable and micro quick disconnect models
- PVC and PUR cable available in 2, 5, and 10 m cable lengths (2 m standard)
- Pigtail cable in PVC with integral micro QD connector available in 0.2, 0.5, and 1.0 m cable lengths
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.8V all models |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | Transient noise protection, reverse polarity protection, short circuit protection, overload protection, false pulse protection |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 4X, 6P, 12, 13; IP67 (IEC 529) |
| Housing Material | Plastic barrel (Valox) |
| Connections | Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.4 mm (0.175 in.) diameter 3-conductor #26 AWG PVC or PUR<br>Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, Integral 4-pin micro QD<br>Quick Disconnect: 4-pin micro style |
| LED | Amber: output energized, 360° visibility |
| Operating Temperature [C (F)], Min | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |

## QD Cordsets and Accessories

| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 872CP WorldProx™ Extended Sensing 3-Wire DC

## Plastic Face/ Threaded Plastic Barrel

### Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency (Hz) | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style |
| 12 | 4 (0.16) | Yes | N.O. | NPN | 2000 | 872CP-M4NN12-E2 | 872CP-M4NN12-D4 |
| | | | | PNP | | 872CP-M4NP12-E2 | 872CP-M4NP12-D4 |
| | | | N.C. | NPN | | 872CP-M4CN12-E2 | 872CP-M4CN12-D4 |
| | | | | PNP | | 872CP-M4CP12-E2 | 872CP-M4CP12-D4 |
| | 8 (0.31) | No | N.O. | NPN | | 872CP-N8NN12-E2 | 872CP-N8NN12-D4 |
| | | | | PNP | | 872CP-N8NP12-E2 | 872CP-N8NP12-D4 |
| | | | N.C. | NPN | | 872CP-N8CN12-E2 | 872CP-N8CN12-D4 |
| | | | | PNP | | 872CP-N8CP12-E2 | 872CP-N8CP12-D4 |
| 18 | 8 (0.31) | Yes | N.O. | NPN | | 872CP-M8NN18-E2 | 872CP-M8NN18-D4 |
| | | | | PNP | | 872CP-M8NP18-E2 | 872CP-M8NP18-D4 |
| | | | N.C. | NPN | | 872CP-M8CN18-E2 | 872CP-M8CN18-D4 |
| | | | | PNP | | 872CP-M8CP18-E2 | 872CP-M8CP18-D4 |
| | 12 (0.47) | No | N.O. | NPN | | 872CP-N12NN18-E2 | 872CP-N12NN18-D4 |
| | | | | PNP | | 872CP-N12NP18-E2 | 872CP-N12NP18-D4 |
| | | | N.C. | NPN | | 872CP-N12CN18-E2 | 872CP-N12CN18-D4 |
| | | | | PNP | | 872CP-N12CP18-E2 | 872CP-N12CP18-D4 |
| 30 | 15 (0.59) | Yes | N.O. | NPN | | 872CP-M15NN30-E2 | 872CP-M15NN30-D4 |
| | | | | PNP | | 872CP-M15NP30-E2 | 872CP-M15NP30-D4 |
| | | | N.C. | NPN | | 872CP-M15CN30-E2 | 872CP-M15CN30-D4 |
| | | | | PNP | | 872CP-M15CP30-E2 | 872CP-M15CP30-D4 |
| | 20 (0.79) | No | N.O. | NPN | | 872CP-N20NN30-E2 | 872CP-N20NN30-D4 |
| | | | | PNP | | 872CP-N20NP30-E2 | 872CP-N20NP30-D4 |
| | | | N.C. | NPN | | 872CP-N20CN30-E2 | 872CP-N20CN30-D4 |
| | | | | PNP | | 872CP-N20CP30-E2 | 872CP-N20CP30-D4 |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | — | 889D-F4AC-2 |

### Cable Options

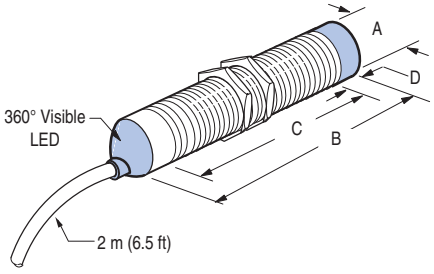
**E2** at the end of cat. no. designates PVC cable 2 m in length. Replace **E2** with **E5** or **E10** for 5 or 10 m length.
For polyurethane cable replace **E2** with **J2**, **J5**, or **J10** for 2, 5, or 10 m length.
For PVC pigtail cable with integral micro QD style connector (4-pin DC male) replace **E2** with **FD02**, **FD05**, or **FD10** for 0.2, 0.5, or 1.0 m length.

| Cable Length | PVC | PUR |
|---|---|---|
| 2 m | E2 | J2 |
| 5 m | E5 | J5 |
| 10 m | E10 | J10 |

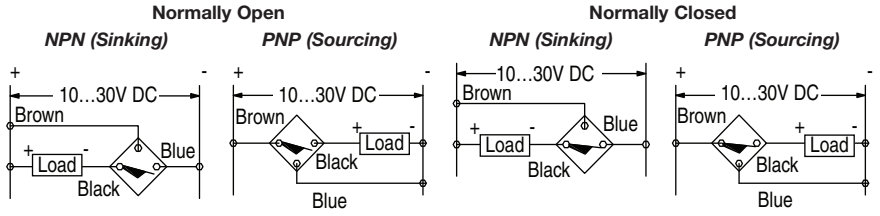
| Pigtail Cable Length | PVC |
|---|---|
| 0.2 m | FD02 |
| 0.5 m | FD05 |
| 1.0 m | FD10 |

## Approximate Dimensions—mm (in)

### Cable Style

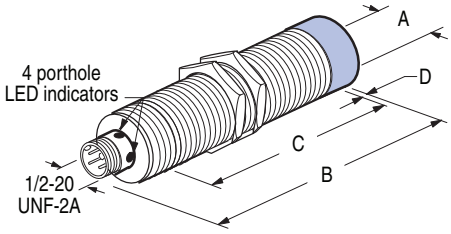


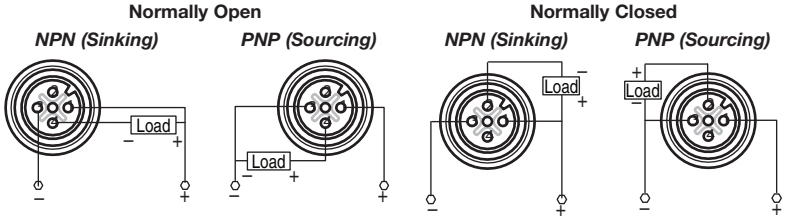

### Wiring Diagrams




| Thread Size | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|
| M12 x 1 | Y | 12.0 (0.47) | 51.6 (2.03) | 44.7 (1.76) | 2.0 (0.08) |
| | N | | | | |
| M18 x 1 | Y | 18.0 (0.71) | | 46.2 (1.82) | |
| | N | | | | |
| M30 x 1.5 | Y | 30.0 (1.18) | | | |
| | N | | | | |

### Micro QD Style




| Thread Size | Shielded | mm (inches) A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|
| M12 x 1 | Y | 12.0 (0.47) | 64.3 (2.53) | 41.4 (1.63) | 2.00 (0.08) |
| | N | | | | |
| M18 x 1 | Y | 18.0 (0.71) | 71.3 (2.8) | 46.2 (1.82) | |
| | N | | | | |
| M30 X 1.5 | Y | 30.0 (1.18) | | | |
| | N | | | | |

*872C DC Cable Style*
*12, 18, 30 mm*

*872C DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 2-wire operation
- 2-conductor or 4-pin connection
- 10…30V DC
- Normally open or normally closed output
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤100 mA |
| Minimum Load Current | 5 mA |
| Leakage Current | ≤0.9 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤6V |
| Repeatability | ≤2% |
| Hysteresis | 10% typical |
| Reverse Polarity Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Certfications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 6P, 12, 13 IP67 (IEC529)<br>Nickel-plated brass barrel, plastic face (PBT) |
| Connections | Cable: 2 m (6.5 ft) length, 4.4 mm (0.175 in.) diameter, 2-conductor #26 AWG PVC<br>Quick-Disconnect: 4-pin micro style |
| LED | Red: Output energized, 360° visibility |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

# 872C WorldProx™ 2-Wire DC

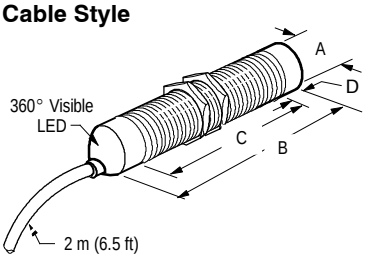
## Plastic Face/Threaded Nickel-Plated Brass Barrel

## Product Selection

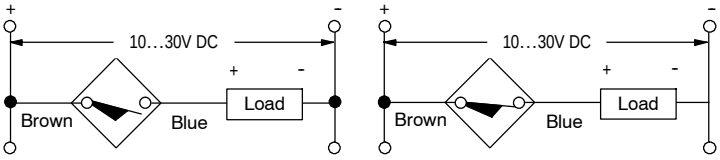
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Micro QD Style |
| 12 mm | 3 (0.12) | Y | N.O. | 2000 | 872C-D3NE12-A2 | **872C-D3NE12-D4** |
| | | | N.C. | | 872C-D3CE12-A2 | 872C-D3CE12-D4 |
| | 4 (0.16) | N | N.O. | | 872C-D4NE12-A2 | **872C-D4NE12-D4** |
| | | | N.C. | | 872C-D4CE12-A2 | 872C-D4CE12-D4 |
| 18 mm | 5 (0.20) | Y | N.O. | 1000 | **872C-D5NE18-A2** | **872C-D5NE18-D4** |
| | | | N.C. | | 872C-D5CE18-A2 | 872C-D5CE18-D4 |
| | 8 (0.31) | N | N.O. | | **872C-D8NE18-A2** | **872C-D8NE18-D4** |
| | | | N.C. | | 872C-D8CE18-A2 | 872C-D8CE18-D4 |
| 30 mm | 10 (0.39) | Y | N.O. | 500 | 872C-D10NE30-A2 | 872C-D10NE30-D4 |
| | | | N.C. | | 872C-D10CE30-A2 | 872C-D10CE30-D4 |
| | 15 (0.59) | N | N.O. | | 872C-D15NE30-A2 | 872C-D15NE30-D4 |
| | | | N.C. | | 872C-D15CE30-A2 | 872C-D15CE30-D4 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | 889D-F4AC-2 |

## Approximate Dimensions [mm (in.)]

### Cable Style



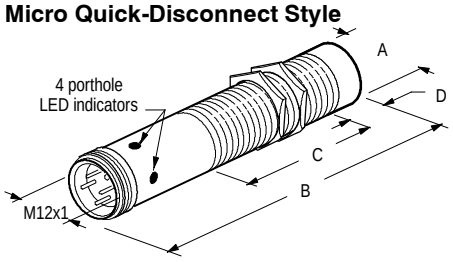

## Wiring Diagrams



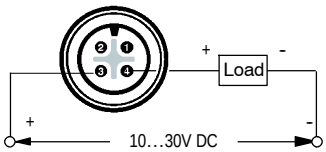

**Note:** Load can be switched to brown wire.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B (max) | C (min) | D (max) |
| M12 X 1 | Y | 12 (0.47) | 50.8 (2.00) | 46.7 (1.84) | — |
| | N | | 58.7 (2.31) | | 7.9 (0.31) |
| M18 X 1 | Y | 18 (0.71) | 50.8 (2.00) | | — |
| | N | | 63.0 (2.48) | | 12.2 (0.48) |
| M30 X 1.5 | Y | 30 (1.18) | 50.8 (2.00) | | — |
| | N | | 63.0 (2.48) | | 12.2 (0.48) |

### Micro Quick-Disconnect Style




### Normally Open or Normally Closed




**Note:** Load can be switched to pin 3.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B (max) | C (min) | D (max) |
| M12 X 1 | Y | 12.0 (0.47) | 65.0 (2.56) | 38.1 (1.50) | — |
| | N | | 72.4 (2.85) | | 7.9 (0.31) |
| M18 X 1 | Y | 18.0 (0.71) | 65.0 (2.56) | | — |
| | N | | 76.5 (3.01) | | 12.2 (0.48) |
| M30 X 1.5 | Y | 30.0 (1.18) | 65.0 (2.56) | 46.7 (1.84) | — |
| | N | | 76.5 (3.01) | | 12.2 (0.48) |

# 872C WorldProx™ QuadroPlex™ 2-Wire DC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*872C DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 2-wire operation
- 4-pin connection
- 10…30V DC
- Normally open or normally closed output
- Short circuit, overload, false pulse, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| Barrel Diameter | 12 mm | 18 mm & 30 mm |
|---|---|---|
| Load Current | 100 mA | 200 mA |
| Minimum Load Current | 5 mA | |
| Leakage Current | ≤1 mA | |
| Operating Voltage | 10…30V DC | |
| Voltage Drop | ≤6V @ 100 mA | ≤6.5V @ 200 mA<br>≤6.0V @ 100 mA |
| Repeatability | ≤10% at constant temperature | |
| Hysteresis | 10% typical | |
| Transient Noise Protection | Incorporated | |
| Short Circuit Protection | Incorporated | |
| Overload Protection | Incorporated | |
| False Pulse Protection | Incorporated | |
| Certfications | cULus Listed and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 6P, 12, 13 IP67 (IEC529)<br>Nickel-plated brass barrel, plastic face (PBT) | |
| Connections | Quick-Disconnect: 4-pin micro style | |
| LED | Red: Output energized, 360° visibility | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

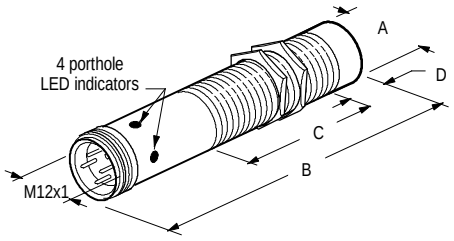
## Product Selection

| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Micro QD Style |
|---|---|---|---|---|---|
| 12 mm | 3 (0.12) | Y | N.O. or N.C. ❶ | 2000 | 872C-M3Q12-D4 |
| | 4 (0.16) | N | | | 872C-N4Q12-D4 |
| 18 mm | 5 (0.20) | Y | | 1000 | 872C-M5Q18-D4 |
| | 8 (0.31) | N | | | 872C-N8Q18-D4 |
| 30 mm | 10 (0.39) | Y | | 500 | 872C-M10Q30-D4 |
| | 15 (0.59) | N | | | 872C-N15Q30-D4 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | 889D-F4AC-2 |

❶ Depending upon wiring diagram.

## Approximate Dimensions [mm (in.)]

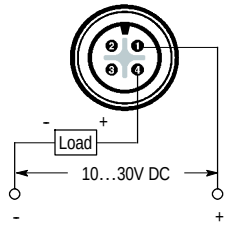
### Micro Quick-Disconnect Style



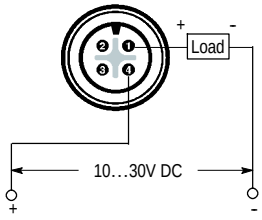

| Thread Size | Shielded | [mm (in.)] A | B (max) | C (min) | D (max) |
|---|---|---|---|---|---|
| M12 X 1 | Y | 12.0 (0.47) | 65.0 (2.56) | 38.1 (1.50) | — |
| | N | | 72.4 (2.85) | | 7.9 (0.31) |
| M18 X 1 | Y | 18.0 (0.71) | 65.0 (2.56) | | — |
| | N | | 76.5 (3.01) | | 12.2 (0.48) |
| M30 X 1.5 | Y | 30.0 (1.18) | 65.0 (2.56) | | — |
| | N | | 76.5 (3.01) | | 12.2 (0.48) |

## Wiring Diagrams

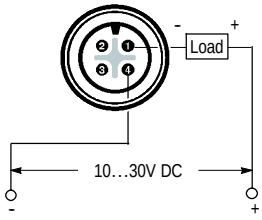
**Normally Open**
**Sourcing Output**



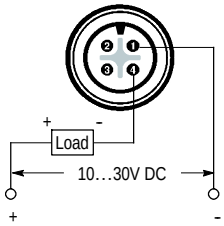

**Normally Closed**
**Sourcing Output**




**Normally Open**
**Sinking Output**




**Normally Closed**
**Sinking Output**



# 872C WorldProx™ 4-Wire DC Complementary Output

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*872C DC Cable Style*
*12, 18, 30 mm*

*872C DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 4-wire operation
- 4-conductor or 4-pin connection
- 10…30V DC
- Complementary normally open and normally closed outputs
- Short circuit, false pulse, reverse polarity, overload and transient noise protection
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤1.6V |
| Repeatability | ≤8% |
| Hysteresis | ≤10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certfications | UL Listed, cUL Certified and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 6P, 12, 13, IP67 (IEC 529); Nickel-plated brass barrel |
| Connections | Cable: 2 m (6.5 ft) length<br>4-conductor PVC<br>Quick-Disconnect: 4-pin micro style |
| LED | Red: Output Energized, 360° visibility |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 872C WorldProx™ 4-Wire DC Complementary Output

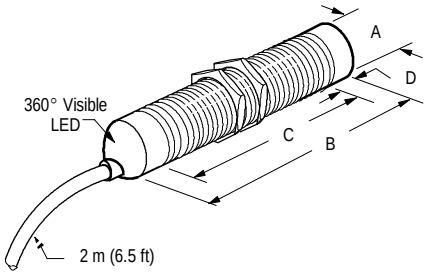
## Plastic Face/Threaded Nickel-Plated Brass Barrel

## Product Selection

| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style |
| 12 mm | 3 (0.12) | Y | N.O. and N.C. | PNP | 2000 | 872C-D3BP12-E2 | 872C-D3BP12-D4 |
| 18 mm | 5 (0.20) | | | | 1000 | 872C-D5BP18-E2 | 872C-D5BP18-D4 |
| 30 mm | 10 (0.39) | | | | 500 | 872C-D10BP30-E2 | 872C-D10BP30-D4 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4AC-2 |

## Approximate Dimensions [mm (in.)]

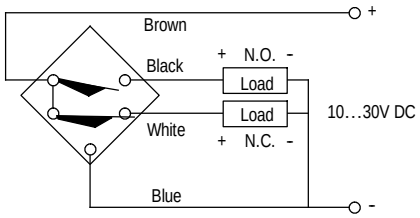
### Cable Style




## Wiring Diagram

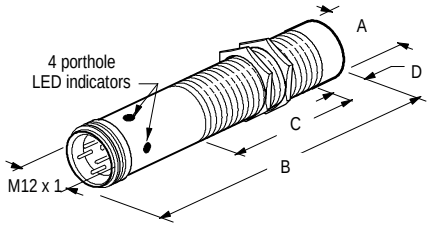
**Complementary Normally Open and Normally Closed**

**PNP (Sourcing)**



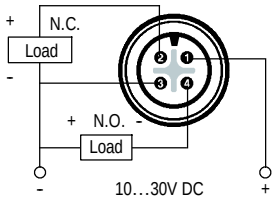

| Thread Size | Shielded | [mm (in.)] | | |
|---|---|---|---|---|
| | | A | B | C |
| M12 X 1 | Y | 12.0 (0.47) | 50.8 (2.00) | 46.7 (1.84) |
| M18 X 1 | Y | 18.0 (0.71) | | |
| M30 X 1.5 | Y | 30.0 (1.18) | | |

### Micro QD Style




**Complementary Normally Open and Normally Closed**

**PNP (Sourcing)**




| Thread Size | Shielded | [mm (in.)] | | |
|---|---|---|---|---|
| | | A | B | C |
| M12 X 1 | Y | 12.0 (0.47) | 65.0 (2.56) | 38.1 (1.50) |
| M18 X 1 | Y | 18.0 (0.71) | | |
| M30 X 1.5 | Y | 30.0 (1.18) | | 48.7 (1.88) |

# 872C WorldProx™ 2-Wire AC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*872C AC Cable Style*
*8 mm*

*872C AC Cable Style*
*12, 18, 30 mm*

*872C AC Mini*
*Quick-Disconnect Style*
*18, 30 mm*

*872C AC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 2-wire operation
- 3-conductor or 3-pin connection
- 20…250V AC (20…240V AC for 8 mm)
- Normally open or normally closed output
- False pulse and transient noise protection
- Extended sensing distance on 18 mm unshielded models
- cULus Listed (12, 18, and 30 mm models only) and CE Marked (all models) for all applicable directives

## Specifications

| | 8 mm | 12, 18, and 30 mm |
|---|---|---|
| Load Current, Max. | 100 mA | ≤300 mA |
| Load Current, Min. | 5 mA | |
| Inrush Current | ≤2 A | |
| Leakage Current | ≤2 mA | |
| Operating Voltage | 20…240V AC | 20…250V AC |
| Voltage Drop | ≤5V | |
| Repeatability | ≤5% | |
| Hysteresis | ≤15% typical | |
| Protection Type | False pulse, transient noise | |
| Certifications | cULus Listed (12, 18, and 30 mm models only) and CE Marked (all models) for all applicable directives | |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 12, 13; IP67 (IEC 529)<br>Nickel-plated brass barrel | |
| Connection Type | Cable: 2 m (6.5 ft) length<br>3-conductor PVC<br>Quick-Disconnect: 3-pin micro style<br>3-pin mini style | |
| LED | Red: output energized, 360° visibility | |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

### Correction Factors

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.5 |
| Aluminum | 0.45 |
| Copper | 0.4 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |



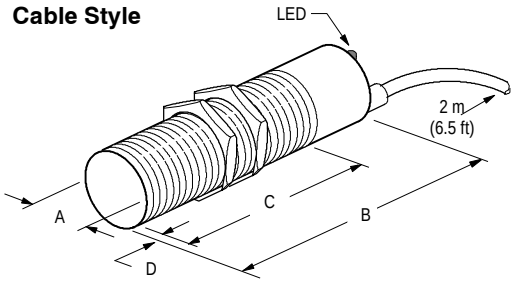
New

## Product Selection

| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD Style | Micro QD Style |
| 8 mm | 1.5 (0.06) | Y | N.O. | 25 | 872C-A1N8-A2 | — | — |
| | | | N.C. | | 872C-A1C8-A2 | — | — |
| | 2 (0.08) | N | N.O. | | 872C-A2N8-A2 | — | — |
| | | | N.C. | | 872C-A2C8-A2 | — | — |
| 12 mm | 2 (0.08) | Y | N.O. | 15 | **872C-A2N12-A2** | — | **872C-A2N12-R3** |
| | | | N.C. | | 872C-A2C12-A2 | — | 872C-A2C12-R3 |
| | 4 (0.16) | N | N.O. | | **872C-A4N12-A2** | — | **872C-A4N12-R3** |
| | | | N.C. | | 872C-A4C12-A2 | — | 872C-A4C12-R3 |
| 18 mm | 5 (0.20) | Y | N.O. | | **872C-A5N18-A2** | **872C-A5N18-N3** | **872C-A5N18-R3** |
| | | | N.C. | | 872C-A5C18-A2 | 872C-A5C18-N3 | 872C-A5C18-R3 |
| | 10 (0.39) | N | N.O. | | **872C-A10N18-A2** | **872C-A10N18-N3** | **872C-A10N18-R3** |
| | | | N.C. | | 872C-A10C18-A2 | 872C-A10C18-N3 | 872C-A10C18-R3 |
| 30 mm | 10 (0.39) | Y | N.O. | | **872C-A10N30-A2** | 872C-A10N30-N3 | 872C-A10N30-R3 |
| | | | N.C. | | 872C-A10C30-A2 | 872C-A10C30-N3 | 872C-A10C30-R3 |
| | 15 (0.59) | N | N.O. | | 872C-A15N30-A2 | 872C-A15N30-N3 | 872C-A15N30-R3 |
| | | | N.C. | | 872C-A15C30-A2 | 872C-A15C30-N3 | 872C-A15C30-R3 |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 |

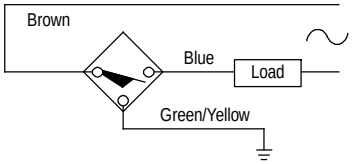
## Approximate Dimensions [mm (in.)]

**Cable Style**

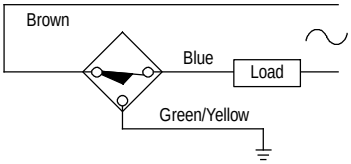



## Wiring Diagrams

**Normally Open**




**Normally Closed**




**NOTE:** Load can be switched to brown wire.

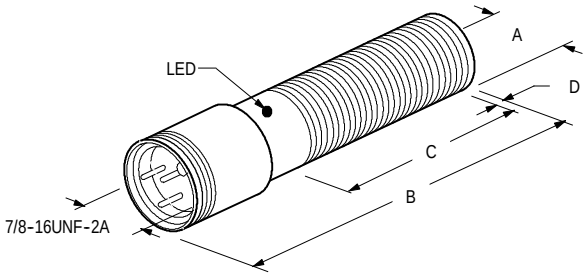
| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M8 X 1 | Y | 8.0 (0.32) | 47.0 (1.85) | 36.0 (1.42) | — |
| | N | 6.0 (0.24) | 47.0 (1.85) | 36.0 (1.42) | 6.0 (0.24) |
| M12 X 1 | Y | 12.0 (0.47) | 70.0 (2.76) | 60.0 (2.36) | — |
| | N | | | 54.0 (2.13) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | 60.0 (2.36) | 50.0 (1.96) | — |
| | N | | | 42.0 (1.65) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 60.0 (2.36) | 50.0 (1.96) | — |
| | N | | | 38.0 (1.50) | 12.0 (0.47) |

# 872C WorldProx™ 2-Wire AC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

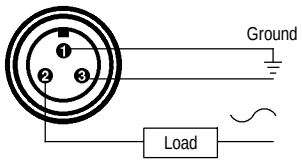
### Approximate Dimensions [mm (in.)]

**Mini QD Style**




### Wiring Diagrams

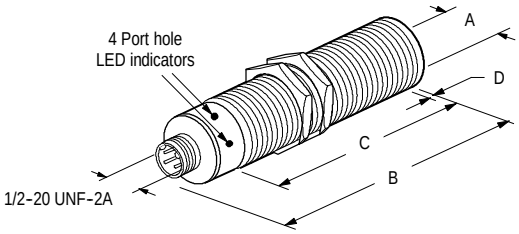
**Normally Open or Normally Closed**



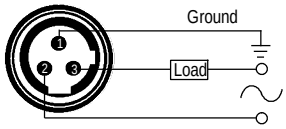

**Note**: Load can be switched to pin 3.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M18 X 1 | Y | 18.0 (0.71) | 91.0 (3.58) | 52.0 (2.05) | — |
| | N | | | 44.0 (1.73) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 91.0 (3.58) | 52.0 (2.25) | — |
| | N | | | 40.0 (1.57) | 12.0 (0.47) |

**Micro Quick-Disconnect Style**




**Normally Open or Normally Closed**




**Note**: Load can be switched to pin 2.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 75.0 (2.95) | 45.0 (1.77) | — |
| | N | | | 40.0 (1.57) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | 80.0 (3.15) | 60.0 (2.36) | — |
| | N | | | 52.0 (2.05) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 80.0 (3.15) | 50.0 (1.96) | — |
| | N | | | 38.0 (1.50) | 12.0 (0.47) |

# 872C WorldProx™ Extended Sensing 2-Wire AC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*872C AC Cable Style*
*12, 18, 30 mm*

*872C AC Mini*
*Quick-Disconnect Style*
*18, 30 mm*

*872C AC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Specifications

| | |
|---|---|
| Load Current, Max. | 300 mA |
| Load Current, Min. | 2 mA |
| Inrush Current (1 cycle) | ≤2 A |
| Leakage Current | ≤1.7 mA |
| Operating Voltage | 20…250V AC |
| Voltage Drop | ≤11V @ 10 mA, ≤7V @ 300 mA |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse, transient noise, overload, and short circuit |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 12, 13; IP67 (IEC 529)<br>Nickel-plated brass barrel |
| Connection Type | Cable: 2 m (6.5 ft) length, 3-conductor PVC<br>Quick-Disconnect: 3-pin micro style, 3-pin mini style |
| LED | Cable Models: yellow - power, green - output energized<br>QD Models: green - power, red - output energized |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

### Correction Factors

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.5 |
| Aluminum | 0.45 |
| Copper | 0.4 |

## Features

- 2-wire operation
- 3-conductor or 3-pin connection
- 20…250V AC
- Normally open or normally closed output
- False pulse, transient noise, and overload protection
- cULus Listed and CE Marked for all applicable directives

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 872C WorldProx™ Extended Sensing 2-Wire AC

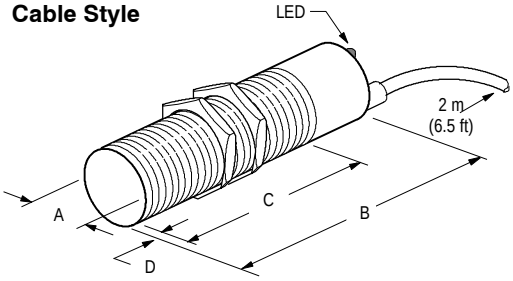
## Plastic Face/Threaded Nickel-Plated Brass Barrel

## Product Selection

| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD Style | Micro QD Style |
| 12 mm | 4 (0.16) | Y | N.O. | 20 | 872C-F4N12-A2 | — | **872C-F4N12-R3** |
| | | | N.C. | | 872C-F4C12-A2 | — | 872C-F4C12-R3 |
| | 8 (0.31) | N | N.O. | | 872C-G8N12-A2 | — | 872C-G8N12-R3 |
| | | | N.C. | | 872C-G8C12-A2 | — | 872C-G8C12-R3 |
| 18 mm | 8 (0.31) | Y | N.O. | | 872C-F8N18-A2 | 872C-F8N18-N3 | **872C-F8N18-R3** |
| | | | N.C. | | 872C-F8C18-A2 | 872C-F8C18-N3 | 872C-F8C18-R3 |
| | 12 (0.47) | N | N.O. | | 872C-G12N18-A2 | 872C-G12N18-N3 | 872C-G12N18-R3 |
| | | | N.C. | | 872C-G12C18-A2 | 872C-G12C18-N3 | 872C-G12C18-R3 |
| 30 mm | 15 (0.59) | Y | N.O. | | 872C-F15N30-A2 | 872C-F15N30-N3 | **872C-F15N30-R3** |
| | | | N.C. | | 872C-F15C30-A2 | 872C-F15C30-N3 | 872C-F15C30-R3 |
| | 30 (1.18) | N | N.O. | | 872C-G30N30-A2 | 872C-G30N30-N3 | 872C-G30N30-R3 |
| | | | N.C. | | 872C-G30C30-A2 | 872C-G30C30-N3 | 872C-G30C30-R3 |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 |

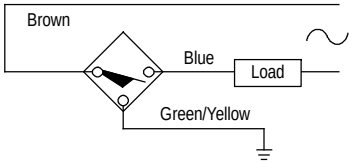
## Approximate Dimensions [mm (in.)]

**Cable Style**

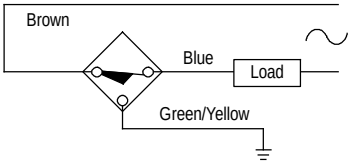



## Wiring Diagrams

**Normally Open**




**Normally Closed**




**NOTE:** Load can be switched to brown wire.

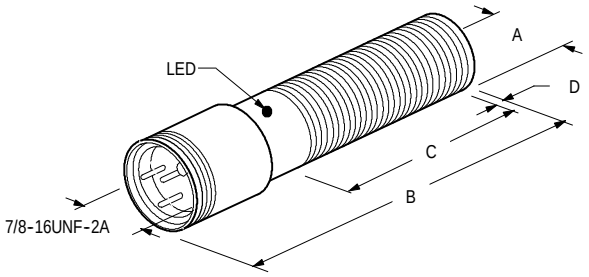
| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 70.0 (2.76) | 60.0 (2.36) | — |
| | N | | | 54.0 (2.13) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | 60.0 (2.36) | 50.0 (1.96) | — |
| | N | | | 42.0 (1.65) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 60.0 (2.36) | 50.0 (1.96) | — |
| | N | | | 38.0 (1.50) | 12.0 (0.47) |

# 872C WorldProx™ Extended Sensing 2-Wire AC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

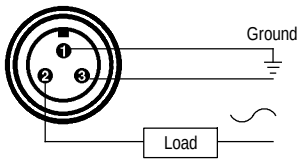
## Approximate Dimensions [mm (in.)]

### Mini QD Style




## Wiring Diagrams

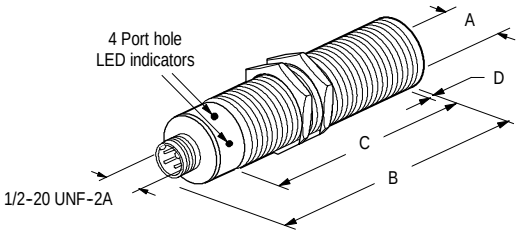
**Normally Open or Normally Closed**



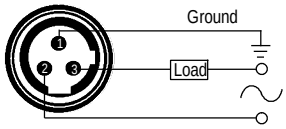

**Note**: Load can be switched to pin 3.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M18 X 1 | Y | 18.0 (0.71) | 91.0 (3.58) | 52.0 (2.05) | — |
| | N | | | 44.0 (1.73) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 91.0 (3.58) | 52.0 (2.25) | — |
| | N | | | 40.0 (1.57) | 12.0 (0.47) |

### Micro Quick-Disconnect Style




**Normally Open or Normally Closed**




**Note**: Load can be switched to pin 2.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 75.0 (2.95) | 45.0 (1.77) | — |
| | N | | | 40.0 (1.57) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | 80.0 (3.15) | 60.0 (2.36) | — |
| | N | | | 52.0 (2.05) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 80.0 (3.15) | 50.0 (1.96) | — |
| | N | | | 38.0 (1.50) | 12.0 (0.47) |

# 872C WorldProx™ 2-Wire AC/DC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*872C AC/DC Cable Style*
*12, 18, 30 mm*

*872C AC/DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 2-wire operation
- 3-conductor or 3-pin connection
- 20…250V AC/DC
- Normally open or normally closed output
- False pulse, transient noise, short circuit, and overload protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 & 30 mm |
|---|---|---|
| Load Current | 300 mA | 350 mA |
| Minimum Load Current | 2 mA | |
| Inrush Current (1 cycle) | ≤2A | |
| Leakage Current | ≤1.7 mA @ 120V and ≤1.9 mA @ 250V | |
| Operating Voltage | 20…250V AC/DC | |
| Voltage Drop | ≤5V | |
| Repeatability | ≤5% | |
| Hysteresis | ≤10% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Short Circuit Protection | Incorporated | |
| Overload Protection | Incorporated | |
| Certfications | cULus Listed and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 12, 13 IP67 (IEC 529)<br>Nickel-plated brass barrel | |
| Connections | Cable: 2 m (6.5 ft) length<br>3-conductor PVC<br>Quick-Disconnect: 3-pin micro style<br>3-pin mini style | |
| LED | Red: output energized, 360° visibility | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock and Vibration | 30 g, 10…55 Hz | |

### Correction Factors

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.5 |
| Aluminum | 0.4 |
| Copper | 0.4 |

## QD Cordsets and Accessories

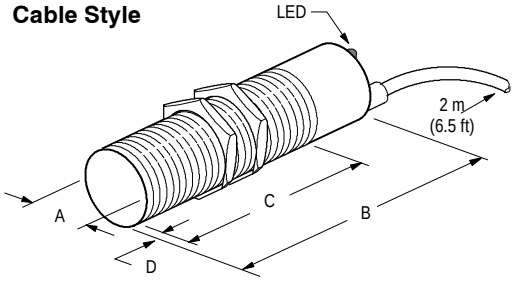
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

## Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Micro QD Style |
| 12 | 2 (0.08) | Yes | N.O. | 30 | 872C-J2N12-A2 | 872C-J2N12-R3 |
| | 4 (0.16) | No | N.O. | | 872C-K4N12-A2 | 872C-K4N12-R3 |
| | | | N.C. | | 872C-K4C12-A2 | 872C-K4C12-R3 |
| 18 | 5 (0.20) | Yes | N.O. | | 872C-J5N18-A2 | 872C-J5N18-R3 |
| | | | N.C. | | 872C-J5C18-A2 | 872C-J5C18-R3 |
| | 8 (0.32) | No | N.O. | | 872C-K8N18-A2 | 872C-K8N18-R3 |
| | 8 (0.32) | No | N.C. | | 872C-K8C18-A2 | — |
| 30 | 10 (0.39) | Yes | N.O. | | 872C-J10N30-A2 | 872C-J10N30-R3 |
| | 15 (0.59) | No | N.O. | | 872C-K15N30-A2 | 872C-K15N30-R3 |
| | | | N.C. | | 872C-K15C30-A2 | — |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889R-F3ECA-2 |

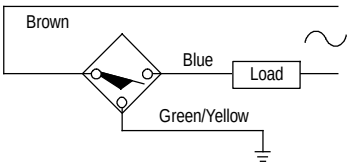
## Approximate Dimensions [mm (in.)]

**Cable Style**




## Wiring Diagrams

**Normally Open**




**NOTE:** Load can be switched to brown wire.

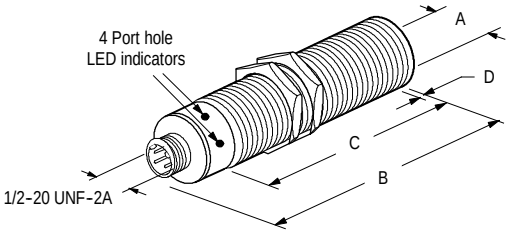
| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 70.0 (2.76) | 60.0 (2.36) | — |
| | N | | | 54.0 (2.13) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | 60.0 (2.36) | 50.0 (1.96) | — |
| | N | | | 42.0 (1.65) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 60.0 (2.36) | 50.0 (1.96) | — |
| | N | | | 38.0 (1.50) | 12.0 (0.47) |

# 872C WorldProx™ 2-Wire AC/DC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

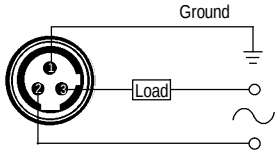
## Approximate Dimensions [mm (in.)]

### Micro Quick-Disconnect Style




## Wiring Diagrams

**Normally Open or Normally Closed**




**Note**: Load can be switched to pin 2.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 75 (2.95) | 45.0 (1.77) | — |
| | N | | | 40.0 (1.57) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | 80.0 (3.15) | 60.0 (2.36) | — |
| | N | | | 52.0 (2.05) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | 80.0 (3.15) | 50.0 (1.96) | — |
| | N | | | 38.0 (1.50) | 12.0 (0.47) |

# 872C WorldProx™ 2-Wire AC/DC Relay Output

## Threaded Nickel-Plated Brass Barrel

*872C AC/DC Cable Style*
*30 mm*

## Features

- High output current capability—up to 3 A
- N.O. and N.C. contacts in the same unit
- Isolated outputs
- 360° LED
- 30…132V AC/DC supply voltage
- Reverse polarity protection (DC)
- Circuit protected against industrial noise and transients
- UL Listed and CE Marked for all applicable directives

## Specifications

| | | |
|---|---|---|
| Load Current | Switched Power, Max<br>Switched Current, Max<br>Switched Voltage, Max<br>Relay Life | 84 W or 900V A<br>3 amps SPDT<br>28V DC or 300V AC<br>20,000,000 operations (no load),<br>100,000 operations (full load) |
| Operating Voltage | 30…132V AC/DC | |
| Repeatability | ≤10% at constant temperature | |
| Hysteresis | 10% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Reverse Polarity Protection | Incorporated | |
| Certfications | cULus Listed and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 3R 4, 4X, 6, 6P, 12, 13, IP67 (IEC 529);<br>Nickel-plated brass barrel | |
| Connections | Cable: 2 m (6.5 ft) length<br>5-conductor 22 AWG PVC cable | |
| LED | Red: Output Energized, 360° visibility | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

# 872C WorldProx™ 2-Wire AC/DC Relay Output

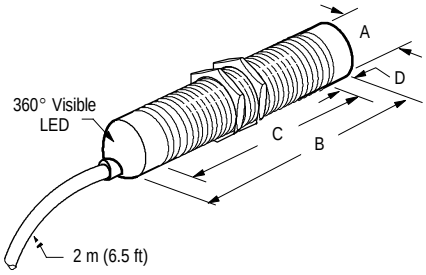
## Threaded Nickel-Plated Brass Barrel

### Product Selection

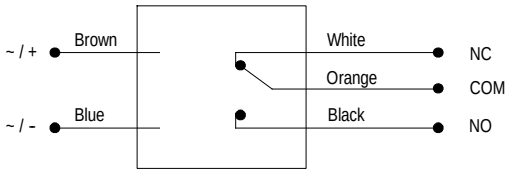
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. |
|---|---|---|---|---|---|
| 30 mm | 10 (0.39) | Y | SPDT Relay | 30 | 872C-B10BR30-E2 |
| | 15 (0.59) | N | | | **872C-B15BR30-E2** |

### Approximate Dimensions [mm (in.)]

**Cable Style**




### Wiring Diagram




| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B (max) | C (min) | D (max) |
| M30 X 1.5 | Y | 30 (1.18) | 61.0 (2.40) | 57.0 (2.24) | — |
| | N | | 73.0 (2.87) | | 12.2 (0.48) |

## Description

Bulletin 871T inductive proximity sensors are self-contained, solid-state devices designed to sense the presence of ferrous and nonferrous metal objects without touching them.

The switch body consists of a plastic or stainless steel face and a threaded stainless steel barrel. They meet NEMA 1, 2, 3, 4, 12, 13 and IP67 (IEC529) enclosure standards. The electronic circuitry is potted for protection against shock, vibration, and contamination.

These sensors are available in 12 and 18 mm diameter housings. Connection options include a PVC cable and mini quick-disconnect.

### Ferrous Selective Proximity Sensors

The Bulletin 871T ferrous (Fe) selective inductive proximity sensors operate in industrial environments where ferrous metal targets must be sensed without being touched. They are also an excellent replacement for standard inductive proximities that are sensing ferrous metals and subject to harsh environments. They are designed to replace standard inductive proximities when sensing ferrous metals or ignoring nonferrous chips smaller than 3 mm (0.125 in.).

The Fe-selective proximity sensors have a stainless steel sensing face and body. The stainless steel sensing face provides extra protection in sensor applications where the sensing face is subjected to abrasion and chemicals. Typical proximity sensors have plastic sensing faces.

These sensors are self-contained, solid state, dual output devices which will energize and de-energize external loads. Each sensor has a normally open (N.O.) and an isolated normally closed (N.C.) output which can be operated up to 500 mA each. As with any sensor each application and target material should be reviewed before installing the sensor. Detailed specifications for these sensors are listed on page 2–90.

## Features

- Threaded stainless steel barrel
- Cable or quick-disconnect styles
- Short circuit protection (DC models)
- Overload protection (DC models)
- Transient noise protection
- False pulse protection
- Reverse polarity protection (DC models)
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Styles

DC 3-Wire . . . . . page 2–86
AC 2-Wire . . . . . page 2–88
AC 4-Wire
Ferrous Selective . . . . . page 2–90

## Accessories

Cordsets . . . . . page 8–1
Conduit Adaptor . . . . . page 2–209
Mounting Bracket,
Spring Return Style . . . . . page 2–210
Mounting Bracket,
Right Angle Style . . . . . page 2–213
Mounting Bracket,
Clamp Style . . . . . page 2–214
End Caps . . . . . page 2–220
Mounting Nuts . . . . . page 2–221
Lock Washers . . . . . page 2–223

## General Information

Torque Chart . . . . . page 2–225
Metric/English
Conversion Chart . . . . . page 14–6

# 871T 3-Wire DC

## Plastic Face/Threaded Stainless Steel Barrel

*871T DC Cable Style*
*12, 18 mm*

*871T DC Mini*
*Quick-Disconnect Style*
*18 mm*

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Normally open output
- Short circuit, overload, false pulse, reverse polarity and transient noise protection
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 mm |
|---|---|---|
| Load Current | ≤300 mA | ≤400 mA |
| Leakage Current | ≤10 mA | |
| Operating Voltage | 10…30V DC | |
| Voltage Drop | ≤1V | |
| Repeatability | ≤10% | |
| Hysteresis | ≤10% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Reverse Polarity Protection | Incorporated | |
| Short Circuit Protection | Incorporated | |
| Overload Protection | Incorporated | |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 12 and 13 IP67 (IEC529)<br>303 Stainless steel barrel | |
| Connections | Cable: 3 m (10 ft) length<br>3-conductor PVC<br>Quick-Disconnect: 4-pin mini style | |
| LED | Red: Output Energized | |
| Operating Temperature [C (F)] | -40…+70° (-40…+158°) | |

**Correction Factors**

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.9 |
| Brass | 0.3…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |

## Product Selection

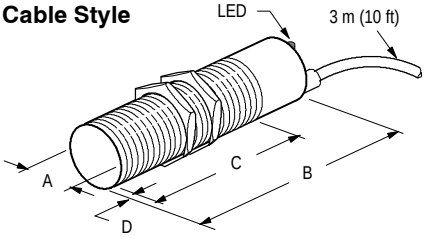
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Mini QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | NPN | 2000 | 871T-R2A12 | — |
| | | | | PNP | | 871T-L2A12 | — |
| | 4 (0.16) | N | | NPN | 1000 | 871T-R4B12 | — |
| | | | | PNP | | **871T-L4B12** | — |
| 18 mm | 5 (0.20) | Y | N.O. | NPN | 1000 | 871T-R5 A18 | 871T-R5J18 |
| | | | | PNP | | 871T-L5 A18 | 871T-L5J18 |
| | 8 (0.31) | N | | NPN | 500 | **871T-R8B18** | 871T-R8K18 |
| | | | | PNP | | 871T-L8B18 | 871T-L8K18 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft)) | | | | | | | 889N-F4AFC-6F |

## QD Cordsets and Accessories

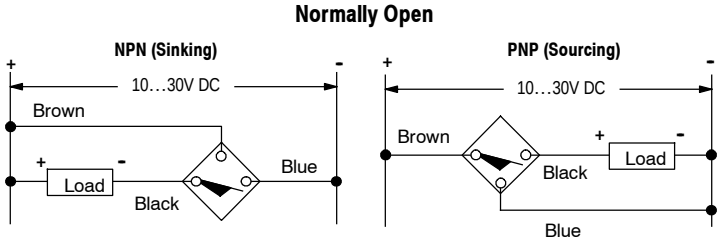
| Description | Page Number | Description | Page Number |
|---|---|---|---|
| Other Cordsets Available | 8-2 | End Caps | 2-220 |
| Terminal Chambers | 8-2 | Mounting Nuts | 2-221…2-222 |
| Mounting Brackets | 2-210…2-214 | — | — |

## Approximate Dimensions [mm (in.)]

### Cable Style

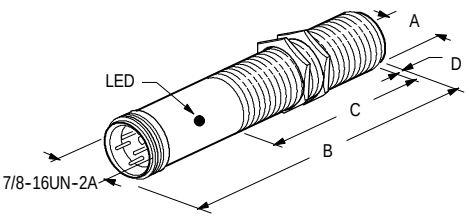


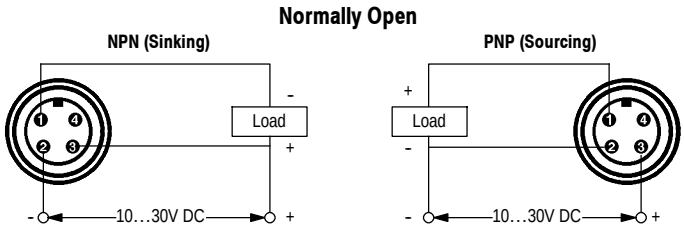

## Wiring Diagrams




| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 80.0 (3.15) | 53.8 (2.12) | 0.8 (0.03) |
| | N | | | 46.5 (1.83) | 8.1 (0.32) |
| M18 X 1 | Y | 18.0 (0.71) | 81.5 (3.21) | 55.6 (2.19) | 0.8 (0.03) |
| | N | | 81.3 (3.20) | 43.7 (1.72) | 12.3 (0.48) |

### Mini Quick-Disconnect Style




| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M18 X 1 | Y | 18.0 (0.71) | 96.9 (3.81) | 51.9 (2.04) | 0.8 (0.03) |
| | N | | 96.9 (3.81) | 40.4 (1.59) | 12.3 (0.48) |

# 871T 2-Wire AC

## Plastic Face/Threaded Stainless Steel Barrel

*871T AC Cable Style*
*12, 18 mm*

*871T AC Mini*
*Quick-Disconnect Style*
*18 mm*

## Features

- 2-wire operation
- 2-conductor, 3-conductor, or 3-pin connection
- 20…132V AC
- False pulse and transient noise protection
- Normally open or normally closed output
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 mm |
|---|---|---|
| Load Current | ≤300 mA | ≤500 mA |
| Inrush Current (1 cycle) | ≤3 A | ≤5 A |
| Leakage Current | ≤1.5 mA | |
| Supply Current (minimum) | 5 mA | |
| Operating Voltage | 20…132V AC | |
| Voltage Drop | 6.5V AC at 500 mA, 10V AC at 20 mA (RMS) | |
| Repeatability | ≤10% | |
| Hysteresis | ≤10% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 12 and 13 IP67 (IEC529)<br>303 Stainless steel barrel | |
| Connections | Cable: 3 m (10 ft) length<br>12 mm—2 conductor PVC<br>18 mm—3 conductor PVC<br>Quick-Disconnect: 3-pin mini style | |
| LED | Red: Output Energized (none on 87IT-G5Q18FT) | |
| Operating Temperature [C (F)] | -40…+70° (-40…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.9 |
| Brass | 0.3…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |

## Product Selection

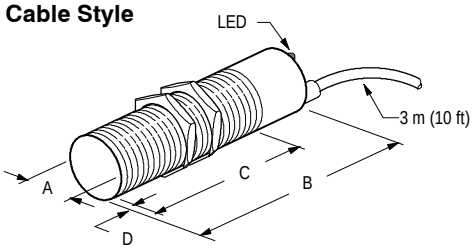
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | 50 | 871T-G2A12 | — |
| | 4 (0.16) | N | | | **871T-G4B12** | — |
| | 2 (0.08) | Y | N.C. | | 871T-H2A12 | — |
| | 4 (0.16) | N | | | 871T-H4B12 | — |
| 18 mm | 5 (0.20) | Y | N.O. | | **871T-G5 A18** | **871T-G5J18** |
| | | | | | — | 871T-G5Q18FT |
| | 8 (0.31) | N | | | **871T-G8B18** | **871T-G8K18** |
| | 5 (0.20) | Y | N.C. | | 871T-H5 A18 | 871T-H5J18 |
| | 8 (0.31) | N | | | 871T-H8B18 | 871T-H8K18 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft)) | | | | | | 889N-F3AFC-6F |

## QD Cordsets and Accessories

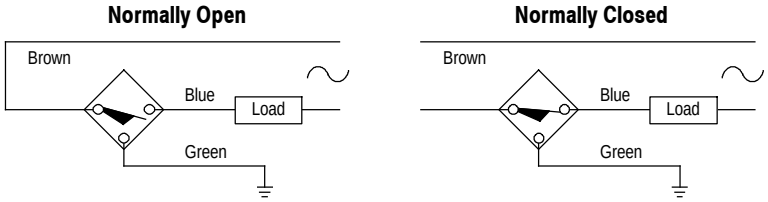
| Description | Page Number | Description | Page Number |
|---|---|---|---|
| Other Cordsets Available | 8-2 | End Caps | 2-220 |
| Terminal Chambers | 8-2 | Mounting Nuts | 2-221…2-222 |
| Mounting Brackets | 2-210…2-214 | — | — |

## Approximate Dimensions [mm (in.)]

### Cable Style



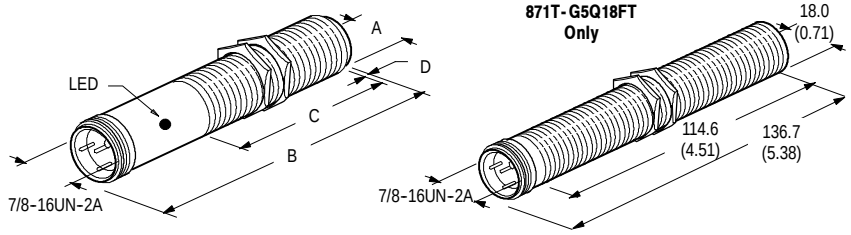

## Wiring Diagrams



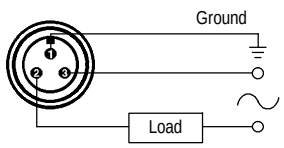

**Note 1:** No green wire on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to brown wire.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 80.0 (3.15) | 53.8 (2.12) | 0.8 (0.03) |
| | N | | | 46.5 (1.83) | 8.1 (0.32) |
| M18 X 1 | Y | 18.0 (0.71) | 81.5 (3.21) | 55.6 (2.19) | 0.8 (0.03) |
| | N | | 81.3 (3.20) | 43.7 (1.72) | 12.3 (0.48) |

### Mini Quick-Disconnect Style




**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 3.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M18 X 1 | Y | 18.0 (0.71) | 96.9 (3.81) | 51.9 (2.04) | 0.8 (0.03) |
| | N | | | 40.4 (1.59) | 12.3 (0.48) |

# 871T 4-Wire AC Ferrous Selective

## Stainless Steel Face/Threaded Stainless Steel Barrel

*871T AC Cable Style*
*18 mm*

*871T AC Mini*
*Quick-Disconnect Style*
*18 mm*

### Features

- 4-wire operation
- 20…132V AC
- Complementary (N.O. and N.C.) outputs
- Ferrous selective sensing
- Stainless steel active sensing face
- False pulse and transient noise protection
- CE Marked for all applicable directives

### Specifications

| | |
|---|---|
| Load Current | ≤500 mA |
| Inrush Current (1 Cycle) | ≤5 A |
| Supply Current (minimum) | 5 mA |
| Leakage Current | ≤1.7 mA |
| Operating Voltage | 20…132V AC |
| Voltage Drop | N.O. output: 6.5V AC at 500 mA, 10V AC at 20 mA (RMS), N.C. output: 1.7V AC at 500 mA (RMS) |
| Isolation Voltage | 800V AC (output to output); 1500V AC (output to housing) |
| Repeatability | ≤10% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse, transient noise |
| Certifications | CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 3, 4, 12 and 13; IP67 (IEC529) |
| Housing Material | Stainless steel face and barrel |
| Connections | Cable: 3.6 m (12 ft) length, 5-conductor PVC, Quick-Disconnect: 5-pin mini style |
| LED | Red: Output Energized, Green: Power |
| Operating Temperature [C (F)] | 0…70 ° (32…158 °) |

### Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel ★ | 0.8…1.1 |
| Brass | 0.0 |
| Aluminum | 0.0 |
| Copper | 0.0 |

★ Stainless steel containing carbon.



New

# 871T 4-Wire AC Ferrous Selective

## Stainless Steel Face/Threaded Stainless Steel Barrel

## Product Selection

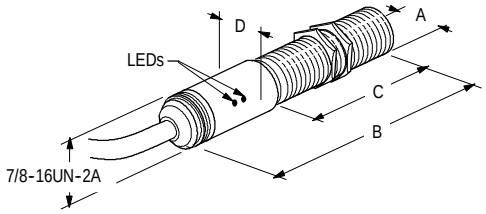
| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD 5-pin Style |
| 18 | 5 (0.20) | Yes | N.O. and N.C. | 10 | 871T-A5A18FE-12 | 871T-A5J18FE |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft)) | | | | | | 889N-F5AFC-6F |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

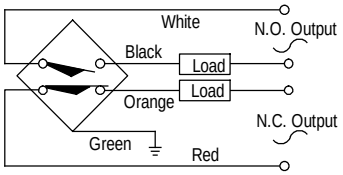
## Approximate Dimensions [mm (in.)]

### Cable Style




## Wiring Diagrams

### Complementary Normally Open and Normally Closed

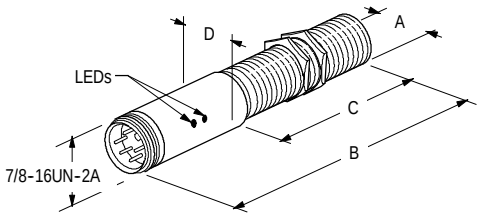



**Notes:**

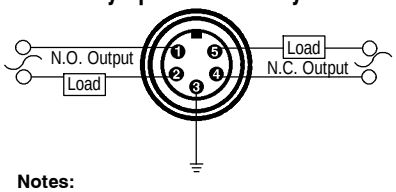
**1.** N.O. output must be wired for operation. N.C. output is optional.
**2.** N.O. load can be switched to white wire.
**3.** N.C. load can be switched to red wire.

| Thread Size | mm (in.) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M18 x 1 | 18.0 (0.71) | 101.6 (4.00) | 50.8 (2.00) | 20.3 (0.80) |

### Mini Quick-Disconnect Style




### Normally Open and Normally Closed




**Notes:**

**1.** N.O. output must be wired for operation. N.C. output is optional.
**2.** N.O. load can be switched to pin 1.
**3.** N.C. load can be switched to pin 4.

| Thread Size | mm (in.) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M18 x 1 | 18.0 (0.71) | 101.6 (4.00) | 50.8 (2.00) | 20.3 (0.80) |

## Notes

# 871TS Food & Beverage

## PPS Plastic Face/Stainless Steel 316L Barrel

### Description

Bulletin 871TS inductive proximity sensors are self-contained, solid-state switching devices designed to sense the presence of metals without touching them. These units were designed to withstand high pressure washdown applications in the food and beverage industry. These sensors also offer a high resistance to corrosion caused by cleansing and exposure to disinfecting agents.

The switch body consists of a PPS (FDA Certified) plastic face and threaded or smooth stainless steel 316L barrel. These switches meet NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13 and IP67, IP68 and IP69K enclosure standards. The electronic circuitry is potted for protection against shock, vibration, and contamination.

These sensors are available in 12 and 18 mm diameter housings with a 4-pin (complementary output) DC micro quick-disconnect style connector.

### Features

- 4-wire operation (complementary normally open and normallly closed outputs)
- Gold-plated 4-pin micro quick-disconnect
- 10…30V DC
- Standard and extended sensing range
- IP67, IP68, and IP69K enclosure ratings
- Stainless steel 316L barrel
- FDA Certified, PPS sensing face
- Extended temperature rating (-40…+80 °C (-40…+176 °F))
- Short circuit, false pulse, reverse polarity, overload, and transient noise protection
- cULus Listed and CE Marked for all applicable directives
- ECOLAB Certified

### Styles

DC 3-Wire ..... page 2-94

### QD Cordsets and Accessories

Cordsets ..... page 8-1
Mounting Bracket, Spring Return Style ..... page 2-210
Mounting Bracket, Swivel/Tilt Style ..... page 2-212
Mounting Bracket, Right Angle Style ..... page 2-213
Mounting Bracket, Clamp Style ..... page 2-214
End Caps ..... page 2-220
Mounting Nuts ..... page 2-221
Lock Washers ..... page 2-223

### General Information

Torque Chart ..... page 2-225
Metric/English Conversion Chart ..... page 14-6

# 871TS Food & Beverage

## PPS Plastic Face/Stainless Steel 316L Barrel

***871TS DC Micro Quick-Disconnect Style 12, 18 mm***

### Features

- 4-wire operation (complementary normally open and normallly closed outputs)
- Gold-plated 4-pin micro quick-disconnect
- 10…30V DC
- Standard and extended sensing range
- IP67, IP68, and IP69K enclosure ratings
- Stainless steel 316L barrel
- FDA Certified, PPS sensing face
- Extended temperature rating (-40…+80 °C (-40…+176 °F))
- Short circuit, false pulse, reverse polarity, overload, and transient noise protection
- cULus Listed and CE Marked for all applicable directives
- ECOLAB Certified

### Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤15 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.0V |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse, transient noise, reverse polarity, short circuit, and overload |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67, IP68, and IP69K |
| Housing Material | Stainless steel 316L, PPS (FDA Certified) plastic face |
| Connection Type | Quick Disconnect: 4-pin micro style |
| LED | Yellow: Output Energized |
| Operating Temperature [C (F)] | -40…+80 ° (-40…+176 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

### Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |



New

## Product Selection

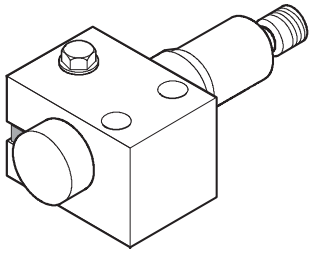
| Barrel Diameter [mm] | Barrel Type | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. Micro QD Style |
|---|---|---|---|---|---|---|---|
| 12 | Threaded | 2 (0.08) | Yes | N.O. and N.C. | NPN | 2000 | 871TS-D2BN12-D4 |
| | | | | | PNP | | 871TS-D2BP12-D4 |
| | | 4 (0.16) | Yes | N.O. and N.C. | NPN | 2000 | 871TS-M4BN12-D4 |
| | | | | | PNP | | 871TS-M4BP12-D4 |
| | | | No | | NPN | | 871TS-D4BN12-D4 |
| | | | | | PNP | | 871TS-D4BP12-D4 |
| | | 8 (0.31) | No | N.O. and N.C. | NPN | 2000 | 871TS-N8BN12-D4 |
| | | | | | PNP | | 871TS-N8BP12-D4 |
| 18 | Threaded | 5 (0.20) | Yes | N.O. and N.C. | NPN | 1500 | 871TS-D5BN18-D4 |
| | | | | | PNP | | 871TS-D5BP18-D4 |
| | | 8 (0.31) | Yes | N.O. and N.C. | NPN | 1500 | 871TS-M8BN18-D4 |
| | | | | | PNP | | 871TS-M8BP18-D4 |
| | | | No | | NPN | | 871TS-D8BN18-D4 |
| | | | | | PNP | | 871TS-D8BP18-D4 |
| | | 12 (0.47) | No | N.O. and N.C. | NPN | 1500 | 871TS-N12BN18-D4 |
| | | | | | PNP | | 871TS-N12BP18-D4 |
| | Smooth ★ | 8 (0.31) | Yes | N.O. and N.C. | PNP | 1500 | 871TS-MM8BP18-D4 |
| | | 12 (0.47) | No | | | | 871TS-NM12BP18-D4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight) | | | | | | | 889D-F4AC-2 |

★ Use a stainless steel clamping bracket (Cat. No. 60-BCS-18B) with smooth barrels.

## QD Cordsets and Accessories

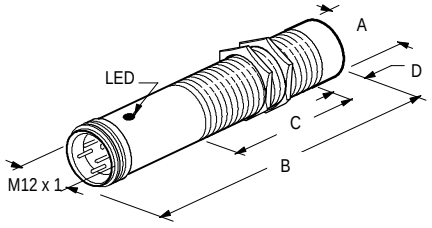
| Description | Page No. |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

### Smooth Barrel Clamping Bracket (Cat. No. 60-BCS-18B)



## Approximate Dimensions [mm (in.)]

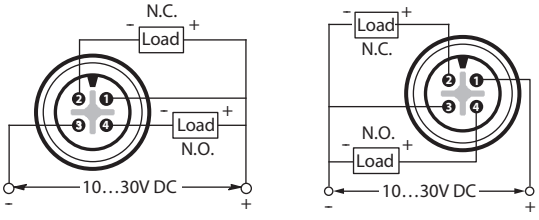
### Micro QD Style




## Wiring Diagrams

### Micro QD Style

**Complementary Normally Open and Normally Closed**




| Barrel Type | Thread Size | Shielded | mm (in.) A | B | C | D |
|---|---|---|---|---|---|---|
| Threaded | M12 X 1 | Yes | 12.0 (0.47) | 65.0 (2.56) | 38.1 (1.50) | — |
| | | No | | | 32.5 (1.28) | 6.5 (0.26) |
| | M18 x 1 | Yes | 18.0 (0.71) | 63.0 (2.48) | 34.5 (1.36) | — |
| | | No | | | 26.5 (1.04) | 8.0 (0.31) |
| Smooth | — | Yes | 18.0 (0.71) | 63.0 (2.48) | — | — |
| | | No | | | — | 8.0 (0.31) |

## Notes

## Description

Bulletin 871Z inductive proximity sensors are self-contained, solid state switching devices designed to sense the presence of metal objects (ferrous and nonferrous) without touching them. These special weld-field immune models are ideal for welding environments and other applications where large magnetic fields are present. They are rated for reliable operation at a 25.4 mm (1 in.) distance from a current line carrying 20,000 A.❶

The electronic circuitry is potted for protection against shock, vibration, and contamination and is enclosed in a threaded, PTFE-coated brass housing which meets NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13 and IP67 (IEC529) enclosure standards. The PTFE-coated housing and mounting nuts, Thermoset Plastic plastic face, and fire-retardant cable offer a high degree of weld splatter protection. The heavy #18 AWG SOOW-A cable offers additional abrasion, chemical, and environmental protection.

All units are provided with short circuit, overload, transient noise, and false pulse protection and weld field immunity which exceeds 20,000 A at 25.4 mm (1 in.) from the welding tip. All of these protections mean you can reduce your down time due to improper wiring, shorts, radio frequency interference, line spikes, and many other causes.

These sensors are available in 12, 18 and 30 mm diameters. Connection options include a 2-meter cable, mini quick-disconnect and micro quick-disconnect.

## Features

- Cable or quick-disconnect styles
- PTFE-coated brass barrel
- Weld field immunity
- Short circuit, false pulse, overload, and transient noise protection
- UL Listed, CSA Certified (AC/DC models) and CE Marked for all applicable directives

## Styles

DC 3-Wire . . . . . page 2-104
AC/DC 2-Wire . . . . . page 2-100

## Accessories

Cordsets . . . . . page 8-1
Mounting Bracket, Spring Return Style . . . . . page 2-210
Mounting Bracket, Right Angle Style . . . . . page 2-213
Mounting Bracket, Clamp Style . . . . . page 2-214
PTFE End Caps . . . . . page 2-219
Mounting Nuts . . . . . page 2-221
Lock Washers . . . . . page 2-223

## General Information

Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6

❶ This distance varies with current line amperage. See page 2-10 of the Introduction section to determine the minimum distance for your application.

# 871Z 3-Wire DC Weld Field Immune

## PTFE Face/Threaded PTFE-Coated Brass Barrel

*871Z DC Mini*
*Quick-Disconnect Style*
*18, 30 mm*

*871Z DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Weld field immunity
- Normally open output
- Reverse polarity, short circuit, overload, false pulse and transient noise protection
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Minimum Load Current | 1 mA |
| Leakage Current | ≤10 μA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.4V |
| Repeatability | ≤10% |
| Hysteresis | ≤15% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Weld Field Immunity | 20,000 A at 1 inch |
| Certifications | CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 12 and 13, IP67 (IEC529)<br>PTFE coated brass barrel |
| Connections | Quick-Disconnect: 4-pin mini style<br>4-pin micro style |
| LED | Red: Output Energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |

# 871Z 3-Wire DC Weld Field Immune

## PTFE Face/Threaded PTFE-Coated Brass Barrel

## Product Selection

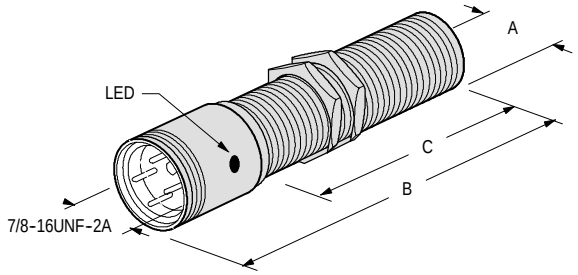
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Mini QD Style | Micro QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | PNP | 15 | — | **871Z-DW2NP12-D4** |
| 18 mm | 5 (0.20) | Y | N.O. | PNP | 15 | 871Z-DW5NP18-N4 | **871Z-DW5NP18-D4** |
| 30 mm | 10 (0.39) | Y | N.O. | PNP | 15 | 871Z-DW10NP30-N4 | 871Z-DW10NP30-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F4AFC-6F | 889D-F4WE-2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| PTFE End Caps | 2-219 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions [mm (in.)]

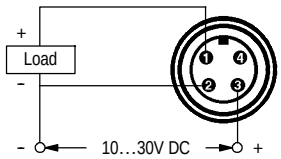
### Mini QD Style




## Wiring Diagram

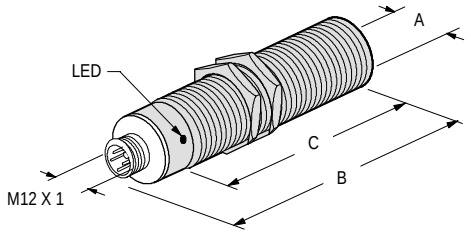
**Normally Open**

**PNP (Sourcing)**



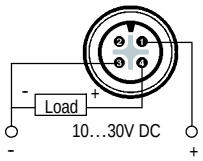

| Thread Size | Shielded | [mm (in.)] | | |
|---|---|---|---|---|
| | | A | B | C |
| M18 X 1 | Y | 18.0 (0.71) | 90 (3.54) | 53 (2.09) |
| M30 X 1.5 | Y | 30.0 (1.18) | 90 (3.54) | 56 (2.20) |

### Micro QD Style




**Normally Open**

**PNP (Sourcing)**




| Thread Size | Shielded | [mm (in.)] | | |
|---|---|---|---|---|
| | | A | B | C |
| M12 X 1 | Y | 12.0 (0.47) | 70.0 (2.76) | 50.0 (1.97) |
| M18 X 1 | Y | 18.0 (0.71) | 80.0 (3.15) | 60.0 (2.36) |
| M30 X 1.5 | Y | 30.0 (1.18) | 80.0 (3.15) | 60.0 (2.36) |

# 871Z 2-Wire AC/DC Weld Field Immune

## Thermoset Plastic Face/Threaded PTFE-Coated Brass Barrel

871Z AC/DC Cable Style
18 & 30 mm

871Z AC/DC Mini
Quick-Disconnect Style
12, 18, and 30 mm

871Z AC/DC Micro
Quick-Disconnect Style
12, 18, and 30 mm

## Features

- 2-wire operation
- 3-conductor or 3-pin connection
- 20…250V AC/DC
- Normally open or normally closed output
- Weld field immunity
- Short circuit, false pulse, overload, and transient noise protection
- UL Listed, CSA Certified, and CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 & 30 mm |
|---|---|---|
| Load Current | 5…200 mA | 5…250 mA |
| Inrush Current (1 cycle) | ≤2 A | ≤4 A |
| Leakage Current | ≤1.9 mA @ 120V AC | |
| Operating Voltage | 20…250V AC/DC | |
| Voltage Drop | ≤10V @ 5…200 mA | ≤10V @ 5…250 mA |
| Repeatability | ≤10% at constant temperature | |
| Hysteresis | 7% typical | |
| Protection Type | Short circuit (trigger @ 5 A typical), false pulse, reverse polarity (DC output), overload (trigger @ 260 mA typical), and transient noise | Short circuit (trigger @ 8 A typical), false pulse, reverse polarity (DC output), overload (trigger @ 320 mA typical), and transient noise |
| Weld Field Immunity | 20,000 A at 1 inch | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives | |
| Enclosure Type Rating | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC529)<br>PTFE coated housing | |
| Connection Type | Cable: 2 m (6.5 ft) length<br>H2 - 3 conductor #18 AWG ToughLink™<br>Quick-Disconnect: 3-pin micro style, 3-pin mini style | |
| LED | Red: Output energized<br>Green: Power | Red: Flashing short circuit/overload |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |



New

# 871Z 2-Wire AC/DC Weld Field Immune

## Thermoset Plastic Face/Threaded PTFE-Coated Brass Barrel

## Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD Style | Micro QD Style |
| 12 | 2 (0.08) | Yes | N.O. | 30 | — | 871Z-BW2N12-N3 | 871Z-BW2N12-R3 |
| | | | N.C. | 20 | — | 871Z-BW2C12-N3 | 871Z-BW2C12-R3 |
| | 4 (0.16) | No | N.O. | 30 | — | 871Z-BW4N12-N3 | 871Z-BW4N12-R3 |
| | | | N.C. | 20 | — | 871Z-BW4C12-N3 | 871Z-BW4C12-R3 |
| 18 | 5 (0.20) | Yes | N.O. | 30 | 871Z-BW5N18-H2 | 871Z-BW5N18-N3 | 871Z-BW5N18-R3 |
| | | | N.C. | 20 | 871Z-BW5C18-H2 | 871Z-BW5C18-N3 | 871Z-BW5C18-R3 |
| 30 | 10 (0.39) | Yes | N.O. | 30 | 871Z-BW10N30-H2 | 871Z-BW10N30-N3 | 871Z-BW10N30-R3 |
| | | | N.C. | 20 | 871Z-BW10C30-H2 | 871Z-BW10C30-N3 | — |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3WEA-2 |

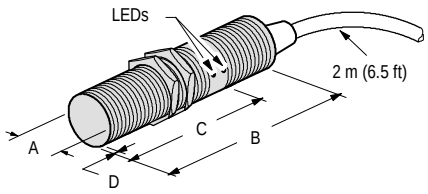
**Note:** This Allen-Bradley Weld Field Immune proximity sensor is also available with additional weld slag resistant material on the sensing face. Consult your local Rockwell Automation sales office or Allen-Bradley distributor for details.

## QD Cordsets and Accessories

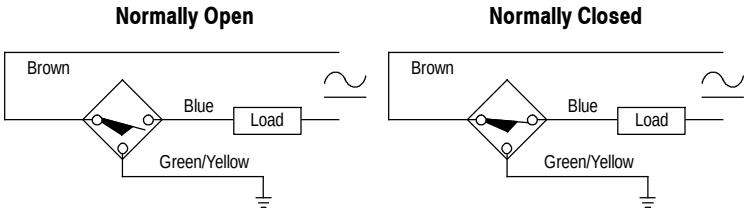
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| PTFE End Caps | 2-219 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions —[mm (in.)]

### Cable Style




## Wiring Diagram




**Note:** Rear portion of barrel left uncoated for ground contact on 12 mm models.

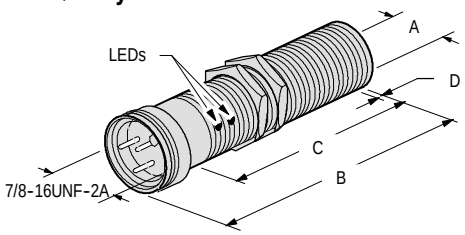
| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M18 X 1 | Y | 18.0 (0.71) | 74.68 (2.94) | 61.6 (2.43) | 0.8 (0.03) |
| M30 X 1.5 | Y | 30.0 (1.18) | 77.52 (3.05) | 64.3 (2.53) | |

# 871Z 2-Wire AC/DC Weld Field Immune

## Thermoset Plastic Face/Threaded PTFE-Coated Brass Barrel

### Approximate Dimensions [mm (in.)]

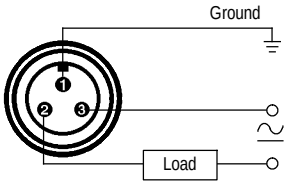
**Mini QD Style**




**Note:** Rear portion of barrel left uncoated for ground contact on 12 mm models.

### Wiring Diagram

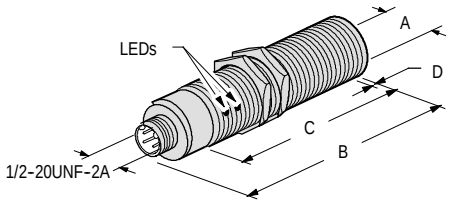
**Normally Open or Normally Closed**




**Note 1:** No ground pin on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to pin 3.

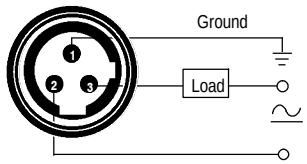
| Thread Size | Shielded | mm (inches) | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 93.45 (3.68) | 46.2 (1.82) | 0.8 (0.03) |
| | N | | | 40.7 (1.52) | 8.1 (0.32) |
| M18 X 1 | Y | 18.0 (0.71) | 75.82 (2.99) | 57.28 (2.26) | 0.8 (0.03) |
| M30 X 1.5 | Y | 30.0 (1.18) | 86.66 (3.41) | 64.3 (2.53) | |

**Micro QD Style**




**Note:** Rear portion of barrel left uncoated for ground contact on 12 mm models.

**Normally Open or Normally Closed**




**Note 1:** No ground pin on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to pin 3.

| Thread Size | Shielded | mm (inches) | | | |
|---|---|---|---|---|---|
| | | A | B (max) | C (min) | D (max) |
| M12 x 1 | Y | 12.0 (0.47) | 90.1 (3.55) | 46.7 (1.85) | 0.8 (0.03) |
| | N | | | 39.7 (1.56) | 8.10 (0.32) |
| M18 x 1 | Y | 18.0 (0.71) | 83.5 (3.29) | 61.6 (2.43) | 0.8 (0.03) |
| M30 X 1.5 | Y | 30.0 (1.18) | 86.0 (3.38) | 64.3 (2.53) | 0.8 (0.03) |



New

# Bulletin 871ZT/Equal Sensing

## PTFE Face/Threaded PTFE-Coated Brass Barrel

## Description

Bulletin 871ZT inductive proximity sensors are self contained, solid-state switching devices designed to sense the presence of metal objects without touching them. However, unlike most inductive sensors, Bulletin 871ZT sensors are equal sensing inductive proximity sensors; they sense all metals at nearly the same distance. Additionally, these special weld-field immune models are ideal for welding environments and other applications where large magnetic fields are present.

The electronic circuitry is potted for protection against shock, vibration, and contamination and is enclosed in a threaded, PTFE-coated brass housing, which meets IP67 (IEC 529) enclosure standards. The PTFE-coated housing, face and mounting nuts offer a high degree of weld-splatter protection.

All units are provided with short circuit, overload, transient noise, and false pulse protection and weld-field immunity, which exceeds 20,000 A at 25.4 mm (1 in.) from the welding tip. All of these protections mean that you can reduce your downtime due to improper wiring, shorts, radio frequency interference, line spikes, and many other causes.

## Features

- Weld field immune
- Weld-slag resistant PTFE-coated brass barrel and face
- Equal sensing for all metals
- Normally open output
- Reverse polarity, short circuit, overload, false pulse and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Styles

DC 3-Wire . . . . . page 2-104

## Accessories

Cordsets . . . . . page 8-1
Conduit Adaptors . . . . . page 2-209
Mounting Brackets, Spring Return Style . . . . . page 2-210
Mounting Brackets, Swivel/Tilt Style . . . . . page 2-212
Mounting Brackets, Right Angle Style . . . . . page 2-213
Mounting Brackets, Clamp Style . . . . . page 2-214
End Caps . . . . . page 2-220
Mounting Nuts . . . . . page 2-221
Lock Washers . . . . . page 2-223

## General Information

Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6

# 871ZT 3-Wire DC Weld Field Immune/Equal Sensing

## PTFE Face/Threaded PTFE-Coated Brass Barrel

*871ZT DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 3-wire operation
- 4-pin micro quick-disconnect
- 10…30V DC
- Weld field immunity
- Weld-slag resistant PTFE coated brass barrel and face
- Equal sensing for all metals
- Normally open output
- Reverse polarity, short circuit, overload, false pulse and transient noise protection
- UL Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current, Max. | 200 mA |
| Load Current, Min. | 1 mA |
| Leakage Current | <0.08 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.5V |
| Repeatability | ≤5% typical |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse, transient noise, reverse polarity, short circuit, overload |
| Weld Field Immunity | Up to 1260 Gauss (M5) |
| Certifications | UL Listed and CE Marked for all applicable directives |
| Enclosure Type Rating | IP67 (IEC 529)<br>PTFE coated brass barrel |
| Connection Type | Quick-Disconnect: 4-pin micro style |
| LED | 360° LED visibility; Orange: Target Present |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.1 |
| Brass | 0.9…1.1 |
| Aluminum | 0.9…1.1 |
| Copper | 0.9…1.1 |



New

# 871ZT 3-Wire DC Weld Field Immune/Equal Sensing

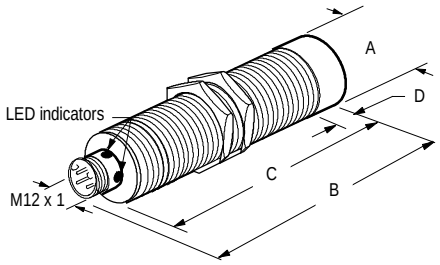
## PTFE Face/Threaded PTFE-Coated Brass Barrel

## Product Selection

| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Outout Configuration | | Switching Frequency [Hz] | Cat. No. Micro QD Style |
|---|---|---|---|---|---|---|
| 12 mm | 3 (0.12) | Y | N.O. | PNP | 2000 | 871ZT-MB3NP12-D4 |
| | 8 (0.31) | N | | | 2000 | 871ZT-NB8NP12-D4 |
| 18 mm | 5 (0.20) | Y | | | 2500 | 871ZT-MB5NP18-D4 |
| | 12 (0.47) | N | | | 2500 | 871ZT-NB12NP18-D4 |
| 30 mm | 10 (0.39) | Y | | | 600 | 871ZT-MB10NP30-D4 |
| | 20 (0.79) | N | | | 1000 | 871ZT-NB20NP30-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889D-F4WE-2 |

## Dimensions [mm (in.)]

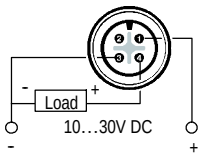
### Micro QD Style




## Wiring Diagram

**Normally Open**

**PNP (Sourcing)**




| Thread Size | Shielded | A | B | C | D |
|---|---|---|---|---|---|
| M12x1 | Y | 12 (0.47) | 65 (2.56) | 50 (1.97) | — |
| | N | 12 (0.47) | 65 (2.56) | 40 (1.58) | 10 (0.39) |
| M18x1 | Y | 18 (0.71) | 65 (2.56) | 50 (1.97) | — |
| | N | 18 (0.71) | 65 (2.56) | 40.5 (1.59) | 10 (0.39) |
| M30x1 | Y | 30 (1.18) | 65 (2.56) | 50.5 (1.99) | — |
| | N | 30 (1.18) | 65 (2.56) | 37.5 (1.48) | 13 (.51) |

## Notes

Obsolete

# 871ZC 3-Wire DC Weld Field Immune

## Thermoset Plastic Face/Threaded Copper Barrel

Obsolete

Obsolete

# 871ZC 2-Wire AC/DC Weld Field Immune

## Thermoset Plastic Face/Threaded Copper Barrel

Obsolete

Obsolete

## 871ZC 2-Wire AC/DC Weld Field Immune

**Thermoset Plastic Face/Threaded Copper Barrel**

Obsolete

# Bulletin 871C

## Plastic Face/Plastic Barrel or Nickel-Plated Brass Barrel

## Description

Bulletin 871C inductive proximity sensors are self-contained, general purpose, solid-state devices designed to sense the presence of ferrous and nonferrous metal objects without touching them.

The switch body consists of a plastic face and either a stainless steel barrel, nickel-plated brass barrel or plastic barrel. The electronic circuitry is potted for protection against shock, vibration, and contamination.

These sensors are available in 3, 4, 5, 8, 12, 18 and 30 mm diameters, with smooth or threaded barrels. Connection options include a 2 m cable, micro quick-disconnect, and pico quick-disconnect.

## Features

- Cable or quick-disconnect styles
- Short circuit protection❶
- Overload protection❶
- Transient noise protection
- False pulse protection
- Reverse polarity protection
- CE Marked for all applicable directives (most models)

## Styles

DC 3-Wire Small Diameter page 2-114
DC 3-Wire Extended Temperature Range . . . . . page 2-117
AC 2-Wire Full-Featured . . page 2-119
AC 2-Wire Plastic Barrel . . page 2-122
NAMUR Intrinsically Safe . page 2-124
Analog Output . . . . . page 2-127

## Accessories

Cordsets . . . . . page 8-1
Conduit Adaptors . . . . . page 2-209
Mounting Brackets, Spring Return Style . . . . . page 2-210
Mounting Brackets, Swivel/Tilt Style . . . . . page 2-212
Mounting Brackets, Right Angle Style . . . . . page 2-213
Mounting Brackets, Clamp Style . . . . . page 2-214
End Caps . . . . . page 2-220
Mounting Nuts . . . . . page 2-221
Lock Washers . . . . . page 2-223

## General Information

Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6

❶ AC full-featured and DC models only.

# 871C 3-Wire DC

## Plastic Face/Small Threaded or Smooth Nickel-Plated Brass Barrel

*871C DC Cable Style*
*Smooth Barrel*
*3, 4 mm*

*871C DC Pico Style 3-Pin 6 inch Lead*
*Smooth Barrel*
*4, 5 mm*

*871C DC Cable Style*
*Threaded Barrel*
*4, 5 mm*

*871C DC Cable Style*
*Smooth Barrel*
*4 mm*

*871C DC Pico Quick-Disconnect*
*Style Threaded Barrel*
*5 mm*

## Features

- 3-wire operation
- 3-conductor, 3-pin pico or 3-pin pico on 6 inch lead
- 10…30V DC
- Normally open
- False pulse, transient noise, reverse polarity and short circuit protections
- cULus Listed and CE Marked for all applicable directives (except for 3 mm models)

## Specifications

| Barrel Diameter | 3 mm Smooth Barrel and 4 mm Threaded Barrel | 4 mm Smooth Barrel and 5 mm Threaded Barrel |
|---|---|---|
| Load Current | ≤100 mA | ≤200 mA |
| Leakage Current | ≤0.1 mA | |
| Operating Voltage | 10…30V DC | |
| Voltage Drop | ≤2.5V | |
| Repeatability | ≤5% | |
| Hysteresis | 15% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Reverse Polarity Protection | Incorporated | |
| Short Circuit Protection | Incorporated | |
| Certifications | cULus Listed and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 12, 13 IP67 (cable only) IP65 (qd only) (IEC529); Stainless steel barrel | |
| Connections | Cable: 2 m (6.5 ft) length 3-conductor PUR<br>Quick-Disconnect: 3-pin pico style 3-pin pico on 6 in. lead | Cable: 2 m (6.5 ft) length 3-conductor PVC<br>Quick-Disconnect: 3-pin pico style |
| LED | Red or Yellow: Output energized | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

### Correction Factors

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |



New

## Product Selection

| Barrel Dia. | Barrel Type | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cable Style | Pico QD Style | Pico with Lead Style |
| 3 | Smooth | 0.6 (0.02) | Y | N.O. | NPN | 5000 | 871C-DM1NN3-E2 | — | 871C-DM1NN3-AP3 |
| | | | | | PNP | | **871C-DM1NP3-E2** | — | 871C-DM1NP3-AP3 |
| | | 1 (0.04) | | | NPN | 3000 | 871C-MM1NN3-E2 | — | 871C-MM1NN3-AP3 |
| | | | | | PNP | | 871C-MM1NP3-E2 | — | 871C-MM1NP3-AP3 |
| 4 | Threaded | 0.8 (0.03) | | | NPN | 5000 | 871C-D1NN4-E2 | — | 871C-D1NN4-AP3 |
| | | | | | PNP | | **871C-D1NP4-E2** | — | 871C-D1NP4-AP3 |
| | | 1 (0.04) | | | NPN | 3000 | 871C-M1NN4-E2 | — | 871C-M1NN4-AP3 |
| | | | | | PNP | | 871C-M1NP4-E2 | — | 871C-M1NP4-AP3 |
| | Smooth | 0.8 (0.03) | | | NPN | 5000 | 871C-DM1NN4-E2 | 871C-DM1NN4-P3 | — |
| | | | | | PNP | | **871C-DM1NP4-E2** | 871C-DM1NP4-P3 | 871C-DM1NP4-AP3 |
| | | 1.5 (0.06) | | | NPN | 3000 | 871C-MM2NN4-E2 | 871C-MM2NN4-P3 | — |
| | | | | | PNP | | 871C-MM2NP4-E2 | 871C-MM2NP4-P3 | — |
| 5 | Threaded | 1 (0.04) | | | NPN | 5000 | 871C-D1NN5-E2 | 871C-D1NN5-P3 | — |
| | | | | | PNP | | **871C-D1NP5-E2** | **871C-D1NP5-P3** | — |
| | | 1.5 (0.06) | | | NPN | 3000 | 871C-M2NN5-E2 | 871C-M2NN5-P3 | — |
| | | | | | PNP | | 871C-M2NP5-E2 | 871C-M2NP5-P3 | — |
| Recommended cordset | | | | | | | | 889P-F3AB-2 | |

## QD Cordsets and Accessories

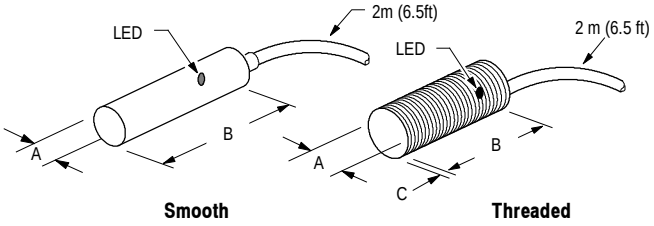
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

# 871C 3-Wire DC

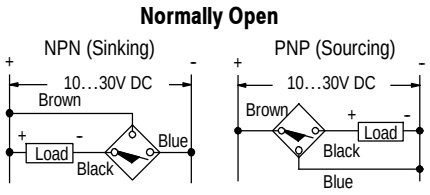
## Plastic Face/Small Threaded or Smooth Nickel-Plated Brass Barrel

### Approximate Dimensions [mm (in.)]

#### Cable Style

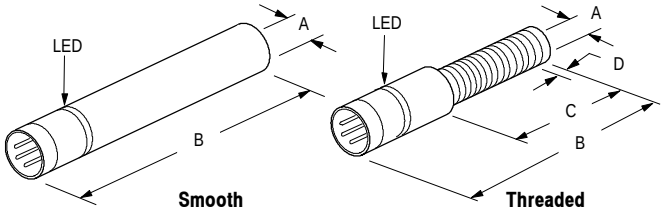


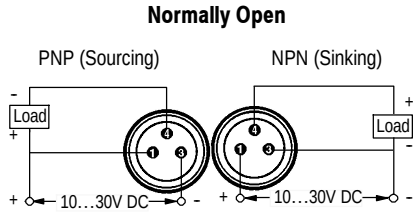

### Wiring Diagram




| Smooth Diameter | Thread Size | Shielded | [mm (in.)] A | B | C |
|---|---|---|---|---|---|
| 3.0 | — | Y | 3.0 (0.12) | 22.0 (0.87) | — |
| 4.0 | — | Y | 4.0 (0.16) | 25.0 (0.98) | — |
| 4.0 | M4 x 0.5 | Y | 4.0 (0.16) | 22.0 (0.87) | — |
| 5.0 | M5 x 0.5 | Y | 5.0 (0.20) | 25.0 (0.98) | — |

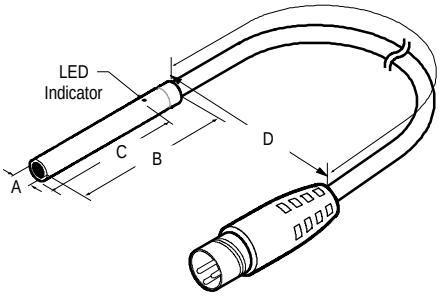
#### Pico QD Style

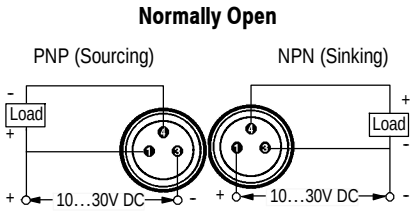



| Smooth Diameter | Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|---|
| 4.0 | — | Y | 4.0 (0.16) | 38.0 (1.50) | 19.0 (0.74) | — |
| 5.0 | M5 x 0.5 | Y | 5.0 (0.20) | 38.0 (1.50) | 23.0 (0.90) | — |

#### Pico with Lead Style




| Barrel Diameter | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| 3.0 | Y | 3.0 (0.12) | 22.0 (0.87) | — | 150.0 (5.9) |
| 4.0 | Y | 4.0 (0.16) | 22.0 (0.87) | 19.0 (0.74) | 150.0 (5.9) |

# 871C 3-Wire DC Extended Temperature

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*871C DC Cable Style*
*12, 18, 30 mm*

*871C DC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Description

Bulletin 871C inductive proximity sensors are self-contained, solid state devices designed for most industrial applications where it is required to sense the presence of metal objects without touching them. These special extended temperature models are ideal for industrial environments where temperatures can reach as high as 212°F (100°C) or as low as -40°F (-40°C). They are available for current source (PNP) operation with a normally open output.

Each switch has a plastic face and a nickel-plated brass housing which meet NEMA 1, 2, 3, 4, 12, 13 and IP67 (IEC529) enclosure standards. The electronic circuitry is potted for protection against shock, vibration, and contamination.

These sensors are available in 12, 18, and 30 mm diameters. Connection options include: 2 m (6.5 ft) PUR cable or micro quick-disconnect (4 pin, 1 keyway).

## Specifications

| | |
|---|---|
| Load Current | 1…200 mA |
| Leakage Current | ≤10 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.4V |
| Repeatability | ≤10% |
| Hysteresis | ≤15% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 12, 13, IP67 (IEC529 )<br>Nickel-plated brass barrel |
| Connections | Cable: 2 m (6.5 ft) length<br>3-conductor PUR<br>Quick-Disconnect: 4-pin micro style |
| LED | Orange: Output Energized |
| Operating Temperature [C (F)] | -40…+100° (-40…+212°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Extended temperature range
- Normally open output
- Short circuit, false pulse, reverse polarity, overload and transient noise protection
- CE Marked for all applicable directives

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.5 |
| Aluminum | 0.45 |
| Copper | 0.4 |

# 871C 3-Wire DC Extended Temperature

## Plastic Face/Threaded Nickel-Plated Brass Barrel

## Product Selection

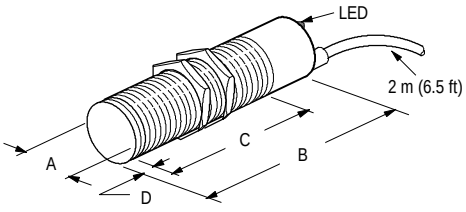
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | PNP | 2000 | 871C-DT2NP12-U2 | 871C-DT2NP12-D4 |
| | 4 (0.16) | N | | | 1000 | 871C-DT4NP12-U2 | 871C-DT4NP12-D4 |
| 18 mm | 5 (0.20) | Y | N.O. | PNP | 1000 | 871C-DT5NP18-U2 | 871C-DT5NP18-D4 |
| | 8 (0.31) | N | | | 500 | 871C-DT8NP18-U2 | 871C-DT8NP18-D4 |
| 30 mm | 10 (0.39) | Y | N.O. | PNP | 500 | 871C-DT10NP30-U2 | 871C-DT10NP30-D4 |
| | 15 (0.59) | N | | | 300 | 871C-DT15NP30-U2 | 871C-DT15NP30-D4 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4AC-2 |

## QD Cordsets and Accessories

| Description | Page Number | Description | Page Number |
|---|---|---|---|
| Other Cordsets Available | 8-2 | End Caps | 2-220 |
| Terminal Chambers | 8-2 | Mounting Nuts | 2-221…2-222 |
| Mounting Brackets | 2-210…2-214 | — | — |

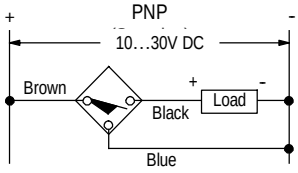
## Approximate Dimensions [mm (in.)]

### Cable Style



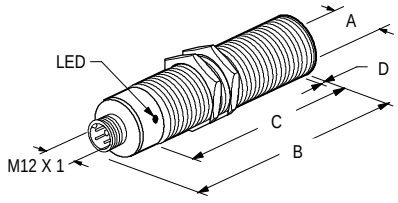

## Wiring Diagram

**Normally Open**



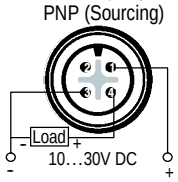

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 40.0 (1.57) | 40.0 (1.57) | — |
| | N | | | 34.0 (1.34) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | | 40.0 (1.57) | — |
| | N | | | 32.0 (1.26) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | | 40.0 (1.57) | — |
| | N | | | 28.0 (1.12) | 12.0 (0.47) |

### Micro QD Style




**Normally Open**

PNP (Sourcing)




| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 60.0 (2.36) | 40.0 (1.57) | — |
| | N | | | 34.0 (1.34) | 6.0 (0.24) |
| M18 X 1 | Y | 18.0 (0.71) | | 40.0 (1.57) | — |
| | N | | | 32.0 (1.26) | 8.0 (0.31) |
| M30 X 1.5 | Y | 30.0 (1.18) | | 40.0 (1.57) | — |
| | N | | | 28.0 (1.10) | 12.0 (0.47) |

# 871C 2-Wire AC Full Featured

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*871C AC Cable Style*
*18, 30 mm*

*871C AC Mini*
*Quick-Disconnect Style*
*12, 18, 30 mm*

*871C AC Micro*
*Quick-Disconnect Style*
*12, 18, 30 mm*

## Features

- 2-wire operation
- 2-conductor or 3-pin connection
- 20…250V AC
- Normally open or normally closed output
- Short circuit, false pulse, overload, and transient noise protection
- UL Listed, CSA Certified, and CE Marked for all applicable directives

## Specifications

| Barrel Diameter | 12 mm | 18 and 30 mm |
|---|---|---|
| Load Current | 5…200 mA | 5…250 mA |
| Minimum Load Current | 5 mA | |
| Inrush Current (1 cycle) | ≤2 A | ≤4 A |
| Leakage Current | ≤1.9 mA @ 120V AC | |
| Operating Voltage | 20…250V AC | |
| Voltage Drop | ≤10V @ 5…200 mA, | ≤10V @ 5…250 mA |
| Repeatability | ≤10% at constant temperature | |
| Hysteresis | 10% typical | |
| False Pulse Protection | Incorporated | |
| Transient Noise Protection | Incorporated | |
| Short Circuit Protection | Incorporated | |
| Overload Protection | Incorporated, trigger at 250 mA typical | Incorporated, trigger at 320 mA typical |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13 IP67 (IEC529)<br>Nickel plated brass barrel | |
| Connections | Cable: 2 m (6.5 ft) length<br>2-conductor PVC<br>Quick Disconnect: 3-pin micro style<br>3-pin mini style | |
| LED | Red: Output energized/Short Circuit (Flashing)<br>Green: Power | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.5 |
| Aluminum | 0.45 |
| Copper | 0.4 |

# 871C 2-Wire AC Full Featured

## Plastic Face/Threaded Nickel-Plated Brass Barrel

### Product Selection

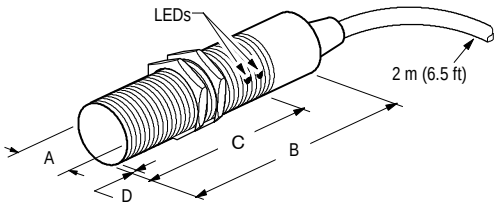
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD Style | Micro QD Style |
| 12 mm | 2 (0.08) | Y | N.O. | 30 | 871C-A2N12-A2 | 871C-A2N12-N3 | 871C-A2N12-R3 |
| | | | N.C. | 20 | 871C-A2C12-A2 | 871C-A2C12-N3 | 871C-A2C12-R3 |
| 18 mm | 5 (0.20) | Y | N.O. | 30 | 871C-A5N18-A2 | **871C-A5N18-N3** | 871C-A5N18-R3 |
| | | | N.C. | 20 | 871C-A5C18-A2 | 871C-A5C18-N3 | 871C-A5C18-R3 |
| 30 mm | 10 (0.39) | Y | N.O. | 30 | 871C-A10N30-A2 | 871C-A10N30-N3 | 871C-A10N30-R3 |
| | | | N.C. | 20 | 871C-A10C30-A2 | 871C-A10C30-N3 | 871C-A10C30-R3 |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 |

### QD Cordsets and Accessories

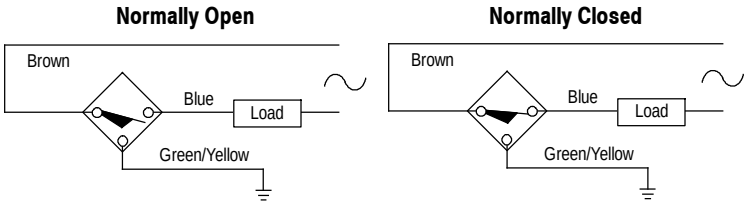
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions [mm (in.)]

### Cable Style



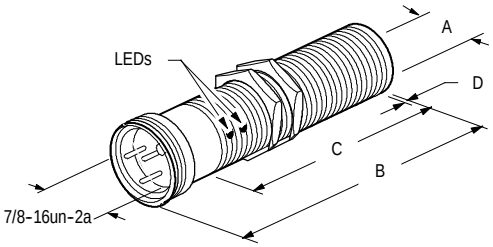

## Wiring Diagram



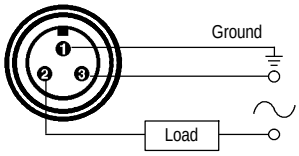

**Note:** Load can be switched to brown wire.

| Thread Size | Shielded | [mm (in.)] | | | |
|---|---|---|---|---|---|
| | | A | B | C | D |
| M12 X 1 | Y | 12.0 (0.47) | 78.99 (3.11) | 47.24 (1.86) | 0.8 (0.03) |
| M18 X 1 | Y | 18.0 (0.71) | 74.68 (2.94) | 61.6 (2.43) | |
| M30 X 1.5 | Y | 30.0 (1.18) | 77.52 (3.05) | 64.31 (2.53) | |

### Mini QD Style



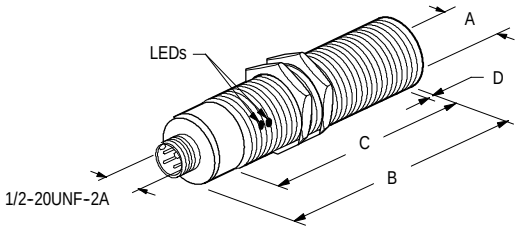

**Normally Open or Normally Closed**



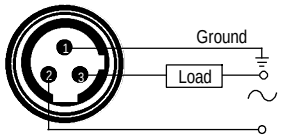

**Note 1:** No ground wire on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to pin 3.

| Thread Size | [mm (in.)] | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M12 X 1 | 12.0 (0.47) | 93.45 (3.68) | 46.08 (1.81) | — |
| M18 X 1 | 18.0 (0.71) | 75.82 (2.99) | 53.92 (2.12) | |
| M30 X 1.5 | 30.0 (1.18) | 86.66 (3.41) | 64.31 (2.53) | |

### Micro QD Style




**Normally Open or Normally Closed**




**Note 1:** No ground wire on 12 mm. Attach housing to ground.
**Note 2:** Load can be switched to pin 2.

| Thread Size | [mm (in.)] | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M12 X 1 | 12.0 (0.47) | 90.42 (3.56) | 46.99 (1.85) | — |
| M18 X 1 | 18.0 (0.71) | 83.54 (3.29) | 61.6 (2.43) | |
| M30 X 1.5 | 30.0 (1.18) | 86.00 (3.39) | 64.31 (2.53) | |

# 871C 2-Wire AC

## Plastic Face/Threaded Plastic Barrel

*871C AC Cable Style*
*18, 30 mm*

## Features

- 2-wire operation
- 2-conductor connection
- 24…250V AC
- Normally open or normally closed output
- Transient noise protection
- CE Marked for all applicable directives

## Specifications

| Barrel Diameter | 18 mm | 30 mm |
|---|---|---|
| Load Current | ≤180 mA | ≤300 mA |
| Inrush Current (1 cycle) | ≤1 A | ≤3 A |
| Leakage Current | ≤.1.7 mA | |
| Operating Voltage | 24…250V AC | |
| Voltage Drop | ≤11V | |
| Hysteresis | ≤20% typical | |
| Transient Noise Protection | Incorporated | |
| Certifications | CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 4X, 12, 13 IP67 (IEC529)<br>Plastic barrel | |
| Connections | Cable: | 2 m (6.5 ft) length<br>2-conductor PVC |
| LED | Red: Output energized | |
| Operating Temperature [C (F)] | -25…+55° (-13…+131°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.3…0.4 |

## Product Selection

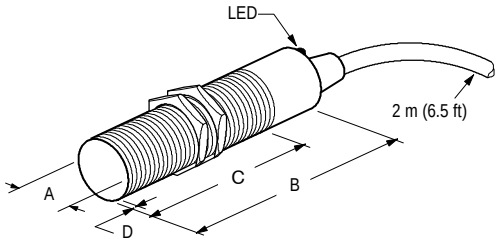
| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Cable Style |
|---|---|---|---|---|---|
| 18 mm | 5 (0.20) | Y | N.O. | 8 | 871C-C5S18 |
| | | | N.C. | | 871C-D5S18 |
| | 8 (0.31) | N | N.O. | | **871C-C8R18** |
| | | | N.C. | | 871C-D8R18 |
| 30 mm | 10 (0.39) | Y | N.O. | | 871C-C10S30 |
| | | | N.C. | | 871C-D10S30 |
| | 15 (0.59) | N | N.O. | | **871C-C15R30** |
| | | | N.C. | | 871C-D15R30 |

## Accessories

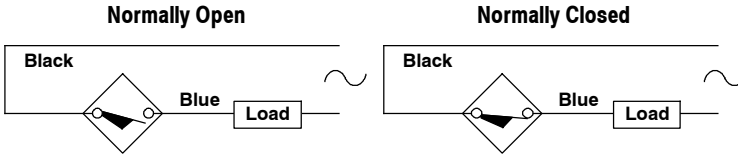
| Description | Page Number |
|---|---|
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions [mm (in.)]

### Cable Style




## Wiring Diagram




**Note:** Load can be switched to black wire.

| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M18 X 1 | Y | 18.0 (0.71) | 81.0 (3.19) | 61.0 (2.40) | 2.0 (0.08) |
| | N ❶ | | | | |
| M30 X 1.5 | Y | 30.0 (1.18) | 81.0 (3.19) | | |
| | N ❶ | | | | |

❶ Unshielded proximity sensors require a metal-free zone around the sensing face. Any metal immediately opposite the sensing face should be no closer than three times the rated nominal sensing distance of the sensor.

# 871C 2-Wire NAMUR

## Nickel-Plated Brass Barrel, Plastic Face

*871C NAMUR*
*Cable Style*
*8, 12, 18, 30 mm*

*871C NAMUR*
*Micro Quick-Disconnect Style*
*8, 12, 18, 30 mm*

## Description

For Allen-Bradley NAMUR style sensors, the sensor input and output conforms to NAMUR specifications (DIN 19 234) allowing these sensors to be used with any approved NAMUR style amplifier/ isolator. Allen-Bradley's NAMUR style sensors are Intrinsically Safe when used with an approved Intrinsically Safe NAMUR style isolator.

The 871C NAMUR style family of sensors can be used in Class I, II, III; Division 1 and 2; Groups A, B, C, D, E, F, and G as well as Zones 0, 1, 2; Groups IIA, IIB, IIC when used with Allen-Bradley's NAMUR style isolators/amplifiers. Installation must be in accordance with the National Electrical Code, ANSI/ISA RP12.6, or per other regulations by authority having jurisdiction over the installation site as appropriate.

## Features

- 2-Wire NAMUR operation
- 8, 12, 18, and 30 mm sizes
- Short barrel length
- Shielded and unshielded models
- FM, CSA, and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Outputs | NAMUR (conforms to DIN 19 234) |
| Load Current Target Present | <1 mA |
| Load Current Target Absent | >3 mA |
| Operating Voltage | 5…15V DC (8.2V DC nom., Ri = 1 kohm, DIN 19 234) |
| Ripple Voltage | <5% |
| Repeatability | <10% |
| Hysteresis | 10% typical |
| Reverse Polarity Protection | Incorporated |
| False Pulse Protection | Realized in amplifier |
| Transient Noise Protection | Realized in amplifier |
| Short Circuit Protection | Realized in amplifier |
| Overload Protection | Realized in amplifier |
| Enclosure | NEMA 4, IP67 (IEC529) |
| Certifications | FM Approved<br>- Class I, II, III; Divisions 1, 2; Groups A, B, C, D, E, F, G<br>CSA Approved<br>- Class I, II, III; Divisions 1, 2; Groups A, B, C, D, E, F, G<br>- Class I; Zone 0, 1, 2; Groups IIC, IIB, IIA<br>CE Marked for all applicable directives |
| Connections | Cable: 2 m (6.5 ft) length 2 conductor #22 AWG PVC<br>Quick-Disconnect: 4-pin micro style |
| LED | None |
| Operating Temperature [C (F)] | -25…60° (-13…140°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |
| Housing Material | Nickel-plated brass barrel, plastic face |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

### Entity Parameters

| Sensor | | | Barrier |
|---|---|---|---|
| $V_{max}$ | 16V | ≥ | $V_t$ |
| $I_{max}$ | 60 mA | ≥ | $I_t$ |
| $C_i$ | 150 nF | ≤ | $C_a$ |
| $L_i$ | 200 µH | ≤ | $L_a$ |

**ATTENTION**

Operating parameters must be adhered to.

# 871C 2-Wire NAMUR, Cable Style

## Nickel-Plated Brass Barrel, Plastic Face

## Product Selection

| Barrel Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Micro QD Style |
| 8 mm | 1 (0.03) | Y | NAMUR DIN 19 234 | 2000 | 871C-DH1M8-A2 | 871C-DH1M8-D4 |
| | 2 (0.06) | N | | 1000 | 871C-DH2M8-A2 | 871C-DH2M8-D4 |
| 12 mm | 2 (0.08) | Y | | 2000 | 871C-DH2M12-A2 | 871C-DH2M12-D4 |
| | 4 (0.16) | N | | 1000 | 871C-DH4M12-A2 | 871C-DH4M12-D4 |
| 18 mm | 5 (0.20) | Y | | 1000 | 871C-DH5M18-A2 | 871C-DH5M18-D4 |
| | 8 (0.31) | N | | 500 | 871C-DH8M18-A2 | 871C-DH8M18-D4 |
| 30 mm | 10 (0.39) | Y | | 500 | 871C-DH10M30-A2 | 871C-DH10M30-D4 |
| | 15 (0.59) | N | | 300 | 871C-DH15M30-A2 | 871C-DH15M30-D4 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | 889D-F4AC-2 ❶ |

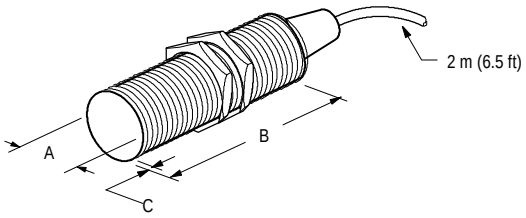
❶ Intrinsically Safe wiring labels 897H-L1 or 897H-L2 must be applied every 7.6 m (25 ft).

## QD Cordsets and Accessories

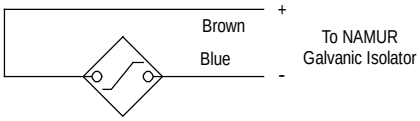
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Galvanic Isolators | 12-5 |
| Intrinsic Safety Wiring Labels | 12-8 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

## Approximate Dimensions [mm (in.)]

### Cable Style




## Wiring Diagram



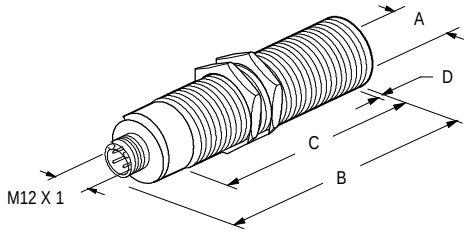

| Thread Size | Shielded | [mm (in.)] | | |
|---|---|---|---|---|
| | | A | B | C |
| M8 x 1 | Y | 8.0 (0.31) | 30.0 (1.18) | — |
| | N | | | 5.0 (0.20) |
| M12 x 1 | Y | 12.0 (0.47) | | — |
| | N | | | 6.0 (0.24) |
| M18 x 1 | Y | 18.0 (0.71) | | — |
| | N | | | 8.0 (0.31) |
| M30 x 1.5 | Y | 30.0 (1.18) | 40.0 (1.57) | — |
| | N | | | 12.0 (0.47) |

# 871C 2-Wire NAMUR

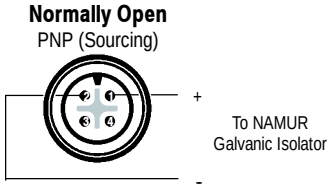
## Nickel-Plated Brass Barrel, Plastic Face

### Approximate Dimensions [mm (in.)]

**Micro QD Style**




### Wiring Diagram




| Thread Size | Shielded | [mm (in.)] A | B | C | D |
|---|---|---|---|---|---|
| M8 x 1 | Y | 8.0 (0.31) | 50.0 (1.97) | 28.0 (1.10) | — |
| | N | | | 23.0 (0.91) | 5.0 (0.20) |
| M12 x 1 | Y | 12.0 (0.47) | | 30.0 (1.18) | — |
| | N | | | 24.0 (0.94) | 6.0 (0.24) |
| M18 x 1 | Y | 18.0 (0.71) | | 30.0 (1.18) | — |
| | N | | | 22.0 (0.87) | 8.0 (0.31) |
| M30 x 1.5 | Y | 30.0 (1.18) | 60.0 (2.36) | 40.0 (1.57) | — |
| | N | | | 28.0 (1.10) | 12.0 (0.47) |

# 871C Analog Output, 3-Wire DC

## Plastic Face/Nickel-Plated Brass Barrel

*871C Cable Style*
*12, 18, 30 mm*

## Description

Bulletin 871C inductive proximity sensors are self-contained, solid-state devices designed to sense the presence of metal objects without touching them. This special version provides a 0…10V sourcing analog output proportional to the sensing distance.

This device is enclosed by a plastic face and a nickel-plated brass housing which meets NEMA 1, 2, 3, 4, 12, 13 and IP67 (IEC529) enclosure standards. The electronic circuitry is potted for protection against shock, vibration and contamination.

This sensor is available in 12, 18 and 30 mm diameters with a 2 m (6.5 ft.) PVC cable connection.

## Features

- 3-wire operation
- 18…30V DC
- Short circuit, overload, reverse polarity, and transient noise protection
- 0…10V sourcing analog output
- CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 mm | 30 mm |
|---|---|---|---|
| Analog Output | 0…10V Sourcing | | |
| Load Current | 5 mA | | |
| Operating Voltage | 18…30V DC | | |
| Repeatability | ≤1% | | |
| Ripple | 10% | | |
| Slew Rate | 1.0V/ms | 0.7V/ms | 0.1V/ms |
| Δ Output / Δ Distance | 0.25 mm/V | 0.375 mm/V | 0.875 mm/V |
| Linearity Tolerance | 6.25% | | |
| Temperature Tolerance | ±0.3V | | |
| Transient Noise Protection | Incorporated | | |
| Reverse Polarity Protection | Incorporated | | |
| Short Circuit Protection | Incorporated | | |
| Overload Protection | Incorporated | | |
| Enclosure | NEMA 1, 2, 3, 4, 12, 13; IP67 (IEC529), Nickel-plated brass barrel, plastic face (PBT) | | |
| Certifications | CE Marked for all applicable directives | | |
| Connections | Cable: 2 m (6.5 ft) length<br>3 conductor PVC | | |
| LED | None | | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | | |
| Shock | 30 g, 11 ms | | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

# 871C Analog Output, 3-Wire DC

## Plastic Face/Nickel-Plated Brass Barrel

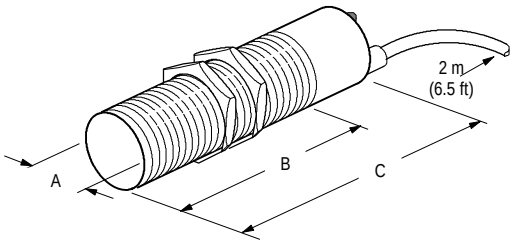
## Product Selection

| Barrel Diameter | Linear Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. |
|---|---|---|---|---|---|---|
| 12 mm | 0.5…2.5 (0.02…0.10) | Y | Analog Voltage | Sourcing | 100 | 871C-D3AP12-E2 |
| 18 mm | 1…4 (0.04…0.16) | Y | Analog Voltage | Sourcing | 100 | 871C-D4AP18-E2 |
| 30 mm | 7…14 (0.27…0.55) | N | Analog Voltage | Sourcing | 30 | 871C-D14AP30-E2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Terminal Chambers | 8-2 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-220 |
| Mounting Nuts | 2-221…2-222 |

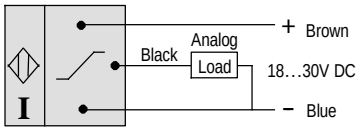
## Approximate Dimensions [mm (in.)]



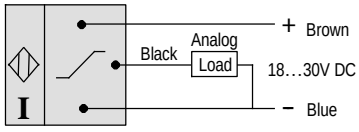

| Thread Size | [mm (in.)] | | |
|---|---|---|---|
| | A | B | C |
| 12 mm | 12 (0.47) | 70 (2.75) | 80 (3.15) |
| 18 mm | 18 (0.71) | | |
| 30 mm | 30 (1.18) | | |

## Wiring Diagrams

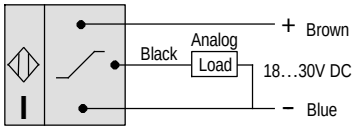
**12 mm**




**18 mm**

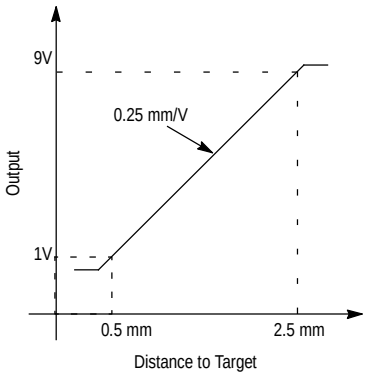



**30 mm**

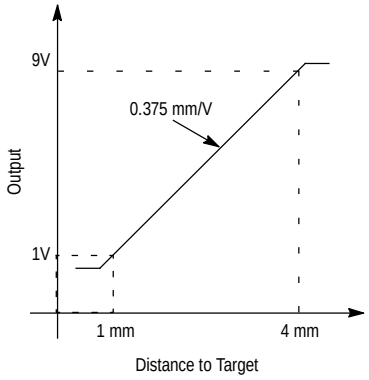



## Nominal Output

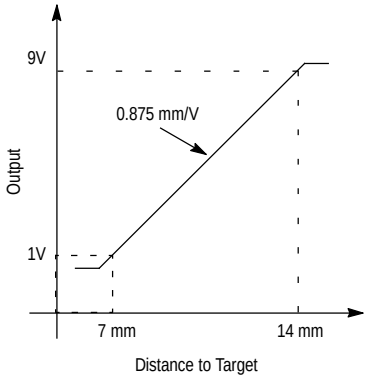
**12 mm**




**18 mm**




**30 mm**



## Description

Bulletin 871P VersaCube inductive proximity sensors are self-contained, solid state devices designed to sense the presence of ferrous and nonferrous metal objects without touching them.

The special weld field immune models are ideal for welding environments and other applications where magnetic fields are present. General Purpose 871P VersaCube models are available for more standard applications where long sensing distance and compact size are required.

The unique VersaCube package is ideal for applications in which space is limited. Their overall size is approximately half that of limit switch style models. The two mounting holes on the VersaCube base align with standard limit switch style mounting holes allowing easy and convenient retrofit capability.

VersaCube models feature two LEDs, one for output and one for power and short-circuit indication. Connection options include mini and micro quick-disconnect.

## Features

- 5-position sensing head
- Rugged burn and weld-slag resistant housing on weld-field immune models
- Mini and micro quick-disconnect styles
- Weld field immunity (some models)
- Short circuit protection
- False pulse protection
- Overload protection
- Transient noise protection
- Reverse polarity protection (DC models)
- ToughCoat Finish™ ❶ resists weld-splatter accumulation
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Styles

DC 3-Wire General Purpose & Weld Field Immune . . . . . page 2-130

DC 4-Wire Weld Field Immune . . . . . page 2-133

AC/DC 2-Wire General Purpose & Weld Field Immune . . . . . page 2-134

## Accessories

Cordsets . . . . . page 8-1

Mounting Kit . . . . . page 2-216

Limit Switch Style Mounting Bracket . . . . . page 2-217

PTFE Covers . . . . . page 2-218

## General Information

Metric/English Conversion Chart . . . . . page 14-6

❶ 871P VersaCube is now being offered with ToughCoat Finish™ on the sensor face. This is a proprietary epoxy-based material which resists the adhesion and accumulation of weld-slag particles thereby improving and extending sensor performance.

# 871P VersaCube™ 3-Wire DC

## General Purpose, Weld Field Immune & ToughCoat Finish™

*871P DC*
*Micro Quick-Disconnect Style*

*871P DC Mini*
*Quick-Disconnect Style*

## Features

- New rugged housing
- Weld field immune models
- ToughCoat Finish❷ resists weld-splatter accumulation
- Convenient mounting base
- 3-wire operation
- 4-pin connection
- 10…60V DC
- Normally open or normally closed output
- Short circuit, overload, false pulse, transient noise, and reverse polarity protection
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Specifications

| | General Purpose | Weld Field Immune |
|---|---|---|
| Load Current | ≤200 mA | ≤200 mA |
| Leakage Current | ≤10 µA | ≤10 µA |
| Operating Voltage | 10…60V DC | 10…60V DC |
| Voltage Drop | <2.5V @ 200 mA | <2.5V @ 200 mA |
| Repeatability | ≤5% | ≤10% of effective operating distance |
| Hysteresis | 5% typical | 12% typical |
| False Pulse Protection | Incorporated | Incorporated |
| Transient Noise Protection | Incorporated | Incorporated |
| Short Circuit Protection | Incorporated | Incorporated |
| Overload Protection | Incorporated | Incorporated |
| Reverse Polarity Protection | Incorporated | Incorporated |
| Weld Field Immunity | N/A | 1000 Gauss ❶ |
| Connections | Quick-Disconnect: 4-pin mini style<br>4-pin micro style | Quick-Disconnect: 4-pin mini style<br>4-pin micro style |
| Certifications | UL Listed, cUL Certified and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown; Plastic body, zinc base; micro connector versions also meet IP69K (IEC 529) | |
| LED | Orange: Output Energized<br>Green: Power | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

❶ Measured with field perpendicular to face.

❷ 871P VersaCube is now being offered with ToughCoat Finish on the sensor face. This is a proprietary epoxy-based material which resists the adhesion and accumulation of weld-slag particles thereby improving and extending sensor performance.

## Product Selection

| Head Size | Weld Field Immune | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Mini QD Style | Micro QD Style |
| 40 mm | N | 20 (0.79) | Y | N.O. | PNP | 100 | 871P-D20NP40-N4 | **871P-D20NP40-D4** |
| | | | | | NPN | | 871P-D20NN40-N4 | 871P-D20NN40-D4 |
| | | | | N.C. | PNP | | 871P-D20CP40-N4 | 871P-D20CP40-D4 |
| | | | | | NPN | | 871P-D20CN40-N4 | 871P-D20CN40-D4 |
| | | 40 (1.57) | N | N.O. | PNP | | 871P-D40NP40-N4 ❶ | **871P-D40NP40-D4** ❶ |
| | | | | | NPN | | 871P-D40NN40-N4 ❶ | 871P-D40NN40-D4 ❶ |
| | | | | N.C. | PNP | | 871P-D40CP40-N4 ❶ | 871P-D40CP40-D4 ❶ |
| | | | | | NPN | | 871P-D40CN40-N4 ❶ | 871P-D40CN40-D4 ❶ |
| | Y | 15 (0.59) | Y | N.O. | PNP | 50 | 871P-DW15NP40-N4 | 871P-DW15NP40-D4 |
| | | | | | NPN | | 871P-DW15NN40-N4 | 871P-DW15NN40-D4 |
| | | | | N.C. | PNP | | 871P-DW15CP40-N4 | 871P-DW15CP40-D4 |
| | | | | | NPN | | 871P-DW15CN40-N4 | 871P-DW15CN40-D4 |
| | | 20 (0.59) | | N.O. | PNP | | — | 871P-DW20NP40-D4 |
| | | 25 (0.79) | N | N.O. | PNP | | 871P-DW25NP40-N4 | 871P-DW25NP40-D4 |
| | | | | | NPN | | 871P-DW25NN40-N4 | 871P-DW25NN40-D4 |
| | | | | N.C. | PNP | | 871P-DW25CP40-N4 | 871P-DW25CP40-D4 |
| | | | | | NPN | | 871P-DW25CN40-N4 | 871P-DW25CN40-D4 |
| | Y w/ToughCoat Finish❷ | 15 (0.59) | Y | N.O. | PNP | 50 | — | 871P-DV15NP40-D4 |
| | | 20 (0.59) | | | PNP | | — | 871P-DV20NP40-D4 |
| | | 25 (0.79) | N | | PNP | | — | 871P-DV25NP40-D4 |
| Recommended Standard QD Cordset (-6F = 1.8m (6ft), -2 = 2m (6.5ft)) | | | | | | | 889N-F4AFC-6F | 889D-F4AC-2 |

❶ Assured operating distance for general purpose unshielded models is 0…33 mm.

❷ 871P VersaCube is now being offered with ToughCoat Finish on the sensor face. This is a proprietary epoxy-based material which resists the adhesion and accumulation of weld-slag particles thereby improving and extending sensor performance.

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Kit ❸ | 2-216 |
| Limit Switch Style Mounting Brackets | 2-217 |
| PTFE Covers | 2-218 |

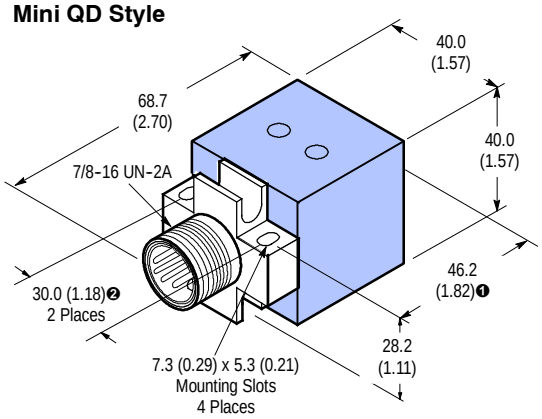
❸ Each mounting kit includes a ground lug, a ground screw, and an optional adaptor for competitive retrofits.

# 871P VersaCube™ 3-Wire DC

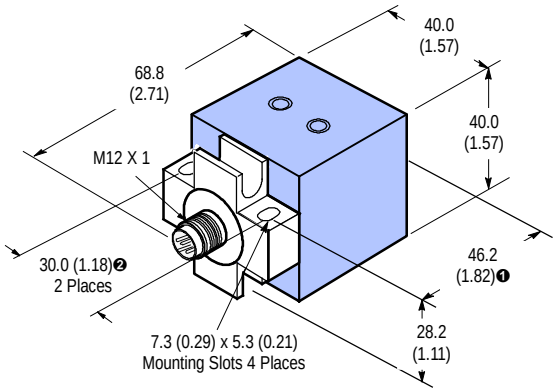
## General Purpose, Weld Field Immune & ToughCoat Finish™

## Approximate Dimensions [mm (in.)]

### Mini QD Style




### Micro QD Style



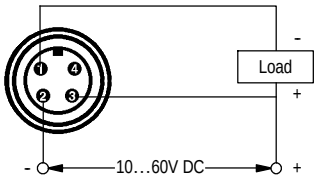

❶ With retrofit adaptor, distance from face to mounting holes becomes 60.0 (2.36).
❷ With retrofit adaptor, spacing between mounting holes becomes 20.0 (0.79).

## Wiring Diagrams

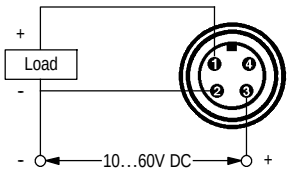
### Mini QD Style

#### Normally Open or Normally Closed

**NPN (Sinking)**



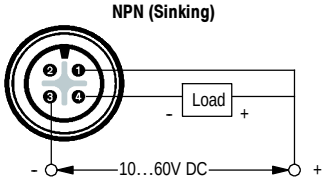

**PNP (Sourcing)**



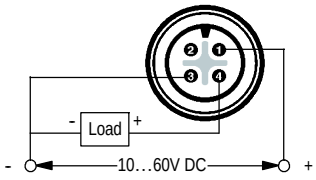

### Micro QD Style

#### Normally Open or Normally Closed

**NPN (Sinking)**




**PNP (Sourcing)**




| ATTENTION | |
|---|---|
| | Unit must be mounted to a grounded metal frame or grounded via field wiring lug per NEC requirements. Recommended grounding lug is available in Allen-Bradley mounting kit 871A-PKIT. |

Obsolete

# 871P VersaCube™ 2-Wire AC/DC

*871P AC/DC General Purpose*
*Micro Quick-Disconnect Style*

## Features

- New rugged housing
- Burn and weld-slag resistant body on weld field immune models
- Convenient mounting base
- 2-wire operation
- 3-pin connection
- 20…250V AC/DC
- Normally open or normally closed output
- Weld-field immune models
- Short circuit, overload, false pulse, and transient noise protection
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Specifications

| | General Purpose | Weld Field Immune |
|---|---|---|
| Load Current | 2…100 mA | 2…300 mA |
| Inrush Current (1 cycle) | ≤ 2 A | ≤ 2 A |
| Leakage Current | ≤1.5 mA @ 20V<br>≤1.7 mA @ 120V<br>≤2.0 mA @ 250V | ≤1.5 mA@20V<br>≤1.7 mA@120V<br>≤2.0 mA@250V |
| Operating Voltage | 20…250V AC/DC | 20–250V AC/DC |
| Voltage Drop | <10V | <10V |
| Repeatability | ≤10% of effective operating distance | ≤10% of effective operating distance |
| Hysteresis | 12% typical | 12% typical |
| False Pulse Protection | Incorporated | Incorporated |
| Transient Noise Protection | Incorporated | Incorporated |
| Short Circuit Protection | Incorporated | Incorporated |
| Overload Protection | Incorporated | Incorporated |
| Weld-Field Immunity | N/A | 1000 Gauss ❶ |
| Certifications | UL Listed, cUL Certified and CE Marked for all applicable directives | |
| Enclosure | NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC529), 1200 psi (8270 kPa) washdown; Plastic body, zinc base; micro connector versions also meet IP69K (IEC 529) | |
| Connections | Quick-Disconnect: 3-pin mini style<br>3-pin micro style | |
| LED | Red: Output Energized<br>Green: Power (short circuit if flashing) | |
| Operating Temperature | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

❶ Measured with field perpendicular to sensing face.

## Product Selection

| Head Size | Weld Field Immune | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Mini QD Style | Micro QD Style |
| 40 mm | N | 20 (0.79) | Y | N.O. | 30 | 871P-B20N40-N3 | **871P-B20N40-R3** |
| | | | | N.C. | | 871P-B20C40-N3 | 871P-B20C40-R3 |
| | | 40 (1.57) | N | N.O. | 20 | 871P-B40N40-N3 ❶ | **871P-B40N40-R3** ❶ |
| | | | | N.C. | | 871P-B40C40-N3 ❶ | 871P-B40C40-R3 ❶ |
| | Y | 15 (0.59) | Y | N.O. | 30 | 871P-BW15N40-N3 | 871P-BW15N40-R3 |
| | | | | N.C. | | 871P-BW15C40-N3 | 871P-BW15C40-R3 |
| | | 25 (0.98) | N | N.O. | 20 | 871P-BW25N40-N3 | 871P-BW25N40-R3 |
| | | | | N.C. | | 871P-BW25C40-N3 | 871P-BW25C40-R3 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 |

❶ Assured operating distance for general purpose unshielded models is 0…33 mm (0…1.3 in.).

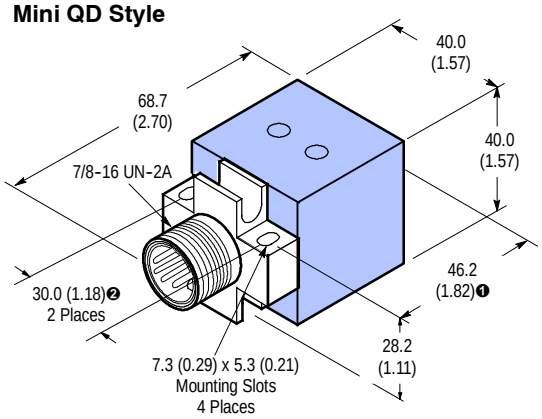
## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Mounting Kit ❷ | 2-216 |
| Limit Switch Style Mounting Brackets | 2-217 |
| PTFE Covers | 2-218 |

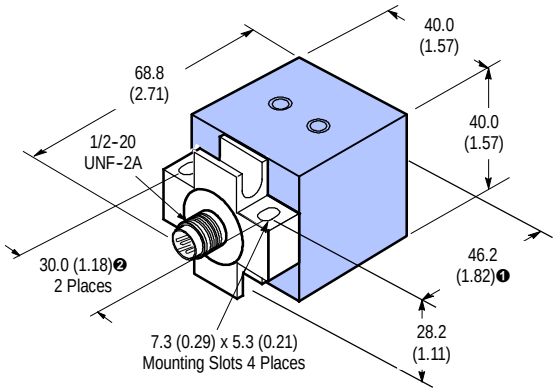
❷ Each mounting kit includes a ground lug, a ground screw, and an optional adaptor for competitive retrofits.

## Approximate Dimensions [mm (in.)]

### Mini QD Style




### Micro QD Style

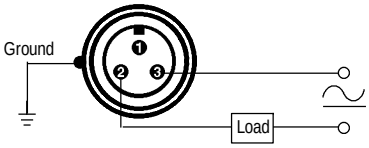



❶ With retrofit adaptor, distance from face to mounting holes becomes 60.0 (2.36).
❷ With retrofit adaptor, spacing between mounting holes becomes 20.0 (0.79).

## Wiring Diagrams

### Mini QD Style

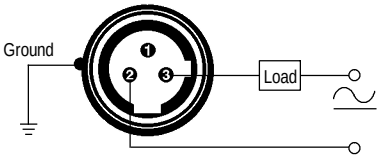
**Normally Open or Normally Closed**




Note: Load can be switched to pin 3.

### Micro QD Style

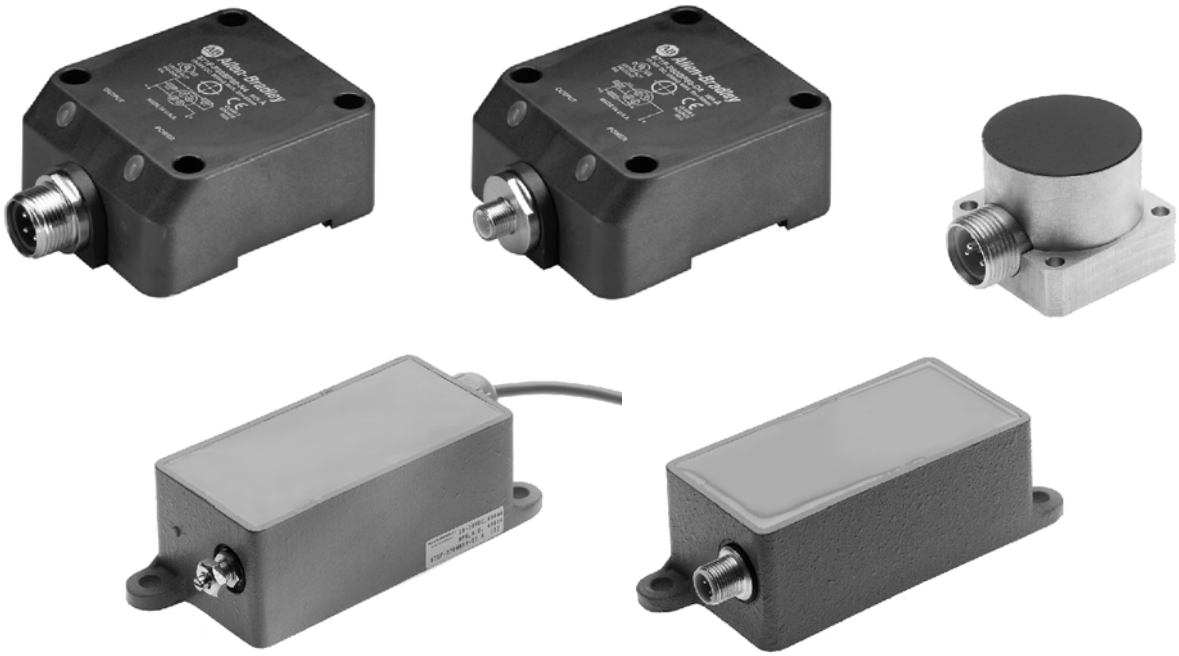
**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 2.

**ATTENTION**

Unit must be mounted to a grounded metal frame or grounded via field wiring lug per NEC requirements. Recommended grounding lug is available in Allen-Bradley mounting kit **871A-PKIT**. This kit is included with all weld field immune models.



## Description

Bulletin 871F inductive flat pack and block style proximity sensors are self-contained, solid state devices. These devices are designed for most applications where it is required to sense the presence of ferrous and nonferrous metal objects without touching them.

The body material is either plastic (flat pack) or aluminum (block) and meets NEMA 1, 2, 3, 4, 6, 6P, 12 and 13, IP67 (IEC529), 1200 psi (8270 kPa) washdown enclosure standards (871F only). The electronic circuitry is potted for protection against shock, vibration, and contamination.

Connection options include a micro and mini quick-disconnect, ToughLink™ and PVC cable models, and both 1/2-14 NPT and PG13.5 conduit opening with screw terminals.

## Features

- Cable, conduit, or quick-disconnect styles
- Short circuit protection
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection (DC models)
- CE Marked for all applicable directives

## Styles

DC 4-Wire Complementary Output Flat Pack . . . . . page 2-138
DC Weld Field Immune . . . page 2-141
AC/DC 2-Wire Flat Pack . . page 2-143
AC/DC 2-Wire Flat Pack Weld Field Immune . . . . . page 2-146
AC/DC 2-Wire Weld Field Immune . . . . . page 2-148
DC 3-Wire Block . . . . . page 2-150

## Accessories

Cordsets . . . . . page 8-1

## General Information

Metric/English Conversion Chart . . . . . page 14-6

# 871F 4-Wire DC Complementary Output

## Flat Pack Style

*871F DC Mini*
*Quick-Disconnect Style*

*871F DC Micro*
*Quick-Disconnect Style*

## Features

- 4-wire operation
- 4-pin or 4-terminal connection
- 10…30V DC
- Complementary normally open and normally closed outputs
- False pulse, transient noise, reverse polarity, short circuit, and overload protection
- cULus Listed and CE Marked for all applicable directives
- DIN Rail mounting option on quick-disconnect and cable models

## Specifications

| | |
|---|---|
| Load Current, Max. | 200 mA |
| Load Current, Min. | 1 mA |
| Leakage Current | ≤10 µA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.5V |
| Repeatability | ≤2% |
| Hysteresis | ≤5% typical |
| Protection Type | False pulse, transient noise, reverse polarity, short circuit, overload |
| Certifications | cULus Listed and CE Marked for all applicable all directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6, 6P, 12 and 13; IP67 (IEC529), 1200 psi (8270 kPa) washdown; micro connector versions also meet IP69K (IEC529) |
| Connection Type | Quick-Disconnect: 4-pin mini, 4-pin micro;<br>Conduit Opening: 1/2 - 14NPT thread, PG 13.5 thread |
| LED | Green: Power, Orange: Output Energized |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |



New

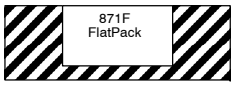
# 871F 4-Wire DC Complementary Output

## Flat Pack Style

## Product Selection

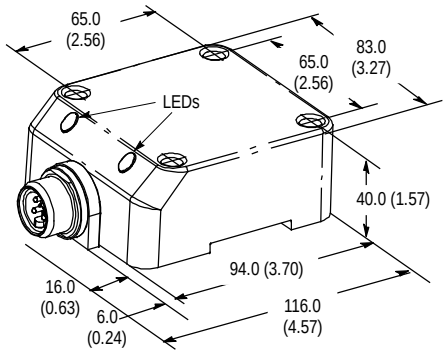
| Head Size [mm (in.)] | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Mini QD Style | Micro QD Style | Conduit 1/2 NPT | Conduit PG13.5 |
| 83 (3.27) | 50 (1.97) ★ | Yes | N.O. and N.C. | PNP | 100 | 871F-P50BP80-N4 | 871F-P50BP80-D4 | 871F-P50BP80-T4 | 871F-P50BP80-Q4 |
| | | | | NPN | | 871F-P50BN80-N4 | 871F-P50BN80-D4 | 871F-P50BN80-T4 | 871F-P50BN80-Q4 |
| | 65 (2.56) | No | | PNP | | 871F-N65BP80-N4 | 871F-N65BP80-D4 | 871F-N65BP80-T4 | 871F-N65BP80-Q4 |
| | | | | NPN | | 871F-N65BN80-N4 | 871F-N65BN80-D4 | 871F-N65BN80-T4 | 871F-N65BN80-Q4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F4AFC-6F | 889D-F4AC-2 | — | — |

★ Must be fully embedded in mild steel to achieve maximum sensing distance.



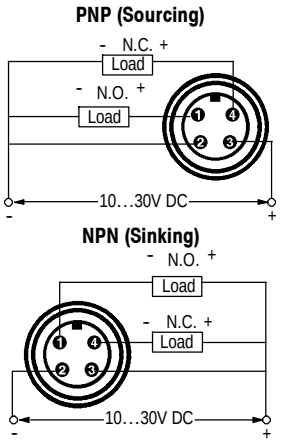

## Approximate Dimensions [mm (in.)]

### Mini QD Style




## Wiring Diagram

### Complementary Normally Open and Normally Closed Outputs

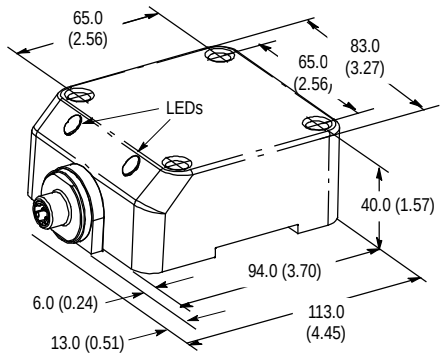


# 871F 4-Wire DC Complementary Output

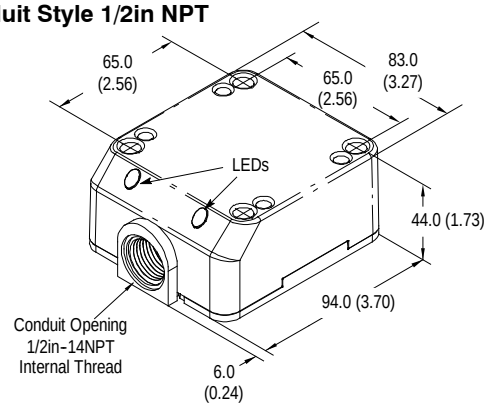
## Flat Pack Style

## Approximate Dimensions [mm (in.)]

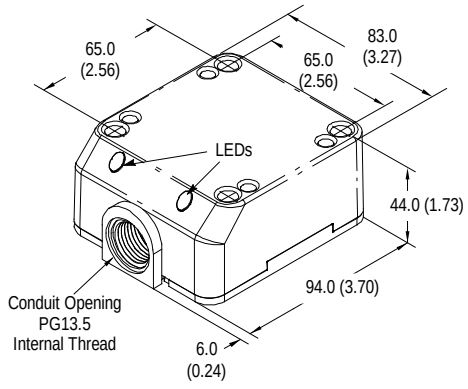
### Micro QD Style




### Conduit Style 1/2in NPT

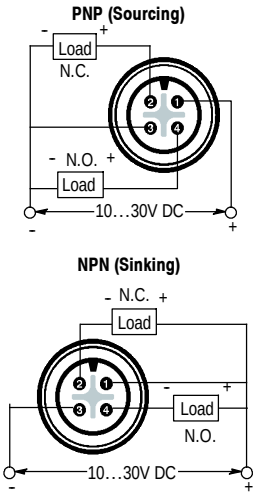



### Conduit Style PG13.5

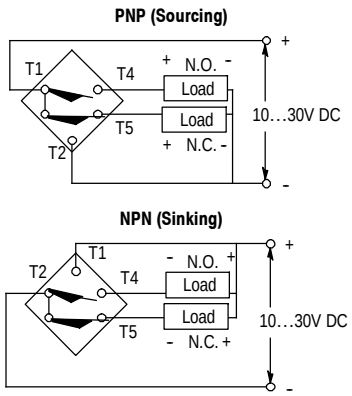



## Wiring Diagram

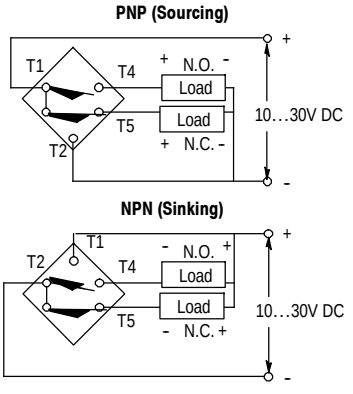
### Complementary Normally Open and Normally Closed




### Complementary Normally Open and Normally Closed Outputs




### Complementary Normally Open and Normally Closed Outputs




## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |

# 871F DC Weld Field Immune

## Flat Pack Style

*871F DC Mini*
*Quick-Disconnect Style*

*871F DC Micro*
*Quick-Disconnect Style*

## Features

- 4-wire operation
- 4-pin, 4-conductor or 4-terminal connection
- 10…30V DC
- Complementary normally open and normally closed outputs
- False pulse, transient noise, reverse polarity, short circuit and overload protection
- UL Listed, cUL Certified and CE Marked for all applicable directives
- DIN rail mounting option on quick-disconnect
- Weld field immune

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Minimum Load Current | 1 mA |
| Leakage Current | ≤10 μA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.5V |
| Repeatability | ≤5% |
| Hysteresis | ≤5% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Weld Field Immunity | 1600 Gauss |
| Certifications | UL Listed, cUL Certified and CE Marked for all applicable all directives |
| Enclosure | NEMA 1, 2, 3, 4, 6, 6P, 12 and 13, IP67 (IEC529),<br>1200 psi (8270 kPa) washdown; Housing material: Valox®; micro connector versions also meet IP69K (IEC529) |
| Connections | Quick Disconnect: 4-pin mini style<br>4-pin micro style |
| LEDs | Green: Power<br>Orange: Output Energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 5 g |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

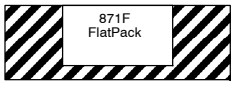
# 871F DC Weld Field Immune

## Flat Pack Style

## Product Selection

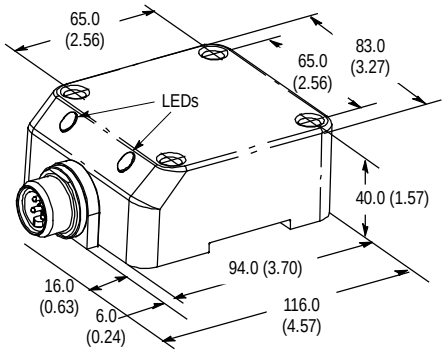
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Mini QD Style | Micro QD Style |
| 83 (3.27) | 40 (1.57) ★ | Y | N.O. and N.C. | PNP | 15 | 871F-PW40BP80-N4 | 871F-PW40BP80-D4 |
| | | | | NPN | | 871F-PW40BN80-N4 | 871F-PW40BN80-D4 |
| | 50 (1.97) | N | | PNP | | 871F-NW50BP80-N4 | 871F-NW50BP80-D4 |
| | | | | NPN | | 871F-NW50BN80-N4 | 871F-NW50BN80-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F4AFC-6F | 889D-F4WE-2 |

★ Must be fully embedded in mild steel to achieve maximum sensing distance.

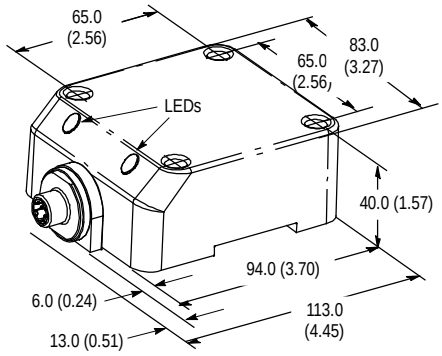



## Approximate Dimensions [mm (in.)]

### Mini QD Style



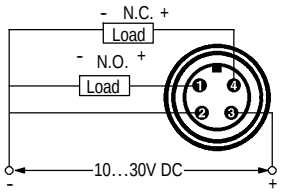

### Micro QD Style



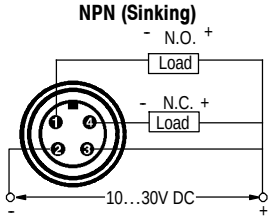

## Wiring Diagram

### Complementary Normally Open and Normally Closed Outputs

**PNP (Sourcing)**

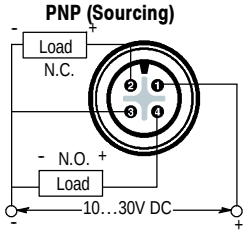



**NPN (Sinking)**

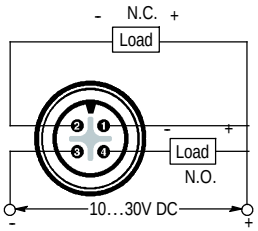



### Complementary Normally Open and Normally Closed

**PNP (Sourcing)**




**NPN (Sinking)**



*871F AC/DC Cable Style*

*871F AC/DC Mini Quick-Disconnect Style*

*871F AC/DC Micro Quick-Disconnect Style*

## Specifications

| | |
|---|---|
| Load Current, Max. | 100 mA |
| Load Current, Min. | 5 mA |
| Leakage Current | ≤1.7 mA @ 120V; ≤2.0 mA @ 250V |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | ≤10V |
| Repeatability | ≤5% |
| Hysteresis | ≤10% typical |
| Protection Type | False pulse, transient noise, short circuit, overload |
| Certifications | cULus Listed and CE Marked for all applicable all directives |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 6, 6P, 12 and 13, IP67 (IEC529), 1200 psi (8270 kPa) washdown; micro connector versions also meet IP69K (IEC529) |
| Connection Type | Cable: 2 m (6.5 ft), 2-conductor #22 AWG ToughLink;<br>Quick-Disconnect: 3-pin mini style, 3-pin micro style;<br>Conduit Opening: 1/2 - 14NPT thread, PG 13.5 thread |
| LED | Green: Power, Orange: Output Energized |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## Features

- 2-wire operation
- 2 conductor, 2 terminal, or 3-pin connection
- 20…250V AC/DC
- False pulse, transient noise, short circuit, and overload protection
- cULus Listed and CE Marked for all applicable directives
- DIN Rail mounting option on quick-disconnect and cable models

# 871F 2-Wire AC/DC

## Flat Pack Style

## Selection Guide

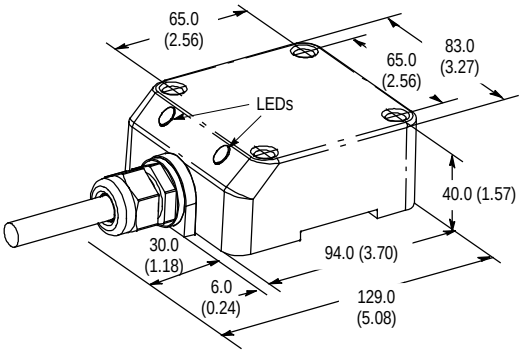
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | ToughLink™ Cable | Mini QD Style | Micro QD Style | Conduit 1/2 NPT | Conduit PG13.5 |
| 83 (3.27) | 50 (1.97) ❶ | Y | N.O. | 10 | 871F-R50N80-C2 | 871F-R50N80-N3 | 871F-R50N80-R3 | 871F-R50N80-T2 | 871F-R50N80-Q2 |
| | 65 (2.56) | N | | | 871F-K65N80-C2 | 871F-K65N80-N3 | 871F-K65N80-R3 | 871F-K65N80-T2 | 871F-K65N80-Q2 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 | — | — |

❶ 50 mm when fully embedded in mild steel as shown

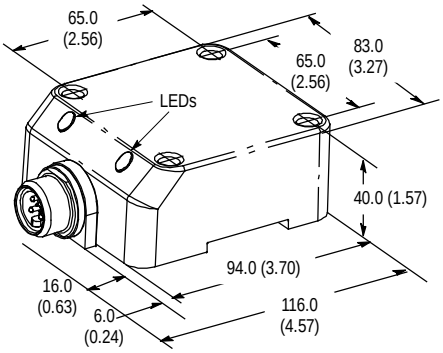
871F FlatPack

## Approximate Dimensions [mm (in.)]

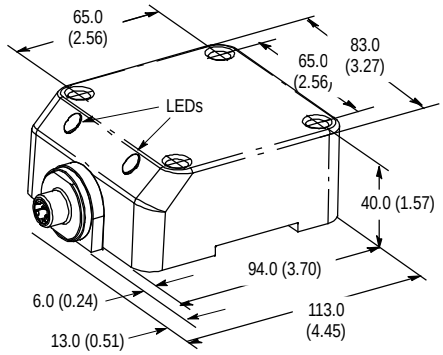
### Cable Style




### Mini QD Style

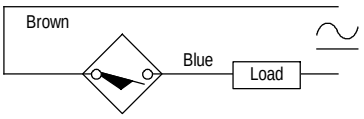



### Micro QD Style



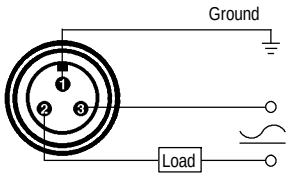

## Wiring Diagram

### Normally Open



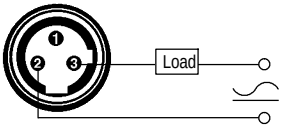

**Note:** Load can be switched to brown wire.

### Normally Open




**Note:** Load can be switched to pin 3.

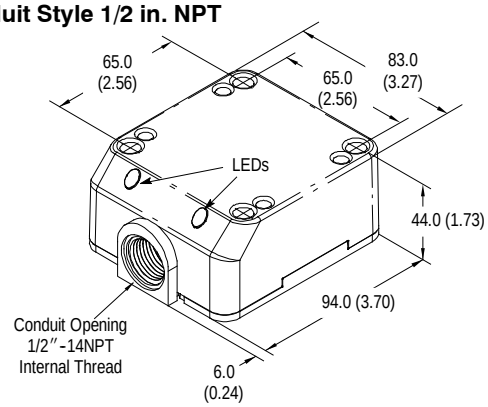
### Normally Open



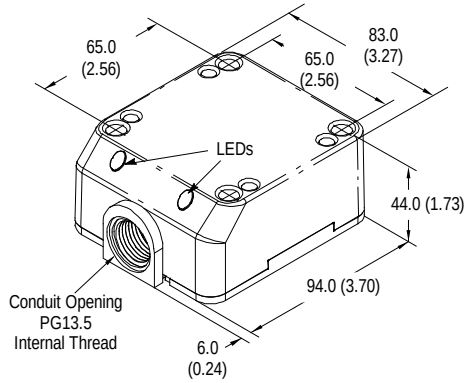

**Note:** Load can be switched to pin 2.

## Approximate Dimensions [mm (in.)]

### Conduit Style 1/2 in. NPT

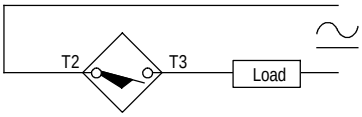



### Conduit Style PG13.5



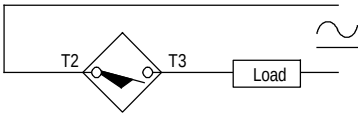

## Wiring Diagram

**Normally Open**




**Note:** Load can be switched to terminal 2.

**Normally Open**




**Note:** Load can be switched to terminal 2.

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |

# 871F 2-Wire AC/DC Weld Field Immune

## Flat Pack Style

*871F AC/DC WFI Micro Quick-Disconnect Style*

## Features

- Weld Field Immune
- 2-wire operation
- 20…250V AC/DC
- False pulse, transient noise, short circuit and overload protection
- UL Listed, cUL Certified and CE Marked for all applicable directives
- DIN rail mountable option on quick-disconnect and cable models

## Specifications

| | |
|---|---|
| Load Current | ≤100 mA |
| Minimum Load Current | 5 mA |
| Leakage Current | ≤1.7 mA @ 120V; ≤2.0 mA @ 250V |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | ≤10V |
| Repeatability | ≤5% |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | UL Listed, cUL Certified and CE Marked for all applicable all directives |
| Enclosure | NEMA 1, 2, 3, 4, 6, 6P, 12 and 13, IP67 (IEC529),<br>1200 psi (8270 kPa) washdown; Housing material: Valox®; micro connector versions also meet IP69K (IEC529) |
| Connections | Quick Disconnect: 3-pin micro style |
| LEDs | Green: Power<br>Red: Output Energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |
| Weld Field Immunity | 1600 Gauss |

**Correction Factors**

| Target Material | Correction Factor | |
|---|---|---|
| | Shielded | Unshielded |
| Steel | 1.0 | 1.0 |
| Stainless Steel | 0.7…0.8 | 0.7…0.8 |
| Brass | 0.5…0.6 | 0.4…0.5 |
| Aluminum | 0.4…0.5 | 0.4…0.5 |
| Copper | 0.4…0.5 | 0.4…0.5 |

## QD Cordsets

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |

# 871F 2-Wire AC/DC Weld Field Immune

## Flat Pack Style

## Product Selection

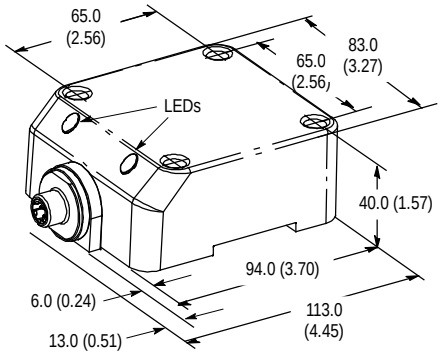
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Micro QD Style |
|---|---|---|---|---|---|
| 83 (3.27) | 40 (1.57) ❶ | Y | N.O. | 10 | 871F-JW40N80-R3 |
| | 50 (1.97) | N | N.O. | 10 | 871F-KW50N80-R3 |
| Recommended Standard QD Cordset (-2 = 2 m (6.5 ft)) | | | | | 889R-F3WEA-2 |

❶ 40 mm when fully embedded in mild steel as shown

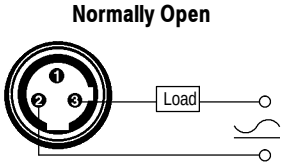
871F FlatPack

## Approximate Dimensions [mm (in.)]

### Micro QD Style




## Wiring Diagram




**Note:** Load can be switched to pin 2.

# 871F 2-Wire AC/DC Weld Field Immune

*871F AC/DC Mini and Micro Quick-Disconnect Style*

## Description

Bulletin 871F inductive proximity sensors are self-contained, solid-state devices designed to sense the presence of ferrous and nonferrous metal objects without touching them. These special weld-field immune models are ideal for welding environments and other applications where large magnetic fields are present. They are rated for reliable operation at a 1in distance from a current in line carrying 20,000A.❶

Each sensor is housed by an aluminum body which meets NEMA 4, 13, and IP67 (IEC529) enclosure standards. It is equipped with a green LED to indicate power and an orange LED which lights when the output is energized.

## Features

- 2-wire operation
- 3-pin connection
- 20…250V AC/DC
- Normally open output
- Weld field immune
- Short circuit, false pulse and transient noise protection
- CE Marked for all applicable directives

❶ This distance varies with current line amperage. See page 2–9 of the Introduction section to determine the minimum distance for your application.

## Specifications

| | |
|---|---|
| Load Current | ≤400 mA |
| Minimum Load Current | 3 mA |
| Inrush Current (1 cycle) | ≤8 A |
| Leakage Current | ≤1.5 mA |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | ≤5V |
| Repeatability | ≤10% |
| Hysteresis | ≤15% typical |
| Short Circuit Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Weld Field Immunity | 20,000A at 1 inch |
| Certifications | CE Marked for all applicable directives |
| Enclosure | NEMA 4 and 13, IP67 (IEC529)<br>Aluminum body, PTFE sensing area |
| Connections | Quick-Disconnect: 3-pin mini style<br>3-pin micro style |
| LEDs | Green: Power<br>Orange: Output Energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

# 871F 2-Wire AC/DC Weld Field Immune

## Product Selection

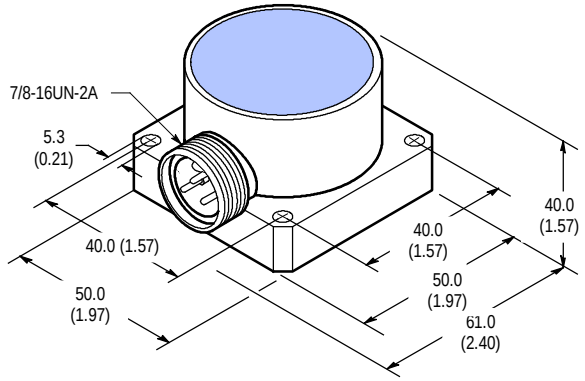
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Mini QD Style | Micro QD Style |
| 50 | 20 (0.79) | Y | N.O. | 15 | 871F-BW20N50-N3 | 871F-BW20N50-R3 |
| Recommended Standard QD Cordset (-2 = 2 m (6.5 ft), -6F = 1.8 m (6 ft)) | | | | | 889N-F3AFC-6F | 889R-F3WEA-2 |

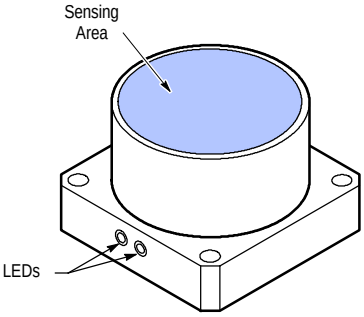
## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |

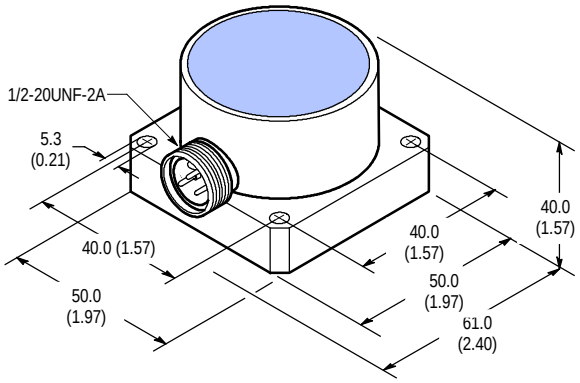
## Approximate Dimensions [mm (in.)]

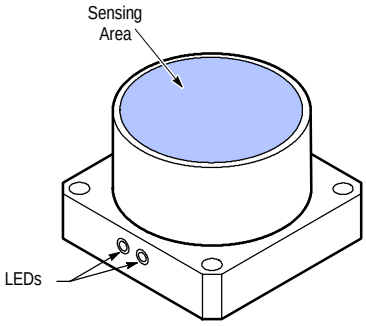
### Mini QD Style



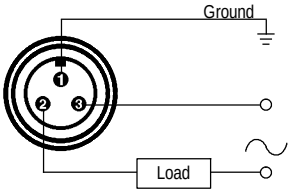

### Micro QD Style



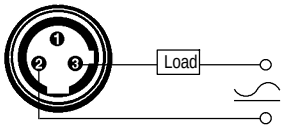

## Wiring Diagram

**Normally Open**




**Note:** Load can be switched to pin 3.

**Normally Open**




**Note:** Load can be switched to pin 2.

# 871F 3-Wire DC

## Block Style

*871F DC Cable Style*

*871F DC Micro*
*Quick-Disconnect Style*

## Features

- 3-wire operation
- 3-conductor or 4-pin connection
- 10…30V DC
- Normally open output
- False pulse, transient noise, reverse polarity, short circuit and overload protection
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤400 mA |
| Minimum Load Current | 1 mA |
| Leakage Current | ≤10 μA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.4V |
| Repeatability | ≤10% |
| Hysteresis | ≤15% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 12, 13, IP67 (IEC529)<br>Aluminum Body |
| Connections | Cable: 2 m (6.5 ft) length<br>3-conductor PVC<br>Quick-Disconnect: 4-pin micro style |
| LED | Orange: Output Energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

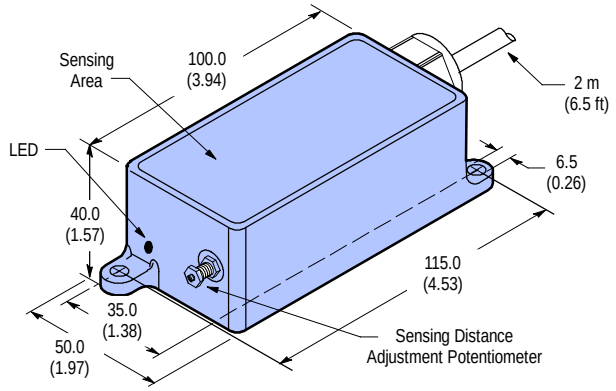
## Product Selection

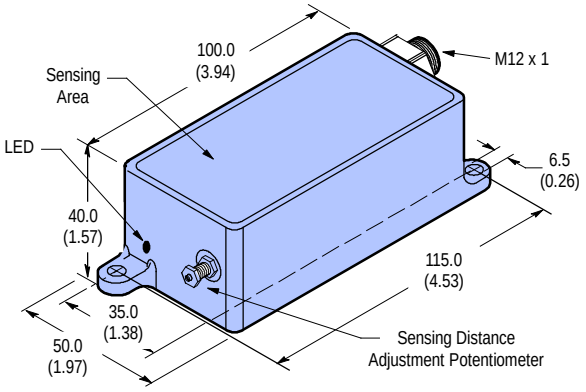
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style |
| 50 | 70 (2.76) | N | N.O. | NPN | 300 | 871F-D70NN50-E2 | 871F-D70NN50-D4 |
| | | | | PNP | | 871F-D70NP50-E2 | 871F-D70NP50-D4 |
| Recommended Standard QD Cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4AC-2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (in.)]



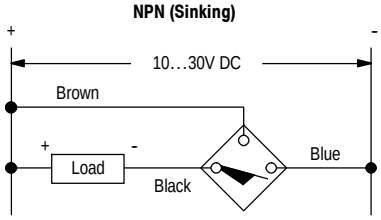




## Wiring Diagrams

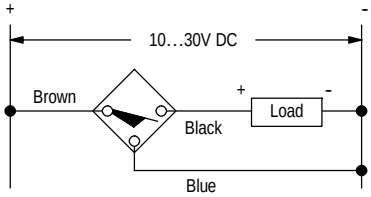
### Cable Style

**Normally Open**

**NPN (Sinking)**



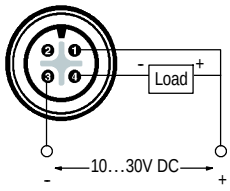

**PNP (Sourcing)**



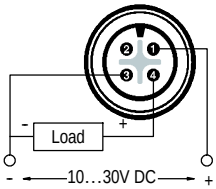

### Micro QD Style

**Normally Open**

**NPN (Sinking)**




**PNP (Sourcing)**



# Notes

## Description

Bulletin 871L and 872L inductive proximity sensors are self-contained, general purpose, solid state devices designed to sense the presence of metal objects (ferrous and nonferrous) without touching them.

These devices provide mounting interchangeability, easily-wired terminations and rugged construction. The adjustable head can be positioned for top or side sensing. In side-sensing applications, the head can be rotated in 22.5° increments and locked in any of 16 positions.

These sensors are available with a 1/2–14NPT conduit opening, mini quick-disconnect, or micro quick-disconnect.

## Features

- 17 sensing head positions (1 top, 16 sides)
- Conduit or quick-disconnect styles
- Short circuit protection (DC only)
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection
- Selectable normally open or normally closed output
- CE Marked for all applicable directives

## Styles

DC 3-Wire . . . . . page 2–154
AC 2-Wire . . . . . page 2–156
AC/DC 2-Wire . . . . . page 2–156

## Accessories

Cordsets . . . . . page 8–1

## General Information

Metric/English
Conversion Chart . . . . . page 14–6

# 871L & 872L 3-Wire DC

## Limit Switch Style

*871L & 872L DC*
*Mini Quick-Disconnect Style*

*871L & 872L DC*
*Micro Quick-Disconnect Style*

*871L & 872L DC*
*Conduit Style*

## Features

- 3-wire operation
- 3-terminal or 4-pin connection
- 10…60V DC for 871L models
- 10…30V DC for 872L models
- Switch selectable normally open or normally closed output on 871L models
- Normally open or normally closed outputs programmable via jumper on 872L models
- Alignment LED on 871L models
- False pulse, transient noise, reverse polarity, short circuit and overload protection
- cULus and CE Marked for all applicable directives

## Specifications

| | 871L Models | 872L Models |
|---|---|---|
| Load Current | ≤400 mA | ≤120 mA |
| Leakage Current | ≤10 μA | ≤10 μA |
| Operating Voltage | 10…60V DC | 10…30V DC |
| Voltage Drop | ≤2.4V | ≤2.5V |
| Repeatability | ≤5% | ≤5% |
| Hysteresis | ≤20% typical | ≤20% typical |
| False Pulse Protection | Incorporated | Incorporated |
| Transient Noise Protection | Incorporated | Incorporated |
| Reverse Polarity Protection | Incorporated | Incorporated |
| Short Circuit Protection | Incorporated | Incorporated |
| Overload Protection | Incorporated | Incorporated |
| Certifications | cULus and CE Marked for all applicable directives | |
| Enclosure | NEMA 3, 4, 6, 12, 13, IP67 (IEC 529)<br>Polyloy | |
| Connections | Quick-Disconnect: 4-pin mini style<br>4-pin micro style<br>Conduit Opening: 1/2-14 NPT internal thread with screw terminals | |
| LEDs | Green: Power (Blinks in SCP/Overload)<br>Orange: Output Energized<br>Red: Alignment Indicator | Green: Power (Blinks in SCP/Overload)<br>Orange: Output Energized |
| Operating Temperature [C (F)] | -25…70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## Product Selection

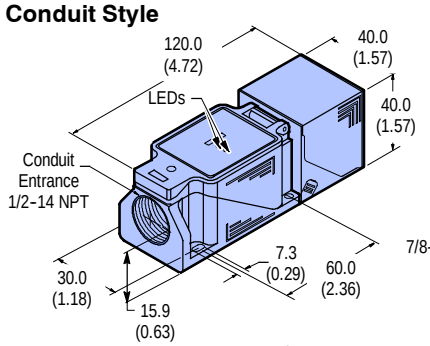
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Conduit Style | Mini QD Style | Micro QD Style |
| 40 | 20 (0.79) | Y | Selectable N.O. or N.C. | NPN | 150 | 871L-D20EN40-T3 | 871L-D20EN40-N4 | 871L-D20EN40-D4 |
| | | | | PNP | | **871L-D20EP40-T3** | 871L-D20EP40-N4 | 871L-D20EP40-D4 |
| | 40 (1.57) | N | | NPN | 70 | 871L-D40EN40-T3 | 871L-D40EN40-N4 | 871L-D40EN40-D4 |
| | | | | PNP | | 871L-D40EP40-T3 | 871L-D40EP40-N4 | 871L-D40EP40-D4 |
| | 20 (0.79) | Y | Program-mable N.O. or N.C. | NPN | 100 | 872L-D20EN40-T3 | 872L-D20EN40-N4 | 872L-D20EN40-D4 |
| | | | | PNP | | 872L-D20EP40-T3 | 872L-D20EP40-N4 | 872L-D20EP40-D4 |
| | 40 (1.57) | N | | NPN | 50 | 872L-D40EN40-T3 | 872L-D40EN40-N4 | 872L-D40EN40-D4 |
| | | | | PNP | | 872L-D40EP40-T3 | 872L-D40EP40-N4 | 872L-D40EP40-D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | 889N-F4AFC-6F | 889D-F4AC-2 |

## QD Cordsets and Accessories

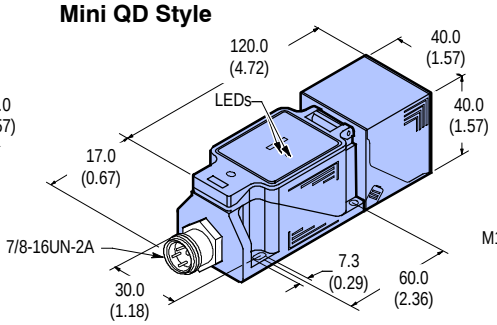
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |

## Approximate Dimensions [mm (in.)]

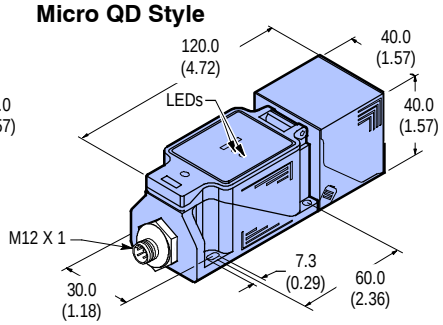
### Conduit Style




### Mini QD Style




### Micro QD Style

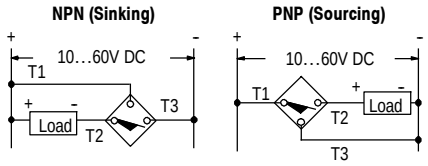



**Note**: Head can be rotated in 22.5° increments to provide 16 side-sensing positions or rotated for top-sensing.

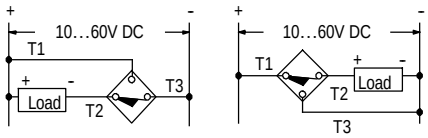
## Wiring Diagram

### Conduit Style

#### Normally Open

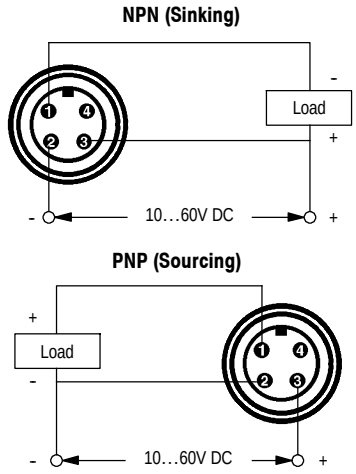



#### Normally Closed



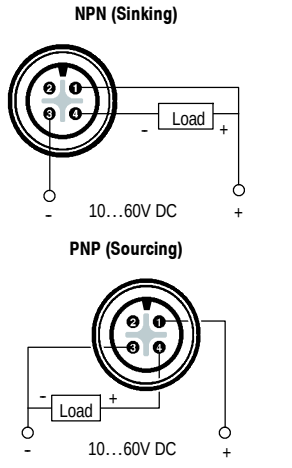

### Mini QD Style

#### Normally Open or Normally Closed




### Micro QD Style

#### Normally Open or Normally Closed



# 871L AC/DC & 872L AC 2-Wire

## Limit Switch Style

*871L AC/DC & 872L AC*
*Mini Quick-Disconnect Style*

*871L AC/DC & 872L AC*
*Micro Quick-Disconnect Style*

*871L AC/DC & 872L AC*
*Conduit Style*

## Features

- 2-wire operation
- 2-terminal or 3-pin connection
- 20…250V AC/DC on 871L models
- 20…250V AC on 872L models
- Switch selectable normally open or normally closed output on 871L models
- Normally open or normally closed output programmable via jumper on 872L models
- False pulse, transient noise, and overload protection
- cULus and CE Marked for all applicable directives

## Specifications

| | 871L Models | 872L Models |
|---|---|---|
| Load Current | ≤400 mA | ≤500 mA |
| Minimum Load Current | 2 mA | 2 mA |
| Inrush Current (1 cycle) | ≤8 A | ≤8 A |
| Leakage Current | ≤2 mA | ≤2 mA |
| Operating Voltage | 20…250V AC/DC | 20-250V AC |
| Voltage Drop | ≤5V | ≤5V |
| Repeatability | ≤5% | ≤5% |
| Hysteresis | ≤20% | ≤20% |
| False Pulse Protection | Incorporated | Incorporated |
| Transient Noise Protection | Incorporated | Incorporated |
| Certifications | cULus and CE Marked for all applicable directives | |
| Enclosure | NEMA 3, 4, 6, 12, 13, IP65 (IEC 529)<br>Polyloy | |
| Connections | Quick Disconnect: 3-pin mini style<br>3-pin micro style<br>Conduit Opening: 1/2-14 NPT internal thread with screw terminals | |
| LEDs | Green: Power (Blinks in SCP/Overload)<br>Orange: Output Energized | |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) | |
| Shock | 30 g, 11 ms | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.7…0.8 |
| Brass | 0.4…0.5 |
| Aluminum | 0.3…0.4 |
| Copper | 0.2…0.3 |

## Product Selection

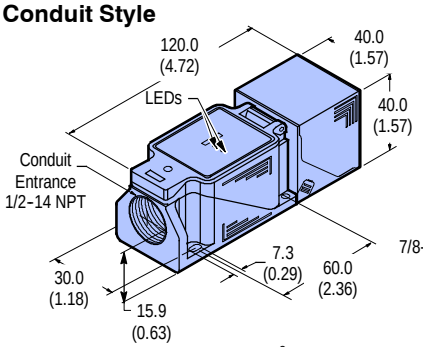
| Head Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|
| | | | | | Conduit Style | Mini QD Style | Micro QD Style |
| 40 | 20 (0.79) | Y | Selectable N.O. or N.C. | 15 | **871L-B20E40-T2** | 871L-B20E40-N3 | 871L-B20E40-R3 |
| | 40 (1.57) | N | | | **871L-B40E40-T2** | 871L-B40E40-N3 | 871L-B40E40-R3 |
| | 20 (0.79) | Y | Programmable N.O. or N.C. | | **872L-A20E40-T2** | 872L-A20E40-N3 | 872L-A20E40-R3 |
| | 40 (1.57) | N | | | 872L-A40E40-T2 | 872L-A40E40-N3 | 872L-A40E40-R3 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 |

## QD Cordsets and Accessories

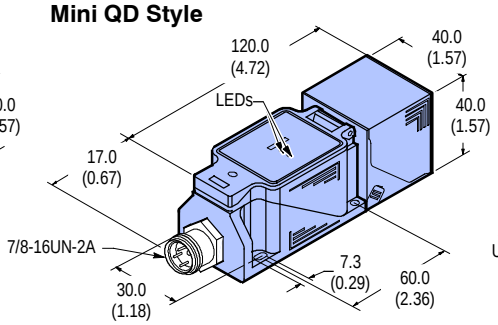
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |

## Approximate Dimensions [mm (in.)]

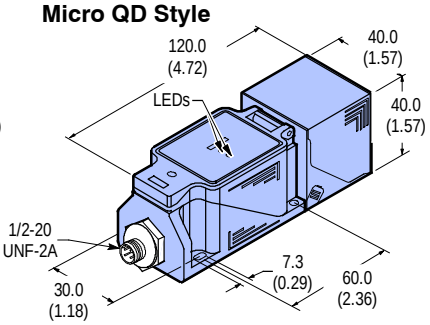
### Conduit Style




### Mini QD Style




### Micro QD Style

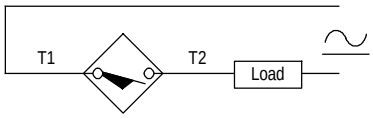



**Note**: Head can be rotated in 22.5° increments to provide 16 side-sensing positions or rotated for top-sensing.

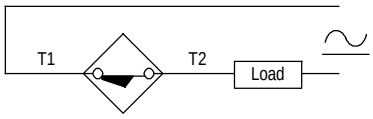
## Wiring Diagram

### Conduit Style

**Normally Open**



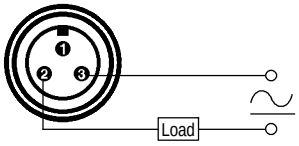

**Normally Closed**




**Note:** Load can be switched to Terminal 1.

### Mini QD Style

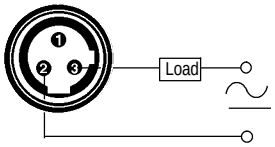
**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 3.

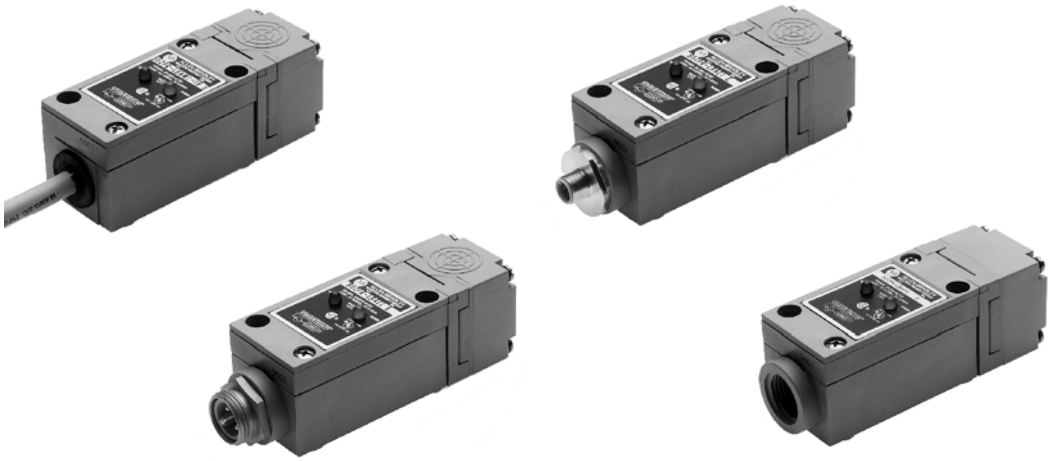
### Micro QD Style

**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 2.

## Notes



## Description

Bulletin 802PR inductive proximity sensors are self-contained, 2-wire devices designed to detect the presence of ferrous and nonferrous metal objects without touching them. Types LA and XA are high-output AC models designed to switch current loads up to 1 A, while types LB and XB are AC/DC solid-state switches made to interface directly with programmable controllers.

| | |
|---|---|
| **ATTENTION** | High-output models should not be used in solid-state switching, TTL, or programmable controller operations. |

Each sensor is housed in a self-extinguishing glass-reinforced polyester body. Special hazardous location models are available which meet Division 2 enclosure standards in Classes I, II, and III (see specifications). Switch constructions include top and side sensing models. The side-sensing head can be rotated in 90° increments to sense in four directions. These devices are available with a threaded conduit opening, conduit coupler, 3-pin mini connector, 3-pin micro connector, or pre-wired cable.

## Features

- Multiple sensing directions
- Cable, conduit, or quick-disconnect styles
- Short circuit protection (AC/DC models)
- Overload protection (AC/DC models)
- Transient noise protection
- False pulse protection
- Hazardous location models are available
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Styles

AC/DC 2-Wire . . . . . page 2-160

AC/DC 2-Wire
Hazardous Location . . . . . page 2-165

AC 2-Wire High-Output . . . page 2-167

AC 2-Wire Hazardous Location
High-Output . . . . . page 2-171

## Accessories

Cordsets . . . . . page 8-1

## General Information

Metric/English
Conversion Chart . . . . . page 14-6

# 802PR 2-Wire AC/DC

## Limit Switch Style

*802PR AC/DC*
*Cable Style*

*802PR AC/DC Mini*
*Quick-Disconnect Style*

*802PR AC/DC Micro*
*Quick-Disconnect Style*

*802PR AC/DC*
*Conduit Style*

## Specifications

| | |
|---|---|
| Load Current | AC 4…25 mA; DC 2…25 mA |
| Leakage Current | ≤1.7 mA at 132V, ≤2.5 mA at 250V |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | ≤10V |
| Repeatability | ≤10% typical |
| Hysteresis | ≤10% typical |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Radio Frequency Protection | 10V per meter; frequency range 20…1000 MHz |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 4X❶, 12, 13, IP65 (IEC529)<br>Self extinguishing glass-reinforced polyester body |
| Connections | Cable: 2.4 m (8 ft) length<br>2-conductor ToughLink™<br>Quick-Disconnect: 3-pin micro style<br>3-pin mini style<br>Conduit Opening or<br>Conduit Coupler: Internal thread with screw terminals<br>(use #18-14 AWG wire) |
| LEDs | Green: Power; Red: Output energized (both on in SCP/Overload) |
| Operating Temperature [C (F)] | -25…+75° (-13…+167°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

❶ Corrosion resistant models

## Features

- 2-wire operation
- 2-conductor or 3-pin connection
- 20…250V AC/DC (for solid state inputs)
- Normally open output
- Short circuit, overload, false pulse, RFI and transient noise protection
- Corrosion resistant models
- 2 LEDs
- UL Listed, CSA Certified and CE Marked for all applicable directives

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.8 |
| Aluminum | 0.75 |
| Copper | 0.7 |

# 802PR 2-Wire AC/DC, Cable Style

## Limit Switch Style

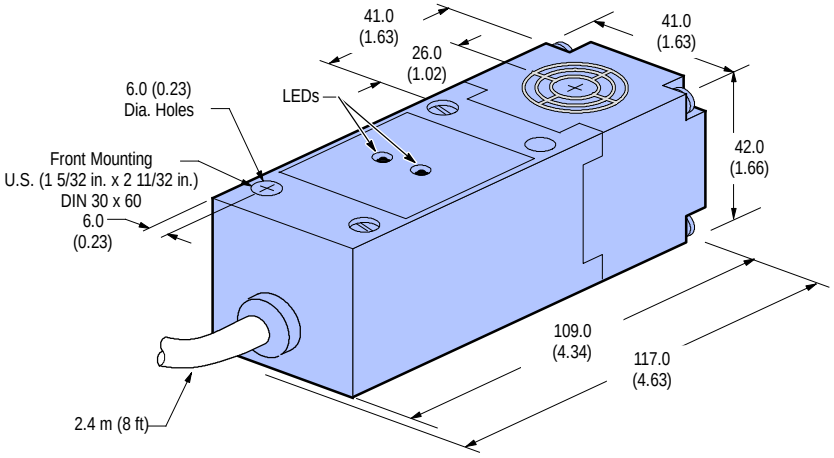
## Product Selection

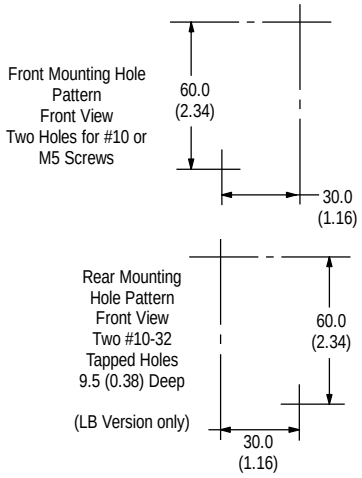
| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cable Length [m (ft)] | Corrosion Resistant | Cat. No. Cable Style |
|---|---|---|---|---|---|---|---|
| Side | 17 (0.67) | Y | N.O. | 20 | 2.5 (8) | Y | 802PR-XBAM1-08 |
| | | | | | | N | 802PR-LBAM1-08 |
| | | | | | 3.6 (12) | Y | 802PR-XBAM1-12 |
| | | | | | | N | 802PR-LBAM1-12 |
| Top | 17 (0.67) | Y | N.O. | 20 | 2.5 (8) | Y | 802PR-XBAR1-08 |
| | | | | | | N | 802PR-LBAR1-08 |
| | | | | | 3.6 (12) | Y | 802PR-XBAR1-12 |
| | | | | | | N | 802PR-LBAR1-12 |

## Accessories

| Description | Page Number |
|---|---|
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (in.)]

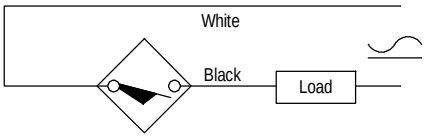



**Note:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.

## Wiring Diagram

**Normally Open**




**Note**: Load can be switched to white lead.

# 802PR 2-Wire AC/DC, Mini Quick-Disconnect Style

## Limit Switch Style

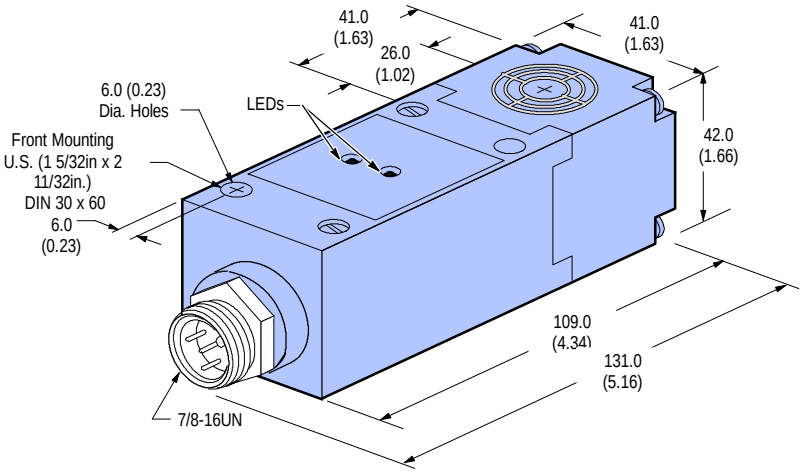
### Product Selection

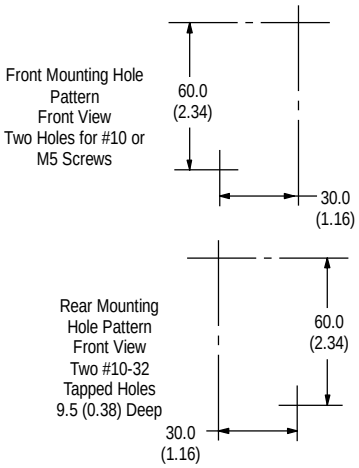
| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Mini QD Style |
|---|---|---|---|---|---|
| Side | 17 (0.67) | Y | N.O. | 20 | 802PR-LBAE1 |
| Top | | | | | 802PR-LBAK1 |
| Recommended Standard QD Cordset Required (-6F = 1.8 m (6 ft)) | | | | | 889N-F3AFC-6F |

### QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

### Approximate Dimensions [mm (in.)]

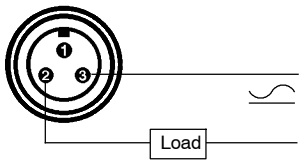



**Note:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.

### Wiring Diagram

**Normally Open**




**Note:** Load can be switched to Pin 3.

# 802PR 2-Wire AC/DC, Micro Quick-Disconnect Style

## Limit Switch Style

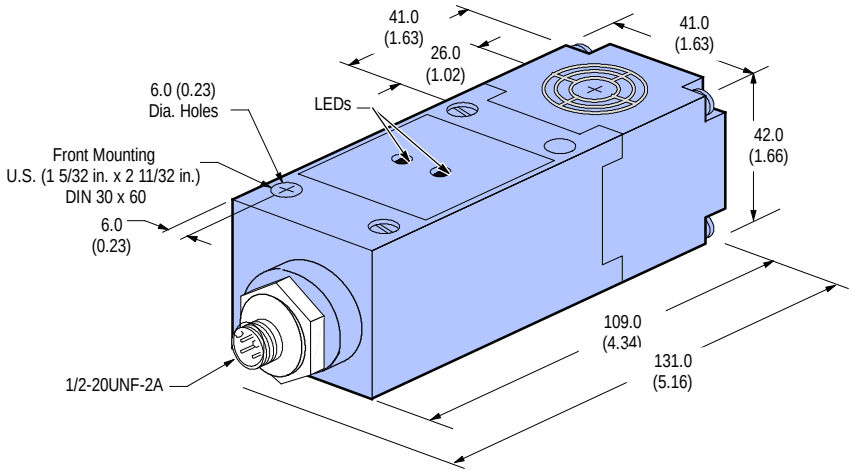
## Product Selection

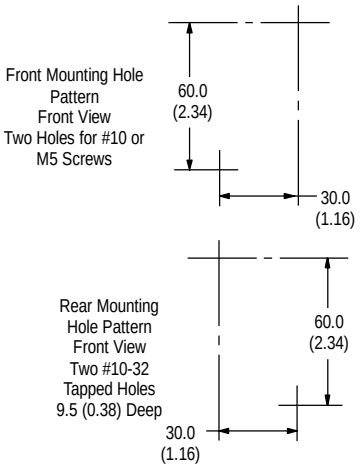
| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Micro QD Style |
|---|---|---|---|---|---|
| Side | 17 (0.67) | Y | N.O. | 20 | 802PR-LBAC1 |
| Top | | | | | 802PR-LBAF1 |
| Recommended Standard QD Cordset Required (-2 = 2 m (6.5 ft)) | | | | | 889R-F3ECA-2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (in.)]

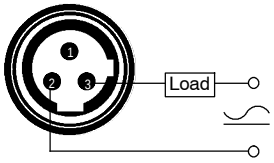



**Note:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.

## Wiring Diagram

**Normally Open**




**Note:** Load can be switched to pin 2.

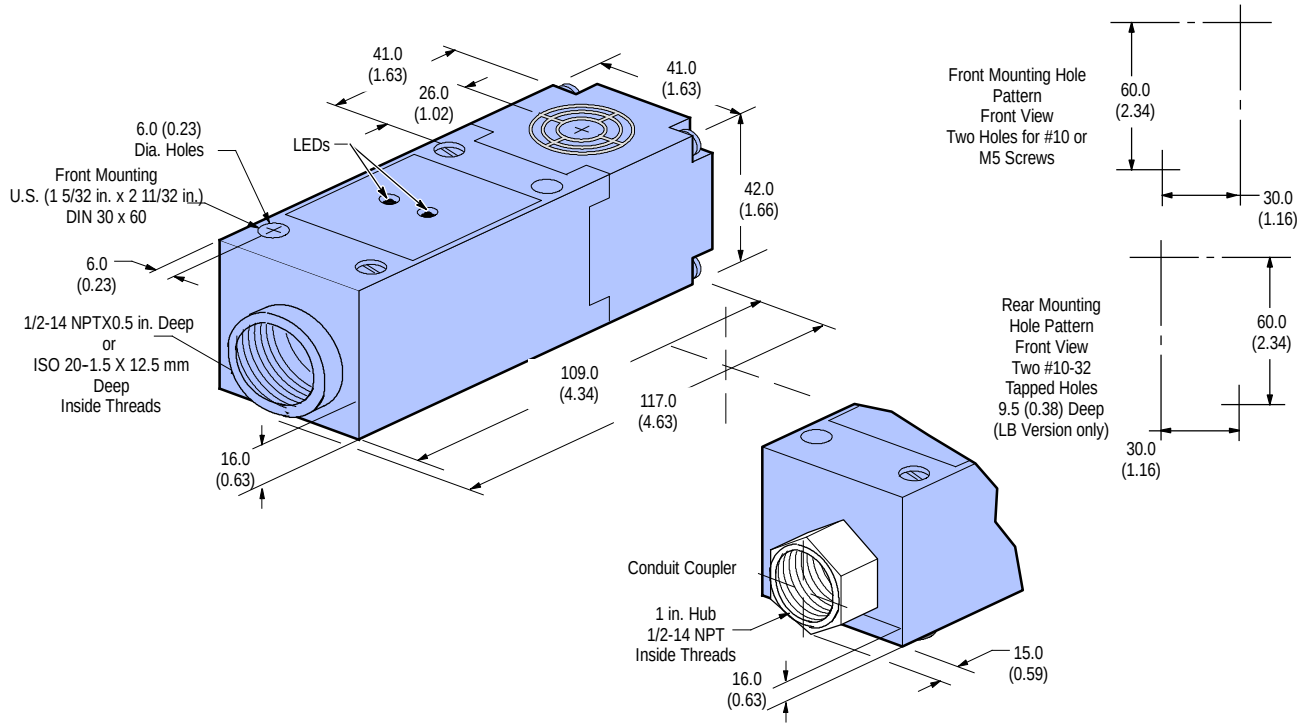
# 802PR 2-Wire AC/DC, Conduit Style

## Limit Switch Style

## Product Selection

| Sensing Direction | Nominal Sensing Distance mm (inches) | Shielded | Output Configuration | Switching Frequency [Hz] | Corrosion Resistant | Connection Type | Cat. No. Conduit Style |
|---|---|---|---|---|---|---|---|
| Side | 17 (0.67) | Y | N.O. | 20 | Y | 1/2 in.-14NPT | 802PR-XBAB1 |
| | | | | | N | | 802PR-LBAB1 |
| | | | | | Y | ISO 20-1.5 | 802PR-XBAB1-S6 |
| | | | | | N | | 802PR-LBAB1-S6 |
| | | | | | N | Conduit Coupler | 802PR-LBAA1 |
| Top | 17 (0.67) | Y | N.O. | 20 | Y | 1/2 in.-14NPT | 802PR-XBAH1 |
| | | | | | N | | **802PR-LBAH1** |
| | | | | | Y | ISO 20-1.5 | 802PR-XBAH1-S6 |
| | | | | | N | | 802PR-LBAH1-S6 |
| | | | | | N | Conduit Coupler | 802PR-LBAJ1 |

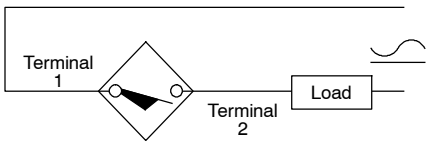
## Approximate Dimensions [mm (in.)]




**Note:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.

## Wiring Diagram

**Normally Open**




**Note:** Load can be switched to Terminal 1.

# 802PR 2-Wire AC/DC Hazardous Location

## Limit Switch Style

*802PR AC/DC*
*Conduit Style*

## Features

- 2-wire operation
- 2-terminal connection
- 20…250V AC/DC (for solid-state inputs)
- Normally open output
- Short circuit, overload, false pulse, RFI, and transient noise protection
- Hazardous location rating
- 2 LEDs
- UL Listed and CSA Certified

## Specifications

| | |
|---|---|
| Load Current | AC: 4…25 mA, DC: 2…25 mA |
| Leakage Current | ≤1.7 mA at 132V, ≤2.5 mA at 250V |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | ≤10V |
| Repeatability | ≤10% typical |
| Hysteresis | ≤10% typical |
| Protection Type | Transient noise, short circuit, overload, false pulse, radio frequency (≤10V per meter; frequency range 20…1000 MHz) |
| Certifications | UL Listed and CSA Certified |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 12, 13; IP65 (IEC529);<br>Division 2<br>Class I: Groups A, B, C & D;<br>Class II: Groups F & G;<br>Class III: All groups<br>Self-extinguishing glass-reinforced polyester body |
| Connection Type | Conduit Coupler: 1/2 - 14 NPT internal thread with screw terminals, use #18…14 AWG wire |
| LED | Green: Power, Red: Output energized (both on in SCP/Overload) |
| Operating Temperature [C (F)] | -25…+75 ° (-13…+167 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9 |
| Brass | 0.8 |
| Aluminum | 0.75 |
| Copper | 0.7 |

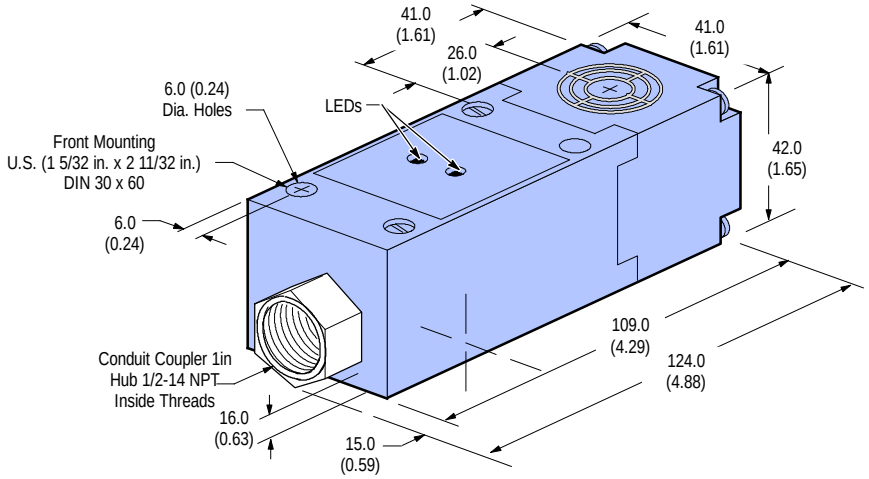
# 802PR 2-Wire AC/DC Hazardous Location, Conduit Style

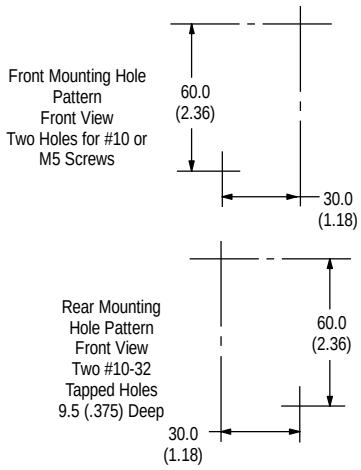
## Limit Switch Style

### Product Selection

| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Conduit Style |
|---|---|---|---|---|---|
| Side | 17 (0.67) | Y | N.O. | 20 | 802PR-LBAA3 |
| Top | | | | | 802PR-LBAJ3 |

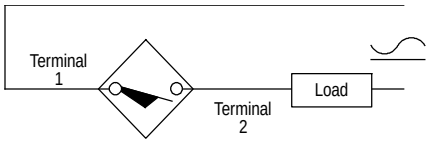
### Approximate Dimensions [mm (in.)]




**Note:** Side-sensing model heads can be turned in 90° increments to accommodate 4 side-sensing positions.

### Wiring Diagram




**Note:** Load can be switched to Terminal 1.

# 802PR 2-Wire AC High Output

## Limit Switch Style

*802PR AC*
*Cable Style*

*802PR AC Mini*
*Quick-Disconnect Style*

*802PR AC*
*Conduit Style*

## Features

- 2-wire operation
- 2-conductor, 3-pin, or 2-terminal connection
- 60…132V AC or 102…132V AC
- Normally open or N.O./N.C. selectable output
- High output (1 A)
- Transient noise and false pulse protection
- UL Listed, CSA Certified and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤1 A at +40°C linearly derated to 0.5 A at 75°C |
| Inrush Current | ≤10 A/1 s |
| Supply Current (minimum) | 25 mA |
| Leakage Current | ≤3.5 mA (60…132V AC); ≤6.5 mA (102…132V AC) |
| Operating Voltage | 60…132V AC or 102…132V AC |
| Voltage Drop | ≤8.5V |
| Repeatability | ≤0.025 mm |
| Hysteresis | 15% (max.) |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 4, 4X❶, 12, 13, IP65 (IEC529)<br>Self-extinguishing glass-reinforced polyester body |
| Connections | Cable: 8 ft or 12 ft length<br>2-conductor 16 AWG STO (oil-resistant thermoplastic)<br>Quick Disconnect: 3-pin mini style<br>Conduit Opening<br>or Conduit Coupler: 1/2-14NPT internal thread with screw terminals<br>(use #18-14 AWG wire) |
| LED | Red: Output Energized |
| Operating Temperature [C (F)] | -25…+75° (-13…+167°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

❶ Corrosion resistant models

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.80…0.85 |
| Brass | 0.50…0.55 |
| Aluminum | 0.45…0.50 |
| Copper | 0.40…0.45 |

# 802PR 2-Wire AC High Output, Cable Style

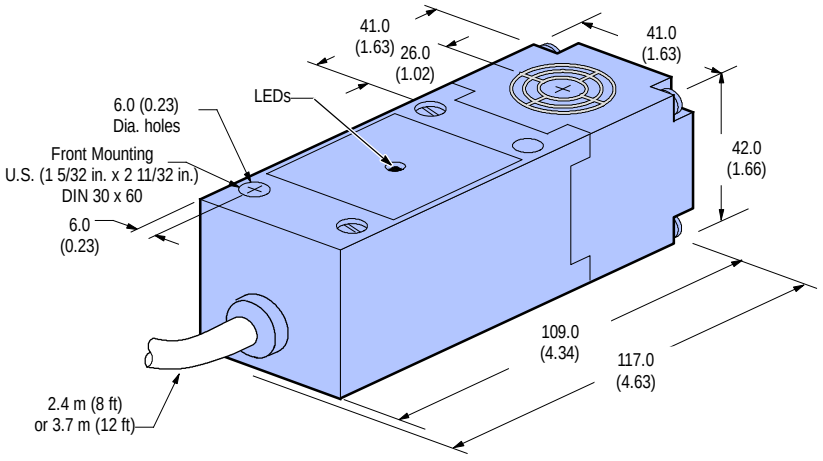
## Limit Switch Style

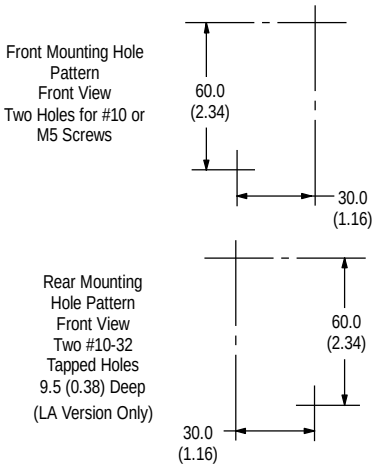
## Product Selection

| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Voltage Range | Output Configuration | Corrosion Resistant | Switching Frequency [Hz] | Cable Length [ft] | Cat. No. Cable Style |
|---|---|---|---|---|---|---|---|---|
| Side | 13 (0.51) | Y | 60…132V AC | Selectable❶ | N | 20 | 8 | 802PR-LABM2-08 |
| | | | | | | | 12 | 802PR-LABM2-12 |
| Top | | | | | | | 8 | 802PR-LABR2-08 |
| | | | | | | | 12 | 802PR-LABR2-12 |
| Side | | | | Selectable❷ | | | 8 | 802PR-LACM2-08 |
| | | | | | | | 12 | 802PR-LACM2-12 |
| Top | | | | | | | 8 | 802PR-LACR2-08 |
| | | | | | | | 12 | 802PR-LACR2-12 |
| Side | | | 102-132V AC | N.O. | | 16 | 8 | 802PR-LAAM1-08 |
| | | | | | | | 12 | 802PR-LAAM1-12 |
| Top | | | | | | | 8 | 802PR-LAAR1-08 |
| | | | | | | | 12 | 802PR-LAAR1-12 |
| Side | | | | | Y | | 8 | 802PR-XAAM1-08 |
| | | | | | | | 12 | 802PR-XAAM1-12 |
| Top | | | | | | | 8 | 802PR-XAAR1-08 |
| | | | | | | | 12 | 802PR-XAAR1-12 |

❶ Preset to N.O. at factory.
❷ Preset to N.C. at factory.

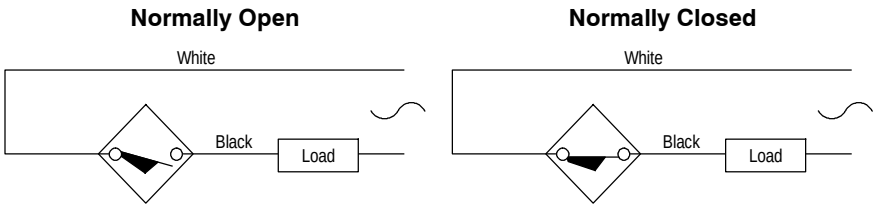
## Approximate Dimensions [mm (in.)]




**Note 1:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.
**Note 2:** Low voltage models have 2 LEDs.

## Wiring Diagrams




**Note:** Load can be switched to white lead.

## Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

# 802PR 2-Wire AC High Output, Mini Quick-Disconnect Style

## Limit Switch Style

## Product Selection

| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Voltage Range | Switching Frequency [Hz] | Cat. No. Mini QD Style |
|---|---|---|---|---|---|---|
| Side | 13 (0.51) | Y | Selectable❶ | 60…132V AC | 20 | 802PR-LABE2 |
| Top | | | | | | 802PR-LABK2 |
| Side | | | Selectable❷ | | | 802PR-LACE2 |
| Top | | | | | | 802PR-LACK2 |
| Side | | | N.O. | 102…132V AC | 16 | 802PR-LAAE1 |
| Top | | | | | | 802PR-LAAK1 |
| Recommended Standard QD Cordset Required (-6F = 1.8 m (6 ft)) | | | | | | 889N-F3AFC-6F |

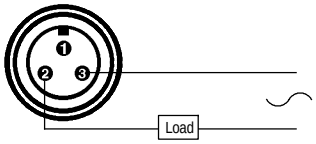
❶ Preset to N.O. at factory.
❷ Preset to N.C. at factory.

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

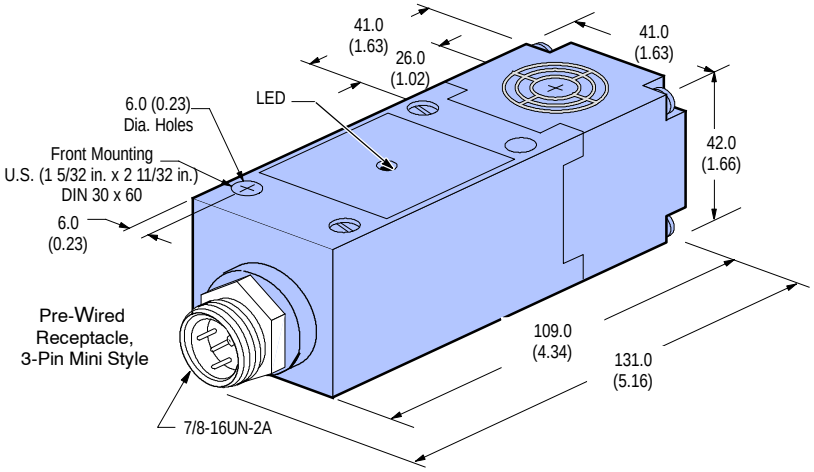
## Wiring Diagram

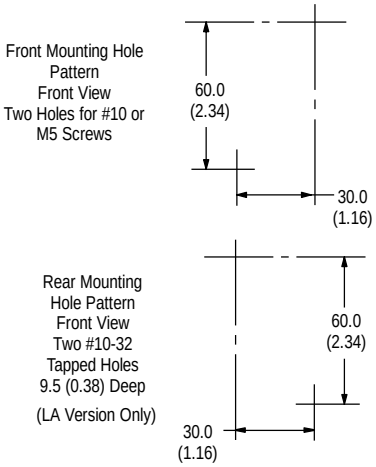
**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 3.

## Approximate Dimensions [mm (in.)]




**Note 1:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.
**Note 2:** Low voltage models have 2 LEDs.

# 802PR 2-Wire AC High Output, Conduit Style

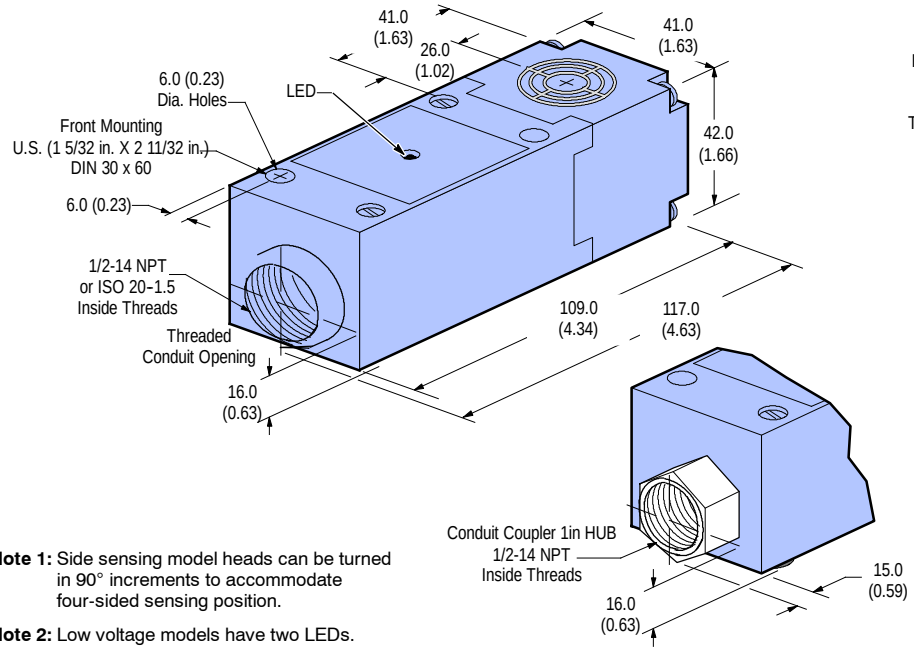
## Limit Switch Style

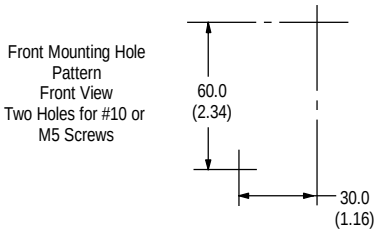
## Product Selection

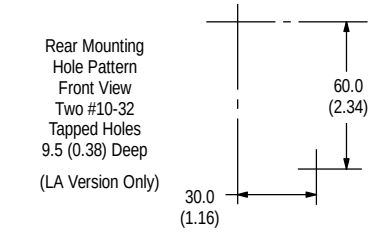
| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Corrosion Resistant | Voltage Range | Switching Freq. [Hz] | Connection | Cat. No. Conduit Style |
|---|---|---|---|---|---|---|---|---|
| Side | 13 (0.51) | Y | Selectable❶ | N | 60…132V AC | 20 | Conduit Coupler | 802PR-LABA2 |
| | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-LABB2 |
| Top | | | | | | | Conduit Coupler | 802PR-LABJ2 |
| | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-LABH2 |
| Side | | | Selectable❷ | | | | Conduit Coupler | 802PR-LACA2 |
| | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-LACB2 |
| Top | | | | | | | Conduit Coupler | 802PR-LACJ2 |
| | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-LACH2 |
| Side | | | N.O. | | 102…132V AC | 16 | Conduit Coupler | 802PR-LAAA1 |
| | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-LAAB1 |
| Top | | | | | | | Conduit Coupler | 802PR-LAAJ1 |
| | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-LAAH1 |
| Side | | | | Y | | | Threaded 1/2-14 NPT❸ | 802PR-XAAB1 |
| Top | | | | | | | Threaded 1/2-14 NPT❸ | 802PR-XAAH1 |

❶ Preset to N.O. at factory.
❷ Preset to N.C. at factory.
❸ To order ISO 20-1.5 add '-S6' to cat. no.

## Approximate Dimensions [mm (in.)]



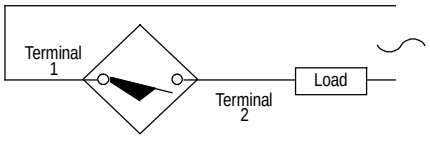




**Note 1:** Side sensing model heads can be turned in 90° increments to accommodate four-sided sensing position.

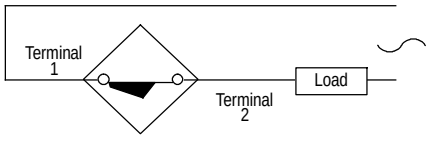
**Note 2:** Low voltage models have two LEDs.

## Wiring Diagram

**Normally Open**




**Normally Closed**




**Note:** Load can be switched to Terminal 1.

# 802PR 2-Wire AC Hazardous Location, High Output

## Limit Switch Style

*802PR AC*
*Conduit Style*

## Features

- 2-wire operation
- 2-terminal connection
- 102…132V AC
- Hazardous location rating
- High output (1 A)
- Normally open output
- Transient noise and false pulse protection
- UL Listed and CSA Certified

## Specifications

| | |
|---|---|
| Load Current | 1 A at 40 °C linearly derated to 0.5 A at 75 °C |
| Inrush Current | ≤10 A/1 s |
| Current Consumption | 25 mA, min. |
| Leakage Current | ≤6.5 mA |
| Operating Voltage | 102…132V AC |
| Voltage Drop | ≤8.5V |
| Repeatability | ≤0.025 mm |
| Hysteresis | 15% (max.) |
| Protection Type | False pulse, transient noise |
| Certifications | UL Listed and CSA Certified |
| Enclosure Type Rating | NEMA 1, 2, 3, 4, 12, 13; IP65 (IEC529)<br>Division 2<br>Class I: Groups A, B, C & D;<br>Class II: Groups F & G;<br>Class III: All groups<br>Self-extinguishing glass reinforced polyester body |
| Connection Type | Conduit Coupler: 1/2 -14NPT internal thread with screw terminals (use #18…14 AWG wire) |
| LED | Red: Output Energized |
| Operating Temperature [C (F)] | -25…+75 ° (-13…+167 °) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.80…0.85 |
| Brass | 0.50…0.55 |
| Aluminum | 0.45…0.50 |
| Copper | 0.40…0.45 |

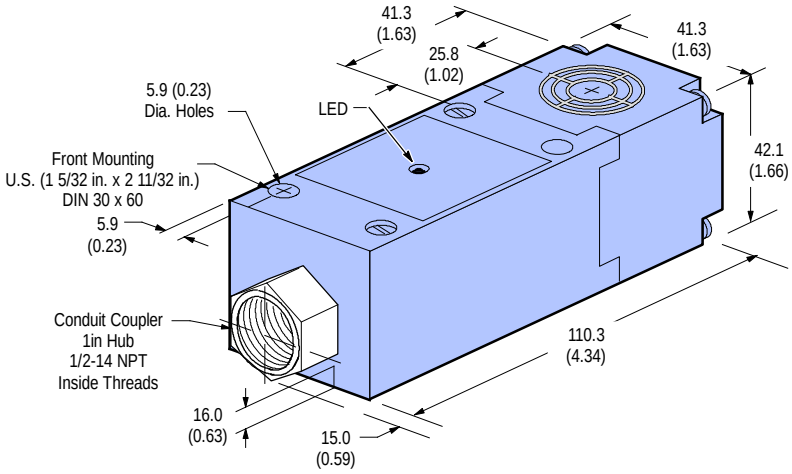
# 802PR 2-Wire AC Hazardous Location, High Output, Conduit Style

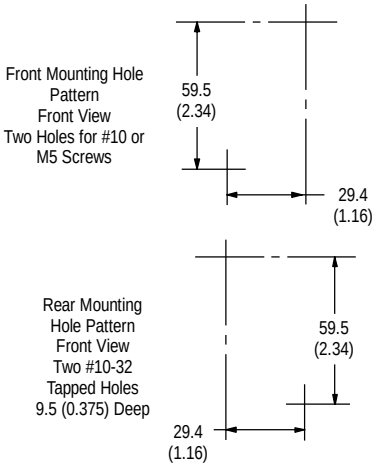
## Limit Switch Style

## Product Selection

| Sensing Direction | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Conduit Style |
|---|---|---|---|---|---|
| Side | 13 (0.51) | Y | N.O. | 16 | 802PR-LAAA3 |
| Top | | | | | 802PR-LAAJ3 |

## Approximate Dimensions [mm (in.)]

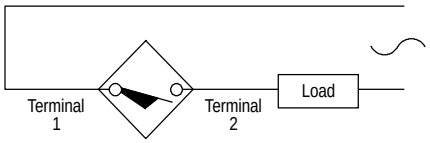


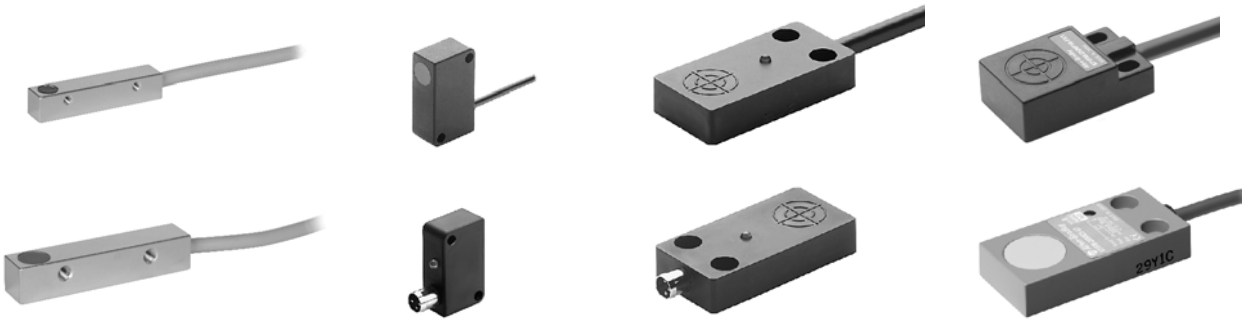

**Note:** Side sensing model heads can be turned in 90° increments to accommodate 4 side sensing positions.

## Wiring Diagram

### Normally Open




**Note:** Load can be switched to Terminal 1.



## Description

Bulletin 871FM inductive flat pack proximity sensors are self-contained, general purpose, solid-state devices designed to sense the presence of ferrous and nonferrous metal objects without touching them.

These sensors are ideal for applications in which space is limited. Connection options include 3-conductor PVC cable or pico quick-disconnect.

## Features

- Cable or quick-disconnect styles
- Short circuit protection
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection
- CE Marked for all applicable directives

## Styles

DC 3-wire metal . . . . . page 2-176

DC 3-wire plastic . . . . . page 2-176

## Accessories

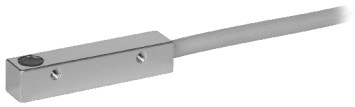
Cordsets . . . . . page 8-1

## General Information

Metric/English
Conversion Chart . . . . . page 14-6

# 871FM 3-Wire DC

## Miniature Flat Pack Style—Metal Housing



*871FM DC Cable*
*M5 Square*

*871FM DC Cable*
*M8 Square*

## Features

- 3-conductor, 3-pin pico or 3-pin pico on 6 inch lead connection
- Convenient flush mounting
- 10…30V DC
- Normally open
- Reverse polarity, short circuit, and overload protection
- Side sensing
- 2 mounting screws included
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤1 mA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.4V |
| Repeatability | ≤10% |
| Hysteresis | 12% typical |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | IP 67, Chrome-plated brass housing, plastic sensing face |
| Connections | 8 mm: PVC cable style/3-pin pico on 6 inch lead or pico QD style<br>5 mm: PUR cable style/3-pin pico on 6 inch lead or pico QD style |
| LED | Orange: Output energized |
| Operating Temperature [C (F)] | -25…+70° (32…+158°) |
| Shock | EN 60947-5-2; 7.4.1 |
| Vibration | EN 60947-5-2; 7.4.2 |

**Correction Factors**

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.85 |
| Brass | 0.64 |
| Aluminum | 0.55 |
| Copper | 0.51 |

## Product Selection

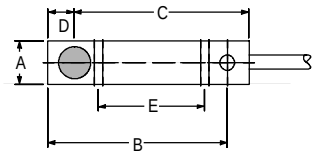
| Housing Diameter | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Pico Style | Leaded Pico Style |
| 5 mm | 0.8 (0.03) | Y | N.O | NPN | 5,000 | 871FM-M1NN5-E2 | — | 871FM-M1NN5-AP3 |
| | 0.8 (0.03) | | | PNP | 5,000 | 871FM-M1NP5-E2 | — | 871FM-M1NP5-AP3 |
| | 1.5 (0.06) | | | NPN | 3,000 | 871FM-M2NN5-E2 | — | 871FM-M2NN5-AP3 |
| | 1.5 (0.06) | | | PNP | 3,000 | **871FM-M2NP5-E2** | — | 871FM-M2NP5-AP3 |
| 8 mm | 2.0 (0.08) | | | NPN | 3,000 | 871FM-M2NN8-E2 | 871FM-M2NN8-P3 | — |
| | 2.0 (0.08) | | | PNP | 3,000 | **871FM-M2NP8-E2** | 871FM-M2NP8-P3 | — |
| | 3.0 (.12) | N | | NPN | 1,000 | 871FM-N3NN8-E2 | 871FM-N3NN8-P3 | — |
| | 3.0 (.12) | | | PNP | 1,000 | 871FM-N3NP8-E2 | 871FM-N3NP8-P3 | — |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889P-F3AB-2 | 889P-F3AB-2 |



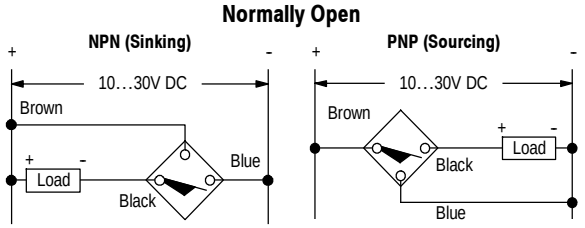
New

## Approximate Dimensions [mm (in.)]

### M5 and M8 Square Cable

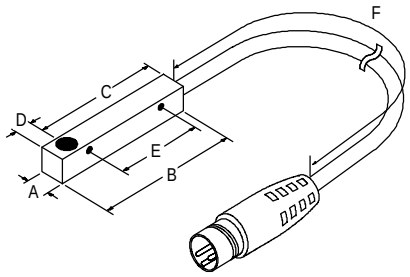


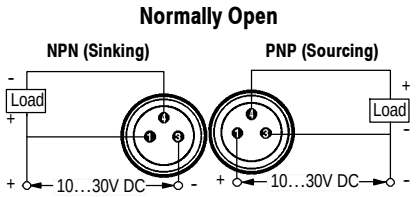

## Wiring Diagram




| Housing Diameter | mm (inches) | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 5 mm | 5.0 (0.2) | 15 (0.59) | 22 (0.87) | 3 (0.12) | 14 (0.55) |
| 8 mm | 8.0 (0.31) | 37 (1.46) | 35 (1.38) | 5 (0.2) | 20 (0.79) |

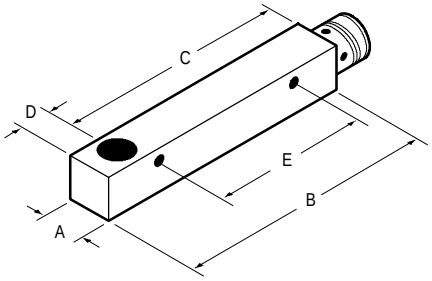
### M5 Square with 6 inch Lead

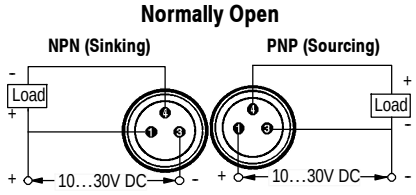



| Housing Diameter | mm (inches) | | | | | |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| 5 mm | 5.0 (0.2) | 25 (0.98) | 22 (0.87) | 3 (0.12) | 14 (0.55) | 150 (6) |

### M8 Square 3-Pin Pico

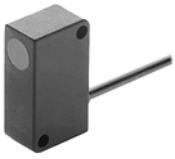



| Housing Diameter | mm (inches) | | | | |
|---|---|---|---|---|---|
| | A | B | C | D | E |
| 8 mm | 8.0 (0.31) | 50 (1.97) | 45 (1.77) | 5 (0.2) | 20 (0.79) |

# 871FM 3-Wire DC

## Miniature Flat Pack Style—Plastic Housing



*871FM DC Cable Style*
*28 x 16 x 11 mm*

*871FM DC Pico*
*Quick-Disconnect Style*
*28 x 16 x 11 mm*

*871FM DC Cable Style*
*25 x 50 x 10 mm*

*871FM DC Pico*
*Quick-Disconnect Style*
*30 x 18 x 10 mm*

### Specifications

| | 28x16x11 mm | 25x50x10 mm | 31x18x10 mm |
|---|---|---|---|
| Current Consumption | <11 mA | <8 mA | 10 mA |
| Load Current | ≤200 mA | ≤200 mA | 50 mA @ 12V DC<br>100 mA @ 24V DC |
| Leakage Current | <100 µA | <100 µA | <100 µA |
| Operating Voltage | 10…30V DC | 10…24V DC | 10…30V DC |
| Voltage Drop | ≤1.8V | ≤2.5V | ≤1V |
| Repeatability | ≤5% | | |
| Hysteresis | 10% typical | | |
| Protection Type | False pulse, transient noise, reverse polarity, short circuit, and overload | | |
| Certifications | CE Marked for all applicable directives | | |
| Enclosure Type Rating | NEMA 4, IP67 (IEC 529)<br>Plastic | | |
| Connection Type | Cable: 2 m (6.5 ft) length, 3-conductor PVC<br>Quick-Disconnect: 3-pin pico style | | |
| LED | Yellow: Output Energized | Red: Output Energized | |
| Operating Temperature [C (F)] | -25…+70 ° (-13…+158 °) | | |
| Shock | 30 g, 11 ms | | 50 g (approx) |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | | 10…55Hz @ 1…5 mm |

### Features

- 3-wire operation
- 3-conductor or 3-pin connection
- 10…30V DC
- Normally open or normally closed output
- False pulse, transient noise, reverse polarity, short-circuit, and overload protection
- CE Marked for all applicable directives

### Correction Factors

| Target Material | Correction Factors |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.85 |
| Brass | 0.55 |
| Aluminum | 0.5 |
| Copper | 0.45 |



New

## Product Selection

| Dimensions | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. Cable Style | Cat. No. Pico QD Style |
|---|---|---|---|---|---|---|---|
| 28 x 16 x 11 mm | 2 (0.08) | Yes | N.O. | PNP | 600 | 871FM-D2NP11-E2 | 871FM-D2NP11-P3 |
| | | | N.C. | PNP | | 871FM-D2CP11-E2 | 871FM-D2CP11-P3 |
| 25 x 50 x 10 mm | 5 (0.20) | Yes | N.O. | NPN | 500 | 871FM-D5NN25-E2 | — |
| | | | | | | 871FM-D5NP25-E2 | 871FM-D5NP25-P3 |
| | | | N.C. | PNP | | 871FM-D5CP25-E2 | — |
| | | | | | | 871FM-D5CN25-E2 | — |
| | 8 (0.31) | No | N.O. | PNP | 200 | 871FM-D8NP25-E2 | 871FM-D8NP25-P3 |
| | | | N.C. | | | 871FM-D8CP25-E2 | — |
| 31 x 18 x 10mm | 5 (0.20) | No | N.O. | PNP | 200 | 871FM-D5NP10-E2 | — |
| Recommended Standard QD Cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889P-F3AB-2 |

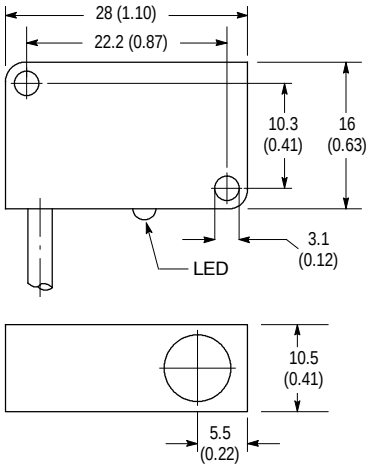
## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (inches)]

### Cable & Pico QD Style

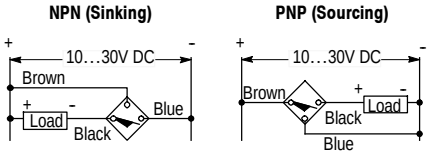
***28 x 16 x 11 mm***



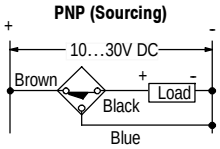

## Wiring Diagrams

### Cable Style

**Normally Open**

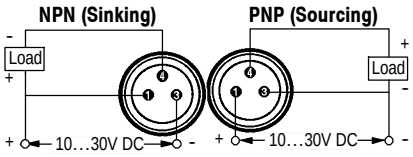



**Normally Closed**




### Pico QD Style

**Normally Open or Normally Closed**



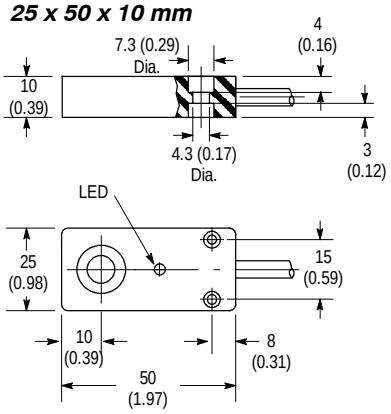
# 871FM 3-Wire DC

## Miniature Flat Pack Style

## Approximate Dimensions [mm (inches)]

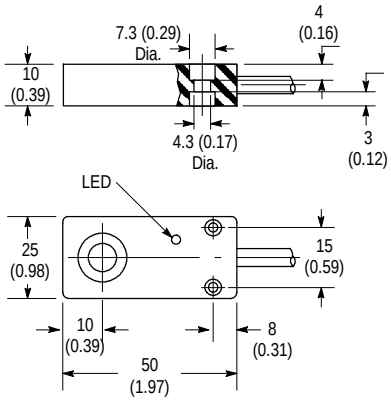
### Unshielded Cable & Pico QD & Shielded Pico QD Style

***25 x 50 x 10 mm***




### Shielded Cable Style

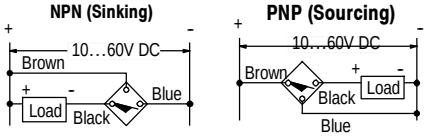
***25 x 50 x 10 mm***



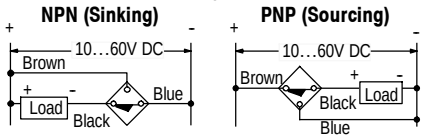

## Wiring Diagram

### Cable Style

**Normally Open**

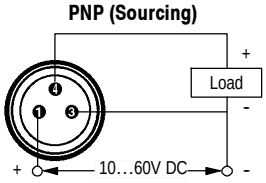



**Normally Closed**



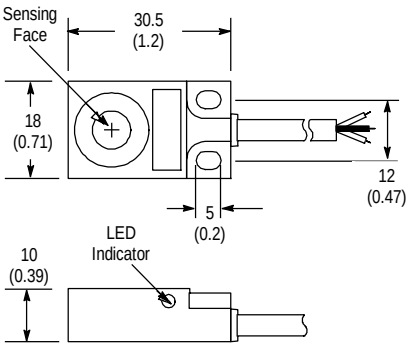

### Pico QD Style

**PNP (Sourcing)**




### Cable Style

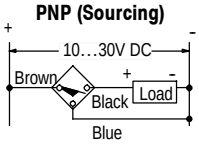
***31 x 18 x 10 mm***




### Cable Style

**Normally Open**

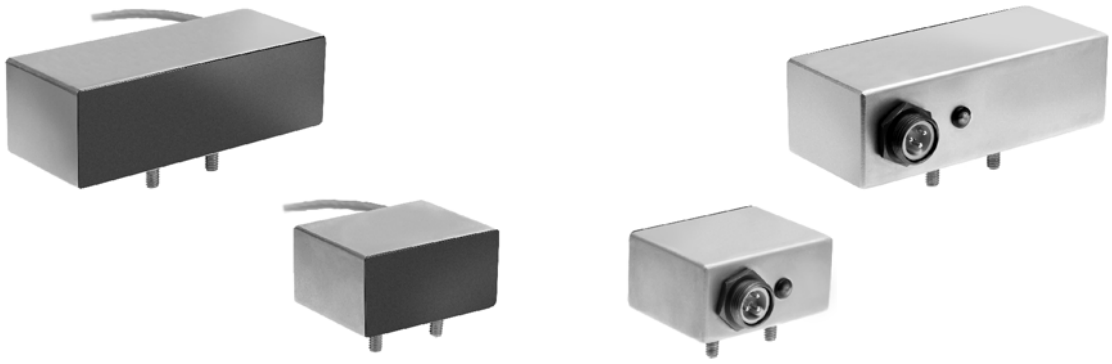
**PNP (Sourcing)**



Obsolete

Obsolete

# Bulletin 871P Can Sensors



## Description

Bulletin 871P inductive proximity can sensors are self-contained solid-state devices, designed specifically for sensing size 202…704 metal cans without physical contact. These sensors have been specifically designed for the canning industry in terms of both functionality and environmental ratings.

Short- and long-range can sensor models are available. These sensors contain multiple coils to provide a wide sensing field which allows metal containers to be sensed on canning lines while the gaps between them are ignored. This type of sensor provides a "cans present" or "cans not present" signal and is the standard sensor type used in can line control. Rockwell Automation provides two models for varying can sizes.

A DC powered can motion sensor is also available for applications which require can movement sensing. Designed with the same multiple coils and wide sensing field as the standard can sensor, an extra coil is added as a separate circuit, which can be set to sense the gaps between the cans. The signal from the wide sensing field circuit (which ignores the gaps between the cans) is combined with the signal from the second circuit (which senses the gaps between the cans) to achieve an output indicating true can motion. If cans are present and not moving, the sensor output turns on. If cans are present and moving or if no cans are present, the sensor will remain off.

Depending on the specific canning line setup, Rockwell Automation can motion sensors can help improve line efficiency or address problem areas on canning line conveyor systems by providing control equipment with motion/no motion information.

The 871P can sensor family combines rugged construction and superior sensing capability to provide long lasting durability and performance in hostile manufacturing and filling environments.

Rockwell Automation can sensors are designed to withstand repeated 1200 psi washdowns common in the food and beverage industries and are mountable on industry standard brackets.

### Features

- Short circuit protection
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection (DC models)
- Stainless steel housing
- NEMA 6P and IP67 enclosure
- 1200 psi (8270 kPa) washdown

## Styles

AC 2-Wire Long-Range . . . page 2-182
DC 4-Wire Short-Range . . page 2-184
DC 4-Wire Long-Range . . . page 2-184
DC 4-Wire Motion . . . . . page 2-186

## Accessories

Cordsets . . . . . page 8-1
Mounting Bracket . . . . . page 2-215

## General Information

Metric/English
Conversion Chart . . . . . page 14-6

# 871P Can Sensors 2-Wire AC

*871P AC Short-Range*
*76 x 36 x 58 mm*

## Features

- 2-wire operation
- 3-conductor connection
- 30…150V AC
- Normally open
- Stainless steel housing
- 1200 psi (8270 kPa) washdown
- False pulse, transient noise, short circuit, and overload protection

## Specifications

| | |
|---|---|
| Outputs | Normally Open |
| Load Current | 300 mA |
| Minimum Load Current | 15 mA |
| Leakage Current | <1.5 mA |
| Inrush Current | <5 A (20 ms) |
| Operating Voltage | 30…150V AC RMS |
| Line Frequency | 40…60 Hz |
| Voltage Drop | <15V @ 300 mA |
| Repeatability | ≤2% |
| Hysteresis | 10% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | UL Listed and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 3, 4, 4X, 6, 6P, 12, 13, IP67 (IEC 529), 1200 psi (8270 kPa) washdown |
| Connections | 3-pin mini style |
| LEDs | Red: Output Energized |
| Operating Temperature [C (F)] | -20…+70° (0…+160°) |
| Housing Material | Stainless steel, plastic face |
| Mounting | 2 stainless steel studs |



New

## Product Selection

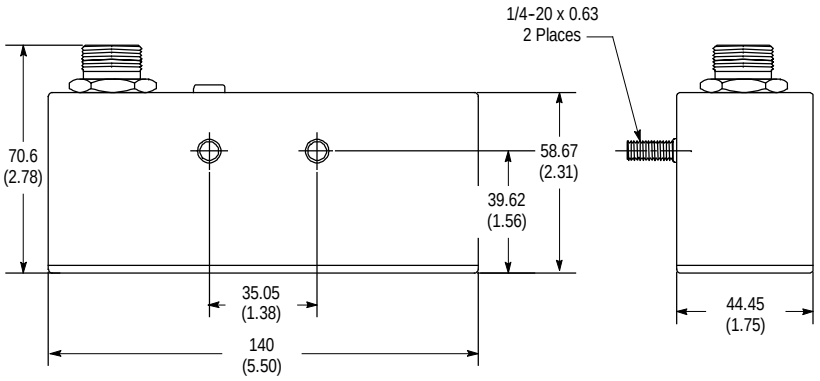
| Style | Container Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Cat. No. Mini QD Style |
|---|---|---|---|---|---|---|
| Long Range | 202…704 | Steel: 29 mm (1.15 in.), Aluminum: 15 mm (0.60 in.) | Yes | N.O. | 25 | 871P-AC29N140-N3 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889N-F3AFC-6F |

## QD Cordsets

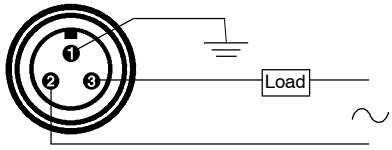
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (in.)]

**Long-Range Mini QD Style**

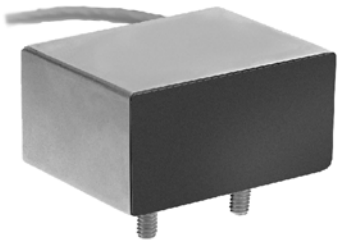



## Wiring Diagram




**Note:** Load can be switched to pin 2.

# 871P Can Sensors 4-Wire DC



*871P DC Short Range*
*76 x 36 x 58 mm*

## Features

- 4-conductor plus shield or 4-pin mini connection
- 10…30V DC
- Normally open NPN and PNP outputs
- Short- and long-range models
- Stainless steel housing
- 1200 psi (8270 kPa) washdown
- False pulse, transient noise, reverse polarity, short circuit, and overload protection

## Specifications

| | |
|---|---|
| Outputs | Normally Open NPN and PNP |
| Load Current | 300 mA |
| Operating Voltage | 10…30V DC |
| Operating Current | 25 mA (off), 55 mA (on) |
| Voltage Drop | ≤2.5V |
| Repeatability | ≤2% |
| Hysteresis | 3…15% |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Enclosure | NEMA 1, 3, 4, 4X, 6, 6P, 12, 13, IP67 (IEC 529), 1200 psi (8270 kPa) washdown |
| Connections | A2: 2 m shielded PVC jacketed cable, 4-wire, #22 AWG, 1/2 in. NPT<br>N4: 4-pin mini quick-disconnect |
| LEDs | Red: Output energized |
| Operating Temperature [C (F)] | -20…+70° (0…+160°) |
| Housing Material | Stainless steel, plastic face |
| Mounting | 2 stainless steel studs |

## Product Selection

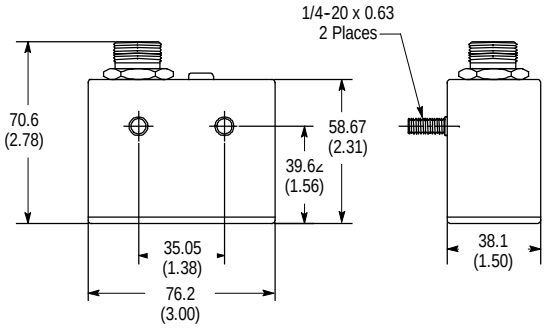
| Style | Container Size | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Cable Style | Mini QD Style |
| Short Range | 202…401 | Steel: 19 (0.75), Aluminum: 13 (0.50) | Yes | N.O. | NPN and PNP | 35 | — | 871P-DC19NB76-N4 |
| Long Range | 202…704 | Steel: 29 (1.15), Aluminum: 15 (0.60) | | | | | 871P-DC29NB140A2 | 871P-DC29NB140N4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | | | 889N-F4AFC-6F |

## QD Cordsets

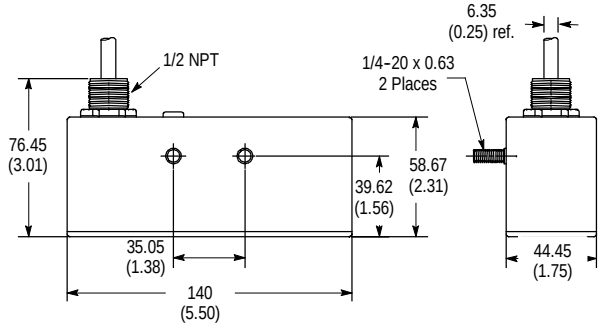
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (inches)]

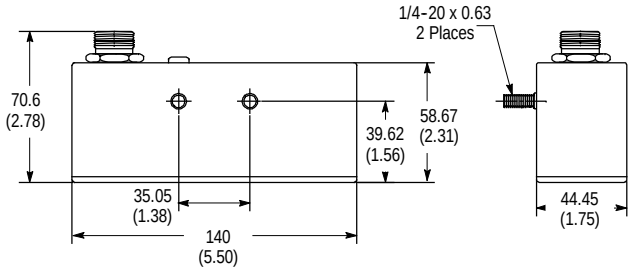
### Short-Range Mini QD Style




### Long-Range Cable Style

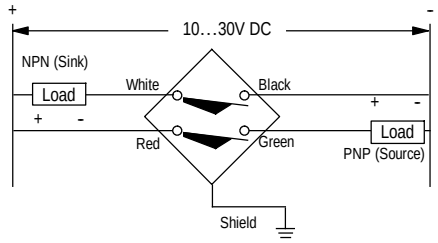



### Long-Range Mini QD Style




## Wiring Diagram

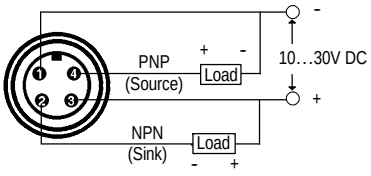
### Cable Style




**ATTENTION**

Red and black wires must be connected for proper operation.

### Mini QD Style



# 871P Can Sensors 4-Wire DC Motion

*871P DC Motion Style*
*140 x 45 x 58 mm*

## Features

- 4-conductor plus shield or 4-pin mini connection
- 10…30V DC
- Normally open NPN and PNP outputs
- Stainless steel housing
- 1200 psi (8270 kPa) washdown
- Dual function output LED
  Dim blink: cans moving
  Bright steady: no motion
- Adjustable sensing distance
- False pulse, transient noise, reverse polarity, short circuit, and overload protection

## Specifications

| | |
|---|---|
| Outputs | Normally Open NPN and PNP |
| Load Current | 300 mA |
| Operating Voltage | 10…30V DC |
| Operating Current | 25 mA (off), 55 mA (on) |
| Voltage Drop | ≤2.5V |
| Repeatability | ≤2% |
| Hysteresis | 3…15% |
| Output Time Delay | 0.5 s after motion stops |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Enclosure | NEMA 1, 3, 4, 4X, 6, 6P, 12, 13, IP67 (IEC 529), 1200 psi (8270 kPa) washdown |
| Connections | A2: 2 m shielded PVC jacketed cable, 4-wire, #22 AWG, 1/2 in. NPT<br>N4: 4-pin mini quick-disconnect |
| LED | Red: Output Energized<br>Dim Blink: Cans moving<br>Bright Steady: No motion |
| Potentiometer | Sensing range adjust |
| Operating Temperature [C (F)] | -20…+70° (0…+160°) |
| Housing Material | Stainless steel, plastic face |
| Mounting | 2 stainless steel studs |

# 871P Can Sensors 4-Wire DC Motion

## Product Selection

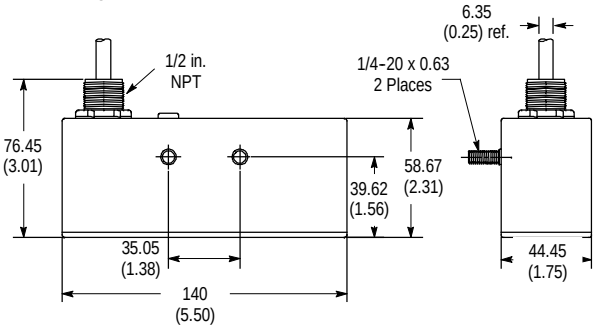
| Container Sizes | Nominal Presence Sensing Distance [mm (in.)] | Nominal Motion Sensing Distance [mm (in.)] | Shielded | Output Configuration | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Mini QD Style |
| 202-704 | Steel: 29 (1.15)<br>Aluminum: 15 (0.60) | Steel: 19 (0.75)<br>Aluminum: 13 (0.50) | Y | Normally Open<br>NPN and PNP | 871P-DD29NB140A2 | 871P-DD29NB140N4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft)) | | | | | | 889N-F4AFC-6F |

## QD Cordsets

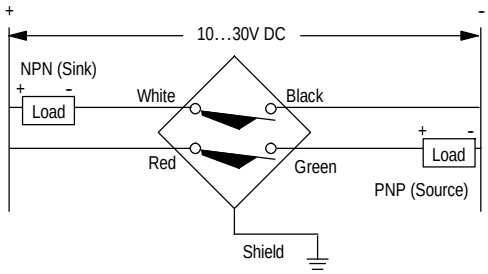
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (in.)]

### Cable Style



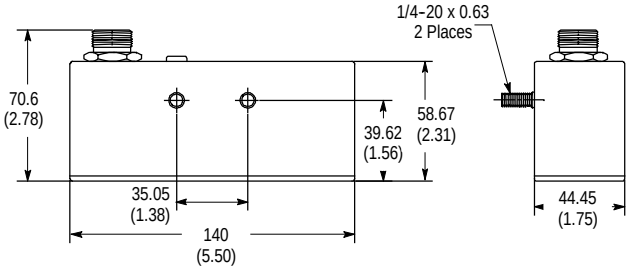

## Wiring Diagram

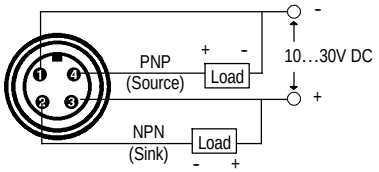



**ATTENTION**

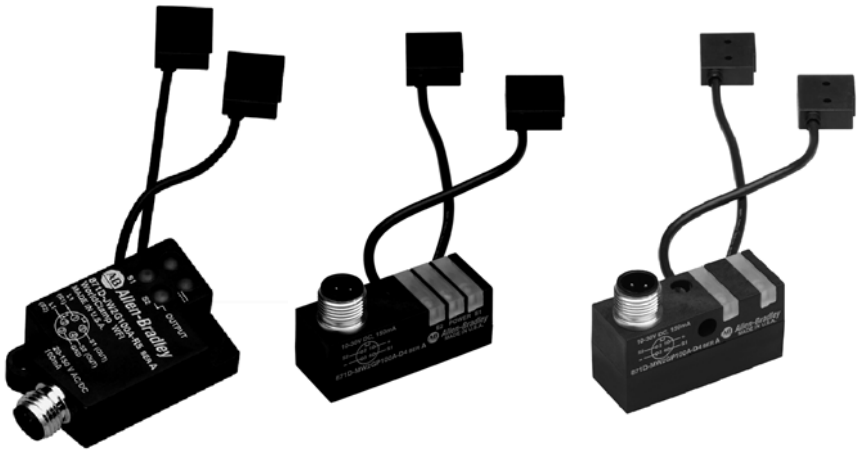
Red and black wires must be connected for proper operation.

### Mini QD Style



## Notes



## Description

Bulletin 871D WorldClamp™ proximity sensors are specifically designed for use in power clamp and gripper applications. These devices incorporate two sensors into one unit, reducing the number of sensors and connection systems required for applications. Each sensor has two sensing coils (chicklets) that are used to detect whether the clamp/gripper is in the open or closed position.

The 871D WorldClamp has a compatible mounting configuration for the cartridges used by the major clamp manufacturers. These models are weld-field immune and have full electrical protections including short circuit, overload, false pulse, reverse polarity (DC models), and transient noise protection. All units meet IEC IP67 enclosure standards and are CE Marked for all applicable directives.

Bulletin 871D WorldClamp™ proximity sensors are available in both 4-wire DC and 5-wire AC/DC micro quick-disconnect styles. Each sensor type is available in 100 mm, 165 mm, and 200 mm lead lengths with either the large or small chicklet size.

## Features

- Superior LED visibility
- Weld-field immune
- Shielded construction
- Short circuit protection
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection (DC models)
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Styles

DC 4-wire . . . . . page 2-190
AC/DC 5-wire . . . . . page 2-192

## Accessories

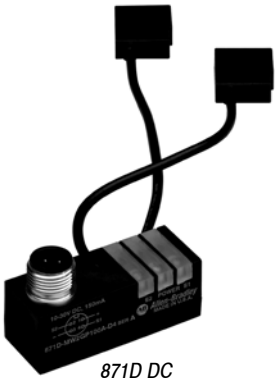
Cordsets . . . . . page 8-1

## General Information

Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6

# Bulletin 871D DC WorldClamp™

## Power Clamp and Gripper Style



*871D DC*
*100, 165, 200 mm*

## Features

- 2 normally open outputs
- Superior LED visibility
- 10…30V DC
- Weld field immune
- Short circuit, overload, false pulse, reverse polarity, and transient noise protection
- Standard 100, 165, and 200 mm lead length for chicklets
- Special 40 mm one lead and 100 mm second lead
- Small or large chicklet sizes
- Impact resistant housing
- 4-pin micro quick-disconnect
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | 150 mA max |
| Leakage Current | < 10 μA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | < 2.5V |
| Repeatability | < 2% |
| Hysteresis | 5% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Weld Field Immunity | 1600 Gauss |
| Certifications | UL Listed, cUL Certified and CE Marked for all applicable directives |
| Enclosure | IP67 |
| Connections | 4-pin micro quick-disconnect |
| LED | Green: power; orange: S1 output; red: S2 output |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

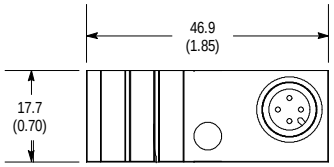
## Product Selection

| Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency [Hz] | Lead Length [mm (in.)] | Chicklet Size | Cat. No. |
|---|---|---|---|---|---|---|
| 2 (0.08) | Y | 2 N.O. PNP Outputs | 15 | 100 (3.94) | Large | 871D-MW2GP100A-D4 |
| | | | | | Small | 871D-MW2GP100B-D4 |
| | | | | | Cylindrical | 871D-MW2GP100C-D4 |
| | | | | 165 (6.50) | Large | 871D-MW2GP165A-D4 |
| | | | | | Small | 871D-MW2GP165B-D4 |
| | | | | 200 (7.88) | Large | 871D-MW2GP200A-D4 |
| | | | | | Small | 871D-MW2GP200B-D4 |
| | | | | 40 (S1)/100 (S2) | Large | 871D-MW2GP40A-D4❶ |
| | | | | | Small | 871D-MW2GP40B-D4❶ |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | 889D-F4AC-2 |

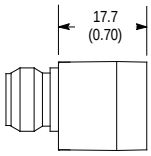
❶ Special length of cable leads, one is 40 mm and the second is 100 mm.

## Approximate Dimensions [mm (in.)]

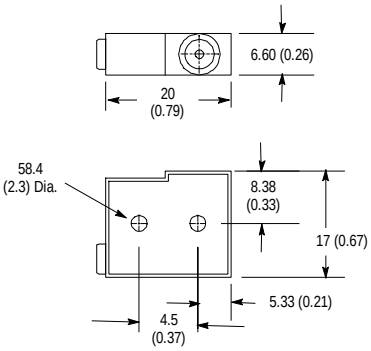
**Front View**



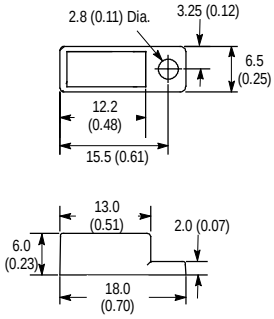

**Side View**



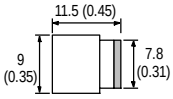

**Large Chicklet**




**Small Chicklet**

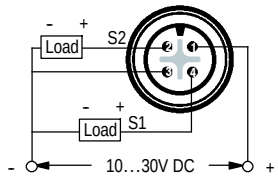



**Cylindrical Chicklet**




## Wiring Diagram

**Normally Open Output**
**PNP (Sourcing)**



# Bulletin 871D AC/DC WorldClamp™

## Power Clamp and Gripper Style

*871D AC/DC*
*100, 165, 200 mm*

## Specifications

| | |
|---|---|
| Load Current | 100 mA max |
| Inrush Current (1 cycle) | ≤ 2 A (1 cycle) |
| Leakage Current | < 1.7 mA |
| Operating Voltage | 20…150V AC/DC |
| Voltage Drop | < 10V |
| Repeatability | < 2% |
| Hysteresis | 5% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Weld Field Immunity | 1600 Gauss |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | IP67 |
| Connections | 5-pin AC micro quick-disconnect |
| LED | 2 green: power S1 and S2; red: S1 output; orange: S2 output |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

## Features

- 2 normally open outputs
- 20…150V AC/DC
- Weld field immune
- Short circuit, overload, false pulse, and transient noise protection
- Standard 100, 165, and 200 mm lead length for chicklets
- Special 40 mm one lead and 100 mm second lead
- Small or large chicklet sizes
- Impact resistant housing
- 5-pin micro quick-disconnect
- cULus Listed and CE Marked for all applicable directives



New

## Product Selection

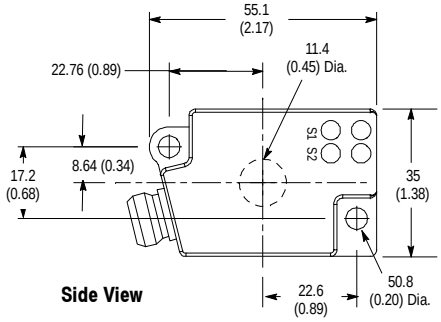
| Sensor | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency (Hz) | Lead Length [mm (in.)] | Chicklet Size | Cat. No. |
|---|---|---|---|---|---|---|---|
| Standard | 2 (0.08) | Y | 2 N.O. Outputs | 20 | 100 (3.94) | Large | 871D-JW2G100A-R5 |
| | | | | | | Small | 871D-JW2G100B-R5 |
| | | | | | 165 (6.50) | Large | 871D-JW2G165A-R5 |
| | | | | | | Small | 871D-JW2G165B-R5 |
| | | | | | 40 (1.57) - S1<br>100 (3.94) - S2 | Large | 871D-JW2G200A-R5 |
| | | | | | | Small | 871D-JW2G200B-R5 |
| | 2 (0.08) | Y | 2 N.O. Outputs | 20 | 200 (7.88) | Large | 871D-JW2G40A-R5❶ |
| | | | | | | Small | 871D-JW2G40B-R5❶ |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889R-F5AEA-2 |

❶ Special length of cable leads, one is 40 mm and the second is 100 mm.

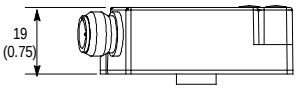
## Approximate Dimensions [mm (in.)]

### Standard Sensor

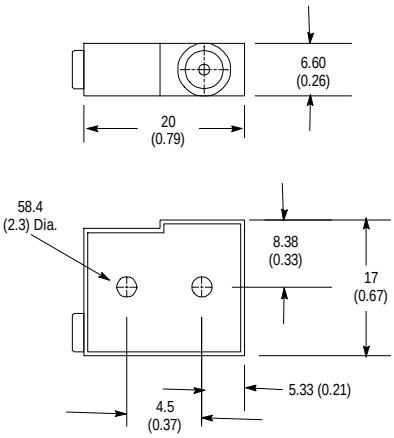
**Front View**



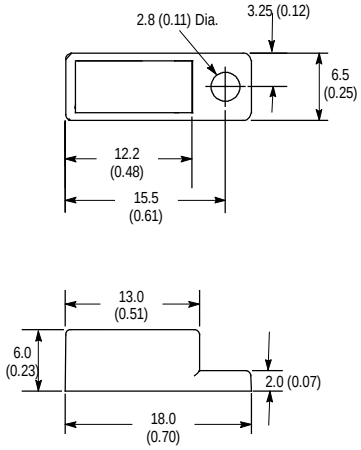

**Side View**




**Large Chicklet**

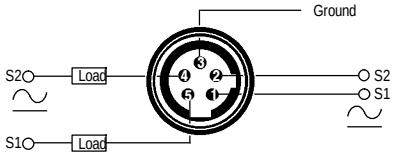



**Small Chicklet**




## Wiring Diagram

**Normally Open Outputs**




**Note:** Load can be switched to pin 1 (S1) and pin 2 (S2).

## Notes

# Bulletin 871D

## Cylinder Position Inductive Style

## Description

Bulletin 871D cylinder position inductive proximity sensors are self-contained solid state devices. These devices are designed for sensing metal objects without physical contact. Bulletin 871D cylinder position sensors are specifically designed for end of stroke detection of both hydraulic and pneumatic cylinders.

The innovative design of the 871D product family allows 304° of rotational movement of the sensor body during installation without breaking the seal. The sensor body is locked into place through the use of one set screw on the sensor mounting flange. This system provides simpler and faster sensor installation as well as neat cable runs.

Each 871D sensor mounts into the industry standard in-port cylinder position sensor bolt pattern with two (1/4 in.-20UNC x 3/4 in.) grade 8 screws and is sealed with an o-ring to withstand pressures up to 3000 psi (207 BAR). All models are weld field immune and employ full electrical protections including short circuit, overload, false pulse, reverse polarity (DC models), and transient noise protection. All units meet IEC IP67 enclosure standards and are CE Marked for all applicable directives.

Bulletin 871D sensors are available in both 3-wire DC and 2-wire AC/DC versions with either mini- or micro-style connectors. DC sensors are available in five industry-standard probe lengths from 26…95.9 mm (1.025…3.775 in.). AC/DC sensors are available in six industry-standard probe lengths from 26…115.9 mm (1.025…4.560 in.). Special spacers are also available to effectively alter the probe length for specific applications.

## Features

- Stainless steel probe with ceramic face
- Low profile housing can be rotated 304° during installation without breaking pressure seal
- Shielded construction
- Weld-field immune
- Short circuit protection
- Overload protection
- Transient noise protection
- False pulse protection
- Reverse polarity protection (DC models)
- UL Listed, cUL Certified, and CE Marked for all applicable directives

## Styles

DC 3-wire . . . . . page 2-196

AC/DC 2-wire . . . . . page 2-198

## Accessories

Cordsets . . . . . page 8-1

Spacer Kits . . . . . page 2-224

## General Information

Torque Chart . . . . . page 2-225

Metric/English Conversion Chart . . . . . page 14-6

# Bulletin 871D 3-Wire DC

## Cylinder Position Inductive Style

*871D DC Mini*
*Quick-Disconnect Style*
*12 mm*

*871D DC Micro*
*Quick-Disconnect Style*
*12 mm*

## Specifications

| | |
|---|---|
| Outputs | Normally Open |
| Max. Load Current | <200 mA |
| Leakage Current | < 80 μA |
| Operating Voltage | 10…30VDC |
| Voltage Drop | < 2.5V DC @ 200 mA |
| Switching Frequency | 10 Hz |
| Repeatability | 5% typical |
| Hysteresis | 15% typical |
| Reverse Polarity Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Weld Field Immunity | 20,000 A at 1 inch |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 6, 12, 13, IP67 (IEC 529) |
| Connections | Quick Disconnect: 4-pin mini style<br>4-pin micro style |
| LED | Green: Power; Orange: Output |
| Operating Temperature [C (F)] | -25…70° (-13…158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |
| Housing Material | Machined aluminum |
| Probe Material | Stainless steel, ceramic face |
| Non-activated Current Draw | ≤10 mA |
| Activated Current Draw | ≤18 mA |

## Features

- Rugged low profile housing
- 3-wire operation
- Housing 304° rotatable during installation without breaking pressure seal
- 10…30V DC
- Normally open output
- Weld-field immune
- Short circuit, overload, false pulse, transient noise, and reverse polarity protection
- cULus Listed and CE Marked for all applicable directives



New

## Product Selection

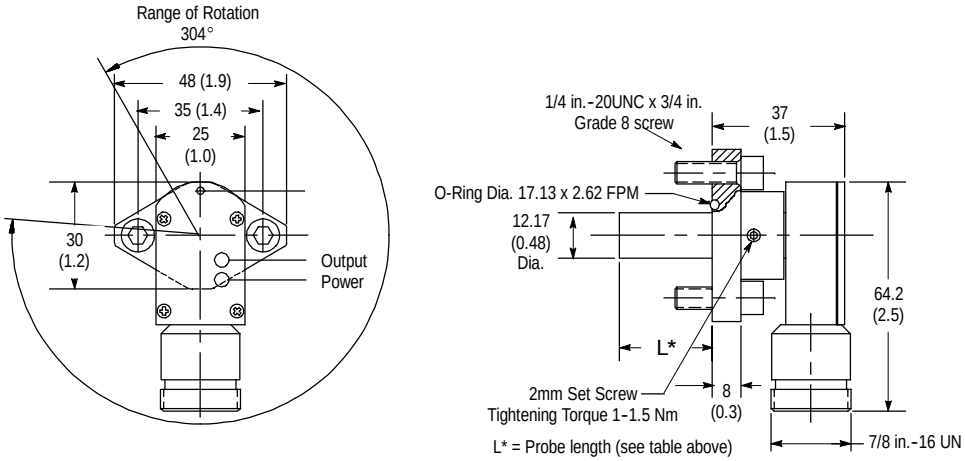
| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Probe Length [mm (in.)] | Cat. No.s | |
|---|---|---|---|---|---|---|
| | | | | | Mini QD | Micro QD |
| 12 mm | 2 (0.08) | Y | N.O. | 26.0 (1.025) | 871D-DW2NP260-N4 | **871D-DW2NP260-D4** |
| | | | | 31.7 (1.250) | 871D-DW2NP317-N4 | 871D-DW2NP317-D4 |
| | | | | 52.4 (2.062) | 871D-DW2NP524-N4 | 871D-DW2NP524-D4 |
| | | | | 73.0 (2.875) | — | 871D-DW2NP730-D4 |
| | | | | 95.9 (3.775) | 871D-DW2NP959-N4 | 871D-DW2NP959-D4 |
| Recommended standard QD cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | 889N-F4AFC-6F | 889D-F4AC-2 |

## QD Cordsets and Accessories

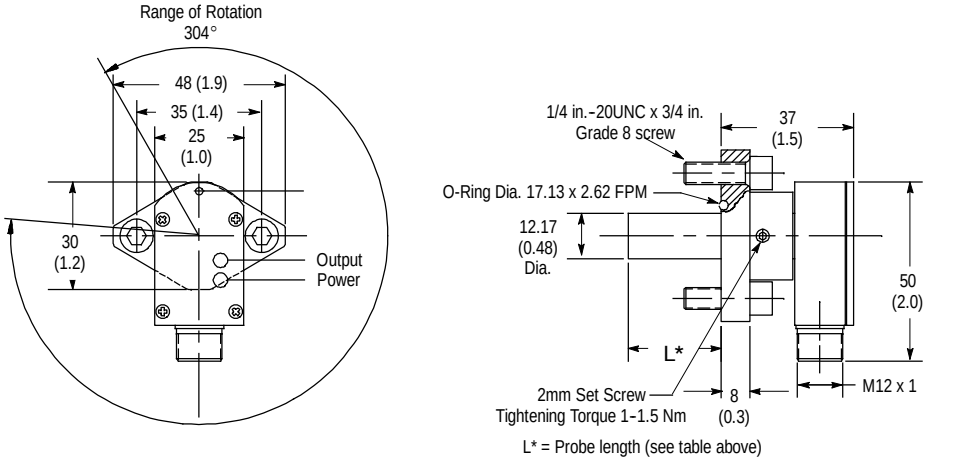
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Spacer Kits | 2-224 |

## Approximate Dimensions [mm (in.)]

### Mini Connector Models




### Micro Connector Models

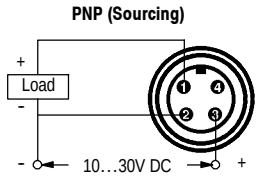



## Wiring Diagrams

### Mini Quick-Disconnect Style

**Normally Open**

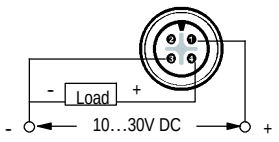
**PNP (Sourcing)**




### Micro Quick-Disconnect Style

**Normally Open**

**PNP (Sourcing)**



# Bulletin 871D 2-Wire AC/DC

## Cylinder Position Inductive Style

*871D AC/DC Mini*
*Quick-Disconnect Style*

*871D AC/DC Micro*
*Quick-Disconnect Style*

## Features

- Rugged low profile housing
- 2-wire operation
- Housing 304° rotatable during installation without breaking pressure seal
- 20…250V AC/DC
- Normally open output
- Weld-field immune
- Short circuit, overload, false pulse, and transient noise protection
- UL Listed, cUL Certified and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Outputs | Normally Open |
| Load Current | 5…400 mA |
| Inrush Current (1 cycle) | < 3 A (t < 20 msec) |
| Leakage Current | < 1.7 mA @ 120V AC |
| Operating Voltage | 20…250V AC/DC |
| Voltage Drop | < 6V at 400 mA |
| Switching Frequency | 50 Hz |
| Repeatability | 5% typical |
| Hysteresis | 15% typical |
| False Pulse Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Weld Field Immunity | 20,000 A at 1 inch |
| Certifications | UL Listed, cUL Certified for Canada and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 6, 12, 13, IP67 (IEC 529) |
| Connections | Quick Disconnect: 3-pin mini style<br>3-pin micro style |
| LED | Green: Power; Orange: Output |
| Operating Temperature [C (F)] | -25…70° (-13…158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |
| Housing Material | Nickel plated brass |
| Probe Material | Stainless steel, ceramic face |

## Product Selection

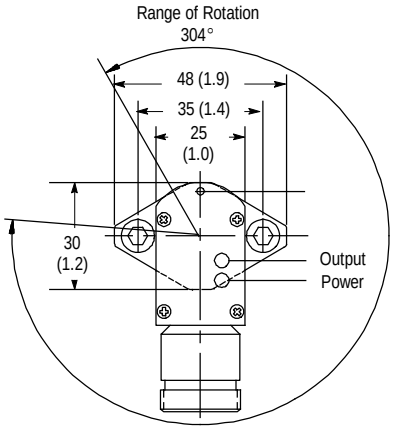
| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Probe Length [mm (in.)] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Mini QD | Micro QD |
| 12mm | 2 (0.08) | Y | N.O. | 26.0 (1.025) | 871D-BW2N260-N3 | 871D-BW2N260-R3 |
| | | | | 31.7 (1.250) | 871D-BW2N317-N3 | 871D-BW2N317-R3 |
| | | | | 52.4 (2.062) | **871D-BW2N524-N3** | 871D-BW2N524-R3 |
| | | | | 73.0 (2.875) | 871D-BW2N730-N3 | 871D-BW2N730-R3 |
| | | | | 95.9 (3.775) | 871D-BW2N959-N3 | 871D-BW2N959-R3 |
| | | | | 115.9 (4.560) | 871D-BW2N1159-N3 | 871D-BW2N1159-R3 |
| Recommended standard QD cordset (-6F = 1.8m (6ft), -2 = 2 m (6.5 ft)) | | | | | 889N-F3AFC-6F | 889R-F3ECA-2 |

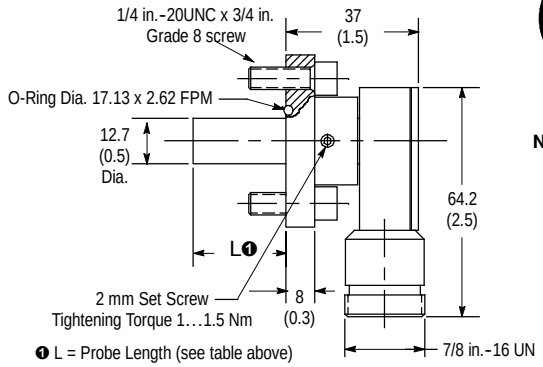
## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |
| Spacer Kits | 2-224 |

## Dimensions—mm (in.)

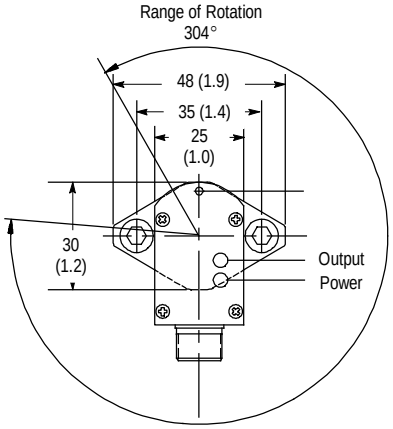
### Mini Connector Models

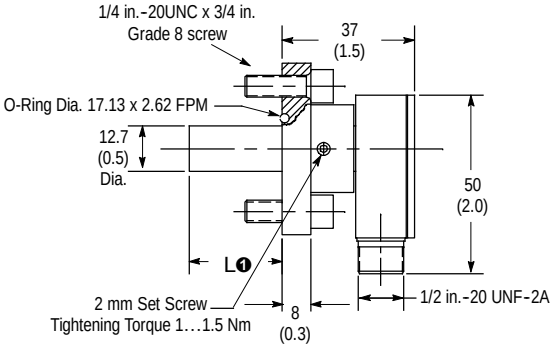



❶ L = Probe Length (see table above)

### Micro Connector Models



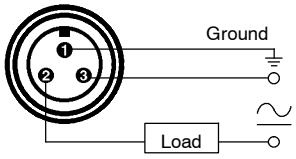




❶ L = Probe Length (see table above)

## Wiring Diagrams

### Mini Quick-Disconnect Style

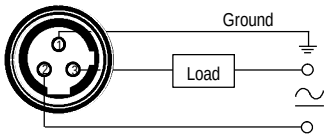
**Normally Open**




**Note 1:** Load can be switched to pin 3.

### Micro Quick-Disconnect Style

**Normally Open or Normally Closed**




**Note 1:** Load can be switched to pin 2.

## Notes

## Description

Bulletin 871R Ring and 871S Slot sensors are self-contained, general purposed, solid-state devices designed to sense the presence of ferrous and nonferrous metal objects that pass through their sensing field.

Ring sensors are available in 12, 20, 50 and 100 mm ring diameter sizes with minimum ball sizes ranging from 2.5…8.0 mm.

Slot sensors are available in 30 mm slot gap. When mounting two slot sensors side by side, it is necessary to use different models with different operating frequencies.

## Features

- Cable or micro QD style
- Short circuit protection
- Reverse polarity protection
- CE Marked for all applicable directives

## Styles

871R DC 3-Wire Ring . . . . page 2-202
871S DC 3-Wire Slot . . . . . page 2-205

## QD Cordsets

Cordsets . . . . . page 8-1

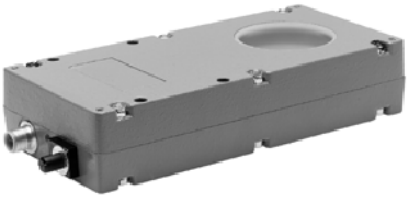
## General Information

Torque Chart . . . . . page 2-225
Metric/English Conversion Chart . . . . . page 14-6

# 871R 3-Wire DC

## Ring Style

*871R DC Cable Style*
*12, 20 mm*



*871R DC Micro*
*Quick-Disconnect Style*
*50 mm*

*871R DC Micro*
*Quick-Disconnect Style*
*100 mm*

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 μA |
| Operating Voltage | 10…30V DC |
| Voltage Drop | ≤2.4V |
| Repeatability | ≤2% |
| Hysteresis | 10% typical |
| Reverse Polarity Protection | Incorporated |
| Transient Noise Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Certificationss | CE Marked for all applicable directives |
| Enclosure | NEMA 4 IP67 (IEC 529) |
| Connections | Cable: 2 m (6.5 ft) length<br>3-conductor #26 AWG PVC<br>Quick-Disconnect: 4-pin micro style |
| LED | Red: Output energized |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock and Vibration | 5 g, 10…55 Hz |

## Features

- 3-wire operation
- 3-conductor, 4-pin micro QD style
- 10…30V DC
- Reverse polarity, short circuit, overload, false pulse, and transient noise protection
- CE Marked for all applicable directives

## Product Selection

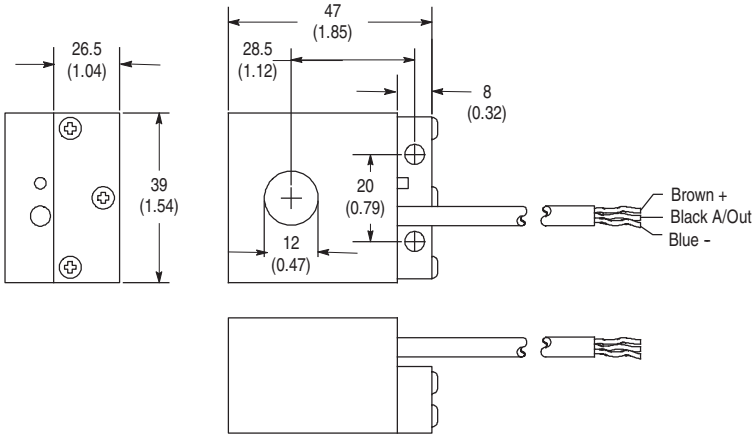
| Ring Diameter | Minimum Ball Size [mm (in.)] | Output Configuration | | Switching Frequency [Hz] | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Micro QD Style |
| 12 mm | 2.5 (0.10) | N.O. | PNP | 800 | 871R-D12NP39-E2 | — |
| 20 mm | 6 (0.24) | | | 1000 | 871R-D20NP73-E2 | |
| 50 mm | 3 (0.12) | N.O. and N.C. | PNP | 500 | — | 871R-D50NP90-D4 |
| | | | NPN | | | 871R-D50NN90-D4 |
| 100 mm | 8 (0.31) | N.O. and N.C. | PNP | 500 | | 871R-D100NP120D4 |
| | | | NPN | | | 871R-D100NN120D4 |
| Recommended Standard QD Cordset (-6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)) | | | | | | 889D-F4AC-2 |

## QD Cordsets

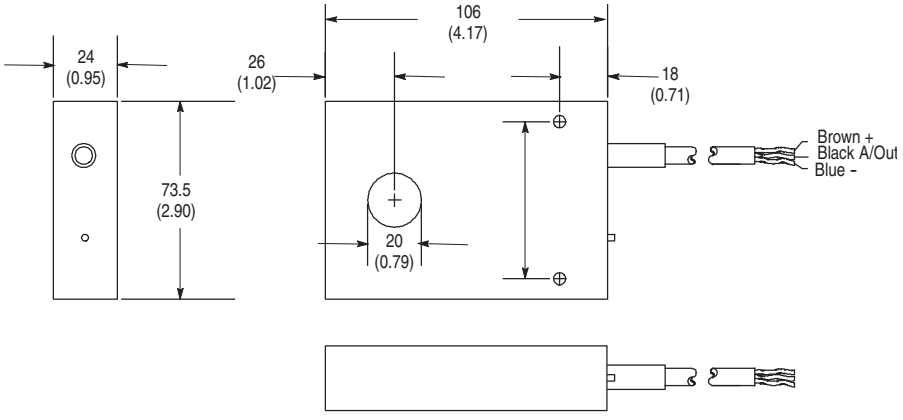
| Description | Page Number |
|---|---|
| Other Cordsets Available | 8-2 |
| Terminal Chambers | 8-2 |

## Approximate Dimensions [mm (in.)]

### Cable Style (Cat. No. 871R-D12NP39-E2)

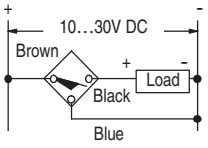



### Cable Style (Cat. No. 871R-D20NP73-E2)

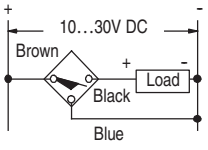



## Typical Wiring Diagrams

Normally Open
PNP (Sourcing)




Normally Open
PNP (Sourcing)

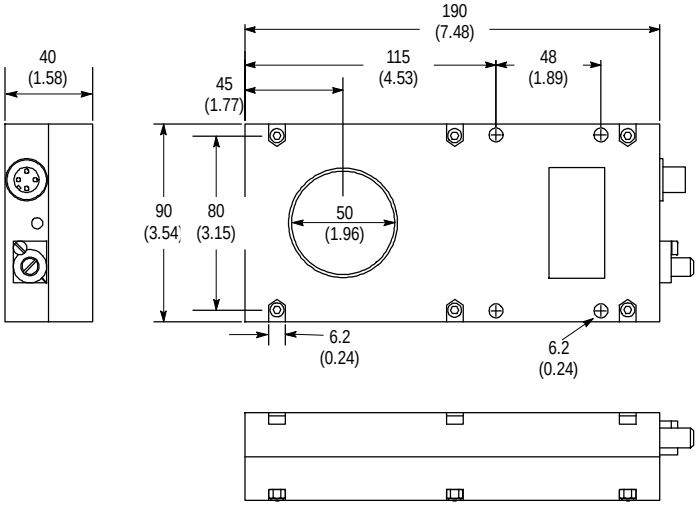


# 871R 3-Wire DC

## Ring Style

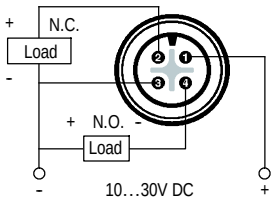
### Approximate Dimensions [mm (in.)]

**Micro Quick-Disconnect Style (871R-D50NP90-D4 & 871R-D50NN90-D4)**

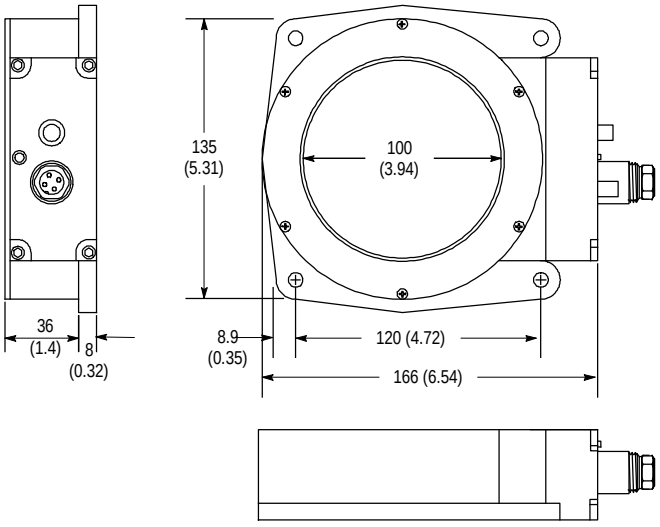



### Wiring Diagrams

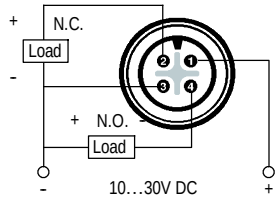
**Complementary Normally Open and Normally Closed**
**PNP (Sourcing)**




**Micro Quick-Disconnect Style (871R-D100NP120-D4 & 871R-D100NN120-D4)**




**Complementary Normally Open and Normally Closed**
**PNP (Sourcing)**



*871R DC Cable Style*
*30 mm Slot Gap*

## Features

- 3-wire operation
- 3-conductor
- 18…30V DC
- False pulse and transient noise protection
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤200 mA |
| Leakage Current | ≤10 μA |
| Operating Voltage | 18…30V DC |
| Voltage Drop | ≤2.4V |
| Repeatability | ≤2% |
| Hysteresis | 15% typical |
| Transient Noise Protection | Incorporated |
| False Pulse Protection | Incorporated |
| Certificationss | CE Marked for all applicable directives |
| Enclosure | NEMA 4 IP65 (IEC 529) |
| Connections | Cable: 2 m (6.5 ft) length<br>3-conductor #26 AWG PVC |
| LED | None |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°F) |
| Shock and Vibration | 5 g, 10…55 Hz |

# 871S 3-Wire DC

## Slot Style

### Product Selection

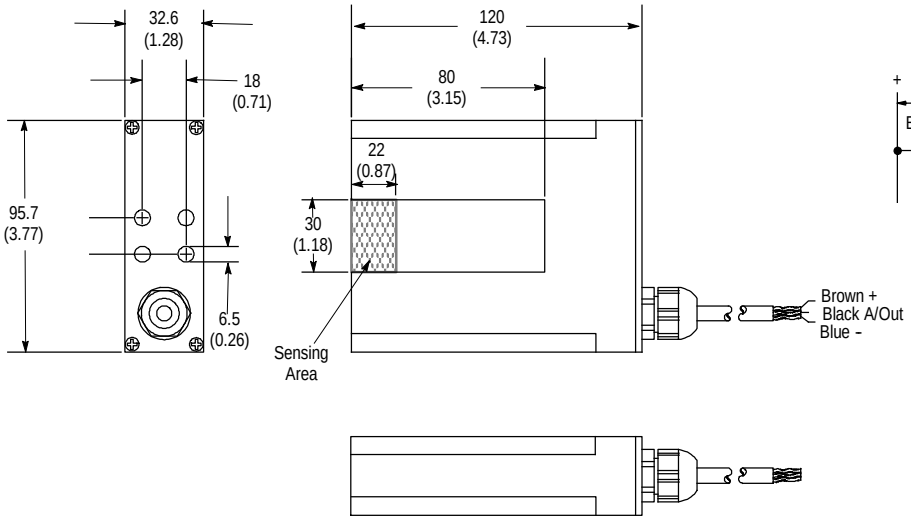
| Slot Gap | Output Configuration | | Switching Frequency [Hz] | Operating Frequency [KHz] | Cat. No. Cable Style |
|---|---|---|---|---|---|
| 30 mm | N.O. | PNP | 500 | 75 | 871S-D20NP30-E2 |
| | | | | 110 | 871S-DX20NP30-E2 |

### QD Cordsets

| Description | Page Number |
|---|---|
| Terminal Chambers | 8-2 |

### Approximate Dimensions [mm (in.)]

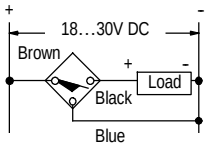
**Cable Style**



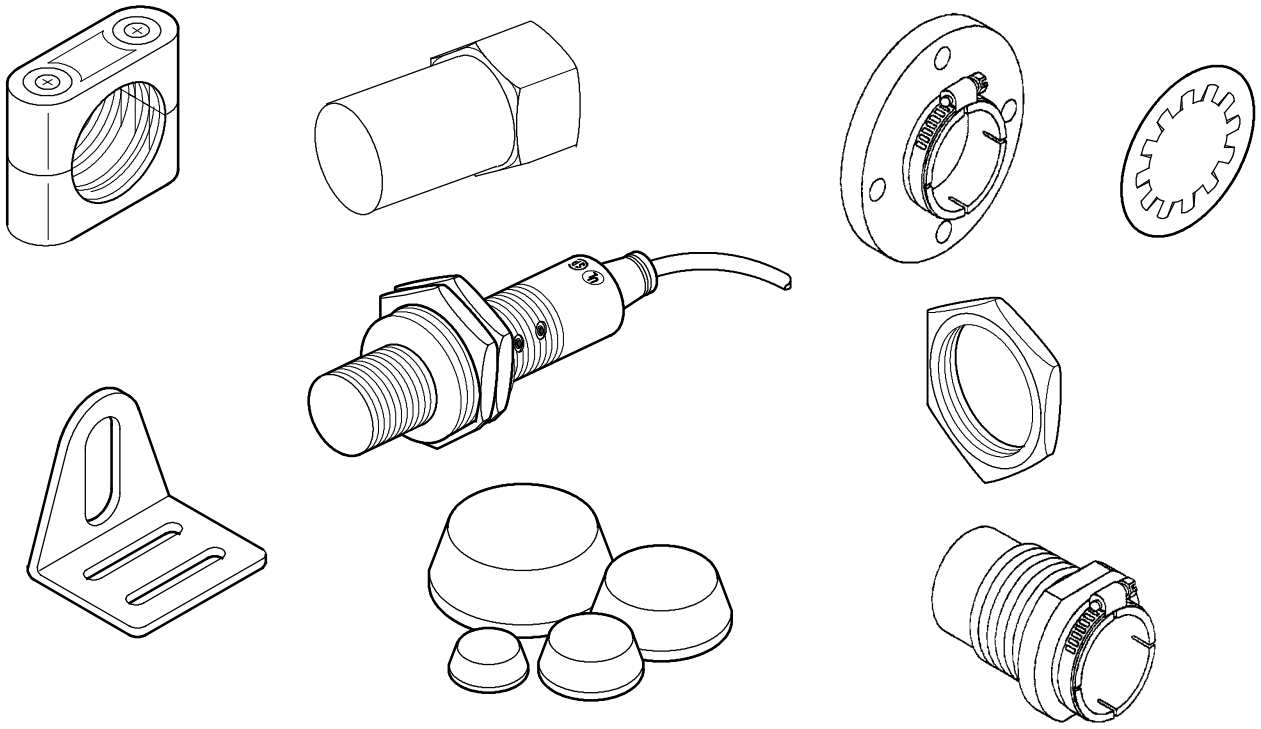

### Wiring Diagrams

**Normally Open**

**PNP (Sourcing)**



# Accessories



## Accessories


Banking Screw Adaptors . page 2-208

Conduit Adaptors . . . . . page 2-209

Mounting Brackets, Spring Return Style . . . . . page 2-210

Mounting Brackets, Quick-Change Style . . . . . page 2-211

Mounting Brackets, Snap Clamp Style . . . . . page 2-212

Mounting Brackets, Swivel/Tilt Style . . . . . page 2-212

Mounting Brackets, Right Angle Style . . . . . page 2-213

Mounting Brackets, Clamp Style . . . . . page 2-214

Mounting Bracket, Can Sensor Style . . . . . page 2-215

Mounting Kit, VersaCube Sensors . . . . . page 2-216

Mounting Bracket, Limit Switch Style, VersaCube . . . . . page 2-217

PTFE Covers VersaCube . page 2-218

PTFE End Caps . . . . . page 2-219

End Caps . . . . . page 2-220

Mounting Nuts . . . . . page 2-221

Lock Washers . . . . . page 2-223

Spacer Kits . . . . . page 2-224


## General Information


Torque Chart . . . . . page 2-225


## Description

A large variety of accessories are available for use with Rockwell Automation/Allen-Bradley products offering convenience in mounting and applying proximity sensors.

Conduit adaptors allow easy connection of most threaded-barrel models to a conduit line. Banking screw adaptors provide a mechanical interface to applications allowing a proximity sensor to be utilized as a mechanical stop switch.

Our clamp, swivel/tilt, and right-angle brackets are designed for convenient mounting and adjustable positioning of tubular-style proximity sensors. Quick-change sensor mounting brackets are designed to allow quick and simple sensor replacement without readjustment. The spring return mounting bracket and end caps help to protect your sensor from damage due to collisions.

VersaCube mounting hardware provides superior mounting stability and convenience when retrofitting rectangular or limit switch style proximity sensors.

Plastic and PTFE end caps and covers provide additional protection to sensors from abrasion corrosion, chemicals, other weld slag and debris.

Sensor wells allow for quick and easy mounting of capacitive sensors in tanks and silos for level detection. Sight-glass mount sensor brackets allow convenient and simple mounting of capacitive sensors to sight tubes for level detection.

All threaded-barrel sensors are shipped with mounting nuts and lock washers. Replacement hardware is available if these become lost or damaged.

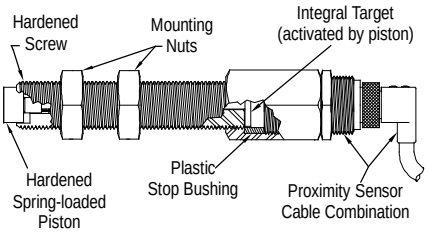
# Accessories

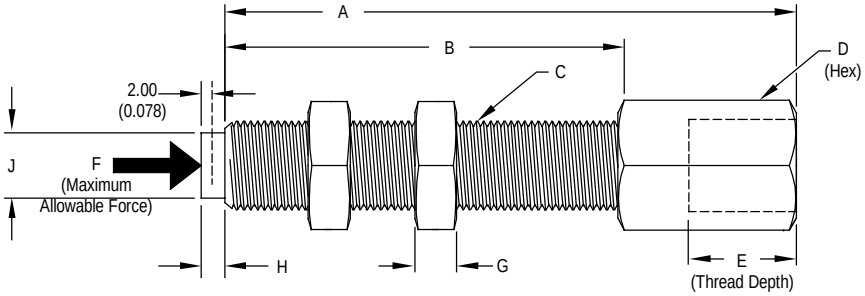
## Banking Screw Adaptors

### Description

Banking screw adaptors provide the flexibility to utilize inductive proximity sensors as mechanical stop switches. These banking screw adaptors are designed for use only with shielded sensors. Each banking screw adaptor is made of heat treated alloy steel components and comes complete with two mounting nuts. Standard models require 252 g (9 oz) of force to activate the switch.

**NOTE**: Models are available requiring more force to activate the switch, contact factory for details.



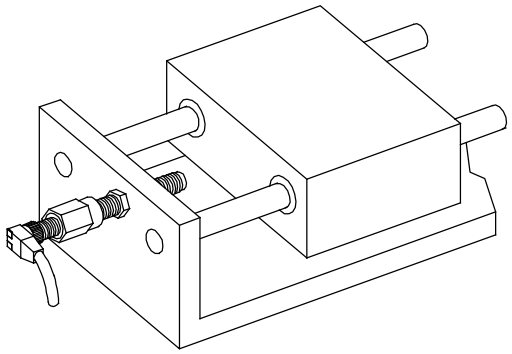

### Approximate Dimensions [mm (in.)]

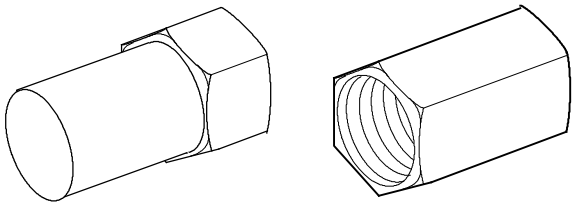
| For Use with: | A | B | C | D | E | F | G | H | J | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|
| 8 mm Shielded Sensors | 57.2 (2.25) | 25.0 (1.00) | M8 x 1 | 11.0 (0.43) | 18.4 (0.72) | 2,000 N (450 lb) | 5.08 (0.20) | 2.93 (0.115) | 5.84 | 871A-AK8-25 |
| | 82.6 (3.25) | 50.0 (2.00) | | | | | | | | 871A-AK8-50 |
| 12 mm Shielded Sensors | 57.2 (2.25) | 25.0 (1.00) | M12 x 1 | 15.7 (0.62) | 17.4 (0.67) | 20,500 N (4,608 lb) | 6.35 (0.25) | 4.22 (0.166) | 9.40 | 871A-AK12-25 |
| | 82.6 (3.25) | 50.0 (2.00) | | | | | | | | 871A-AK12-50 |
| | 108 (4.25) | 75.0 (3.00) | | | | | | | | 871A-AK12-75 |
| | 133 (5.25) | 100 (4.00) | | | | | | | | 871A-AK12-100 |
| 18 mm Shielded Sensors | 57.2 (2.25) | 25.0 (1.00) | M18 x 1 | 22.1 (0.87) | 22.1 (0.87) | 45,000 N (10,115 lb) | 6.35 (0.25) | 4.22 (0.166) | 14.2 | 871A-AK18-25 |
| | 82.6 (3.25) | 50.0 (2.00) | | | | | | | | 871A-AK18-50 |
| | 108 (4.25) | 75.0 (3.00) | | | | | | | | 871A-AK18-75 |
| | 133 (5.25) | 100 (4.00) | | | | | | | | 871A-AK18-100 |

### Sensors for use with Banking Screw Adaptors

| Sensor Diameter | Sensing Range [mm (in.)] | Specifications | Cat. No. |
|---|---|---|---|
| 8 mm | 1.5 (0.06) | (10…30V DC, N.O., PNP, Micro QD) | 872C-DX15-D4 |
| 12 mm | 2.0 (0.08) | | 872C-DX34-D4 |
| 18 mm | 3.0 (0.12) | | 872C-DX33-D4 |
| 12 mm | 1.0 (0.04) | (20…250V AC, N.O., Micro QD) | **872C-A2N12-R3** |
| 18 mm | 4.0 (0.16) | | **872C-A5N18-R3** |

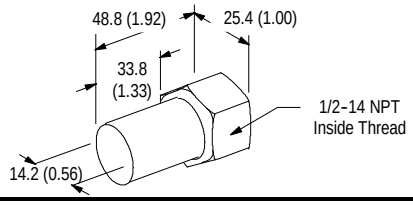
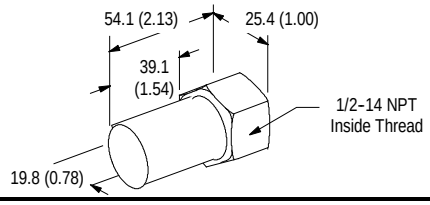
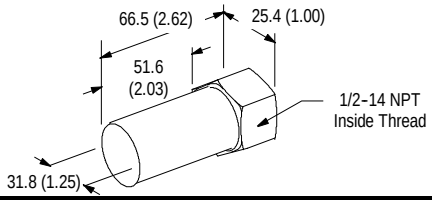
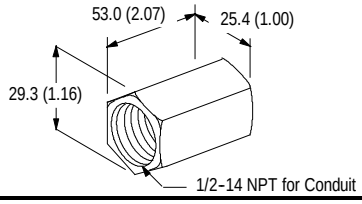
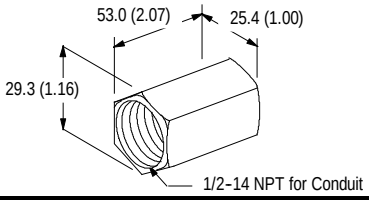
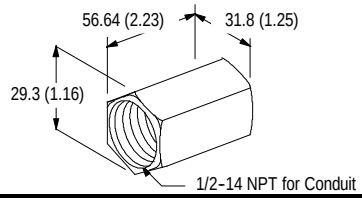
### Typical Application





*12, 18, 30 mm*

## For All Bulletin Numbers Except 871U

| Tube Diameter [mm (in.)] | Tube Thread Size | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|
| 12 (0.47) | M12 x 1 |  | 871C-N13 |
| 18 (0.71) | M18 x 1 |  | 871C-N19 |
| 30 (1.18) | M30 x 1.5 |  | 871C-N31 |
| 12 (0.47) | M12 x 1 |  | 871T-N5 |
| 18 (0.71) | M18 x 1 |  | 871T-N6 |
| 30 (1.18) | M30 x 1.5 |  | 871T-N7 |

# Accessories

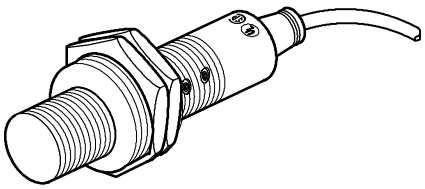
## Mounting Brackets for Tubular Proximity Sensors—Spring Return Style

### Description

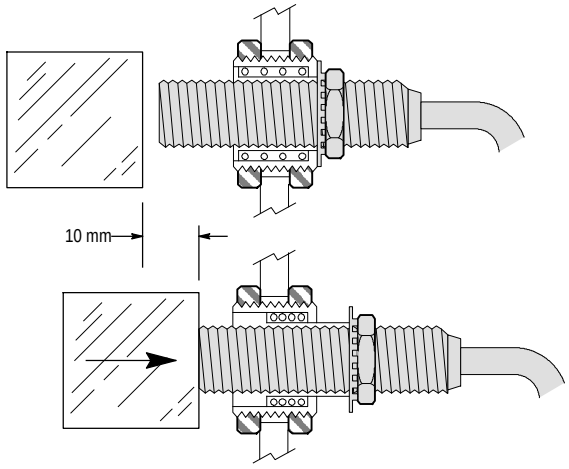
Spring return mounting brackets provide protection for the sensor in the event of a target collision. The bracket is designed to allow the sensor to retract axially when force is applied to its face, then to return to its original position when the force is removed. The bracket is simply threaded onto a tubular proximity sensor and locked into place by using the mounting nut provided with the sensor.

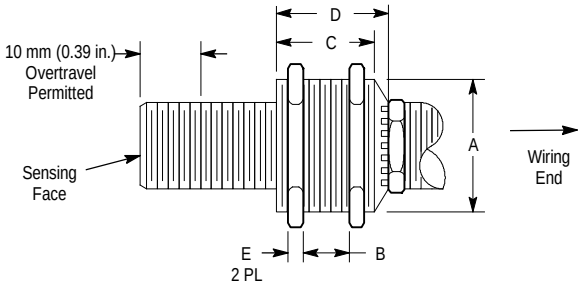
For protection against lateral collisions, the addition of a plastic deflecting cap is recommended (see page 2-220).

**Note**: Right angle mounting brackets are available for use with these spring return brackets (see page 2-213).



*8, 12, 18, 30 mm*




**NOTE 1:** Any overtravel greater than 10 mm (0.39 in.) or improper installation can damage sensor and/or mount. **Do not exceed** torque specifications listed or distortion of mounting sleeve will result.

**NOTE 2:** Use a single jam nut, provided with the sensor, to lock the inner sleeve to the sensor body. A bonding agent such as low strength Loctite adhesive is recommended. Tip holes for retaining ring pliers are provided for grasping the inner sleeve.

### Approximate Dimensions [mm (in.)]

| Sensor Diameter | [mm (in.)] | | | | | | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | Clearance Hole Diameter | A | B | C | D | E | Anodized Aluminum | Stainless Steel |
| 8 mm | 15.9 (0.63) | M16 X 1.5 | 11.0 (0.43) | 19.0 (0.75) | 22.0 (0.87) | 3.5 (0.14) | 871A-BXN8 | 871A-BXS8 |
| 12 mm | 22.2 (0.88) | M22 X 1.5 | 11.0 (0.43) | 19.0 (0.75) | 22.0 (0.87) | 4.0 (0.16) | 871A-BXN12 | 871A-BXS12 |
| 12 mm | 17.9 (0.70) | M18 X 1 | 10.0 (0.40) | 19.0 (0.75) | 21.2 (0.84) | 4.0 (0.16) | — | 871A-BXS12-LP |
| 18 mm | 31.0 (1.22) | M30 X 1.5 | 15.0 (0.59) | 26.0 (1.02) | 30.0 (1.18) | 5.0 (0.20) | 871A-BXN18 | 871A-BXS18 |
| 30 mm | 47.5 (1.87) | M47 X 1.5 | 25.4 (1.0) | 35.0 (1.38) | 37.9 (1.49) | 5.0 (0.20) | 871A-BXN30 | 871A-BXS30 |

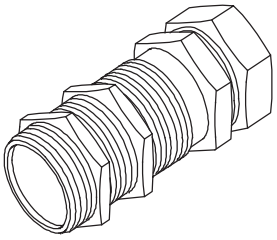
**Note:** Each spring return mounting bracket is supplied with two mounting nuts.

## Description

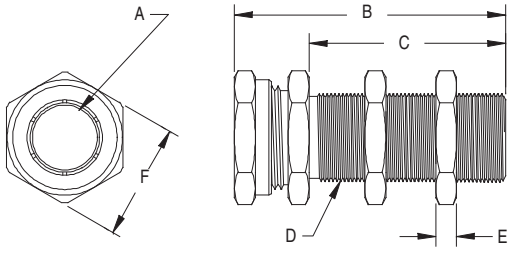
Quick-change sensor brackets provide the ability to install or remove shielded proximity sensors quickly and easily. Quick sensor change-out is achieved with a single collet-style locknut, while maintaining the original sensing distance setup thus eliminating time consuming readjustments. Each quick-change sensor bracket is made of zinc-plated brass components and comes complete with two mounting nuts.

**ATTENTION**

Not for use with ferrous selective proximity sensors.



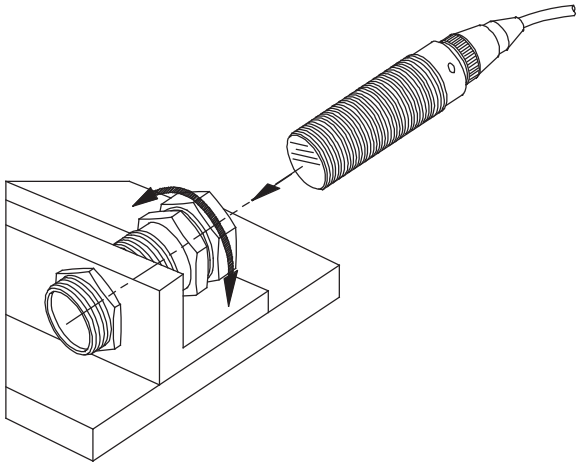
8, 12, 18, 30 mm




## Approximate Dimensions [mm (in.)]

| Sensor Diameter | A | B | C | D | E | F | Cat. No. |
|---|---|---|---|---|---|---|---|
| 8 mm | 8 (0.31) | 32.0 (1.25) | 18.0 (0.71) | M12 X 1 | 3.05 (0.12) | 17.4 (0.68) | 871A-BQN8 |
| | | 48.0 (1.89) | 34.0 (1.34) | | | | 871A-BQN8-L |
| 12 mm | 12 (0.47) | 34.0 (1.34) | 20.0 (0.79) | M16 X 1 | 3.30 (0.13) | 22.2 (0.88) | 871A-BQN12 |
| | | 44.0 (1.73) | 30.0 (1.18) | | | | 871A-BQN12-L |
| 18 mm | 18 (0.71) | 38.0 (1.50) | 20.0 (0.79) | M24 X 1.5 | 5.08 (0.20) | 30.2 (1.19) | 871A-BQN18 |
| | | 58.0 (2.28) | 40.0 (1.57) | | | | 871A-BQN18-L |
| 30 mm | 30 (1.18) | 38.0 (1.50) | 20.0 (0.79) | M36 X 1.5 | 5.84 (0.23) | 41.3 (1.63) | 871A-BQN30 |
| | | 58.0 (2.28) | 40.0 (1.57) | | | | 871A-BQN30-L |

## Typical Application

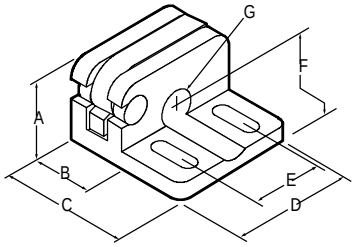


# Accessories

## Snap-Clamp Style Mounting Bracket for Tubular Proximity Sensors

### Description

The snap-clamp style mounting bracket for tubular inductive proximity sensors provides easy, tool-free installation for 12 and 18 mm barrel diameters. This plastic bracket allows fast, simple installation and removal of the sensor, and is ideal for general purpose applications.




### Approximate Dimensions and Product Selection [mm (in.)]

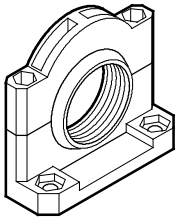
| Sensor Diameter | A | B | C | D | E | F | G | Cat. No. |
|---|---|---|---|---|---|---|---|---|
| 12 mm | 25.3 (0.99) | 22.1 (0.87) | 39.9 (1.57) | 35.5 (1.4) | 22.0 (0.87) | 8.1 (0.32) | 12 mm | **871A-SCBP12** |
| 18 mm | 30.5 (1.2) | 22.9 (0.9) | 42.9 (1.69) | 39.6 (1.56) | 26.0 (1.02) | 11.2 (0.44) | 18 mm | **871A-SCBP18** |

## Mounting Brackets for Tubular Proximity Sensors—Swivel/Tilt Style

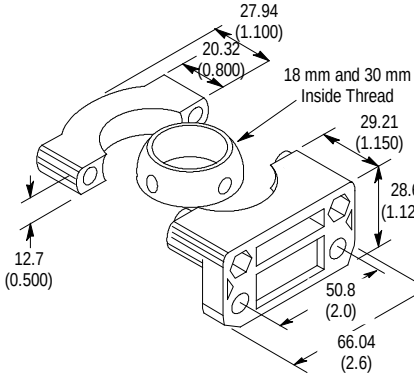
### Description

The swivel/tilt mounting bracket provides both axial and 10° tilt adjustment for our 18 mm and 30 mm tubular-style products. It is ideal for convenient mounting and alignment of 873C ultrasonic sensors.

*18 mm and 30 mm*



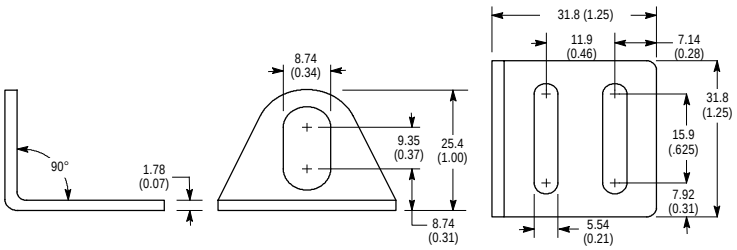
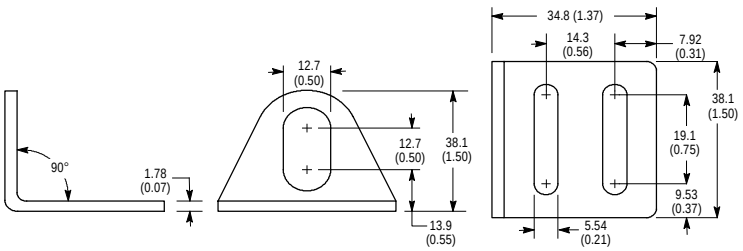
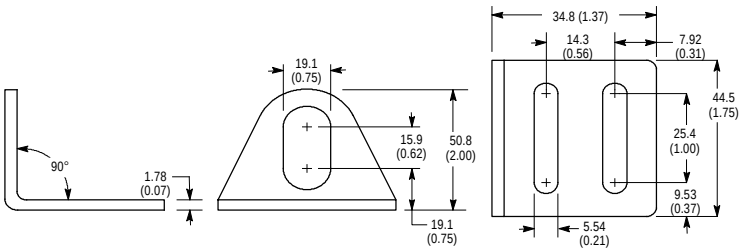
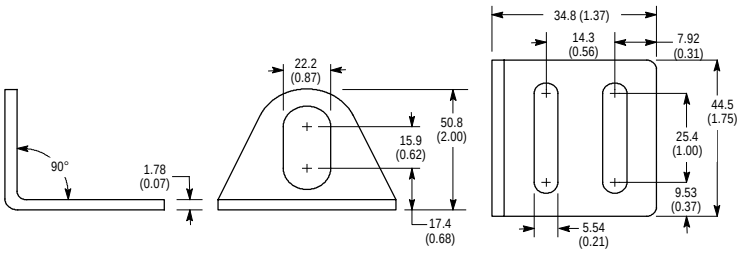
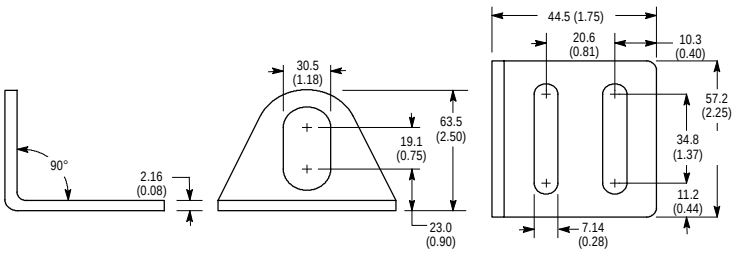
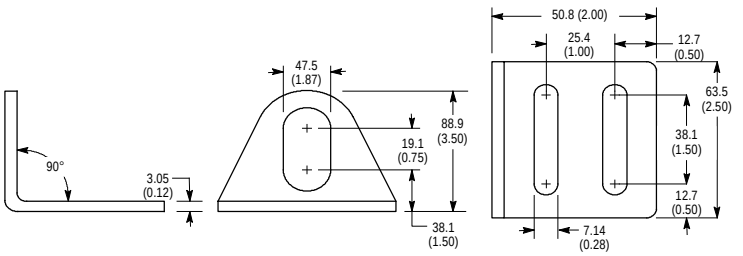
### Approximate Dimensions [mm (in.)]




| Description | Cat. No. |
|---|---|
| 30 mm Mounting Bracket | 60-2439 |
| 18 mm Mounting Bracket | 60-2649 |

**Note:** Each swivel/tilt mounting bracket is supplied with two screws and two locking nuts.

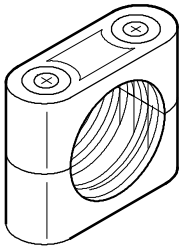
## Mounting Brackets for Tubular Proximity Sensors—Right Angle Style

| Proximity Tube Diameter [mm in.] | Approximate Dimensions [mm (in.)] | Material | Cat. No. |
|---|---|---|---|
| 8 (0.31) |  | Zinc-Plated Steel | 871A-BRN8 |
| | | Stainless Steel | 871A-BRS8 |
| 12 (0.047) |  | Zinc-Plated Steel | **871A-BRN12** |
| | | Stainless Steel | 871A-BRS12 |
| 18 (0.071)<br>Also for use with the 871A-BXN8 or 871A-BXS8 Spring Return Brackets |  | Zinc-Plated Steel | **871A-BRN18** |
| | | Stainless Steel | **871A-BRS18** |
| For use with 871A-BXN12 or 871A-BXS12 Spring Return Brackets |  | Zinc-Plated Steel | 871A-BRN22 |
| | | Stainless Steel | 871A-BRS22 |
| 30 (1.18)<br>Also for use with the 871A-BXN18 or 871A-BXS18 Spring Return Brackets |  | Zinc-Plated Steel | **871A-BRN30** |
| | | Stainless Steel | **871A-BRS30** |
| For use with 871A-BXN30 or 871A-BXS30 Spring Return Brackets |  | Zinc-Plated Steel | 871A-BRN47 |
| | | Stainless Steel | 871A-BRS47 |

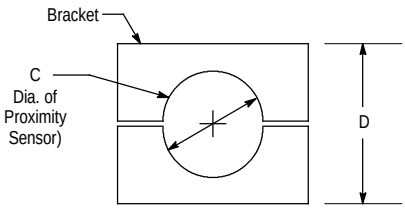
# Accessories

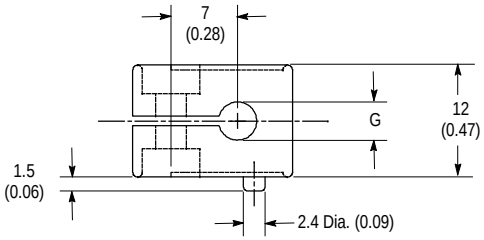
## Mounting Brackets for Tubular Proximity Sensors—Clamp Style

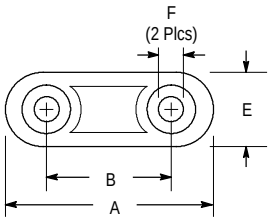
**Stainless Steel Mounting Hardware and Chemical Resistant Material for Harsh Environment**

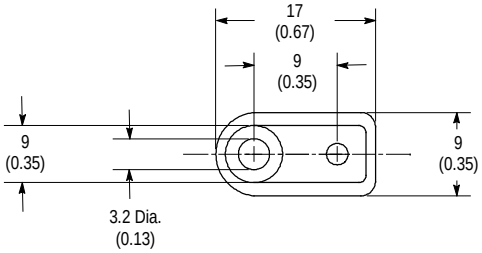


*5, 6.5, 8, 12, 18, 30, 34 mm*



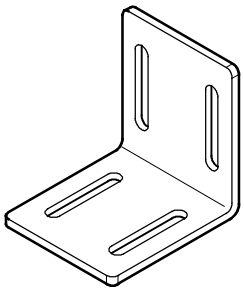



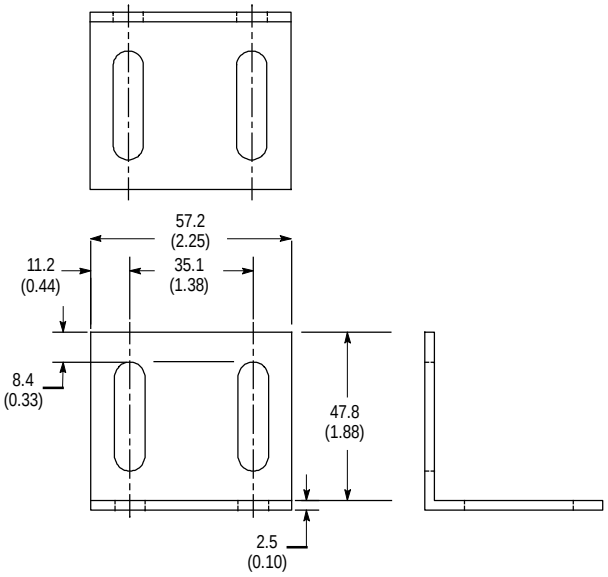

## Approximate Dimensions [mm (in.)]

| Sensor Diameter | A | B | C | D | E | F | G | Cat. No. |
|---|---|---|---|---|---|---|---|---|
| 5 mm | — | — | — | — | — | — | 5 (0.20) | 871A-BP5 |
| 6.5 mm | — | — | — | — | — | — | 6.5 (0.26) | 871A-BP7 |
| 8 mm | 29.0 (1.14) | 18.0 (0.708) | 8.0 (0.31) | 18.3 (0.72) | 11.0 (0.432) | 4.4 (0.172) | — | 871A-BP8 |
| 12 mm | 36.0 (1.42) | 24.0 (0.944) | 12.0 (0.47) | | 12.0 (0.472) | | — | 871A-BP12 |
| 18 mm | 45.0 (1.772) | 32.0 (1.26) | 18.0 (0.71) | 29.4 (1.16) | 13.0 (0.512) | 5.4 (0.212) | — | **871A-BP18** |
| 30 mm | 60.0 (2.40) | 45.0 (1.772) | 30.0 (1.18) | 48.4 (1.91) | 15.8 (0.624) | 5.5 (0.218) | — | 871A-BP30 |
| 34 mm | 65.8 (2.59) | 50.0 (1.97) | 34.0 (1.34) | 48.3 (1.90) | | | — | 871A-BP34 |

## Stainless Steel Mounting Bracket Assembly



## Approximate Dimensions [mm (in.)]




| Description | Cat. No. |
|---|---|
| Mounting Bracket | 871A-BR58 |

# Accessories

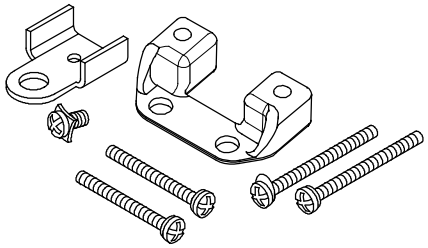
## Mounting Bracket for VersaCube™ Proximity Sensors

### Description

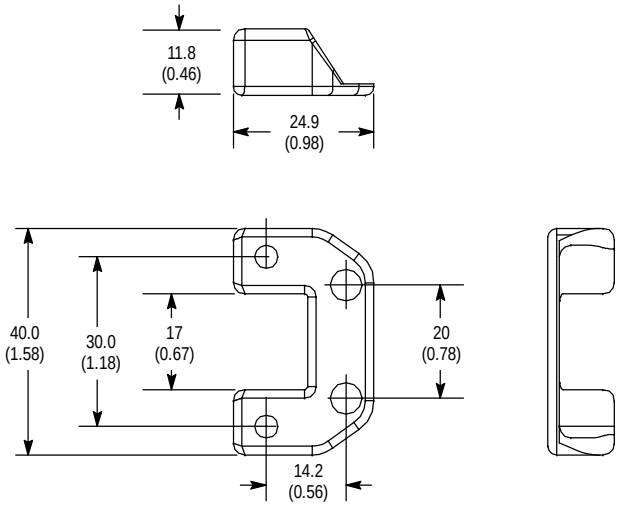
The mounting kit for VersaCube sensors provides additional mounting flexibility to 871P VersaCube style sensors. This kit includes an accessory mounting bracket that allows the VersaCube to bolt in place of existing 871P rectangular and similar competitive sensors. Appropriately sized mounting screws are also supplied. Additionally a ground lug terminal and green color-coded binding screw are provided for grounding the VersaCube sensor in the event that the unit is not mounted to a grounded metal frame.

**Kit includes:**

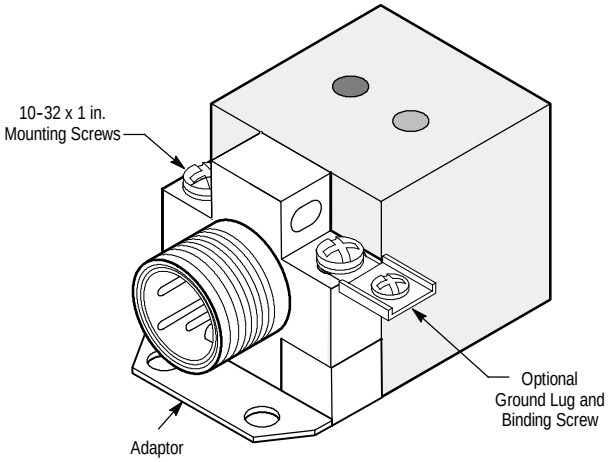
(1) Threaded mounting bracket
(1) Through-hole mounting bracket
(2) 10-32 x 1 in. mounting screw
(2) 10-32 x 1½ in. mounting screw
(1) Ground terminal lug
(1) Green color-coded binding screw



### Approximate Dimensions [mm (in.)]




### Typical Application

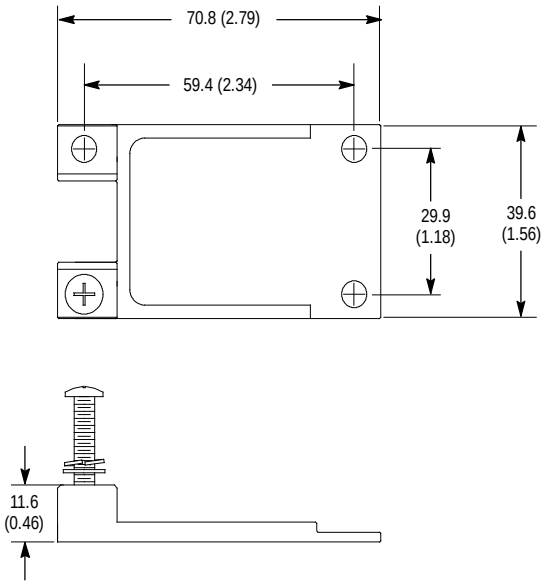



| Description | Cat. No. |
|---|---|
| Mounting Kit | 871A-PKIT |

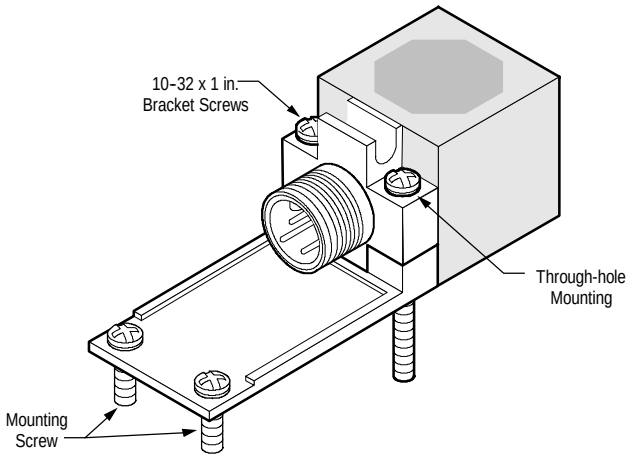
## Description

The limit switch style mounting bracket (**871A-PKITLS**) has the same mounting pattern as limit switch style proximity sensors. It provides superior mounting stability and convenience when retrofitting a limit switch style proximity sensor with a VersaCube.

## Approximate Dimensions [mm (in.)]




## Typical Application



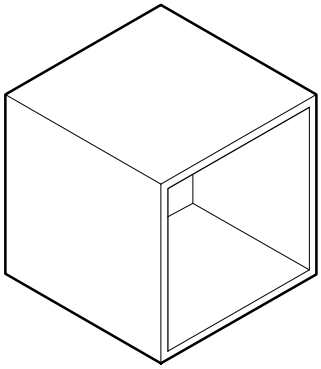

| Description | Cat. No. |
|---|---|
| Mounting Kit | 871A-PKITLS |

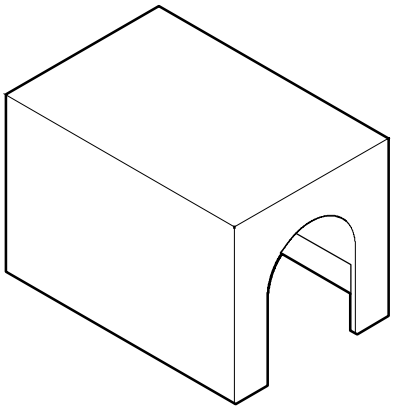
# Accessories

## PTFE Cover for VersaCube

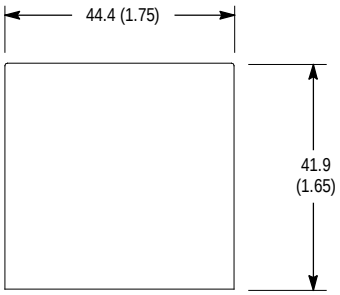
### Description

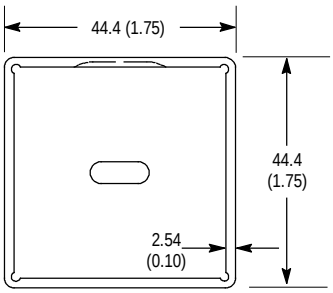
These PTFE covers are designed to protect the VersaCube from weld slag and other debris.



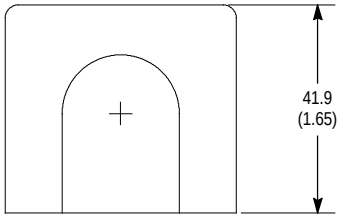


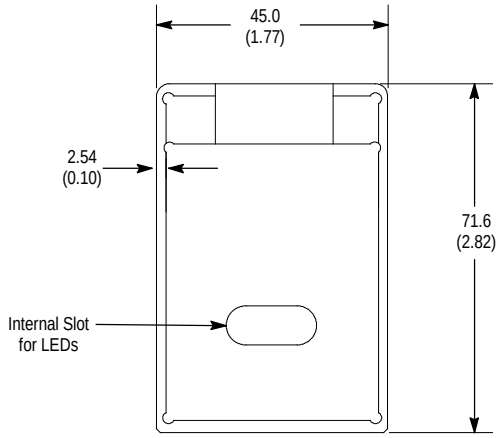
### 871A-KCT40-F




### 871A-KCT40-T



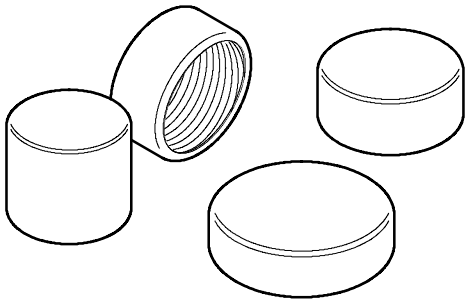




**NOTE:** Internal slot for LED visibility.

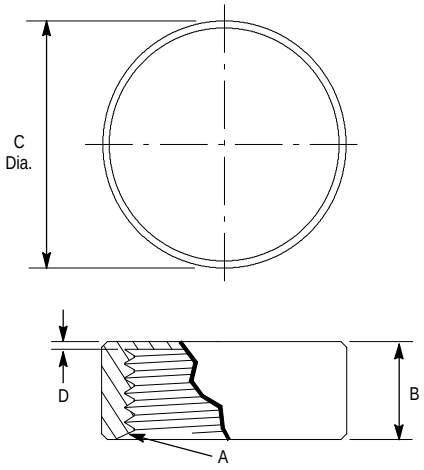
| Description | Cat. No. |
|---|---|
| Short PTFE Cover | 871A-KCT40-F |
| Long PTFE Cover | 871A-KCT40-T |

## Description

PTFE end caps protect tubular proximity sensors from abrasion, corrosion, chemical exposure, weld slag, and other debris.



*8, 12, 18, 30 mm*




## Approximate Dimensions [mm (in.)]

**Shielded**

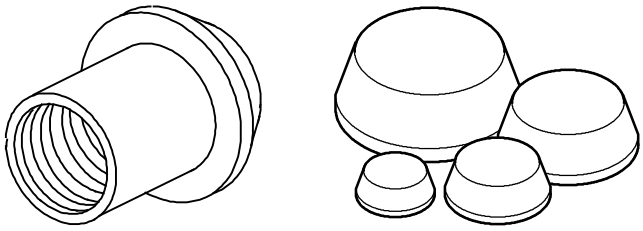
| Sensor Diameter | A | B | C | D | Cat. No. |
|---|---|---|---|---|---|
| 8 mm | M8 x 1 | 5.0 (0.20) | 10.8 (0.43) | 0.50 (0.02) | 871A-KT8 |
| 12 mm | M12 x 1 | 8.9 (0.35) | 14.8 (0.58) | 0.89 (0.035) | 871A-KT12 |
| 18 mm | M18 x 1 | 8.8 (0.35) | 24.4 (0.96) | 1.27 (0.05) | 871A-KT18 |
| 30 mm | M30 x 1.5 | 10.0 (0.39) | 38.1 (1.50) | 2.03 (0.08) | 871A-KT30 |

**Unshielded**

| Sensor Diameter | A | B | C | D | Cat. No. |
|---|---|---|---|---|---|
| 8 mm | M8 x 1 | 9.6 (0.38) | 10.8 (0.43) | 0.50 (0.02) | 871A-KUT8 |
| 12 mm | M12 x 1 | 15.0 (0.60) | 14.8 (0.58) | 0.89 (0.035) | 871A-KUT12 |
| 18 mm | M18 x 1 | 18.8 (0.70) | 24.4 (0.96) | 1.27 (0.05) | 871A-KUT18 |
| 30 mm | M30 x 1.5 | 23.0 (0.90) | 38.1 (1.50) | 2.03 (0.08) | 871A-KUT30 |

# Accessories

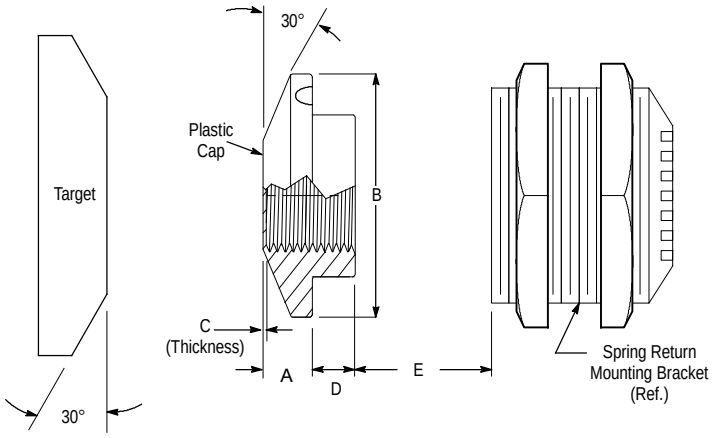
## End Caps for Tubular Proximity Sensors



*8, 12, 18, 30 mm*

## Description

Plastic deflecting caps are designed to be utilized with spring return brackets when lateral collisions might occur. The cap is simply threaded onto the front of the proximity sensor. The 30° slope allows the sensor and spring bracket to retract when a lateral collision occurs.



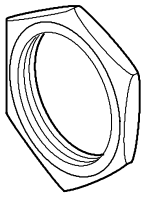

## Approximate Dimensions [mm (in.)]

### Shielded

| Sensor Diameter | A | B | C | D | E | Cat. No. |
|---|---|---|---|---|---|---|
| 8 mm | 5.1 (0.20) | 15.1 (0.59) | 0.25 (0.01) | 0 | 10.0 (0.39) | 871A-KP8 |
| 12 mm | 6.4 (0.25) | 22.9 (0.90) | 0.89 (0.04) | | | 871A-KP12 |
| 18 mm | 8.0 (0.31) | 31.4 (1.34) | | | | 871A-KP18 |
| 30 mm | | 44.5 (1.75) | | | 12.7 (0.50) | 871A-KP30 |

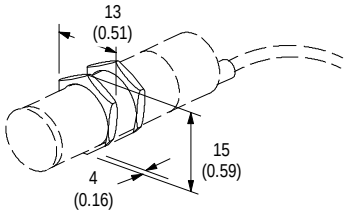
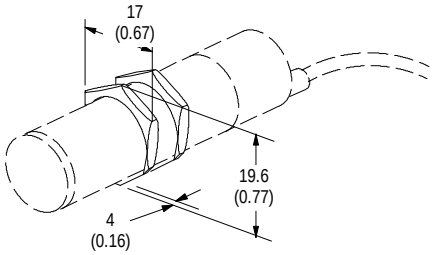
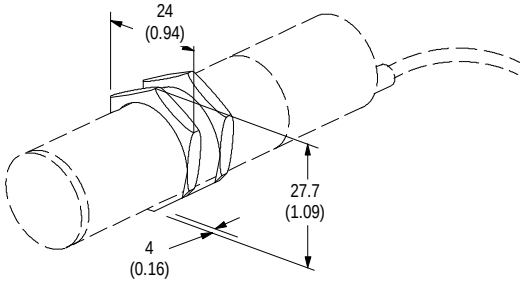
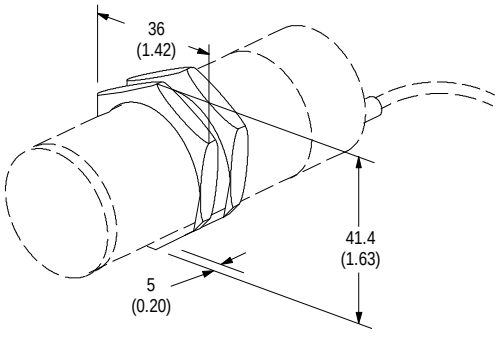
### Unshielded

| Sensor Diameter | A | B | C | D | E | Cat. No. |
|---|---|---|---|---|---|---|
| 8 mm | 5.1 (0.20) | 15.1 (0.59) | 0.25 (0.01) | 9.51 (0.37) | 10.0 (0.39) | 871A-KPU8 |
| 12 mm | 6.4 (0.25) | 22.9 (0.90) | 0.89 (0.04) | 17.3 (0.68) | | 871A-KPU12 |
| 18 mm | 8.0 (0.31) | 31.4 (1.34) | | | | 871A-KPU18 |
| 30 mm | | 44.5 (1.75) | | 20.0 (0.79) | 12.7 (0.50) | 871A-KPU30 |



8, 12, 18, 30 mm

## Brass

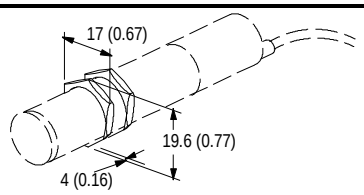
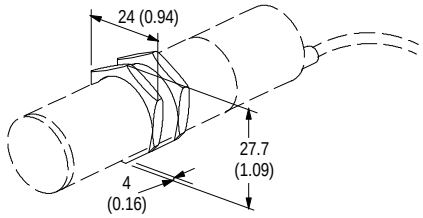
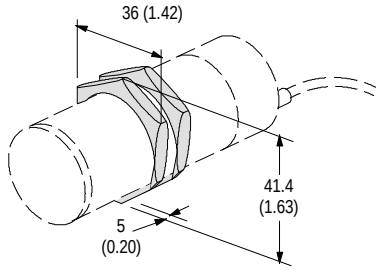
| Proximity Tube Diameter [mm (in.)] | Thread Size ISO Metric | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|
| 8 (0.31) | M8 x 1 |  | 871C-N1 Nickel-Plated |
| 12 (0.47) | M12 x 1 |  | 871C-N2 Nickel-Plated<br>871A-NBT12 PTFE-Coated |
| 18 (0.71) | M18 x 1 |  | 871C-N3 Nickel-Plated<br>871A-NBT18 PTFE-Coated |
| 30 (1.18) | M30 x 1.5 |  | 871C-N4 Nickel-Plated<br>871A-NBT30 PTFE-Coated |

**Note**: Each cat. no. includes two mounting nuts.

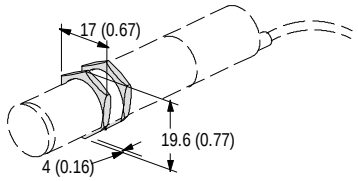
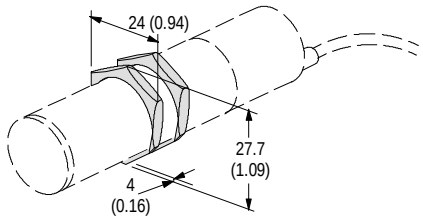
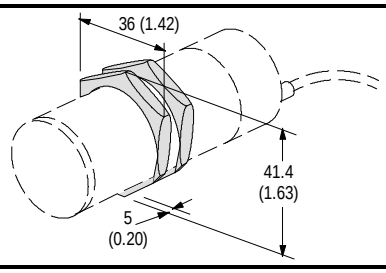
# Accessories

## Mounting Nuts for Tubular Proximity Sensors—Brass, Stainless Steel, and Plastic

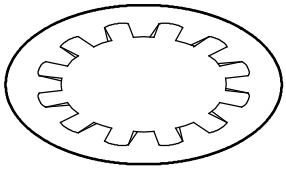
### Stainless Steel

| Proximity Tube Diameter [mm (in.)] | Thread Size ISO Metric | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|
| 12 (0.47) | M12 x 1 |  | 871T-N2 |
| 18 (0.71) | M18 x 1 |  | 871T-N4 |
| 30 (1.18) | M30 x 1.5 |  | 871T-N8 |

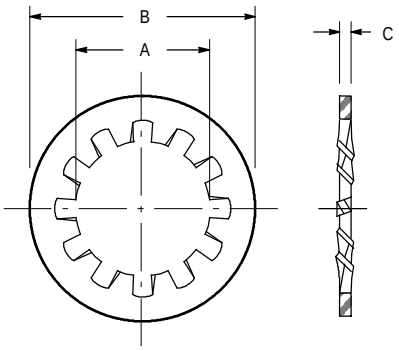
### Plastic

| Proximity Tube Diameter [mm (in.)] | Thread Size ISO Metric | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|
| 12 (0.47) | M12 x 1 |  | 871T-N1 |
| 18 (0.71) | M18 x 1 |  | 871T-N3 |
| 30 (1.18) | M30 x 1.5 |  | 871C-N5 |

**Note**: Each cat. no. includes two mounting nuts.



8, 12, 18, 30 mm




## Approximate Dimensions [mm (in.)]

| Nominal Washer Size [mm (in.)] | A | | B | | C | | Cat. No. |
|---|---|---|---|---|---|---|---|
| | Inside Diameter [mm (in.)] | | Outside Diameter [mm (in.)] | | Material Thickness [mm (in.)] | | |
| 8.0 (0.031) | 8.5 (0.33) | 8.2 (0.32) | 15.5 (0.61) | 14.75 (0.58) | 0.85 (0.03) | 0.7 (0.03) | 871A-LWN8 |
| 12.0 (0.047) | 12.7 (0.5) | 12.3 (0.48) | 20.25 (0.8) | 19.5 (0.77) | 1.0 (0.04) | 0.8 (0.03) | 871A-LWN12 |
| 18.0 (0.071) | 19.1 (0.75) | 18.5 (0.73) | 29.6 (1.17) | 28.6 (1.13) | 1.3 (0.051) | 1.1 (0.04) | 871A-LWN18 |
| 30.0 (1.18) | 31.4 (1.24) | 30.6 (1.2) | 46.3 (1.82) | 45.1 (1.78) | 1.7 (0.07) | 1.5 (0.06) | 871A-LWN30 |

**Note**: Each cat. no. includes two lock washers.

# Accessories

## Spacer Kits

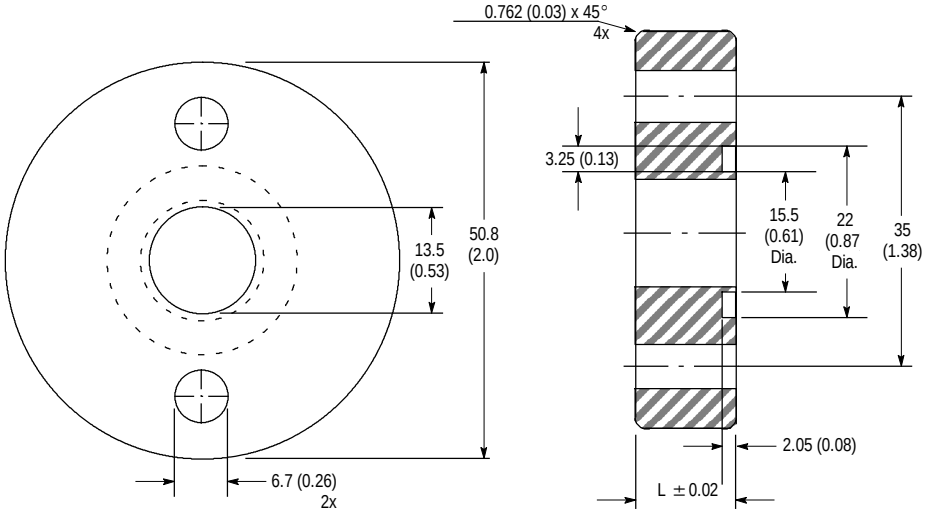
### Selection Guide

Spacer kits are available for use with 871D in-port tubular position sensors for nonstandard tubular probe lengths. Example from chart below: Sensor probe length required is 101.6 mm (4.00 in.). Using sensor 871D-DW2NP1159-D4 and spacer 871A-S1427 results in a probe length of 101.5 mm (3.998 in.). Any difference between desired probe length and length resulting from sensor and spacer combination should be carefully considered to ensure proper clearance in application.

| Spacer Kit Cat. No. | Sensor Cat. No. / Probe Length [mm (in.)] / Spacer Height [mm (in.)] | 871D-xxxxx260-xx | 871D-xxxxx317-xx | 871D-xxxxx524-xx | 871D-xxxxx730-xx | 871D-xxxxx959-xx | 871D-xxxxx1159-xx |
|---|---|---|---|---|---|---|---|
| | | 26.0 (1.025) | 31.7 (1.250) | 52.4 (2.062) | 73.0 (2.875) | 95.9 (3.775) | 115.9 (4.560) |
| 871A-S478 | 4.78 (0.188) | 21.26 (0.837) | 26.97 (1.062) | 47.60 (1.874) | 68.25 (2.687) | 91.11 (3.587) | 111.05 (4.372) |
| 871A-S572 | 5.72 (0.225) | 20.32 (0.800) | 26.04 (1.025) | 46.66 (1.837) | 67.31 (2.650) | 90.17 (3.550) | 110.11 (4.335) |
| 871A-S780 | 7.80 (0.307) | 18.24 (0.718) | 23.95 (0.943) | 44.58 (1.755) | 65.23 (2.568) | 88.09 (3.468) | 108.03 (4.253) |
| 871A-S945 | 9.45 (0.372) | 16.59 (0.653) | 22.30 (0.878) | 42.93 (1.690) | 63.58 (2.503) | 86.44 (3.403) | 106.38 (4.188) |
| 871A-S953 | 9.53 (0.375) | 16.51 (0.650) | 22.23 (0.875) | 42.85 (1.687) | 63.50 (2.500) | 86.36 (3.400) | 106.30 (4.185) |
| 871A-S1270 | 12.70 (0.500) | 13.34 (0.525) | 19.05 (0.750) | 39.67 (1.562) | 60.33 (2.375) | 83.19 (3.275) | 103.12 (4.060) |
| 871A-S1382 | 13.82 (0.544) | 12.22 (0.481) | 17.93 (0.706) | 38.56 (1.518) | 59.21 (2.331) | 82.07 (3.231) | 102.01 (4.016) |
| 871A-S1427 | 14.27 (0.562) | 11.76 (0.463) | 17.48 (0.688) | 38.10 (1.500) | 58.75 (2.313) | 81.61 (3.213) | 101.55 (3.998) |
| 871A-S1524 | 15.24 (0.600) | 10.80 (0.425) | 16.51 (0.650) | 37.13 (1.462) | 57.79 (2.275) | 80.65 (3.175) | 100.58 (3.960) |
| 871A-S1737 | 17.37 (0.684) | 8.66 (0.341) | 14.38 (0.566) | 35.00 (1.378) | 55.65 (2.191) | 78.51 (3.091) | 98.45 (3.876) |
| 871A-S1809 | 18.09 (0.712) | 7.95 (0.313) | 13.67 (0.538) | 34.29 (1.350) | 54.94 (2.163) | 77.80 (3.063) | 97.74 (3.848) |
| 871A-S2057 | 20.57 (0.810) | 5.46 (0.215) | 11.18 (0.440) | 31.80 (1.252) | 52.45 (2.065) | 75.31 (2.965) | 95.25 (3.750) |
| 871A-S2380 | 23.80 (0.937) | 2.24 (0.088) | 7.95 (0.313) | 28.58 (1.125) | 49.23 (1.938) | 72.09 (2.838) | 92.02 (3.623) |

Each spacer kit contains:
- (1) Spacer
- (1) O-ring
- (2) Appropriate length mounting bolts

### Approximate Dimensions [mm (in.)]

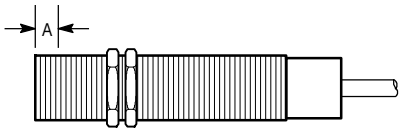



L = Spacer height as indicated in Selection Guide above.

# Torque Chart ❶

## Spring Loaded Brackets

| Mounting Nut Torque | Sensor Nut Torque | Cat. No. |
|---|---|---|
| 8.4 N•m (75 in•lbs) | 3.3 N•m (30 in•lbs) | 871A-BXN8 |
| 15.2 N•m (136 in•lbs) | 5.5 N•m (50 in•lbs) | 871A-BXN12 |
| 22.0 N•m (195 in•lbs) | 11.3 N•m (100 in•lbs) | 871A-BXN18 |




## Bulletin 871C/872C

| Diameter | Shielded | "A" Length | | | Remainder of Thread Length | |
|---|---|---|---|---|---|---|
| | | A [mm (in.)] | Torque N•m (in•lbs) | Turns | Torque N•m (in•lbs) | Turns |
| 8 mm | Y | 4.6 (0.18) | 1.7 (15) | 1 1/2 | 2.8 (25) | 1 1/2 |
| 12 mm | Y | 11.7 (0.46) | 4.0 (35) | 1/4 | 9.6 (85) | 1/2 |
| | N | 5.6 (0.22) | | | | |
| 18 mm | Y | 13.7 (0.54) | 11.3 (100) | 1/3 | 19.8 (175) | 1/2 |
| | N | 5.6 (0.22) | | | | |
| 30 mm | Y/N | - | 33.9 (300) | 1/8 | 33.9 (300) | 1/8 |

## Bulletin 871T

| Diameter | Shielded | "A" Length | | | Remainder of Thread Length | |
|---|---|---|---|---|---|---|
| | | A [mm (in.)] | Torque N•m (in•lbs) | Turns | Torque N•m (in•lbs) | Turns |
| 12 mm | Y | 11.7 (0.46) | 9.0 (80) | 2/3 | 14.1 (125) | 3/4 |
| | N | 5.6 (0.22) | | | | |
| 18 mm | Y | 13.7 (0.54) | 19.8 (175) | 1/2 | 28.3 (250) | 2/3 |
| | N | 5.6 (0.22) | | | | |

## Bulletin 871TM

| Diameter | Shielded | Torque N•m (in•lbs) | Turns |
|---|---|---|---|
| 12 mm | Y | 14.1 (125) | 3/4 |
| | N | | |
| 18 mm | Y | 28.3 (250) | 2/3 |
| | N | | |
| 30 mm | Y | 33.9 (300) | 1/8 |
| | N | | |

❶ For metal housing using supplied hardware.

# Torque Chart ❶

## Bulletin 871Z

| Diameter | Shielded | Remainder of Thread Length | |
|---|---|---|---|
| | | Torque N•m (in•lbs) | Turns |
| 12 mm | Y | 9.6 (85) | 1/2 |
| | N | | |
| 18 mm | Y | 19.8 (175) | 1/2 |
| | N | | |
| 30 mm | Y | 33.9 (300) | 1/8 |
| | N | | |

❶ For metal housing using supplied hardware.

## Bulletin 871ZC

| Diameter | Shielded | Remainder of Thread Length | |
|---|---|---|---|
| | | Torque N•m (in•lbs) | Turns |
| 12 mm | Y | 13.4 (120) | 1/2 |
| 18 mm | | 16.8 (150) | |
| 30 mm | | 19.8 (175) | 1/8 |

# Contents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Technical Definitions and Terminology . . . . . page 3–3

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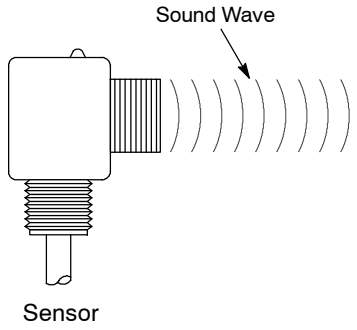
Comprehensive Product Index . . . . . page 14–1

# Quick Selection Guide

| Specifications | <br>**873P**<br>**Analog or Discrete Output** | <br>**873P**<br>**Programmable** | <br>**873C**<br>**Analog or Discrete Output** | <br>**873E**<br>**RightSound™ Opposed Mode Clear Object Sensing System** |
|---|---|---|---|---|
| **Features** | • Sensing ranges from 100…2500 mm<br>• Analog output models (4…20 mA, 0…10V DC)<br>• Discrete output models (normally open, PNP)<br>• Plastic barrel housing<br>• Adjustable sensing distance (discrete models)<br>• Short circuit, overload, false pulse, transient noise and reverse polarity protection<br>• Hold/Synchronize function to reduce crosstalk<br>• cULus Listed and CE Marked for all applicable directives | • Sensing ranges from 150…3500 mm<br>• Programmable models include 2 discrete and 1 analog output<br>• Discrete outputs can be programmed for normally open or normally closed operation<br>• Programmable set point adjustment via push button<br>• Short circuit, overload, false pulse, transient noise and reverse polarity protection | • 3-wire operation<br>• 3-conductor connection<br>• 18…30V DC<br>• Metal, nonmetal solid and liquid sensing capability<br>• Short circuit, false pulse, reverse polarity, overload and transient noise protection<br>• Adjustable sensing distance (discrete model)<br>• Adjustable background suppression (analog model) | • Ideal solution for sensing clear objects or materials including glass and plastic bottles.<br>• Popular right angle package allows through hole mounting as well as 18 mm threaded mounting hubs on the sensor nose and base.<br>• Highly visible 360° indicators conveniently mounted at the top of the sensor.<br>• Designed to Rugged Food Industry Standards: enclosure rated for 1200 psi washdown as well as NEMA 4X, 6P, and IP67 water ingress standards.<br>• Receivers come with both NPN (sinking) and PNP (sourcing) outputs.<br>• Short circuit, overload, reverse polarity, false pulse, and transient noise. |
| **Material** | • Plastic Barrel; 18, 30 mm | • Plastic Barrel; 30 mm | • Plastic Face/Threaded Nickel-Plated Brass Barrel | • Plastic |
| **Sensing Range [mm (in.)]** | • 100…600 (3.94…23.62)<br>• 200…1500 (7.87…59.06)<br>• 300…2500 (11.81…98.43) | • 150…1500 (5.98…59.10)<br>• 350…3500 (13.78…137.80) | • 300…1000 (11.81…39.37) | • 50…750 (2…30) |
| **Operating Voltage** | • 18…30V DC | • 19…30V DC | • 18…30V DC | • 10.8…30V DC |
| **Output Configuration** | • Discrete (Normally Open—PNP)<br>• Analog Current (4…20 mA)<br>• Analog Voltage (0…10V DC) | • Programmable (2—PNP with Analog current or Analog voltage) | • Analog Voltage (1…10V DC)<br>• Discrete (Normally Open—PNP) | • NPN/PNP |
| **Enclosure Type Rating** | • IP67 | • IP67 | • NEMA 12 and IP65 (IEC529) | • NEMA 4X, 6P, IP67 (IEC529); 1200 psi (8270 kPa) washdown |
| **Connection Type** | • Micro QD | • Micro QD | • Cable: 2 m (6.5 ft) length 3-conductor PVC | • Cable: #22 AWG PVC, 2 m (6.5 ft) QD: 4-pin DC micro style male receptacle on pigtail |
| **Additional Info** | • See page 3-5 | • See page 3-8 | • See page 3-11 | • See page 3-13 |

## Principles of Operation

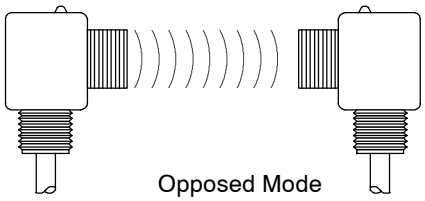



Ultrasonic sensors operate by emitting and receiving high-frequency sound waves. The frequency is usually in the order of 200 kHz, which is too high for the human ear to hear.

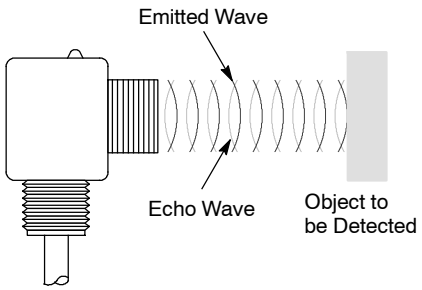
## Modes of Operation

There are two basic modes of operation: opposed mode and diffuse (echo) mode.

In opposed mode, one sensor emits the sound wave and another, mounted opposite the emitter, receives the sound wave.

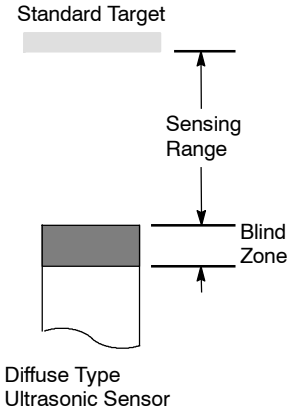



In diffuse mode, the same sensor emits the sound wave and then listens for the echo that bounces off an object.




## Sensing Range

The sensing range is the distance within which the ultrasonic sensor will detect a target under fluctuations of temperature and voltage.




## Blind Zone

Ultrasonic sensors have an inherent blind zone located at the sensing face. The size of the blind zone depends on the frequency of the transducer. Objects located within the blind spot can not be reliably detected.

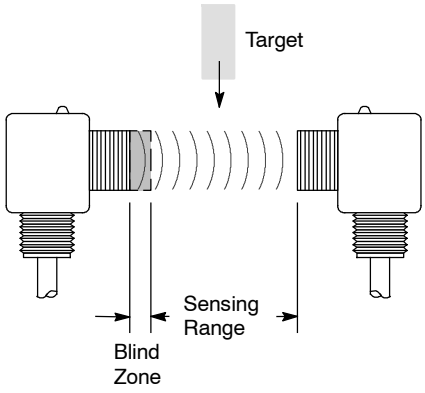
## Target Considerations

Certain characteristic of targets must be considered when using ultrasonic sensors. These include target shape, material, temperature, size and positioning.

Soft materials such as fabric or foam rubber are difficult to detect by diffuse ultrasonic technology because they are not sound-reflective.

The standard target for a diffuse type ultrasonic sensor is established by the International Electrotechnical Commission standard IEC 60947-5-2. The standard target is a square shape, having a thickness of 1mm and made from metal with a rolled finish. The size of the target is dependent upon the sensing range.

For opposed mode ultrasonic sensors, there is no established standard.




Standard targets are used to establish the performance parameters of the sensors. The user must take into consideration differences in performance due to nonstandard targets.

## Notes

# Bulletin 873P Analog or Discrete Output

## Plastic Barrel

*873P Analog Output*
*18 mm*

*873P Discrete Output*
*30 mm*

## Description

Bulletin 873P Ultrasonic Sensors are self-contained solid-state devices designed for noncontact sensing of solid and liquid objects. They are available in 18 mm and 30 mm barrel diameters that are constructed from PBT plastic and meet IP67 enclosure standards. The electronic circuitry is potted to protect against shock, vibration, and contamination.

These sensors are available with either analog or discrete output types and three different sensing ranges. Analog model selection includes 4…20 mA or 0…10V DC outputs.

Discrete models have a normally open PNP output and a potentiometer for adjusting the sensing range to ignore background targets. Bulletin 873P ultrasonic sensors have full electrical protections including short circuit, overload, false pulse, transient noise, and reverse polarity.

## Specifications

| | Discrete | Analog Current | Analog Voltage |
|---|---|---|---|
| Output Configuration | Normally Open, PNP | 4…20 mA | 0…10V DC |
| Load Current, Max. | <500 mA | — | |
| Leakage Current | <0.5 mA | — | |
| Current Consumption | < 35 mA | | |
| Operating Voltage | 18…30V DC | | |
| Sensor Voltage Drop | < 3.5V DC | — | |
| Repeatability | 0.2% | | |
| Hysteresis | 2.5% typical | — | |
| Linearity Tolerance | — | ±0.3% | |
| Frequency | 130, 180, 300 k Hz | | |
| Beam Angle | 8° | | |
| Protection Type | Short circuit, overload, false pulse, transient noise, and reverse polarity | | |
| Certifications | cULus Listed and CE Marked for all applicable directives | | |
| Material | Plastic - PBT | | |
| Enclosure Type Rating | IP67 | | |
| Connection Type | Micro quick-disconnect (18 mm discrete models have 12 inch pigtail) | | |
| Indicator LED | Yellow | — | |
| Sensitivity Adjustment | Potentiometer | — | |
| Operating Temperature [C (F)] | -15…70° (5…158°) | | |
| Shock | 30 g, 11 ms | | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | | |

## Features

- Sensing ranges from 100…2500 mm
- Analog output models (4…20 mA, 0…10V DC)
- Discrete output models (normally open, PNP)
- Plastic barrel housing
- Adjustable sensing distance (discrete models)
- Short circuit, overload, false pulse, transient noise and reverse polarity protection
- Hold/Synchronize function to reduce crosstalk
- cULus Listed and CE Marked for all applicable directives

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Beam Deflectors | 3-10 |
| Cordsets | 8-16 |
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221 |

# 873P Analog or Discrete Output

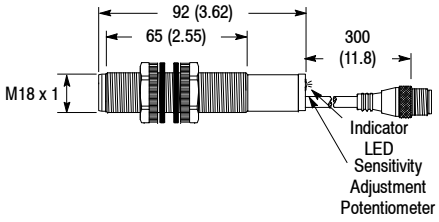
## Plastic Barrel

## Product Selection

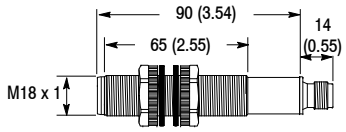
| Barrel Diameter [mm] | Sensing Range [mm (in.)] | Output Configuration | Switching Frequency (Hz) | Connection Type | Cat. No. |
|---|---|---|---|---|---|
| 18 | 100…600 (3.94…23.62) | Normally Open PNP | 20 | Micro QD Pigtail | 873P-DBNP1-F4 |
| | 200…1500 (7.87…59.06) | | 10 | | 873P-DBNP2-F4 |
| 30 | 300…2500 (11.81…98.43) | | 5 | Micro QD | 873P-DCNP1-D5 |
| 18 | 100…600 (3.94…23.62) | 4…20 mA | — | | 873P-DBAC1-D4 |
| | 200…1500 (7.87…59.06) | | | | 873P-DBAC2-D4 |
| 30 | 300…2500 (11.81…98.43) | | | | 873P-DCAC1-D5 |
| 18 | 100…600 (3.94…23.62) | 0…10V DC | | | 873P-DBAV1-D4 |
| | 200…1500 (7.87…59.06) | | | | 873P-DBAV2-D4 |
| 30 | 300…2500 (11.81…98.43) | | | | 873P-DCAV1-D5 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | 889D-F4AC-2 |

## Approximate Dimensions [mm (in.)]

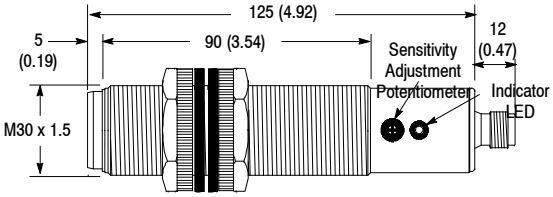
### 18 mm Discrete



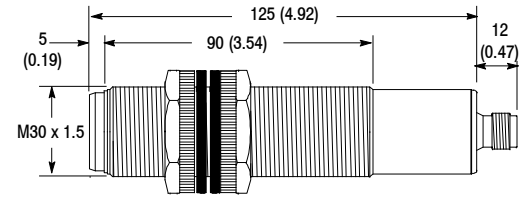

### 18 mm Analog



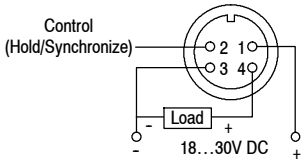

### 30 mm Discrete

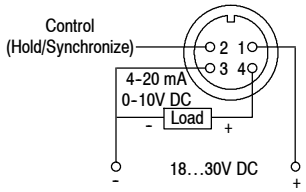


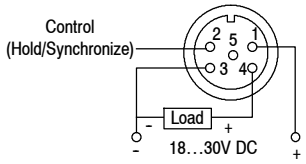

### 30 mm Analog

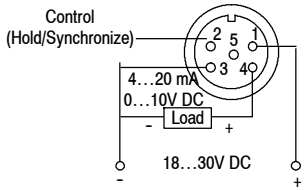



## Wiring Diagrams



## Control Pin

### Normal Operation

For normal operation do not connect the control pin. Hold and synchronize features can be used for special applications.

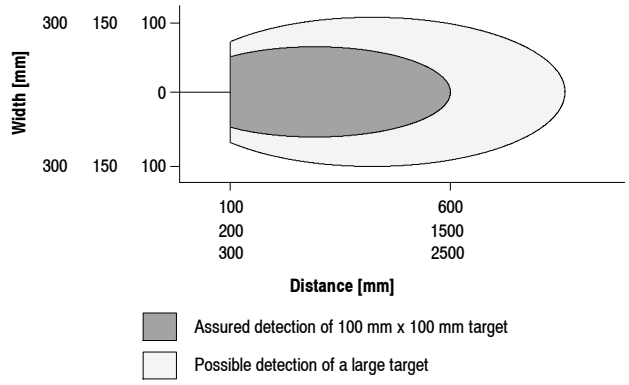
### Hold

To inhibit sensor operation and hold the output to its present state connect the control pin (2) to 0V DC. The sensor will not transmit or receive ultrasonic pulses until this voltage is removed from the control pin. Switching output models will be latched and analog output models will hold their value during this period.

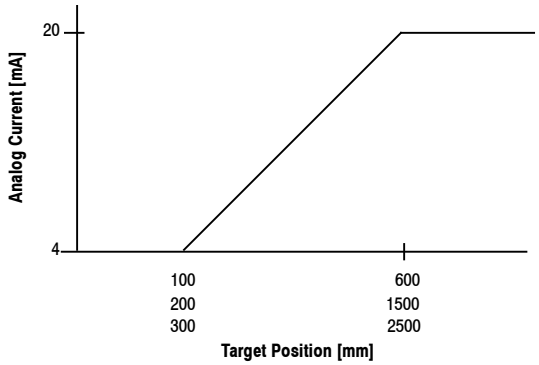
### Synchronize

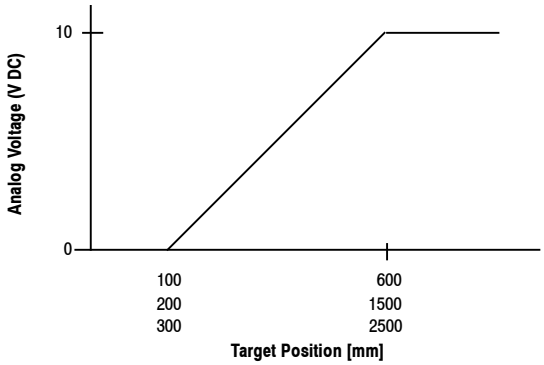
To synchronize the transmission of ultrasonic pulses between several sensors connect the control pins together. This feature reduces the potential for sensor crosstalk between models that are mounted in close proximity to one another.

## Beam Pattern




## Analog Output



# Bulletin 873P Programmable

## Plastic Barrel

*873P DC Programmable*
*30 mm*

## Description

Bulletin 873P Programmable Ultrasonic Sensors are self-contained solid-state devices designed for non-contact sensing of solid and liquid objects. They are available with a 30 mm barrel diameter that is constructed from PBT plastic and meets IP67 enclosure standards. The electronic circuitry is potted to protect against shock, vibration, and contamination.

These sensors have two programmable setpoints with sourcing (PNP) outputs that can be configured for either normally open or normally closed operation. They also feature a 4…20 mA or 0…10V DC analog output. The slope of the analog output is scaled between the limits of the setpoint values. Programming of the setpoints and the output configuration is done using the setup push button on the rear of the housing.

In addition, these devices have full electrical protections including short circuit, overload, false pulse, transient noise and reverse polarity. Bulletin 873P programmable ultrasonic sensors are ideal for applications such as level control, diameter measurement, distance measurement, slope control, and presence detection.

## Specifications

| | |
|---|---|
| **Output Configuration** | Two discrete PNP (Programmable N.O./N.C.)<br>Analog Current: 4…20 mA<br>Analog Voltage: 0…10V DC |
| **Load Current, Max.** | <100 mA (Open collector) |
| **Leakage Current** | <0.5 mA |
| **Current Consumption** | <45 mA |
| **Operating Voltage** | 19…30V DC |
| **Sensor Voltage Drop** | <5V DC |
| **Repeatability** | 0.4% |
| **Hysteresis** | 1% typical |
| **Linearity Tolerance** | ±0.5% |
| **Frequency** | 130, 200 kHz |
| **Beam Angle** | 8° |
| **Protection Type** | Short circuit, overload, false pulse, transient noise, reverse polarity |
| **Certifications** | cULus Listed and CE Marked for all applicable directives |
| **Material** | Plastic - PBT |
| **Enclosure Type Rating** | IP67 |
| **Connection Type** | Micro quick-disconnect |
| **Indicator LED** | Yellow: (2) P1, P2 output; Green: Alignment/echo |
| **Programming** | Via setup push button |
| **Operating Temperature [C (F)]** | -15…70° (5…158°) |
| **Shock** | 30 g, 11 ms |
| **Vibration** | 55 Hz, 1 amplitude, 3 planes |

## Features

- Sensing ranges from 150…3500 mm
- Programmable models include 2 discrete and 1 analog output
- Discrete outputs can be programmed for normally open or normally closed operation
- Programmable set point adjustment via push button
- Short circuit, overload, false pulse, transient noise, and reverse polarity protection
- cULus Listed and CE Marked for all applicable directives

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Beam Deflectors | 3-10 |
| Cordsets | 8-16 |
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221 |

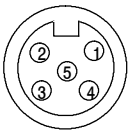
## Product Selection

| Barrel Diameter [mm] | Sensing Range [mm (in.)] | Output Configuration | Switching Frequency (Hz) | Connection Type | Cat. No. |
|---|---|---|---|---|---|
| 30 mm | 150…1500 (5.91…59.10) | 2 PNP (NO or NC) with 4…20 mA | 1 | Micro QD | 873P-DCAC1S-D5 |
| | 350…3500 (13.78…137.80) | | | | 873P-DCAC2S-D5 |
| | 150…1500 (5.91…59.10) | 2 PNP (NO or NC) with 0…10V DC | | | 873P-DCAV1S-D5 |
| | 350…3500 (13.78…137.80) | | | | 873P-DCAV2S-D5 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | 889D-F5AC-2 |

## Approximate Dimensions [mm (in.)]

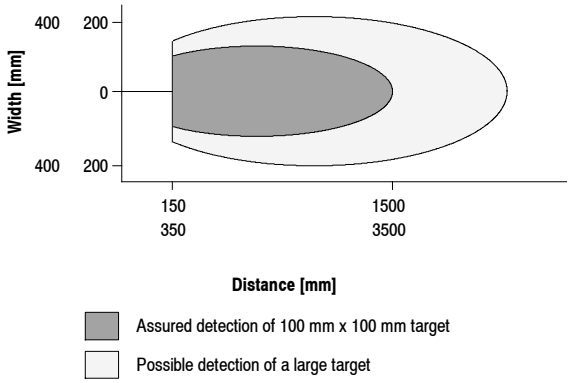
**1500 mm** **3500 mm**

## Wiring Diagram

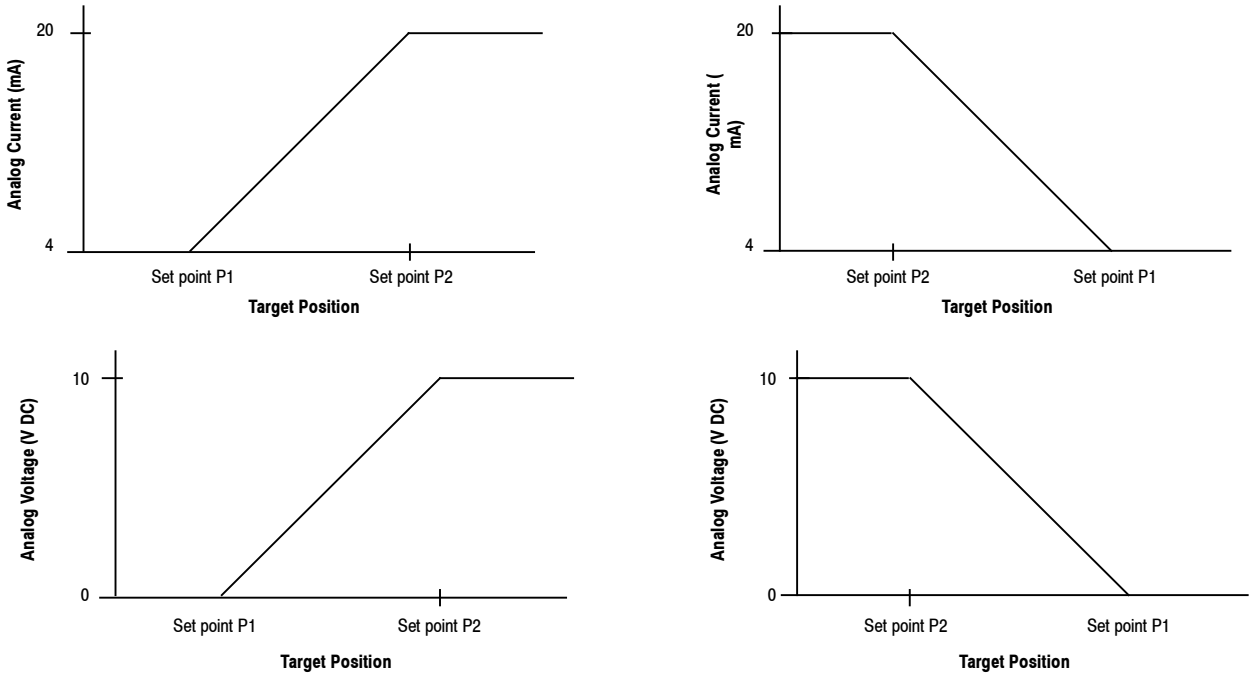



| Pin | Function |
|---|---|
| 1 | 19…30V DC Operating Voltage |
| 2 | Set point (P2) |
| 3 | 0V DC |
| 4 | Set point (P1) |
| 5 | 4…20 mA or 0…10V DC (depending on model) |

## Beam Pattern



## Analog Output

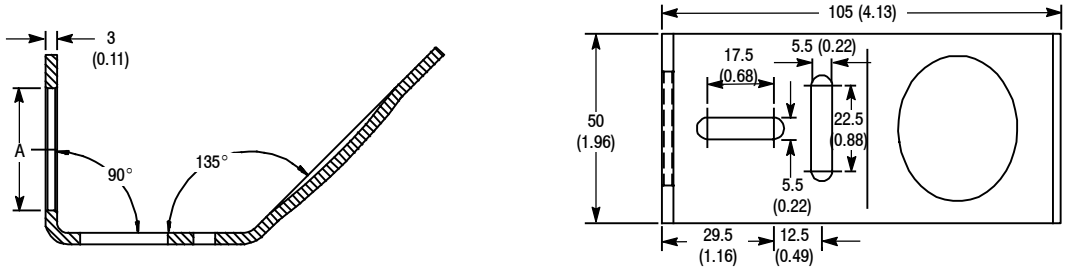



## Accessories

### Beam Deflectors

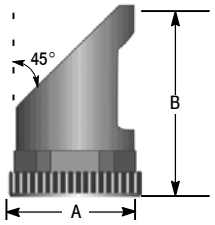
These plastic or stainless steel beam deflectors reduce the mounting profile for space critical applications by deflecting the ultrasonic beam 90°. In addition, stainless steel models provide mounting capability and focus the ultrasonic beam.

**Ultrasonic Beam Deflector/Bracket—Stainless Steel [mm (in.)]**




| Sensor Diameter | A [mm (in.)] | Cat. No. |
|---|---|---|
| 18 mm | 20 (0.79) Dia. | 60-2757 |
| 30 mm | 32 (1.26) Dia. | 60-2758 |

**Ultrasonic Beam Deflector—Plastic [mm (in.)]**




| Sensor Diameter | A [mm (in.)] | B [mm (in.)] | Cat. No. |
|---|---|---|---|
| 18 mm | 23 (0.91) | 35 (1.38) | 60-2759 |
| 30 mm | 35.5 (1.40) | 54 (2.13) | 60-2760 |

*873C DC Cable Style*
*30 mm*
*page 3-12*

## Description

The Bulletin 873C ultrasonic sensor has the ability to detect solid and liquid targets from a distance of up to 1 m (3.3 ft).

The Bulletin 873C comes in one of two versions: a background suppression unit with analog voltage output or a standard diffuse model with a digital output.

The analog model provides an output voltage that varies linearly with the target distance and an adjustable background suppression feature. For many applications, such as monitoring the level of water in a tank, ultrasonic technology allows a single device to do a job that would otherwise require multiple sensors.

The digital model has a normally open PNP output that can be adjusted between 300 mm (11.8 in.) and 1 m (3.3 ft).

## Features

- 3-wire operation
- 3-conductor connection
- 18…30V DC
- Analog or digital (discrete) output
- Metal, nonmetal solid and liquid sensing capability
- Short circuit, false pulse, reverse polarity, overload, and transient noise protection
- Adjustable sensing distance (digital/discrete model)
- Adjustable background suppression (analog model)
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| **Load Current, Max.** | Discrete output: ≤400 mA<br>Analog output: ≤5 mA |
| **Load Current, Min.** | 1 mA |
| **Leakage Current** | ≤10 μA |
| **Operating Voltage** | 18…30V DC |
| **Sensor Voltage Drop** | ≤2.4V |
| **Analog Output** | 1…9V DC |
| **Repeatability** | ±5 mm in axial direction |
| **Hysteresis** | ≤15 mm typical |
| **Frequency** | 200 kHz |
| **Pulse Cone Angle** | 8° (full angle) |
| **Protection Type** | False pulse, transients, reverse polarity, short circuit, overload |
| **Certifications** | CE Marked for all applicable directives |
| **Enclosure Type Rating** | NEMA 12 and IP65 (IEC529)<br>Nickel-plated brass barrel with plastic face |
| **Connection Type** | Cable: 2 m (6.5 ft) length<br>3-conductor PVC |
| **Indicator LED** | Discrete Model: Output Energized<br>Analog Model: Echo Detected |
| **Operating Temperature [C (F)]** | -10…+60° (+14…+140°) |
| **Shock** | 30 g |
| **Vibration** | 10…55 Hz |

## Target Considerations

Because ultrasonic sensors depend on a reflected sound wave for proper operation, the shape, material, temperature and positioning of the target are important. These must be selected to return the strongest possible echo.

The ideal target shape is a smooth, flat surface. Rounded or uneven objects can also be detected, but the sensing distances and/or analog output voltages will be reduced.

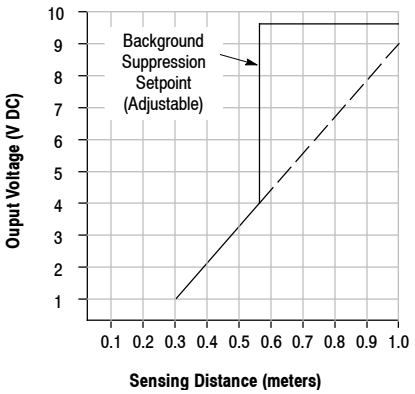
An object must be close to the sensor barrel axis to be detected because the 873C emits ultrasonic pulses in an 8° cone. Targets must be within this cone to reflect the pulses and activate the switch. The object's surface must also face directly toward the sensor to give a proper echo.

The sensor can be positioned accurately using the LED on its end, which glows with an intensity proportional to the strength of the echo. Simply place a target at the desired sensing point, then adjust the position and angle of the sensor to maximize the LEDs brightness.

Soft materials such as fabric or foam rubber are difficult to detect by ultrasonic technology because they are not adequately sound-reflective. This means that non-target objects in the sensing field can be hidden from the sensor by covering them with sound-absorbent material and/or by positioning them so that their echoes are not reflected to the detector.

Target temperatures must be at or below 100°C (212°F) for reliable sensing.

## Output Voltage vs. Target Distance (Analog Model)



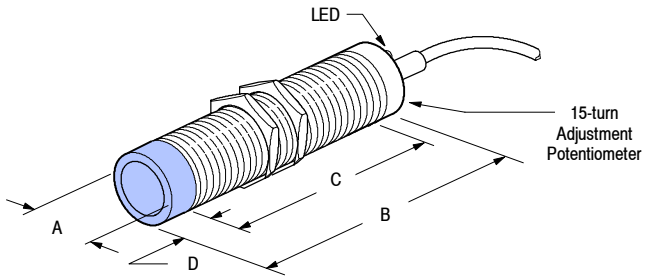
# 873C 3-Wire DC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

### Product Selection

| Barrel Diameter [mm] | Nominal Sensing Distance [mm (in.)] | Output Configuration | | Switching Frequency (Hz) | Cat. No. |
|---|---|---|---|---|---|
| 30 | 300…1000 (11.81…39.37) | Analog | PNP | 5 | 873C- DDAV1000E2 |
| | | N.O. | | | 873C- DDNP1000E2 |

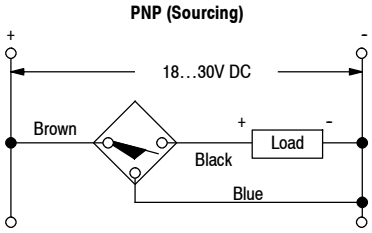
### Approximate Dimensions [mm (in.)]



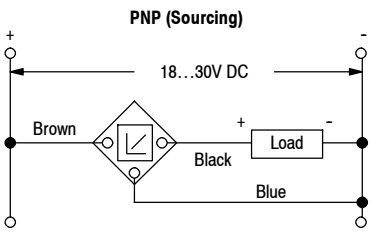

| Thread Size | [mm (in.)] | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M30 X 1.5 | 30.0 (1.18) | 117.0 (4.61) | 95.0 (3.74) | 12.0 (0.47) |

### Wiring Diagrams

**Normally Open Digital (Discrete)**




**Analog**




### Accessories

| Description | Page Number |
|---|---|
| Mounting Brackets | 2-210…2-214 |
| Extra Mounting Nuts | 2-221…2-222 |

# 873E RightSound™ Opposed Mode Clear Object Sensing System

## 18 mm Right Angle Plastic Housing

*Opposed Mode*
*18 mm*

## Specifications

| | |
|---|---|
| **Emitter** | 873E-EDZZ0750A2 (2 m (6.5 ft) 300V cable)<br>873E-EDZZ0750F4 (4-pin DC micro style QD pigtail) |
| **Receiver** | 873E-RDTT0750A2 (2 m (6.5 ft) 300V cable)<br>873E-RDTT0750F4 (4-pin DC micro style QD pigtail) |
| **Sensing Mode** | Opposed |
| **Sensing Range [mm (in.)]** | 50…750 (2…30) |
| **Protection Type** | False pulse, transient noise, short circuit, overload, reverse polarity |
| **Operating Voltage** | 10.8…30V DC |
| **Output Type** | NPN/PNP |
| **Outputs** | Normally Open/Normally Closed |
| **Load Current, Max.** | 100 mA |
| **Leakage Current** | 0.1 mA max. |
| **Response Time** | <2.5 ms |
| **Power-up Delay** | <300 ms |
| **Switching Frequency, Max.** | 125 Hz |
| **Frequency** | 200…240 kHz |
| **Pulse Cone Angle** | (+/-) 5° |
| **Material** | Noryl |
| **Sensing Face Material** | FDA compliant silicone rubber |
| **Enclosure Type Rating** | NEMA 4X, 6P; IP67 (IEC529); 1200 psi (8270 kPa) washdown |
| **Connection Type** | Cable: #22 AWG PVC, 2 m (6.5 ft)<br>QD: 4-pin DC micro style male receptacle on pigtail |
| **Vibration** | 20 g, 10…55 Hz (non-operational) |
| **Operating Temperature [C (F)]** | -25…+70° (-13…+158°) |
| **Storage Temperature [C (F)]** | -40…+85° (-40…+185°) |
| **Relative Humidity** | Not to exceed 95%, noncondensing |
| **Certifications** | UL, cUL, and CE Marked for all applicable directives |
| **Standards** | IEC60947-5-2, EN60947-5-2 |

## Description

RightSound Bulletin 873E sensors are opposed mode ultrasonic sensors consisting of an emitter and a receiver. The receiver is microprocessor based to provide advanced temperature stability and noise immunity. Precise tuning of the receiver to the emitter minimizes interference from ambient noise sources.

The emitter volume control allows the operator to correctly adjust the volume for the sensing distance (distance from the emitter to the receiver) and other variables of a given application (i.e., target speed and spacing, etc.).

The sensing of clear objects, which can be difficult to do reliably with photoelectric controls, is made highly reliable with RightSound ultrasonic sensors. RightSound sensors have been designed for demanding environments, especially those of the Food and Beverage Industry. The NORYL housings are extremely rugged and are rated for 1200 psi washdown and NEMA 4X and 6P standards. The acoustic faces of the emitter and receiver are made of FDA compliant silicone rubber for maximum durability and water ingress protection.

Receivers come with both NPN current sinking and PNP current sourcing outputs rated to 100 mA. The receiver has the ability to operate in either a normally open or normally closed mode. Modes are selected by the polarity of receiver supply voltage. When the receiver is in the normally open mode, the output conducts when the receiver hears a RightSound emitter.

When the receiver is in the normally closed mode, the output conducts when the sonic beam from the emitter is blocked or not present.

## Features

- Continuously adjustable emitter amplitude with instability indicator allows for simple optimized adjustment over 2…30 inch sensing range.
- Ideal solution for sensing clear objects or materials including glass and plastic bottles.
- Highly immune to ambient sonic and electrical noise.
- Popular right angle package allows through hole mounting as well as 18 mm threaded mounting hubs on the sensor nose and base.
- Highly visible 360° indicators conveniently mounted at the top of the sensor.
- Designed to Rugged Food Industry Standards: enclosure rated for 1200 psi washdown as well as NEMA 4X, 6P and IP67 water ingress standards.
- Receivers come with both NPN (sinking) and PNP (sourcing) outputs; output logic switchable via polarity of receiver power wiring; simplified product selection… Select a 6.5 foot cable or a 6 inch pigtail quick-disconnect and cordset and you're ready to start sensing!
- 10.8…30V DC operation with protections for short circuit, overload, reverse polarity, false pulse and transient noise.

# 873E RightSound™ Opposed Mode Clear Object Sensing System

## 18 mm Right Angle Plastic Housing

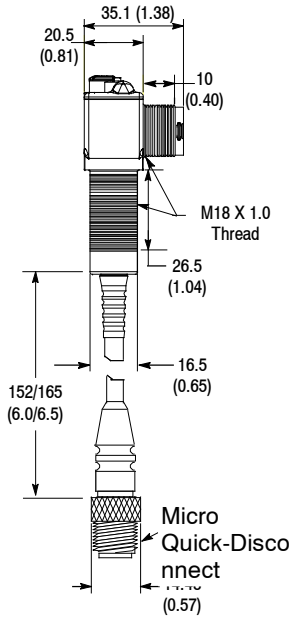
## Product Selection

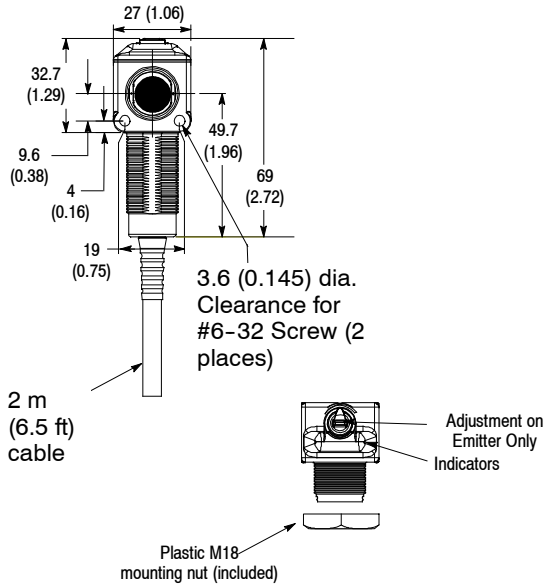
| Sensor Type | Termination Type | Operating Voltage/Supply Current | Cat. No. |
|---|---|---|---|
| Emitter | 2 m (6.5 ft) Cable 300V | 10.8…30V DC<br>20 mA @ 20°C<br>100 mA @ -25°C | **873E-EDZZ0750A2** |
| Emitter | Micro Style QD | | **873E-EDZZ0750F4** |
| Receiver | 2 m (6.5 ft) Cable 300V | 10.8…30V DC<br>10 mA | **873E-RDTT0750A2** |
| Receiver | Micro Style QD | | **873E-RDTT0750F4** |
| DC Micro QD | Recommended Standard QD Cordset<br>(-2 = 2 m (6.5 ft) | | **889D-F4AC-2** |

## LED Indicator Lights

| Sensor Type | Label | Color | Status |
|---|---|---|---|
| Emitter | — | Green | Sensor powered |
| Receiver | PWR | | Sensor powered |
| | OUT | Yellow | Output is conducting |
| | MAR/SCP | Red | Unreliable sensing condition (On) |
| | | | Output in overload or short circuit (Flashing) |

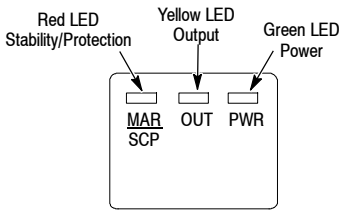
## Approximate Dimensions [mm (in.)]



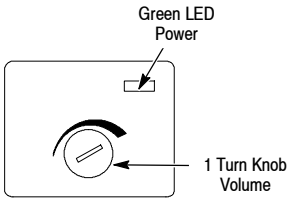




### LED and Adjustment Locations

**RightSound Ultrasonic Receiver**



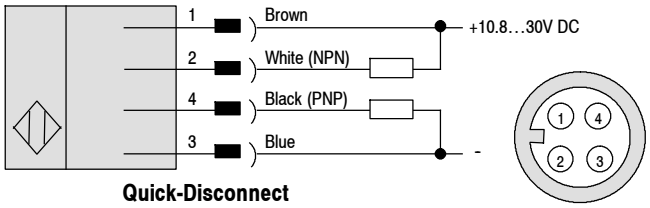

**RightSound Ultrasonic Emitter**



## Wiring Diagrams

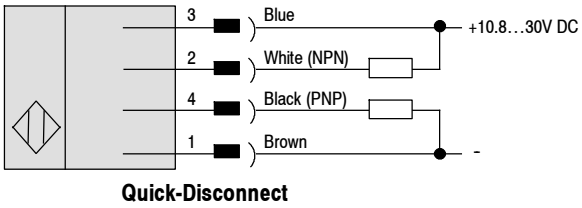
### Receivers with Quick-Disconnect

#### Normally Open Configuration



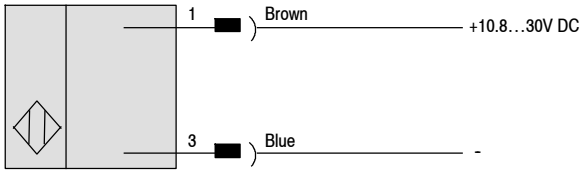

Quick-Disconnect

#### Normally Closed Configuration




Quick-Disconnect

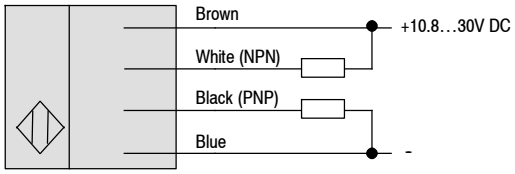
### Emitter with Quick-Disconnect




Quick-Disconnect

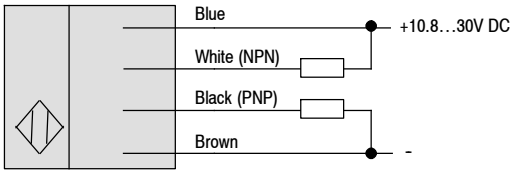
### Receivers with Cable

#### Normally Open Configuration



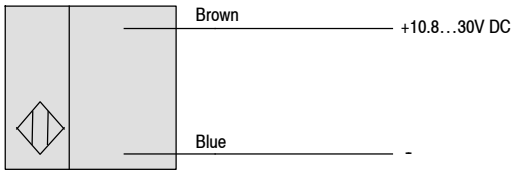

Cable

#### Normally Closed Configuration




Cable

### Emitter with Cable




Cable

## Accessories

| Description | Page Number |
|---|---|
| Terminal Chambers | 8-24 |
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221…2-222 |

## Notes

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875C and 875CP Nickel-Plated and Plastic Barrel . . . . . page 4–9

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Comprehensive Product Index . . . . . page 14–1

# Quick Selection Guide

| Specifications | 875C<br>General Purpose Tubular | | 875CP<br>Plastic Barrel Tubular | |
|---|---|---|---|---|
| | | | | |
| **Description** | • Nickel-plated brass barrel | | • Plastic barrel | |
| **Features** | • Capacitive technology senses metals and nonmetals, liquid and solids<br>• Adjustable sensing distance<br>• 3-wire DC and 2-wire AC models<br>• DC models have short circuit, overload, transient noise, and reverse polarity protection<br>• Cable or quick-disconnect styles | | • Capacitive technology senses metals and nonmetals, liquid and solids<br>• Adjustable sensing distance<br>• 3-wire DC and 2-wire AC models<br>• DC models have short circuit, overload, transient noise, and reverse polarity protection<br>• Cable or quick-disconnect styles | |
| **Operating Voltage** | • 10…48V DC | • 24…240V AC | • 10…48V DC | • 24…240V AC |
| **Diameter** | • 12, 18, 30 mm | • 18, 30 mm | • 18, 30, 34 mm | • 18, 30, 34 mm |
| **Available Models** | • DC 3-Wire Nickel-Plated Brass Barrel | • AC 2-Wire Nickel-Plated Brass Barrel | • DC 3-Wire Plastic Barrel | • AC 2-Wire Plastic Barrel |
| **Connection** | • PVC Cable<br>• Pico QD (18 mm)<br>• Micro QD (30 mm) | • PVC Cable<br>• Micro QD (30 mm) | • PVC Cable<br>• Pico QD (18 mm)<br>• Micro QD (30 & 34 mm) | • PVC Cable<br>• Micro QD (30 & 34 mm) |
| **Enclosure** | • Nickel-plated brass barrel<br>• NEMA 1, 3, 4, 6, 13; IP67 | • Nickel-plated brass barrel<br>• NEMA 1, 3, 4, 6, 13; IP67 | • Plastic barrel<br>• NEMA 12; IP67 (IEC 529) | • Plastic barrel<br>• NEMA 1, 3, 4, 6, 13; IP67 |
| **Additional Info** | • See page 4-10 | • See page 4-16 | • See page 4-13 | • See page 4-18 |

# Technical Definitions and Terminology

**Axial Approach:** The approach of the target with its center maintained on the reference axis.

**Complementary Outputs:** (N.O. & N.C.) A proximity sensor that features both normally open and normally closed outputs, which can be used simultaneously.

**Correction Factors:** Suggested multiplication factors taking into account variations in the target material composition. When figuring actual sensing distance this factor should be multiplied with the nominal sensing distance.

**Current Consumption:** The current consumed by the proximity switch when the output device is in the off condition.

**Differential Travel:** See Hysteresis.

**Dual Output:** Sensor which has two outputs which may be complementary or may be of a single type (i.e. two normally open or two normally closed).

**Effective Operating Distance:** (Sr) The operating distance of an individual proximity switch measured at stated temperature, voltage, and mounting condition.

**False Pulse:** An undesired change in the state of the output of the proximity switch that lasts for more than two milliseconds.

**Flush Mounting:** A shielded proximity sensor which can be flush mounted in metal up to the plane of the active sensing face.

**Free Zone:** The area around the proximity switch which must be kept free from any damping material.

**Hysteresis:** The difference, in percentage (%), of the nominal sensing distance between the operate (switch on) and release point (switch off) when the target is moving away from the sensors active face. Without sufficient hysteresis a proximity sensor will "chatter" (continuously switch on and off) when there is significant vibration applied to the target or sensor.

**Isolation Voltage:** Maximum rated voltage between isolated outputs or input and output.

**Lateral Approach:** The approach of the target perpendicular to the reference axis.

**Leakage Current:** Current which flows through the output when the output is in an "off" condition or de-energized. This current is necessary to supply power to the electronics of the sensor.

**LED:** Light Emitting Diode used to indicate sensor status.

**Maximum Load Current:** The maximum current level at which the proximity sensor can be continuously operated.

**Maximum Inrush Current:** The maximum current level at which the proximity sensor can be operated for a short period of time.

**Minimum Load Current:** The minimum amount of current required by the sensor to maintain reliable operation.

**Sensing Distance:** The distance at which an approaching target activates (changes state of) the proximity output.

**Normally Closed:** Output opens when an object is detected in the active switching area.

**Normally Open:** Output closes when an object is detected in the active switching area.

**NPN:** The sensor switches the load to the negative terminal. The load should be connected between the sensor output and positive terminal.

**Operating Distance, Rated:** The operating distance specified by the manufacturer and used as a reference value. Also known as nominal sensing distance.

**PNP:** The sensor switches the load to the positive terminal. The load should be connected between the sensor output and negative terminal.

**Programmable Output:** (N.O. or N.C.) Output which can be changed from N.O. to N.C. or N.C. to N.O. by way of a switch or jumper wire. Also known as selectable output.

**Repeatability:** The variation of the effective operating distance measured at room temperature and constant supply voltage. It is expressed as a percentage of the sensing distance.

**Residual Voltage:** The voltage across the sensor output while energized and carrying maximum load current.

**Response Time:** See Switching Frequency.

**Reverse Polarity Protection:** Proximity sensors which are protected against a reversal in voltage polarity.

**Ripple:** The variance between peak-to-peak values in DC voltage. It is expressed in percentage of rated voltage.

**Sensing Range:** The rated operating distance.

**Shielded:** Sensor which can be flush mounted in metal up to the plane of the active sensing face.

**Short Circuit Protection:** (SCP) Sensor protected from damage when a shorted condition exists for an indefinite or defined period of time.

**Sinking:** See NPN.

**Sourcing:** See PNP.

**Switching Frequency:** The maximum number of times per second the sensor can change state (ON and OFF) usually expressed in Hertz (Hz). As measured in DIN EN 50010.

**Target:** Object which activates the sensor.

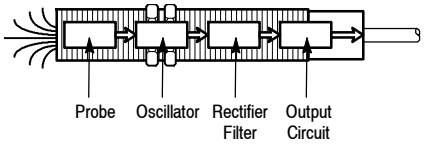
**Three-Wire Proximity Switch:** An AC or DC proximity sensor with three leads, two of which supply power and a third that switches the load.

**Two-Wire Proximity Switch:** A proximity sensor which switches a load connected in series to the power supply. Power for the proximity switch is obtained through the load at all times.

**Voltage Drop:** The maximum voltage drop across a conducting sensor.

# Notes

## Principles of Operation for Capacitive Proximity Sensors




Capacitive proximity sensors are designed to operate by generating an electrostatic field and detecting changes in this field caused when a target approaches the sensing face. The sensor's internal workings consist of a capacitive probe, an oscillator, a signal rectifier, a filter circuit and an output circuit.

In the absence of a target, the oscillator is inactive. As a target approaches, it raises the capacitance of the probe system. When the capacitance reaches a specified threshold, the oscillator is activated which triggers the output circuit to change between "on" and "off."

The capacitance of the probe system is determined by the target's size, dielectric constant and distance from the probe. The larger the size and dielectric constant of a target, the more it increases capacitance. The shorter the distance between target and probe, the more the target increases capacitance.

## Standard Target and Grounding for Capacitive Proximity Sensors

The standard target for capacitive sensors is the same as for inductive proximity sensors. The target is grounded per IEC test standards. However, a target in a typical application does not need to be grounded to achieve reliable sensing.

## Shielded vs. Unshielded Capacitive Sensors

Shielded capacitive proximity sensors are best suited for sensing low dielectric constant (difficult to sense) materials due to their highly concentrated electrostatic fields. This allows them to detect targets which unshielded sensors cannot. However, this also makes them more susceptible to false triggers due to the accumulation of dirt or moisture on the sensor face.

The electrostatic field of an unshielded sensor is less concentrated than that of a shielded model. This makes them well suited for detecting high dielectric constant (easy to sense) materials or for differentiating between materials with high and low constants. For the right target materials, unshielded capacitive proximity sensors have longer sensing distances than shielded versions.

Unshielded capacitive sensors are also more suitable than shielded types for use with plastic sensor wells, an accessory designed for liquid level applications. The well is mounted through a hole in a tank and the sensor is slipped into the well's receptacle. The sensor detects the liquid in the tank through the wall of the sensor well. This allows the well to serve both as a plug for the hole and a mount for the sensor.

## Target Correction Factors for Capacitive Proximity Sensors

For a given target size, correction factors for capacitive sensors are determined by a property of the target material called the dielectric constant. Materials with higher dielectric constant values are easier to sense than those with lower values. A partial listing of dielectric constants for some typical industrial materials follows. For more information, refer to the *CRC Handbook of Chemistry and Physics (CRC Press), the CRC Handbook of Tables for Applied Engineering Science (CRC Press),* or other applicable sources.

**Dielectric Constants of Common Industrial Materials**

| | |
|---|---|
| Acetone | 19.5 |
| Acrylic Resin | 2.7-4.5 |
| Air | 1.000264 |
| Alcohol | 25.8 |
| Ammonia | 15-25 |
| Aniline | 6.9 |
| Aqueous Solutions | 50-80 |
| Bakelite | 3.6 |
| Benzene | 2.3 |
| Carbon Dioxide | 1.000985 |
| Carbon Tetrachloride | 2.2 |
| Celluloid | 3.0 |
| Cement Powder | 4.0 |
| Cereal | 3-5 |
| Chlorine Liquid | 2.0 |
| Ebonite | 2.7-2.9 |
| Epoxy Resin | 2.5-6 |
| Ethanol | 24 |
| Ethylene Glycol | 38.7 |
| Fired Ash | 1.5-1.7 |
| Flour | 1.5-1.7 |
| Freon R22 & 502 (liquid) | 6.11 |
| Gasoline | 2.2 |
| Glass | 3.7-10 |
| Glycerine | 47 |
| Marble | 8.0-8.5 |
| Melamine Resin | 4.7-10.2 |
| Mica | 5.7-6.7 |
| Nitrobenzine | 36 |
| Nylon | 4-5 |
| Oil Saturated Paper | 4.0 |
| Paraffin | 1.9-2.5 |
| Paper | 1.6-2.6 |
| Perspex | 3.2-3.5 |
| Petroleum | 2.0-2.2 |
| Phenol Resin | 4-12 |
| Polyacetal | 3.6-3.7 |
| Polyamide | 5.0 |
| Polyester Resin | 2.8-8.1 |
| Polyethylene | 2.3 |
| Polypropylene | 2.0-2.3 |
| Polystyrene | 3.0 |
| Polyvinyl Chloride Resin | 2.8-3.1 |
| Porcelain | 4.4-7 |
| Powdered Milk | 3.5-4 |
| Press Board | 2-5 |
| Quartz Glass | 3.7 |
| Rubber | 2.5-35 |
| Salt | 6.0 |
| Sand | 3-5 |
| Shellac | 2.5-4.7 |
| Shell Lime | 1.2 |
| Silicon Varnish | 2.8-3.3 |
| Soybean Oil | 2.9-3.5 |
| Styrene Resin | 2.3-3.4 |
| Sugar | 3.0 |
| Sulphur | 3.4 |
| Teflon | 2.0 |
| Toluene | 2.3 |
| Transformer Oil | 2.2 |
| Turpentine Oil | 2.2 |
| Urea Resin | 5-8 |
| Vaseline | 2.2-2.9 |
| Water | 80 |
| Wood, Dry | 2-7 |
| Wood, Wet | 10-30 |

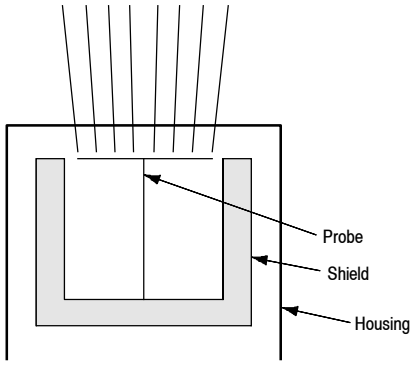
## Shielded vs. Unshielded Construction

Each capacitive sensor can be classified as having either a shielded or unshielded construction.

### Shielded Probe

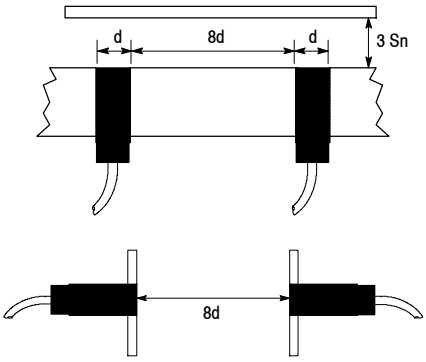
Shielded sensors are constructed with a metal band surrounding the probe. This helps to direct the electrostatic field to the front of the sensor and results in a more concentrated field.

**Shielded Probe**




Shielded construction allows the sensor to be mounted flush in surrounding material without causing false trigger.

**Shielded Sensors Flush Mounted**

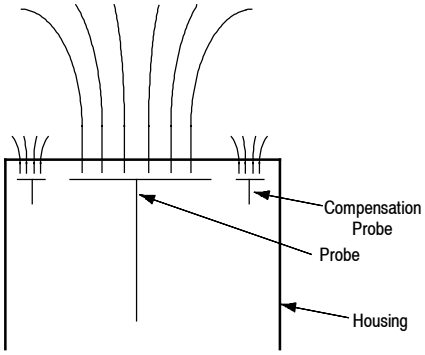



Shielded capacitive proximity sensors are best suited for sensing materials with low dielectric constants (difficult to sense) as a result of their highly concentrated electrostatic fields. This allows them to detect targets that unshielded sensors cannot.

### Unshielded Probe

Unshielded sensors do not have a metal band surrounding the probe and hence have a less concentrated electrostatic field. Many unshielded models are equipped with compensation probes, which provide increased stability for the sensor. Compensation probes are discussed later in this section.

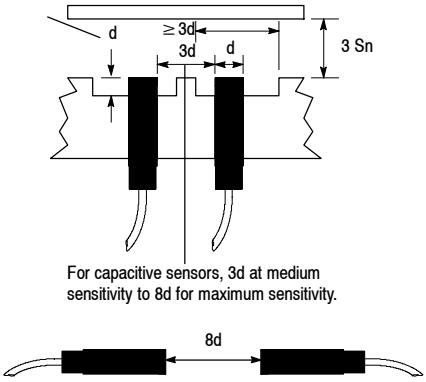
**Unshielded Probe**




Unshielded capacitive sensors are also more suitable than shielded types for use with plastic sensor wells, an accessory designed for liquid level applications. The well is mounted through a hole in a tank and the sensor is slipped into the well's receptacle. The sensor detects the liquid in the tank through the wall of the sensor well.

**Unshielded Construction Mounted Above Metal and Mounted in Plastic Sensor Well**

d for capacitive sensors if mounted in plastic. 3d (12, 18 mm models) or 1.5d (30, 34 mm models) if mounted in metal.

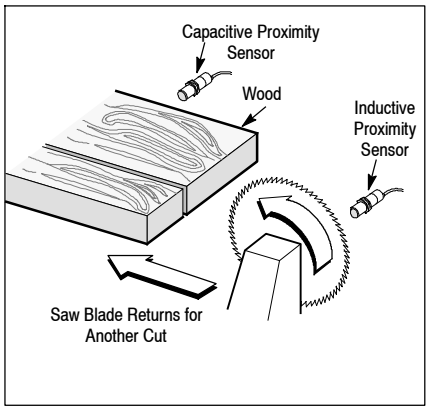



d = diameter or width of active sensing face
Sn = nominal sensing distance

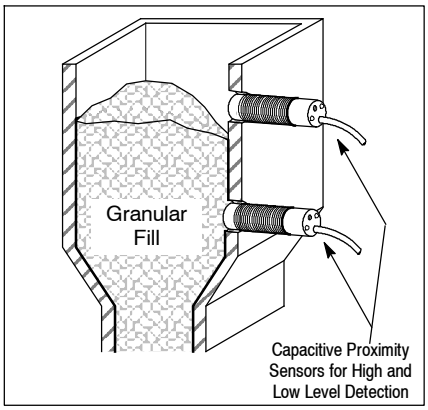
The electrostatic field of an unshielded sensor is less concentrated than that of a shielded model. This makes them well suited for detecting high dielectric constant (easy to sense) materials or for differentiating between materials with high and low constants. For certain target materials, unshielded capacitive proximity sensors have longer sensing distances than shielded versions.

# Applications

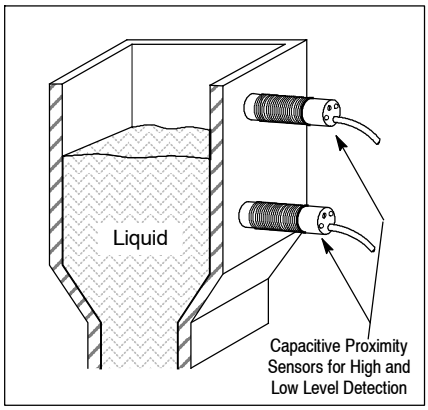
## Wood Industry



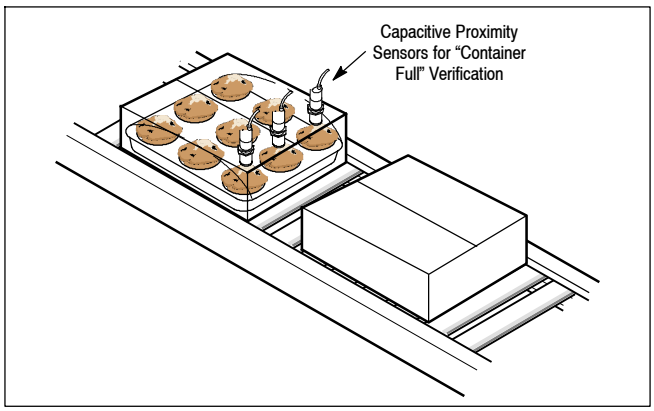

## Level Detection



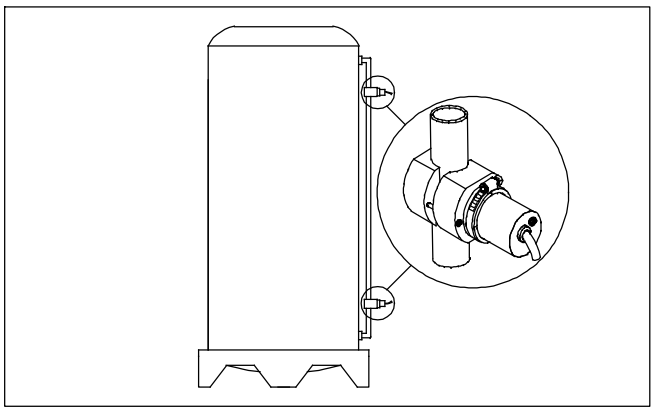

## Liquid Level Detection



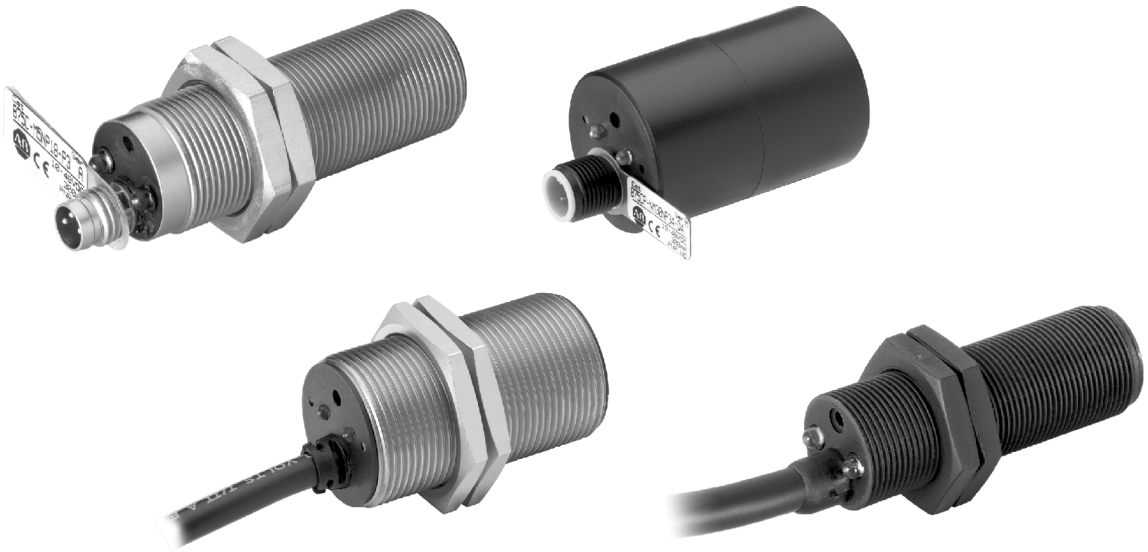

## Food Processing




## Sight-Tube Level Detection



# Notes



## Description

Bulletin 875C and 875CP capacitive proximity sensors are self-contained solid-state devices designed for noncontact sensing of a wide range of materials.

Unlike inductive proximity sensors, the 875C and 875CP can detect nonmetal solids and liquids in addition to standard metal targets. They can even sense the presence of some targets through certain other materials, making them an ideal choice in some applications where inductive proximity and photoelectric sensors cannot be used.

Each unit has an adjustable sensing distance and is equipped with two LEDs to indicate power and output. They are housed in either a nickel-plated brass barrel (shielded models) or a plastic barrel (unshielded models) which meets NEMA 12 and IP67 (IEC 529) enclosure standards. Connection options include PVC cable as well as micro and pico quick-disconnect.

## Features

- Metal, nonmetal solid and liquid sensing capability
- Adjustable sensing distance
- Cable or quick-disconnect styles
- Short circuit❶, overload❶, reverse polarity❶, and transient noise protection
- Plastic models have glass filled nylon housings
- Meets NEMA 12 and IP67 (IEC 529) enclosure standards
- cULus Listed and CE Marked for all applicable directives

## Styles

DC 3-Wire Nickel-Plated Brass Barrel . . . . . page 4–10
DC 3-Wire Plastic Barrel . . . page 4–13
AC 2-Wire Nickel-Plated Brass Barrel . . . . . page 4–16
AC 2-Wire Plastic Barrel . . . page 4–18

## Accessories

Cordsets . . . . . page 9–1
Mounting Brackets Sight Glass Style . . . . . page 4–21
Sensor Wells . . . . . page 4–22

❶ DC models only.

# 875C 3-Wire DC

## Plastic Face/Threaded Nickel-Plated Brass Barrel

*875C DC Cable Style*
*12, 18, 30 mm*
*page 4-11*

*875C DC Micro*
*Quick-Disconnect Style*
*18 and 30 mm*
*page 4-12*

*875C DC Pico*
*Quick-Disconnect Style*
*18 mm*
*page 4-12*

## Features

- Metal, nonmetal solid and liquid sensing capability
- Adjustable sensing distance for 18 mm and 30 mm models
- 3-wire operation
- 3 conductor, 3-pin or 4-pin connection
- Normally open or normally closed output
- Short circuit, overload, reverse polarity, and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | 12 mm | 18 mm | 30 mm |
|---|---|---|---|
| Load Current | 300 mA | 300 mA | 300 mA |
| Leakage Current | 0.3 mA | 0.1 mA | 0.1 mA |
| Operating Voltage | 10…48V DC | 10…48V DC | 10…48V DC |
| Voltage Drop | ≤2V | ≤2V | ≤2V |
| Current Consumption | ≦10 mA | | |
| Repeatability | ≤10% | | |
| Hysteresis | ≤20% | | |
| Transient Noise Protection | Incorporated | | |
| Reverse Polarity Protection | Incorporated | | |
| Short Circuit Protection | Incorporated | | |
| Overload Protection | Incorporated | | |
| Certifications | cULus Listed and CE Marked for all applicable directives | | |
| Enclosure | NEMA 1, 3, 4, 6, 13 and IP67; Nickel-plated brass barrel | | |
| Connections | Cable: 2 meter length; 3 conductor PVC<br>Quick-Disconnect: 4-pin micro; 3-pin pico | | |
| LEDs | Green: Power<br>Yellow: Output | | |
| Operating Temperature [C (F)] | -25…+75° (-13…+167°) | | |
| Shock | 30 g, 11 ms | | |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes | | |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Acetone | 0.75 |
| Acrylic Resin | 0.10…0.25 |
| Air | 0.0 |
| Alcohol | 0.85 |
| Ammonia | 0.70…0.85 |
| Aniline | 0.40 |
| Aqueous Solutions | 0.98…1.0 |
| Bakelite | 0.20 |
| Benzene | 0.10 |
| Carbon Dioxide | 0.0 |
| Carbon Tetrachloride | 0.10 |
| Celluloid | 0.15 |
| Cement Powder | 0.25 |
| Cereal | 0.15…0.30 |
| Chlorine Liquid | 0.10 |
| Ebonite | 0.15 |
| Epoxy Resin | 0.15…0.35 |
| Ethanol | 0.85 |
| Ethylene Glycol | 0.93 |
| Fired Ash | 0.05 |
| Flour | 0.05 |
| Freon R22 & 502 (liquid) | 0.35 |
| Gasoline | 0.10 |
| Glass | 0.20…0.55 |
| Glycerine | 0.98 |
| Marble | 0.50 |
| Melamine Resin | 0.25…0.55 |
| Mica | 0.35 |
| Nitrobenzine | 0.93 |
| Nylon | 0.20…0.30 |
| Oil Saturated Paper | 0.25 |
| Paraffin | 0.10 |
| Paper | 0.10 |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Perspex | 0.15 |
| Petroleum | 0.05 |
| Phenol Resin | 0.20…0.60 |
| Polyacetal | 0.20 |
| Polyamide | 0.30 |
| Polyester Resin | 0.15…0.50 |
| Polyethylene | 0.10 |
| Polypropylene | 0.10 |
| Polystyrene | 0.15 |
| Polyvinyl Chloride Resin | 0.15 |
| Porcelain | 0.25…0.40 |
| Powdered Milk | 0.20 |
| Press Board | 0.10…0.30 |
| Quartz Glass | 0.20 |
| Rubber | 0.15…0.90 |
| Salt | 0.35 |
| Sand | 0.15…0.30 |
| Shellac | 0.15…0.25 |
| Shell Lime | <0.05 |
| Silicon Varnish | 0.15 |
| Soybean Oil | 0.15 |
| Styrene Resin | 0.15 |
| Sugar | 0.15 |
| Sulphur | 0.15 |
| PTFE | 0.10 |
| Toluene | 0.10 |
| Transformer Oil | 0.10 |
| Turpentine Oil | 0.10 |
| Urea Resin | 0.30…0.45 |
| Vaseline | 0.10 |
| Water | 1.0 |
| Wood, Dry | 0.10…0.40 |
| Wood, Wet | 0.60…0.85 |



New

## Product Selection

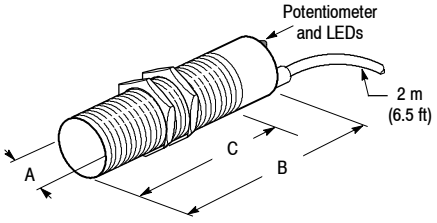
| Barrel Dia. & Type | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency (Hz) | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style | Pico QD Style |
| 12 mm Threaded | 2.5 (0.09) | Y | N.O. | PNP | 100 | 875C-M2NP12-A2 | — | — |
| 18 mm Threaded | 1 (0.04)…5 (0.20) | | | | | 875C-M5NP18-A2 | — | 875C-M5NP18-P3 |
| | | | | NPN | | 875C-M5NN18-A2 | — | 875C-M5NN18-P3 |
| | | | N.C. | PNP | | 875C-M5CP18-A2 | — | 875C-M5CP18-P3 |
| | | | | NPN | | 875C-M5CN18-A2 | — | 875C-M5CN18-P3 |
| 30 mm Threaded | 2 (0.08)…10 (0.39) | | N.O. | PNP | | 875C-M10NP30-A2 | **875C-M10NP30-D4** | — |
| | | | | NPN | | 875C-M10NN30-A2 | 875C-M10NN30-D4 | — |
| | | | N.C. | PNP | | 875C-M10CP30-A2 | 875C-M10CP30-D4 | — |
| | | | | NPN | | 875C-M10CN30-A2 | 875C-M10CN30-D4 | — |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4AC-2 | 889P-F3AB-2 |

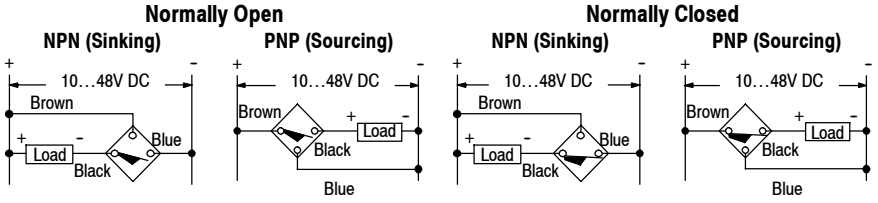
## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221…2-222 |
| Terminal Chambers | 8-1 |
| Other Cordsets Available | 8-1 |

## Approximate Dimensions [mm (in.)] Wiring Diagram

### Cable Style



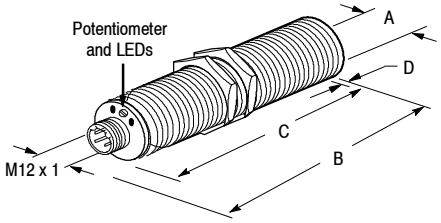

| Thread Size | mm (inches) | | |
|---|---|---|---|
| | A | B | C |
| M12 x 1 | 12.0 (0.47) | 50.0 (1.96) | 42.0 (1.65) |
| M18 x 1 | 18.0 (0.71) | 52.0 (2.04) | 47.4 (1.87) |
| M30 x 1.5 | 30.0 (1.18) | 53.0 (2.08) | 53.0 (2.08) |

# 875C 3-Wire DC

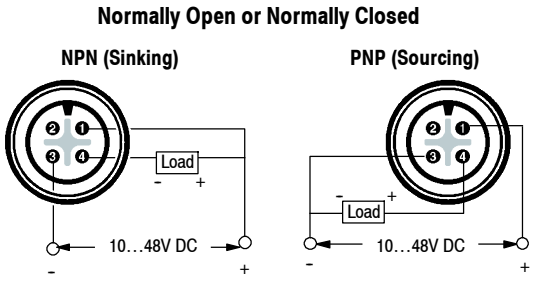
## Plastic Face/Threaded Nickel-Plated Brass Barrel

### Approximate Dimensions [mm (in.)]

**Micro QD Style**

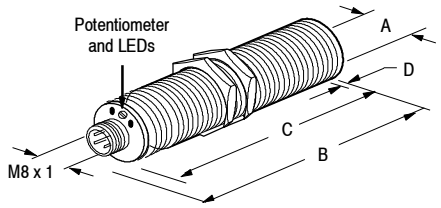


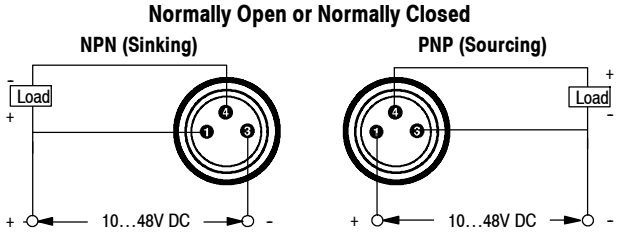

### Wiring Diagram




| Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M30 x 1.5 | 30.0 (1.18) | 66.0 (2.60) | 53.0 (2.08) | 1.0 (0.04) |

**Pico QD Style**




| Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M18 x 1 | 18.0 (0.71) | 61.5 (2.42) | 52.0 (2.04) | 1.0 (0.04) |

*875CP DC Micro*
*Quick-Disconnect Style*
*Smooth Barrel 34 mm*
*page 4-14*

*875CP DC Pico*
*Quick-Disconnect Style*
*Threaded Barrel 18 mm*
*page 4-14*

## Features

- Metal, nonmetal solid and liquid sensing capability
- Adjustable sensing distance
- 3-wire operation
- 3 conductor, 3-pin or 4-pin connection
- 10…48V DC
- Normally open or normally closed output
- Short circuit, overload, reverse polarity and transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤ 300 mA |
| Leakage Current | 0.01 mA |
| Operating Voltage | 10…48V DC |
| Voltage Drop | <2V |
| Current Consumption | ≦ 10 mA |
| Repeatability | ≤ 10% |
| Hysteresis | ≤ 20% |
| Transient Noise Protection | Incorporated |
| Reverse Polarity Protection | Incorporated |
| Short Circuit Protection | Incorporated |
| Overload Protection | Incorporated |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Enclosure | NEMA 12; IP67 (IEC 529) |
| Housing Material | Plastic (PBT) |
| Connections | Cable: 2 meter length; 3 conductor PVC<br>Quick-Disconnect: 4-pin micro; 3-pin pico |
| LEDs | Green: Power<br>Yellow: Output |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Acetone | 0.75 |
| Acrylic Resin | 0.10…0.25 |
| Air | 0.0 |
| Alcohol | 0.85 |
| Ammonia | 0.70…0.85 |
| Aniline | 0.40 |
| Aqueous Solutions | 0.98…1.0 |
| Bakelite | 0.20 |
| Benzene | 0.10 |
| Carbon Dioxide | 0.0 |
| Carbon Tetrachloride | 0.10 |
| Celluloid | 0.15 |
| Cement Powder | 0.25 |
| Cereal | 0.15…0.30 |
| Chlorine Liquid | 0.10 |
| Ebonite | 0.15 |
| Epoxy Resin | 0.15…0.35 |
| Ethanol | 0.85 |
| Ethylene Glycol | 0.93 |
| Fired Ash | 0.05 |
| Flour | 0.05 |
| Freon R22 & 502 (liquid) | 0.35 |
| Gasoline | 0.10 |
| Glass | 0.20…0.55 |
| Glycerine | 0.98 |
| Marble | 0.50 |
| Melamine Resin | 0.25…0.55 |
| Mica | 0.35 |
| Nitrobenzine | 0.93 |
| Nylon | 0.20…0.30 |
| Oil Saturated Paper | 0.25 |
| Paraffin | 0.10 |
| Paper | 0.10 |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Perspex | 0.15 |
| Petroleum | 0.05 |
| Phenol Resin | 0.20…0.60 |
| Polyacetal | 0.20 |
| Polyamide | 0.30 |
| Polyester Resin | 0.15…0.50 |
| Polyethylene | 0.10 |
| Polypropylene | 0.10 |
| Polystyrene | 0.15 |
| Polyvinyl Chloride Resin | 0.15 |
| Porcelain | 0.25…0.40 |
| Powdered Milk | 0.20 |
| Press Board | 0.10…0.30 |
| Quartz Glass | 0.20 |
| Rubber | 0.15…0.90 |
| Salt | 0.35 |
| Sand | 0.15…0.30 |
| Shellac | 0.15…0.25 |
| Shell Lime | <0.05 |
| Silicon Varnish | 0.15 |
| Soybean Oil | 0.15 |
| Styrene Resin | 0.15 |
| Sugar | 0.15 |
| Sulphur | 0.15 |
| PTFE | 0.10 |
| Toluene | 0.10 |
| Transformer Oil | 0.10 |
| Turpentine Oil | 0.10 |
| Urea Resin | 0.30…0.45 |
| Vaseline | 0.10 |
| Water | 1.0 |
| Wood, Dry | 0.10…0.40 |
| Wood, Wet | 0.60…0.85 |

# 875CP 3-Wire DC

## Plastic Face/Threaded or Smooth Plastic Barrel

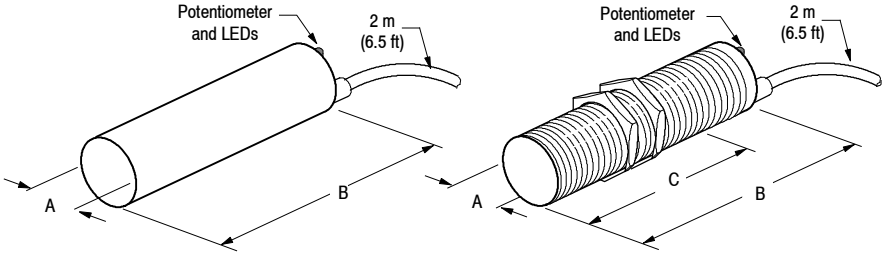
## Product Selection

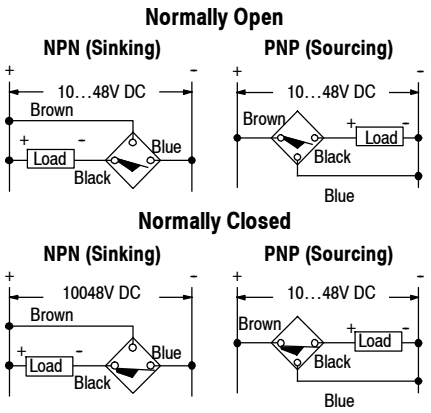
| Barrel Dia. & Type | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | | Switching Frequency (Hz) | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Cable Style | Micro QD Style | Pico QD Style |
| 18 mm Threaded | 2 (0.08)…8 (0.31) | N | N.O. | PNP | 100 | 875CP-N8NP18-A2 | — | 875CP-N8NP18-P3 |
| | | | | NPN | | 875CP-N8NN18-A2 | — | 875CP-N8NN18-P3 |
| | | | N.C. | PNP | | 875CP-N8CP18-A2 | — | 875CP-N8CP18-P3 |
| | | | | NPN | | 875CP-N8CN18-A2 | — | 875CP-N8CN18-P3 |
| 30 mm Threaded | 5 (0.20)…20 (0.79) | | N.O. | PNP | | 875CP-N20NP30-A2 | **875CP-N20NP30-D4** | — |
| | | | | NPN | | 875CP-N20NN30-A2 | 875CP-N20NN30-D4 | — |
| | | | N.C. | PNP | | 875CP-N20CP30-A2 | 875CP-N20CP30-D4 | — |
| | | | | NPN | | 875CP-N20CN30-A2 | 875CP-N20CN30-D4 | — |
| 34 mm Smooth | 7 (0.28)…30 (1.18) | | N.O. | PNP | | 875CP-NM30NP34-A2 | 875CP-NM30NP34-D4 | — |
| | | | | NPN | | 875CP-NM30NN34-A2 | 875CP-NM30NN34-D4 | — |
| | | | N.C. | PNP | | 875CP-NM30CP34-A2 | 875CP-NM30CP34-D4 | — |
| | | | | NPN | | 875CP-NM30CN34-A2 | 875CP-NM30CN34-D4 | — |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | | 889D-F4AC-2 | 889P-F3AB-2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221…2-222 |
| Sensor Wells | 4-22 |
| Terminal Chambers | 8-1 |
| Other Cordsets Available | 8-1 |

### Cable Style



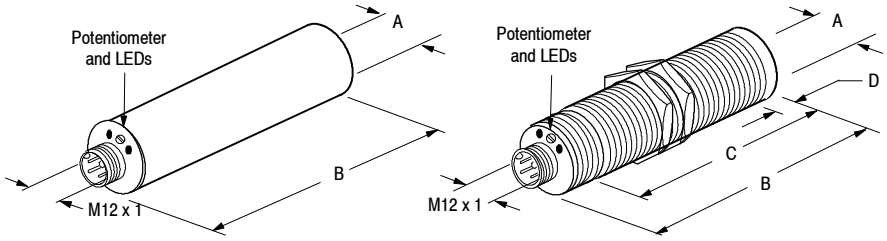

| Diameter or Thread Size | mm (inches) | | |
|---|---|---|---|
| | A | B | C |
| M18 x 1 | 18.0 (0.71) | 52.0 (2.04) | 52.0 (2.04) |
| M30 x 1.5 | 30.0 (1.18) | | 46.1 (1.81) |
| ∅34 | 34.0 (1.34) | | N/A |



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

## Approximate Dimensions [mm (in.)]

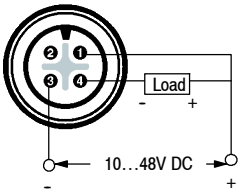
### Micro QD Style



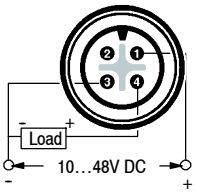

## Wiring Diagram

**Normally Open or Normally Closed**

**NPN (Sinking)**

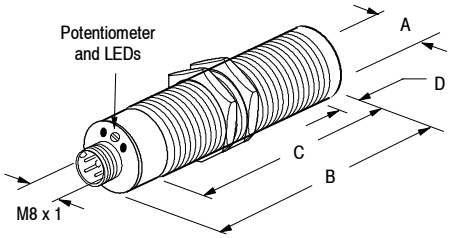



**PNP (Sourcing)**



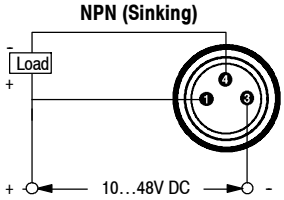

| Diameter or Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M30 x 1.5 | 30.0 (1.18) | 65.0 (2.56) | 52.0 (2.04) | 1.0 (0.04) |
| ∅34 | 34.0 (1.34) | 65.0 (2.56) | N/A | N/A |

### Pico QD Style

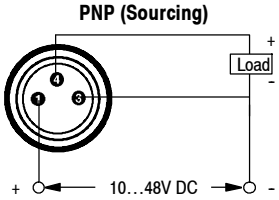



**Normally Open or Normally Closed**

**NPN (Sinking)**



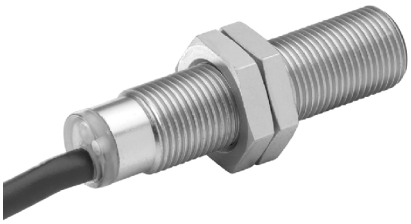

**PNP (Sourcing)**




| Diameter or Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M18 x 1 | 18.0 (0.71) | 61.5 (2.42) | 52.0 (2.04) | 1.0 (0.04) |

# 875C 2-Wire AC

## Plastic Face/Threaded Nickel-Plated Brass Barrel



*875CP AC Cable Style*
*Threaded Barrel*
*18, 30 mm*
*page 4-17*

*875CP AC Micro Quick-Disconnect Style*
*Threaded Barrel*
*30 mm*
*page 4-17*

## Features

- Metal, nonmetal solid and liquid sensing capability
- Adjustable sensing distance
- 2-wire operation
- 2 conductor or 3-pin connection
- 24…240V AC
- Normally open or normally closed output
- Transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤ 300 mA |
| Inrush Current | 2A |
| Leakage Current | <1.5 mA |
| Operating Voltage | 24…240V AC |
| Voltage Drop | <7.5V AC |
| Repeatability | ≤ 10% |
| Hysteresis | ≤ 20% |
| Transient Noise Protection | Incorporated |
| Enclosure | NEMA 1, 3, 4, 6, 13 and IP67 |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Connections | Cable: 2 meter length; 2 conductor PVC<br>Quick-Disconnect: 3-pin micro |
| LEDs | Green: Power<br>Yellow: Output |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Acetone | 0.75 |
| Acrylic Resin | 0.10…0.25 |
| Air | 0.0 |
| Alcohol | 0.85 |
| Ammonia | 0.70…0.85 |
| Aniline | 0.40 |
| Aqueous Solutions | 0.98…1.0 |
| Bakelite | 0.20 |
| Benzene | 0.10 |
| Carbon Dioxide | 0.0 |
| Carbon Tetrachloride | 0.10 |
| Celluloid | 0.15 |
| Cement Powder | 0.25 |
| Cereal | 0.15…0.30 |
| Chlorine Liquid | 0.10 |
| Ebonite | 0.15 |
| Epoxy Resin | 0.15…0.35 |
| Ethanol | 0.85 |
| Ethylene Glycol | 0.93 |
| Fired Ash | 0.05 |
| Flour | 0.05 |
| Freon R22 & 502 (liquid) | 0.35 |
| Gasoline | 0.10 |
| Glass | 0.20…0.55 |
| Glycerine | 0.98 |
| Marble | 0.50 |
| Melamine Resin | 0.25…0.55 |
| Mica | 0.35 |
| Nitrobenzine | 0.93 |
| Nylon | 0.20…0.30 |
| Oil Saturated Paper | 0.25 |
| Paraffin | 0.10 |
| Paper | 0.10 |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Perspex | 0.15 |
| Petroleum | 0.05 |
| Phenol Resin | 0.20…0.60 |
| Polyacetal | 0.20 |
| Polyamide | 0.30 |
| Polyester Resin | 0.15…0.50 |
| Polyethylene | 0.10 |
| Polypropylene | 0.10 |
| Polystyrene | 0.15 |
| Polyvinyl Chloride Resin | 0.15 |
| Porcelain | 0.25…0.40 |
| Powdered Milk | 0.20 |
| Press Board | 0.10…0.30 |
| Quartz Glass | 0.20 |
| Rubber | 0.15…0.90 |
| Salt | 0.35 |
| Sand | 0.15…0.30 |
| Shellac | 0.15…0.25 |
| Shell Lime | <0.05 |
| Silicon Varnish | 0.15 |
| Soybean Oil | 0.15 |
| Styrene Resin | 0.15 |
| Sugar | 0.15 |
| Sulphur | 0.15 |
| PTFE | 0.10 |
| Toluene | 0.10 |
| Transformer Oil | 0.10 |
| Turpentine Oil | 0.10 |
| Urea Resin | 0.30…0.45 |
| Vaseline | 0.10 |
| Water | 1.0 |
| Wood, Dry | 0.10…0.40 |
| Wood, Wet | 0.60…0.85 |



New

## Product Selection

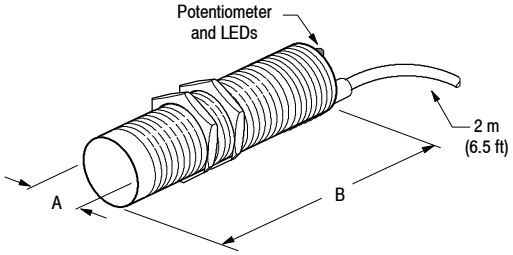
| Barrel Diameter and Type | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency (Hz) | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Micro QD Style |
| 18 mm Threaded | 1 (0.04)…5 (0.20) | Y | N.O. | 25 | 875C-F5N18-A2 | — |
| | | | N.C. | | 875C-F5C18-A2 | — |
| 30 mm Threaded | 2 (0.08)…10 (0.39) | | N.O. | | 875C-F10N30-A2 | 875C-F10N30-R3 |
| | | | N.C. | | 875C-F10C30-A2 | 875C-F10C30-R3 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | 889R-F3ECA-2 |

## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221…2-222 |
| Sensor Wells | 4-22 |
| Terminal Chambers | 8-1 |
| Other Cordsets Available | 8-1 |

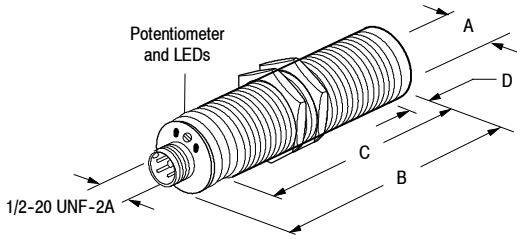
## Approximate Dimensions [mm (in.)]

### Cable Style




| Diameter or Thread Size | mm (inches) | |
|---|---|---|
| | A | B |
| M18 x 1 | 18.0 (0.71) | 52.0 (2.04) |
| M30 x 1.5 | 30.0 (1.18) | 53.0 (2.08) |

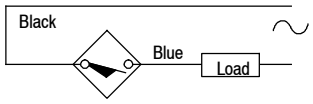
### Micro QD Style



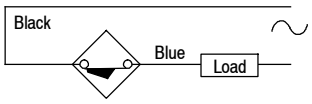

| Diameter or Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M30 x 1.5 | 30.0 (1.18) | 66.0 (2.60) | 53.0 (2.08) | 1.0 (0.04) |

## Wiring Diagram

**Normally Open**

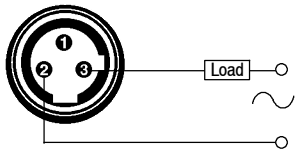



**Normally Closed**




**Note:** Load can be switched to black wire.

**Normally Open or Normally Closed**




**Note:** Load can be switched to pin 2.

# 875CP 2-Wire AC

## Plastic Face/Threaded or Smooth Plastic Barrel

*875CP AC Cable Style*
*Smooth Barrel*
*34 mm*
*page 4-19*

*875CP AC Cable Style*
*Threaded Barrel*
*18, 30 mm*
*page 4-19*

*875CP AC Micro Quick-Disconnect Style*
*Smooth Barrel*
*34 mm*
*page 4-20*

*875CP AC Micro Quick-Disconnect Style*
*Threaded Barrel*
*30 mm*
*page 4-20*

## Features

- Metal, nonmetal solid and liquid sensing capability
- Adjustable sensing distance
- 2-wire operation
- 2 conductor or 3-pin connection
- 24…240V AC
- Normally open or normally closed output
- Transient noise protection
- cULus Listed and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Load Current | ≤ 300 mA |
| Inrush Current | 2A |
| Leakage Current | <1.5 mA |
| Operating Voltage | 24…240V AC |
| Voltage Drop | <7.5V AC |
| Repeatability | ≤ 10% |
| Hysteresis | ≤ 20% |
| Transient Noise Protection | Incorporated |
| Enclosure | NEMA 1, 3, 4, 6, 13 and IP67 |
| Housing Material | Plastic (PBT) |
| Certifications | cULus Listed and CE Marked for all applicable directives |
| Connections | Cable: 2 meter length; 2 conductor PVC<br>Quick-Disconnect: 3-pin micro |
| LEDs | Green: Power<br>Yellow: Output |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Acetone | 0.75 |
| Acrylic Resin | 0.10…0.25 |
| Air | 0.0 |
| Alcohol | 0.85 |
| Ammonia | 0.70…0.85 |
| Aniline | 0.40 |
| Aqueous Solutions | 0.98…1.0 |
| Bakelite | 0.20 |
| Benzene | 0.10 |
| Carbon Dioxide | 0.0 |
| Carbon Tetrachloride | 0.10 |
| Celluloid | 0.15 |
| Cement Powder | 0.25 |
| Cereal | 0.15…0.30 |
| Chlorine Liquid | 0.10 |
| Ebonite | 0.15 |
| Epoxy Resin | 0.15…0.35 |
| Ethanol | 0.85 |
| Ethylene Glycol | 0.93 |
| Fired Ash | 0.05 |
| Flour | 0.05 |
| Freon R22 & 502 (liquid) | 0.35 |
| Gasoline | 0.10 |
| Glass | 0.20…0.55 |
| Glycerine | 0.98 |
| Marble | 0.50 |
| Melamine Resin | 0.25…0.55 |
| Mica | 0.35 |
| Nitrobenzine | 0.93 |
| Nylon | 0.20…0.30 |
| Oil Saturated Paper | 0.25 |
| Paraffin | 0.10 |
| Paper | 0.10 |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Perspex | 0.15 |
| Petroleum | 0.05 |
| Phenol Resin | 0.20…0.60 |
| Polyacetal | 0.20 |
| Polyamide | 0.30 |
| Polyester Resin | 0.15…0.50 |
| Polyethylene | 0.10 |
| Polypropylene | 0.10 |
| Polystyrene | 0.15 |
| Polyvinyl Chloride Resin | 0.15 |
| Porcelain | 0.25…0.40 |
| Powdered Milk | 0.20 |
| Press Board | 0.10…0.30 |
| Quartz Glass | 0.20 |
| Rubber | 0.15…0.90 |
| Salt | 0.35 |
| Sand | 0.15…0.30 |
| Shellac | 0.15…0.25 |
| Shell Lime | <0.05 |
| Silicon Varnish | 0.15 |
| Soybean Oil | 0.15 |
| Styrene Resin | 0.15 |
| Sugar | 0.15 |
| Sulphur | 0.15 |
| PTFE | 0.10 |
| Toluene | 0.10 |
| Transformer Oil | 0.10 |
| Turpentine Oil | 0.10 |
| Urea Resin | 0.30…0.45 |
| Vaseline | 0.10 |
| Water | 1.0 |
| Wood, Dry | 0.10…0.40 |
| Wood, Wet | 0.60…0.85 |



New

## Product Selection

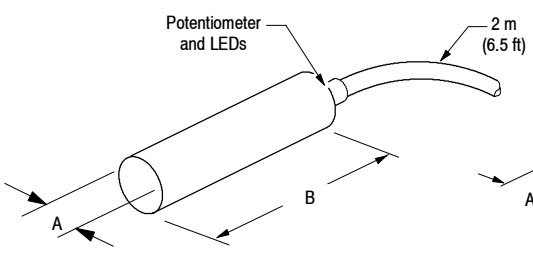
| Barrel Diameter and Type | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Switching Frequency (Hz) | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Cable Style | Micro QD Style |
| 18 mm Threaded | 2 (0.08)…8 (0.31) | N | N.O. | 25 | **875CP-G8N18-A2** | — |
| | | | N.C. | | 875CP-G8C18-A2 | — |
| 30 mm Threaded | 5 (0.20)…20 (0.79) | | N.O. | | **875CP-G20N30-A2** | 875CP-G20N30-R3 |
| | | | N.C. | | 875CP-G20C30-A2 | 875CP-G20C30-R3 |
| 34 mm Smooth | 7 (0.28)…30 (1.18) | | N.O. | | 875CP-GM30N34-A2 | 875CP-GM30N34-R3 |
| | | | N.C. | | 875CP-GM30C34-A2 | 875CP-GM30C34-R3 |
| Recommended standard QD cordset (-2 = 2 m (6.5 ft)) | | | | | | 889R-F3ECA-2 |

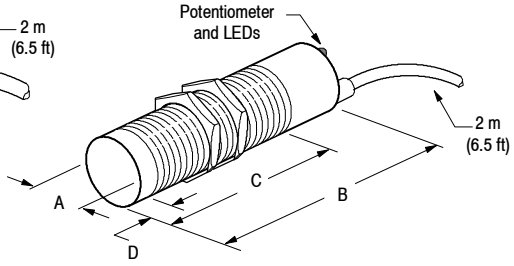
## QD Cordsets and Accessories

| Description | Page Number |
|---|---|
| Mounting Brackets | 2-210…2-214 |
| Mounting Nuts | 2-221…2-222 |
| Sensor Wells | 4-22 |
| Terminal Chambers | 8-1 |
| Other Cordsets Available | 8-1 |

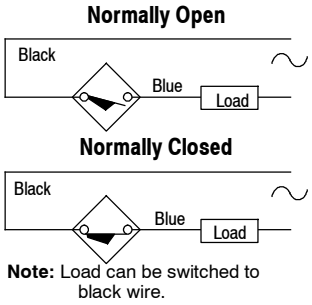
## Approximate Dimensions [mm (in.)]

### Cable Style




## Wiring Diagram




**Note:** Load can be switched to black wire.

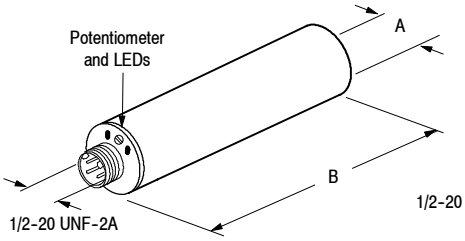
| Diameter or Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M18 x 1 | 18.0 (0.71) | 52.0 (2.04) | 52.0 (2.04) | 1.0 (0.04) |
| M30 x 1.5 | 30.0 (1.18) | 52.0 (2.04) | 46.1 (1.81) | 1.0 (0.04) |
| ∅34 | 34.0 (1.34) | 52.0 (2.04) | N/A | N/A |

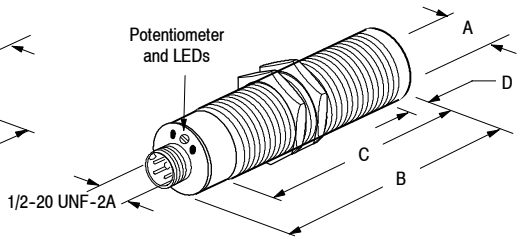
# 875CP 2-Wire AC

## Plastic Face/Threaded or Smooth Plastic Barrel

### Approximate Dimensions [mm (in.)]

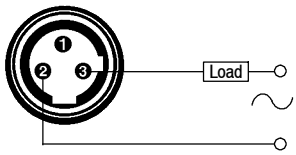
**Micro QD Style**




### Wiring Diagram

**Normally Open or Normally Closed**

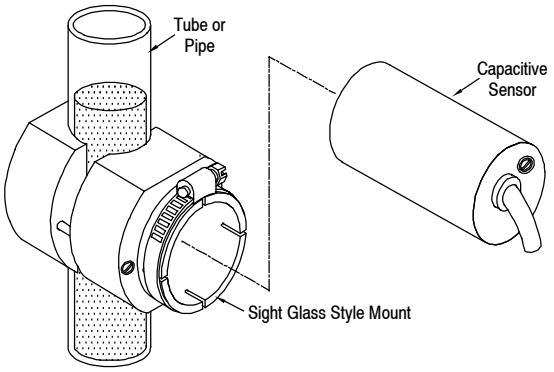


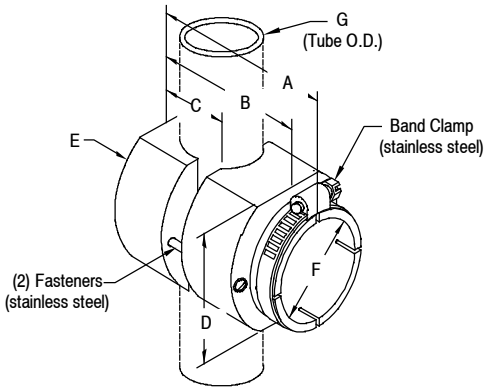

**Note:** Load can be switched to pin 2.

| Diameter or Thread Size | mm (inches) | | | |
|---|---|---|---|---|
| | A | B | C | D |
| M30 x 1.5 | 30.0 (1.18) | 65.0 (2.56) | 52.0 (2.04) | 1.0 (0.04) |
| ∅34 | 34.0 (1.34) | 65.0 (2.56) | N/A | N/A |

## Description

Sight glass style sensor mounts provide simple and convenient mounting of capacitive sensors to sight tubes for high/low level sensing. Sight glass style sensor mounts are available to fit 3/8 inch through 1¾ inch diameter plastic or glass tubing. These mounts are designed for use with 12, 18, and 30 mm diameter capacitive sensors. All sight glass style sensor mounts are made of Delrin™ plastic with stainless steel fasteners and band clamp included.

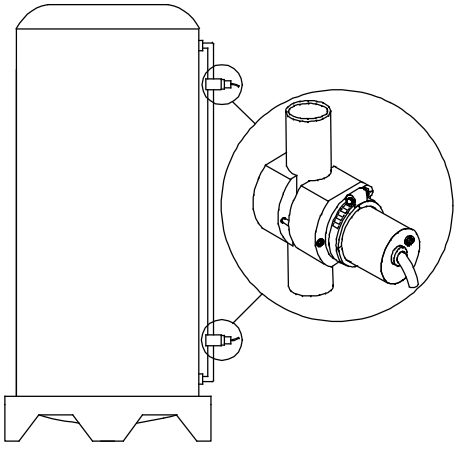



## Approximate Dimensions [mm (in.)]

| A | B | C | D | E | F- Sensor Diameter | G- Tube O.D. | Cat. No. |
|---|---|---|---|---|---|---|---|
| 44.5 (1.75) | 33.0 (1.30) | 12.7 (0.50) | 25.4 (1.00) | 31.8 (1.25) | 12 mm (threaded) | 9.40…20.6 (0.37…0.81) | 871A-BGD12 |
| 48.3 (1.90) | 36.8 (1.45) | 15.2 (0.60) | 31.5 (1.24) | 37.5 (1.75) | 18 mm (threaded) | 16.0…28.4 (0.63…1.12) | 871A-BGD18 |
| 87.6 (3.45) | 76.3 (3.00) | 31.8 (1.50) | 37.5 (1.75) | 50.8 (2.00) | 30 mm (threaded) | 25.4…44.5 (1.00…1.75) | 871A-BGD30 |

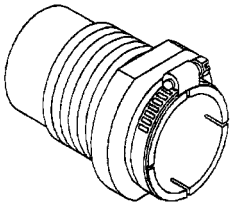
## Typical Application



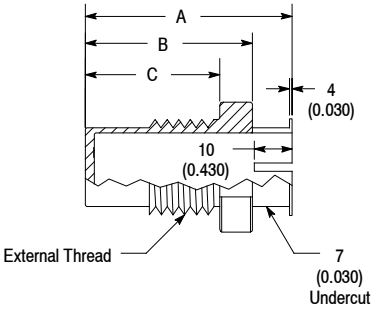
# Accessories

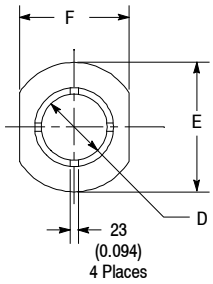
## Sensor Wells for Capacitive Proximities

### Threaded Sensor Well



*12, 18, 30, 34 mm*

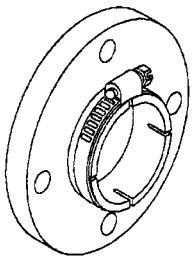



### Approximate Dimensions [mm (in.)]

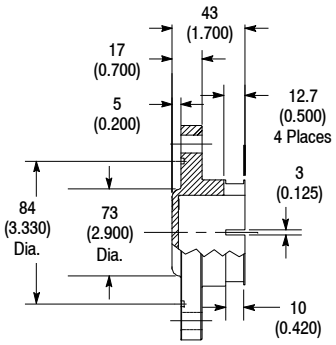
| Sensor Diameter | A | B | C | D | E | F | Pressure Rating (psi) | External Thread | Material | Cat. No, |
|---|---|---|---|---|---|---|---|---|---|---|
| 12 mm | 44 (1.750) | 33 (1.300) | 26 (1.050) | 11…12 (0.47…0.48) | 31 (1.250) | 25 (0.995) | 200 | 1/2-14 NPT | Delrin | 871A-WTD12 |
| | | | | | | | | | PTFE | 871A-WTT12 |
| 18 mm | 59 (2.350) | 48 (1.900) | 38 (1.530) | 18 (0.72…0.725) | 37 (1.470) | 31 (1.245) | | 3/4-14 NPT | Delrin | 871A-WTD18 |
| | | | | | | | | | PTFE | 871A-WTT18 |
| 30 mm | | | | 29…30 (1.18…1.185) | 50 (1.970) | 44 (1.745) | | 1-1/4-11.5 NPT | Delrin | 871A-WTD30 |
| | | | | | | | | | PTFE | 871A-WTT30 |
| 34 mm | | | | 34 (1.34…1.345) | 69 (2.750) | 31 (1.245) | | 1-1/2-11.5 NPT | Delrin | 871A-WTD34 |
| | | | | | | | | | PTFE | 871A-WTT34 |

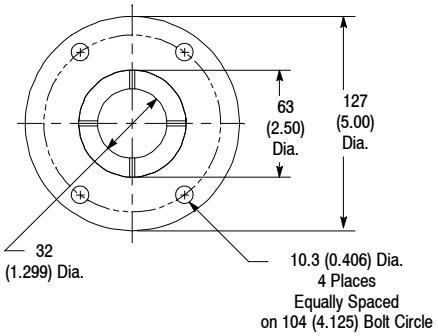
### Bolt-on Sensor Well



*30 mm Bolt-on*

Material: High Density Polyethylene
Pressure Rating: 150 PSI




| Description | Cat. No. |
|---|---|
| Bolt on sensor well | 871A-WSPE30 |

**Note: All 871A Series sensor wells are made of FDA approved materials**

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# Quick Selection Guide

| Specifications | <br>**801**<br>**General Purpose** | <br>**802G**<br>**Gravity Return** | <br>**802M and 802MC**<br>**Pre-Wired Factory Sealed** | <br>**802R**<br>**Sealed Contact** |
|---|---|---|---|---|
| **Description** | • General purpose limit switch for a wide variety of applications | • Plug-in gravity return switch<br>• Designed for conveyor-type operations with small or lightweight objects | • Compact, prewired switch<br>• Factory sealed to meet the requirements of demanding applications, wet or dry | • Similar construction to the 802T nonplug-In<br>• Glass hermetically sealed reed switch (used as the switching element to provide high contact reliability) |
| **Features** | • Mounting option; surface | • Mounting options: surface, manifold | • Cable entry and wire strands (epoxy sealed to protect against fluids entering or wicking into the switch)<br>• Mounting options: surface. | • Enclosure: gasketed, transparent plastic cover<br>• Allows inspection of terminals without removing the cover<br>• Mounting option: surface |
| **Contact Rating** | • NEMA A600 | • NEMA B600 | • 2-circuit: NEMA A600<br>4-circuit: NEMA B300 | • NEMA B600 |
| **Temperature Rating** | • -0…40°C<br>(32…104°F) | • 0…110°C<br>(32…230°F) | • 0…80°C<br>(32…176°F) | • -29…121°C<br>(-20…250°F) |
| **Actuators** | • Lever, maintained | • Three adjustable rod levers | • Lever, maintained<br>• Top and side push (with or without rollers) | • Lever<br>• Low operating force<br>• Top and side push (with or without rollers)<br>• Cat whisker<br>• Wobble stick |
| **Enclosure** | • NEMA Type 1, Type 4 or Type 7 and 9 | • NEMA Type 1 | • NEMA Types 1, 4, 4X, 6P and 13; IP67 (IEC529) | • NEMA Types 13 |
| **Additional Info** | • See page 5-9 | • See page 5-13 | • See page 5-15 | • See page 5-34 |

# Quick Selection Guide

| **802T** **Plug-In Style** | **802T** **Low Energy** | **802T** **NonPlug-In Style** | **802X** **Watertight or Hazardous Location** | **802XR** **Sealed Contact Hazardous Location** |
|---|---|---|---|---|
| • Plug-in construction provides quick and easy installation<br>• New front-mounting design and method of mode change in head make it easy to apply | • Similar body style to standard 802T plug-in limit switches<br>• Direct connection to PLCs and other low energy circuits | • Ideal for applications which require heavy-duty pilot ratings<br>• High degree of versatility and a rugged, oiltight construction | • NEMA Types 7 and 9<br>• Designed for hazardous locations only<br>• Class I, Groups B, C, D Class II, Groups E, F and G, Class III | • Designed for hazardous locations<br>• Contains sealed glass contact switch for greater contact reliability |
| • Circuitry: 4-circuit version (for most types the same size as the 2-circuit switches)<br>• Seals: Viton seals for special applications<br>• Mounting options: surface, manifold | • Conduit and mini receptacle wiring options<br>• Plug-in style for ease of wiring<br>• UL listed, CSA certified and CE marked for all applicable directives. | • Dual, air operated<br>• 2-pole vertical or horizontal lever<br>• Operated time delay<br>• Mounting options: surface, cavity, manifold | • Mounting option: surface | • Mounting option: surface |
| • 2-Circuit: NEMA A600<br>4-Circuit: NEMA A300 | • 1 N.O. and 1 N.C. contact<br>• Slow break before make<br>• DC 0.40 VA load per pole max and 0.025 VA load per pole min. | • NEMA A600 | • NEMA A600 | • NEMA B600 |
| • -18…110°C (0…230°F); Optional: -40…110°C (-40…230°F), | • -18…110 (0…230)<br>• -40…110 (-40…230) low temp model | • -18…54°C (0…130°F) Optional: -29…121°C (-20…250°F) | • -46…121°C (-50…250°F) | • -29…121°C (-20…250°F) |
| • Lever<br>• Maintained<br>• Low operating force<br>• Top and side push (with or without rollers)<br>• Cat whisker<br>• Wobble stick<br>• Neutral position | • Lever<br>• Side push rod<br>• Top push roller<br>• Side push vertical roller | • Lever<br>• Maintained, low operating force<br>• Top and side push (with or without rollers)<br>• Cat whisker<br>• Wobble stick<br>• Neutral position | • Lever<br>• Maintained, top and side push (with or without rollers)<br>• Wobble stick<br>• Neutral position | • Lever<br>• Top and side push (with or without rollers)<br>• Wobble stick |
| • NEMA Types 1, 4, 6P (select side rotary styles), 13 | • IP30 | • NEMA Types 1, 13 | • NEMA Types 7 and 9 Class I, Groups B, C or D Class II, Groups E, F or G Class III | • NEMA Types 7 and 9 Class I, Groups B, C or D Class II, Groups E, F or G |
| • See page 5-41 | • See page 5-48 | • See page 5-54 | • See page 5-74 | • See page 5-81 |

# Quick Selection Guide

| Specifications | <br>**802B**<br>**Compact** | <br>**802B**<br>**Precision** | <br>**802B**<br>**Small Precision** | <br>**802T**<br>**Safety Limit Switches** |
|---|---|---|---|---|
| **Description** | • Compact metal body<br>• Prewired to maintain enclosure seals<br>• Industry standard mounting for ease of installation. | • Precision style limit switch<br>• Industry standard mounting<br>• Low trip and reset points for more precise sensing | • metal bodied for use in industrial applications<br>• Twelve different styles available for solving multiple applications | • designed for use in control reliable applications and safety applications per ISO 14119 |
| **Features** | • 3 m cable standard<br>• AC or DC LED versions<br>• Low current versions<br>• Booted and panel mount versions<br>• UL/CSA and CE Marked for all applicable directives | • 1/2 in. NPT conduit entry<br>• Grounding screw<br>• Booted models<br>• Side and flange mounting available<br>• UL/CSA and CE Marked for all applicable directives | • 12 different actuators<br>• Screw termination<br>• Small size<br>• Booted and Panel mount versions<br>• UL/CSA and CE marked for all applicable directives | • Direct opening action<br>• Snap acting contacts<br>• Rugged metal construction<br>• Long life and reliability<br>• Plug-in design<br>• NEMA 6P/IP67 sealing |
| **Contact Rating** | • SPDT Form C<br>• NEMA B300 | • SPDT Form C<br>• 15 A @ 125/250/480 V AC | • SPDT Form C<br>• NEMA B300 | • 2-circuit: A600/AC-15<br>Q300/DC-13<br>• 4-circuit: A300<br>Q300/DC-13 |
| **Temperature Rating** | • -10…70°C<br>(14…158°F) | • -10…80°C<br>(14…176°F) | • -10…80°C<br>(14…176°F) | • -18C…+110°C<br>(0F…+230°F) |
| **Actuators** | • Rotary arm<br>• Center rotary arm<br>• Wobble stick<br>• Top push<br>• Top push bevel<br>• Top push roller<br>• Top push cross roller | • Top push<br>• Top push roller<br>• Top push cross roller<br>• Roller lever<br>• One-way roller lever | • Top push<br>• Top push roller<br>• Top push cross roller<br>• Hinge lever<br>• Short hinge lever<br>• Roller lever<br>• Short roller lever<br>• One-way roller lever<br>• Short one-way roller lever | • Lever<br>• Top push roller<br>• Side push vertical roller<br>• Side push horizontal roller |
| **Enclosure** | • NEMA 1, 3, 4, 6, 12, 13 and IP67 | • Nonbooted: NEMA 1 and IP 60<br>• Booted: NEMA 1, 3, 4 and IP65 | • NEMA 1, 3, 4, 6, 13 and IP67 | • NEMA 4, 6P, 12, 13 and IP67 |
| **Additional Info** | • See page 5-88 | • See page 5-97 | • See page 5-105 | • See page 5-109 |

# Quick Selection Guide

| **440P-A**<br>**22 mm Metal Safety Limit switches** | **440P-C**<br>**22 mm Plastic Safety Limit switches** | **440P-M**<br>**30 mm Metal Safety Limit switches** | **440P-M**<br>**15 mm Plastic Safety Limit switches** | **Operating Lever** |
|---|---|---|---|---|
| • Compact die-cast alloy metal body with prewired 2 m cable exiting bottom or side of switch mounting for ease of installation<br>• Industry standard mounting for ease of installation<br>• Choice of actuator heads | • Conforms to EN50047 (22 mm)<br>• Glass reinforced thermoplastic housing<br>• Most feature direct opening contacts designed to meet IEC 947<br>• Available in snap-acting, slow make/break with 2 or 3 pole contact arrangement<br>• Heads can be rotated in 90° increments for flexible mounting | • Conforms to EN50041 (30 mm x 60 mm)<br>• Cast aluminum housing<br>• Most feature direct opening contacts designed to meet IEC 947<br>• Available in snap-acting, slow make/break with 2, 3 or 4 pole contact arrangement.<br>• Heads can be rotated in 90° increments for flexible mounting | • Small size with mounting hole options<br>• Choice of actuator position<br>• UL approved glass filled polyester housing | • To be used with 802T, 802M, 802MC, 802X and 802XR limit switches |
| • Rugged die cast enclosure<br>• Positive operation, forced disconnection of contacts (direct opening action)<br>• Snap-acting contact actuation<br>• Contacts 1 N.C. + 1 N.O.<br>• Prewired 2 meter cable, bottom or side exit<br>• UL Recognized, TÜV and CE Marked for all applicable directives | • Available in1/2 in. NPT, M20 and QD versions<br>• Cat. 1 device per EN954-1, dual-channel interlocks suitable for Cat. 3 or 4 systems<br>• cULus, TÜV, CCC, and CE Marked for all applicable directives<br>• Mounting options: surface | • Available in1/2 in. NPT, M20 and QD versions<br>• Cat. 1 device per EN954-1, dual-channel interlocks suitable for Cat. 3 or 4 systems<br>• cULus, TÜV, CCC, and CE Marked for all applicable directives<br>• Mounting options: surface | • Positive operation, forced disconnection of contacts<br>• Contacts, 1 N.C. & 1 N.O.<br>• CSA NRTL/C and CE Marked for all applicable directives | • Various lengths materials and styles to suit specific applications |
| • 1 N.O. and 1 N.C. snap acting contact, AC15/B330, DC 13/Q300 | • A600/AC-15<br>• N600/DC-13 | • A600/AC-15<br>• N600/DC-13 | • 1 N.O. and 1 N.C. contact<br>• Slow break before make | — |
| • 2…+70°C (35.6…158°F) | • -25…80°C (-13…176°F) | • -25…80°C (-13…176°F) | • -25…80°C (-113…176°F) | — |
| • Roller plunger<br>• Dome plunger<br>• Cross roller plunger<br>• Lever arm | • Roller plunger<br>• Dome plunger<br>• Hinge lever<br>• Short lever<br>• Offset hinge<br>• Adjustable lever<br>• Large rubber roller | • Roller plunger<br>• Dome plunger<br>• Short lever<br>• Adjustable lever<br>• Rod lever<br>• Spring rod<br>• Telescope arm | • Roller plunger | • Rod levers<br>• Roller levers |
| • NEMA 1, IP66 and IP67 | • IP66 | • IP66 | • IP30 | — |
| • See page 5-114 | • See page 5-116 | • See page 5-122 | • See page 5-128 | • See page 5-130 |

# Technical Definitions and Terminology

**Actuator**: A switch mechanism that when moved as intended, operates the switch contacts. This mechanism transmits the applied force from the actuating device…the contact block, causing the contacts to operate.

**Actuator Free Position**: The initial position of the actuator when there is no external force (except gravity) applied to the actuator.

**Actuator Operating Position**: The position of the actuator when the contacts operate.

**Actuator Resetting Position**: The position of the actuator at which the contacts move from the operated position to the “normal” position.

**Differential Travel (Travel to reset contacts)**: The angle or distance through which the actuator moves from the contact operating position to the actuator resetting position, or the distance between the operating point and the release point.

**Normal Contact Position**: The position of the contacts when no operating force is applied.

**Operating Contact Position**: The position to which the contacts move when the actuator is deflected to or beyond the actuator operating position.

**Operating Force**: The straight line force in the designed direction applied to the switch actuator to cause the contacts to move to the operated position.

**Operating Torque**: The torque that must be applied to the actuator to cause the movable contacts to move to the operated contact position.

**Overtravel**: The movement of the actuator beyond the contact operating position.

**Pretravel (Travel to the operate contacts)**: Travel to operate the contacts from the actuator free position.

**Slow Make-Slow Break**: A type of contact structure with no overcenter mechanism. Contacts move at a speed directly proportional to the speed of operation of the actuator. Contacts may touch with little contact pressure.

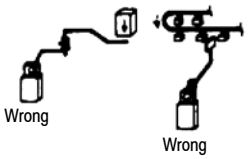
**Snap Action**: In this type of contact structure, movement of the actuator applies force to an overcenter mechanism, which creates a fast change in contact state once the overcenter position has been exceeded.

**Snap Action/IEC Positive Opening Action**: This contact structure is very similar to the snap action contact with one addition: continued operation of the operating mechanism beyond the normal snap action position applies force directly to the normally closed (N.C.) contact if it has not opened with the snap action mechanism. This helps to ensure opening of even a welded contact. For example, if a contact has a snap action operating point at 40° rotary movement, the direct opening action point may be at 60° or more. No direct opening action forces are applied to the N.O. contact.

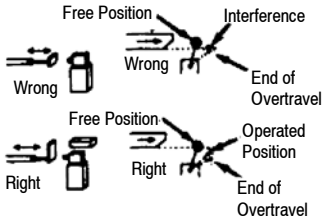
**Total or Maximum Travel**: The sum of the pretravel and the overtravel.

# Application Considerations

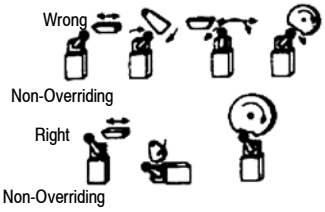
## Actuator Consideration



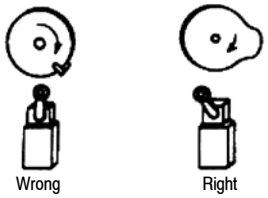

Limit switches are designed for proper performance with the actuators with which they are supplied. Supplementary actuators should not be used unless the limit switches are specifically designed for them.



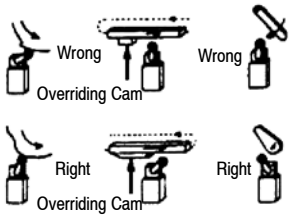

Operating mechanism for limit switches should be so designed that under any operating or emergency conditions the limit switch is not operated beyond its overtravel limit position. A limit switch should not be used as a mechanical stop.



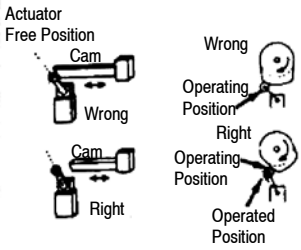

For limit switches with lever actuators, the actuating force should be applied as nearly perpendicular to the lever as practical and perpendicular to the shaft axis about which the lever rotates.



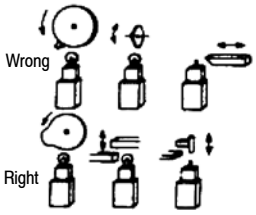

Where relatively fast motions are involved cam arrangements should be such that the actuator does not receive a severe impact. Cams should be designed such that the limit switch will be held operated long enough to operate relays, valves, etc.




Cam or dog arrangements should be such that the actuator is not suddenly released to snap back freely.

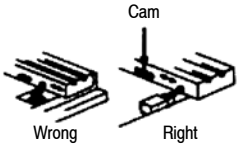



A limit switch actuator must be allowed to move far enough for positive operation of the contacts.

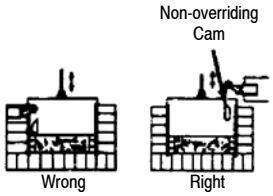



For limit switches with push rod actuators the actuating force should be applied as nearly as possible in line with the push rod axis.

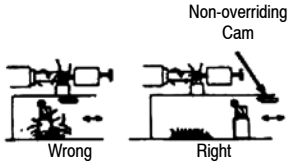
## Location and Installation



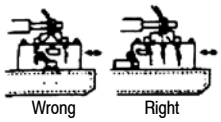

Limit switches should be mounted rigidly and in readily accessible locations with suitable clearances to permit easy service and replacement when necessary. Cover plates should face the maintenance access point.



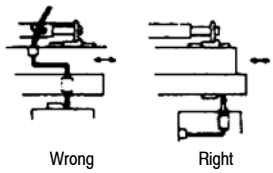

Limit switches should not be used in locations where temperature or atmosphere conditions are beyond those for which they have been specifically designed.



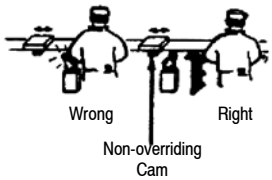

Limit switches should be placed in locations where machining chips do not accumulate under normal operating conditions.




Limit switches should not be submerged in or splashed with oils, coolants or other liquids.




The location of oiltight limit switches and the method of connecting them should be such that condensation in the conduit cannot enter the switch enclosure.




Limit switches should be mounted in locations which will prevent false operation by normal movements of operator or machine components.

# Notes

801-ASA11

801-ASC17

801-CMC21

801-FSC148

801-ASC1411

## Description

The Bulletin 801 line of general purpose limit switches includes many types of switches for use in a wide variety of applications. Many different contact arrangements are available. Slow and snap action contact operating mechanisms are available. Snap action limit switches are designed to provide high snap through force once the mechanism has traveled the required distance. Refer to the table on page 5–12 for limit switch selection.

**Figure 1**

Lever on right side as illustrated. Clockwise operation only. Lever can be adjusted through 360°.

**Figure 2**

Contacts are operated in both directions of roller lever. With roller on inside, lever is adjustable through 49° either side of center line. With roller on outside, lever is adjustable through 360°.

**Figure 3**

Similar to Figure 2 except roller lever is longer for use where more space is necessary between limit switch and its operating device. The total height from base of limit switch to the end of roller is 181.0 mm (7.125 in.).

**Figure 4**

Same contact operation in either direction, with roller on either inside or outside. Starting position of lever is adjustable 43° either side of center line.

**Figure 5**

Contact operation is obtained only in direction shown. Lever is free to move in opposite direction, but contacts are not actuated. With roller on inside, starting position of lever can be adjusted through 128° from extreme left position; with roller on outside, the roller lever is adjustable through 360°.

**Figure 6**

Similar to Figure 5, except that operation is to the left.

**Figure 7**

For clockwise operation. Ratchet type. When lever is moved to right, contacts are operated. Lever is spring return, but contacts remain in the operated position. Next movement of roller lever to the right returns the contacts to their original position. This completes cycle of operation. Lever is adjustable through 360°.

**Figure 8**

Similar to Figure 7 except that operation is counterclockwise.

**Figure 9**

Contacts are operated when fork lever is operated in one direction and are restored to original position when lever is operated in the reverse direction. Rod or Chain/Stroke Type Actuators not shown.

**Figure 10❶**

Roller lever on right side. Roller 34.9 mm (1.375 in.) in diameter. Lever travels through 30° arc. Downward travel of roller, 33.3 mm (1.312 in.).

**Figure 11❶**

Similar to Figure 10, except roller has a rubber trim, 76.2 mm (3 in.) in diameter. Downward Travel of roller, 42.1 mm (1.656 in.).

**Figure 12❶**

Roller lever on right side. Steel roller, 34.9 mm (1.375 in.) in diameter. Lever travel, either direction, 30°.

**Figure 13❶**

For clockwise operation. Roller, 1.375 in. (34.9 mm) diameter. Downward linear travel of roller, 50 mm (1.969 in.).

❶ For NEMA 7 & 9 housing, reduce total height by 1.6 mm (0.063 in.).

**Figure 14❶**

Contact operation obtained when fork lever is moved in direction shown and restored to original position when lever is operated in reverse direction.

**Figure 15**

Contacts operate in the direction shown. Track type limit switch with roller fork lever. Rollers 22.2 mm (0.875 in.) diameter hardened steel.

**Figure 16**

Contacts operate when the lever is moved in either direction. Should only be used where the link between lever and operating mechanism is short, so that the weight of the connecting mechanism will not offset the force of the spring return. Maximum weight of connecting mechanism: 0.5 lb.

**Figure 17**

Counterweight holds contacts closed. When the hook reaches the upper limit of its travel, it raises the counterweight and the weighted lever operates the contacts. When the hook is lowered the contacts are reset.

**Figure 18**

Similar to Figure 1 except lever is on left side.

**Figure 19**

Similar to Figures 5 and 6 except contacts are arranged for maintained operation. Contacts are actuated when lever is operated in direction shown. Contacts are restored when lever is operated in reverse direction.

**Figure 20**

Similar to Figures 2 and 3 except contacts are arranged for sequential operation in either direction. Operation is as follows:

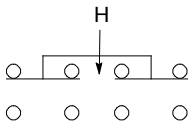
Circuit 1 opens at 14°,
Circuit 2 closes at 45°,
Total travel is 55°.

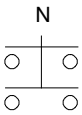
## Contact Arrangements and Ratings

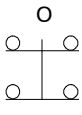
AC
- 3 A, 120V
- 1.5 A, 240V
- 0.75 A, 480V
- 0.6 A, 600V

DC
- 1.1 A, 115V
- 0.55 A, 230V
- 0.2 A, 550V

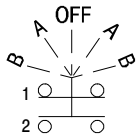
Light Duty



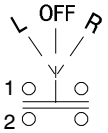




D



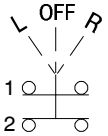

| Lever Pos. | Contact Pos. 1 | 2 |
|---|---|---|
| Off | C | O |
| A | O | O |
| B | O | C |

F



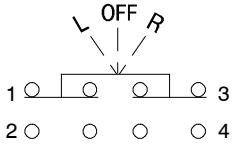

| Lever Pos. | Contact Pos. 1 | 2 |
|---|---|---|
| R | C | O |
| Off | O | O |
| L | O | C |

G




| Lever Pos. | Contact Pos. 1 | 2 |
|---|---|---|
| R | C | O |
| Off | C | C |
| L | O | C |

K




| Lever Pos. | Contact Pos. 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| R | C | O | O | C |
| Off | C | O | C | O |
| L | O | C | C | O |

AC
- 6A, 120V
- 3A, 240V
- 1.5A, 480V
- 1.2A, 600V

DC
- 2.2A, 115V
- 1.1A, 230V
- 0.4A, 550V

Standard Duty

## Ambient Temperature Range

0…+40°C (+32…+104°F) minimum temperature based on the absence of freezing moisture or water.l

## Approximate Dimensions [mm (in.)]

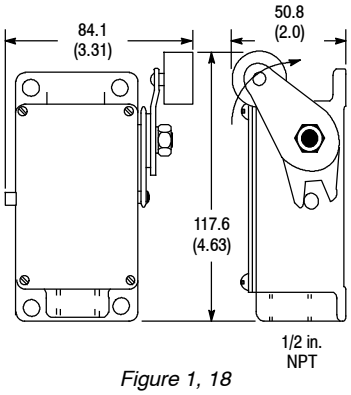



*Figure 1, 18*

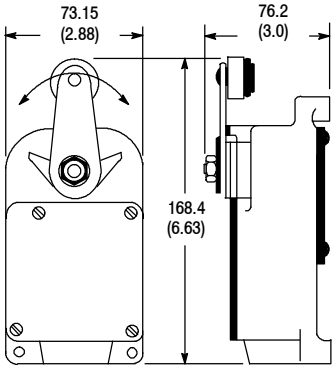



*Figure 2, 3, 20*

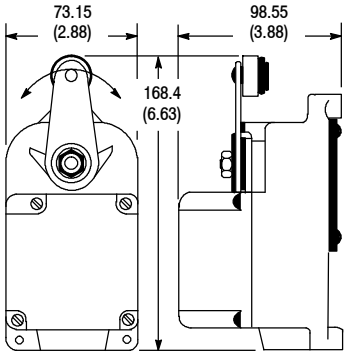



*Figure 4*

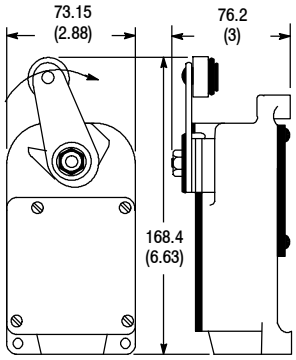



*Figure 5, 6, 19*

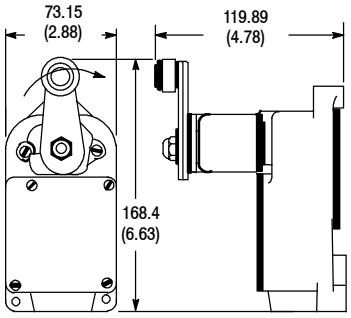



*Figure 7, 8*

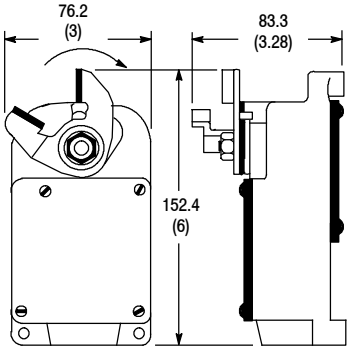



*Figure 9*

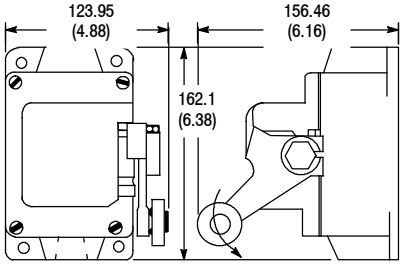



*Figure 10, 11*

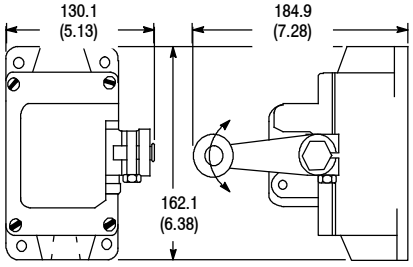



*Figure 12*

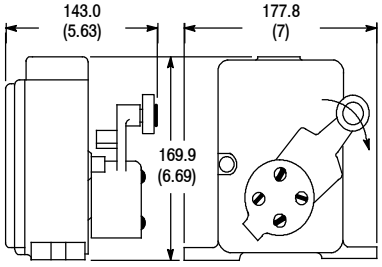



*Figure 13*

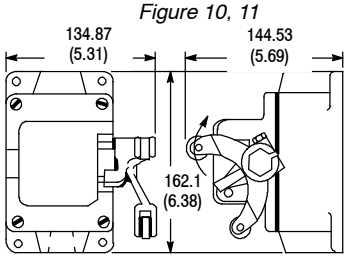



*Figure 14*

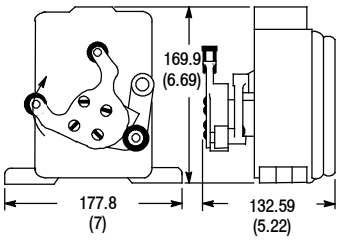



*Figure 15*

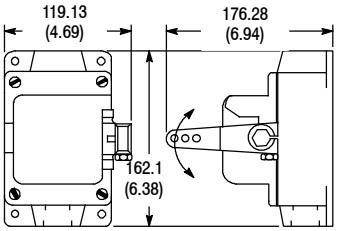



*Figure 16*

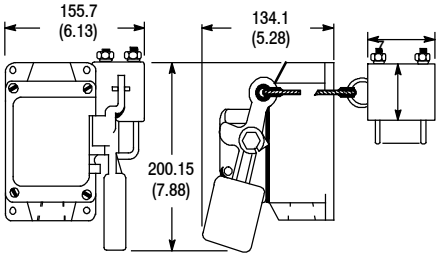



*Figure 17*

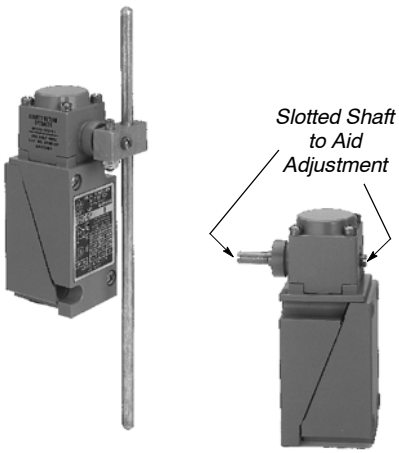
# 801

## General Purpose

### Product Selection

| Type of Lever | Contact Operation | Housing Style | Contact Type & Rating ❶ | Force to Operate (Max.) | Travel to Operate Contacts (Nominal) | Over Travel (Min.) | Cat. No. |
|---|---|---|---|---|---|---|---|
| **NEMA Type 1 Enclosure** | | | | | | | |
| Roller | Slow Action Spring Return | Figure 1 | A | 15.58 N (3.5 lb) | 8° | 3° | 801-ASA11 |
| | | | B | 15.58 N (3.5 lb) | 3° | 8° | 801-ASB11 |
| | | Figure 18 | A | 15.58 N (3.5 lb) | 8° | 3° | 801-ASA12 |
| | | Figure 2 | C | 10.0 N (2.25 lb) | 30° | 25° | 801-ASC17 |
| | | | D | 10.0 N (2.25 lb) | See Figure 20 ❷ | See Figure 20 ❷ | 801-ASD17 |
| | | | F | 10.0 N (2.25 lb) | 25° | 30° | 801-ASF17 |
| | | | G | 10.0 N (2.25 lb) | 15° | 40° | 801-ASG17 |
| | Snap Action Spring Return | Figure 2 | C | 22.25 N (5.0 lb) | 25° | 30° | **801-ASC21** |
| | | | C | 37.82 N (8.5 lb) | 9° | 40° | 801-ASC21X |
| | | | N | 22.25 N (5.0 lb) | 25° | 30° | 801-ASN21 |
| | | | N | 37.82 N (8.5 lb) | 9° | 40° | 801-ASN21X |
| | | | O | 22.25 N (5.0l bs) | 25° | 30° | 801-ASO21 |
| | | | O | 37.82 N (8.5 lb) | 9° | 40° | 801-ASO21X |
| | | | C | 10.0 N (2.25 lb) | 30° | 25° | 801-ASC313 |
| | | Figure 4 | H | 22.25 N (5.0 lb) | 30° | 20° | 801-ASH22 |
| | | | H | 31.15 N (7.0 lb) | 10° | 43° | 801-ASH26X |
| | | Figure 3 | C | 17.8 N (4.0 lb) | 25° | 30° | 801-ASC25 |
| | | | C | 31.15 N (7.0 lb) | 9° | 44° | 801-ASC25X |
| | | | N | 17.8 N (4.0 lb) | 25° | 30° | 801-ASN25 |
| | | | N | 28.92 N (6.5 lb) | 9° | 44° | 801-ASN25X |
| | | Figure 5 | C | 22.25 N (5.0 lb) | 25° | 15° | 801-ASC27 |
| | | Figure 6 | C | 17.8 N (4.0 lb) | 25° | 15° | 801-ASC29 |
| | Ratchet Type Maintained | Figure 7 | C | 28.92 N (6.5 lb) | 68° | 12° | 801-ASC218 |
| | | Figure 8 | C | 22.25 N (5.0 lb) | 68° | 12° | 801-ASC220 |
| | Snap Action Maintained | Figure 19 | C | 10.0 N (2.25 lb) | 38° | 24° | 801-AMC211 |
| Fork | Snap Action Maintained | Figure 9 | C | 15.58 N (3.5 lb) | 20.6 mm (0.81 in.) | — | 801-CMC21 |
| Rod or Chain | | | C | 10.0 N (2.25 lb) | 20.6 mm (0.81 in.) | 20.6mm (0.81 in.) | 801-DMC21 |
| Stroke | | | C | 20.0 N (4.5 lb) | 14.2 mm (0.56 in.) | — | 801-EMC21 |
| **NEMA Type 4 Enclosure (For Indoor Use)** | | | | | | | |
| Roller | Slow Action Spring Return | Figure 10 | C | 27.81 N (6.25 lb) | 26° | 4° | 801-ASC1411 |
| | | | H | 27.81 N (6.25 lb) | 26° | 4° | 801-ASH1411 |
| | | Figure 11 | C | 17.8 N (4.0 lb) | 26° | 4° | 801-ASC1415 |
| | | Figure 12 | K | 17.8 N (4.0 lb) | 26° | 4° | 801-ASK1421 |
| | Snap Action Spring Return | Figure 13 | C | 17.8 N (4.0 lb) | 26.5° | 6° | 801-ASC2426 |
| Fork | Slow Action Maintained | Figure 14 | C | 31.15 N (7.0 lb) | 31.8 mm (1.25 in.) | — | 801-CMC144 |
| | Snap Action Maintained | Figure 15 | C | 28.92 N (6.5 lb) | 38.1 mm (1.5 in.) | — | 801-CMC2411 |
| Rod or Chain | Slow Action Spring Return | Figure 16 | K | 13.35 N (3.0 lb) | 26° | 4° | 801-DSK145 |
| Weight | | Figure 17 | C | 22.25 N (5.0 lb) | 26° | 4° | 801-FSC148 ❸ |
| **NEMA Type 7 & 9 Enclosure** | | | | | | | |
| Roller | Slow Action Spring Return | Figure 10 | C | 27.81 N (6.25 lb) | 26° | 4° | 801-ASC1711 |
| | | | H | 27.81 N (6.25 lb) | 26° | 4° | 801-ASH1711 |
| | | Figure 11 | C | 17.8 N (4.0 lb) | 26° | 4° | 801-ASC1715 |
| | | Figure 12 | K | 17.8 N (4.0 lb) | 26° | 4° | 801-ASK1721 |
| | Snap Action Spring Return | Figure 13 | C | 17.8 N (4.0 lb) | 26.5° | 6° | 801-ASC2726 |
| Fork | Snap Action Maintained | Figure 15 | C | 28.92 N (6.5 lb) | 38.1 mm (1.5 in.) | — | 801-CMC2711 |

❶ See table on page 5-10.
❷ See Figure 20 on page 5-9.
❸ The following replacement parts are available: combination lever/weight = B7391, counterweight = Z1997, counterweight cable = B37939.




*802G-GP with Steel Operating Lever*

## Description

The Bulletin 802G is a plug-in gravity return limit switch designed for conveyor applications with small or lightweight moving objects. It has an extremely low operating torque and uses the action of gravity on the lever arm to reset the contacts. Three unique lever arms are available for the Bulletin 802G in nylon or steel with adjustable lengths.

| ATTENTION | Bulletin 802T or 802MC levers cannot be used on the gravity return limit switch. Teh gravity return limit switch requires the levers on page 5-14. |
|---|---|

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 1 |
| **Certifications** | UL Listed, CSA Certified and CE Marked for applicable directives |
| **Ambient Temperature [C (F)]** | 0…110° (32…230°) |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, Same Polarity)**

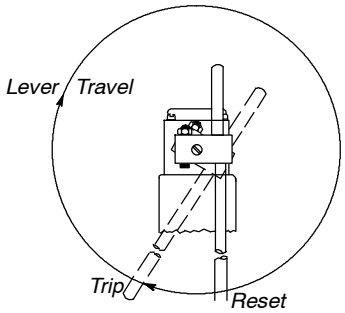
| NEMA Rating Designation | Max AC Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| B600 | 120 | 30 | 3.00 | 5 A | 3600 | 360 |
| | 240 | 15 | 1.50 | 5 A | 3600 | 360 |
| | 480 | 7.5 | 0.75 | 5 A | 3600 | 360 |
| | 600 | 6 | 0.60 | 5 A | 3600 | 360 |

**DC Contact Rating (Maximum per Pole, Same Polarity)**

| Voltage Range | Current Rating |
|---|---|
| 115…125 | 0.4 A |
| 230…250 | 0.2 A |
| 550…600 | 0.1 A |

Since the switch shaft can be rotated continuously through 360º, the trip point is adjustable to any angle. This adjustment is easily made using the slots provided at both ends to hold the shaft, while rotating the lever arm to the desired angle. A clamping pin is used to maintain this setting, and a set screw to hold the rod length adustment. The trip angle and lever length must be carefully adjusted to provide proper switch action.

*Example: CW Operation*




## Features

- Light operating torque
- Unique lever arms
- Trip point adjustable to any angle

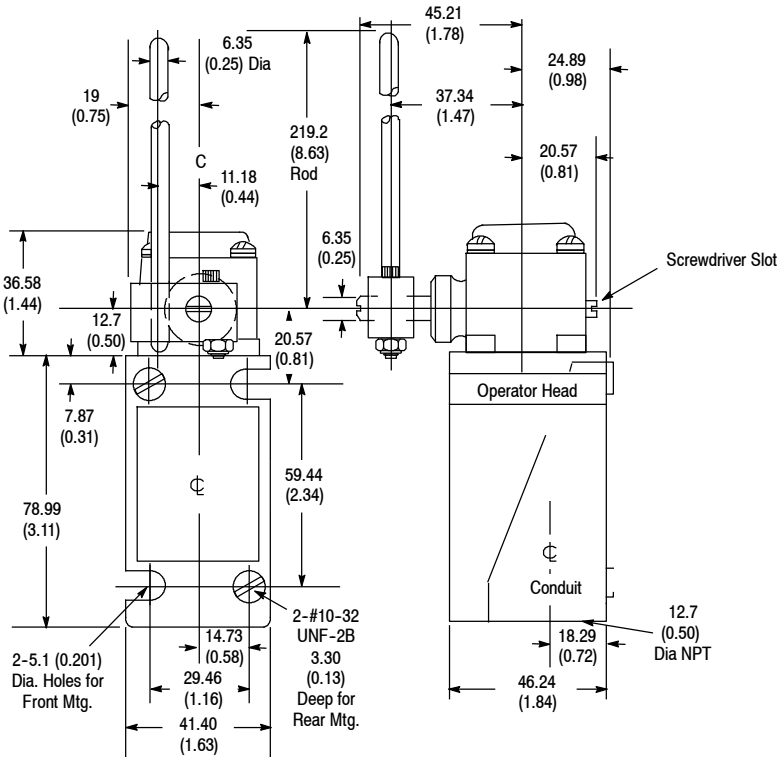
## Product Selection

| Contact Operation | Torque to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Complete Switch Without Lever | Switch Without Lever and Base |
| 1 N.O.<br>1 N.C. | 0.018 N•m<br>(2.5 oz•in.)<br>(without lever) | Adj. from<br>10°…180° | 360°<br>CW or CCW | 10°❶ | **802G-GP** | 802G-GP1 |

❶ 10° opposite trip direction, 180° in trip direction.

## Approximate Dimensions [mm (in.)]

Dimensions are not intended to be used for manufacturing purposes.




*802G-GP with 802G-W10 Lever*
*Approximate Shipping Wt. 1.5lbs (680g)*

## Modification for Neon Indicating Light

The Bulletin 802G gravity return limit switch can be supplied with a neon indicating light. To order, add the letter **"N"** for 120V AC 50/60 Hz or **"N5"** for 240V AC 50/60 Hz. **Example**: Catalog number **802G-GP,** becomes catalog number **802G-GPN.**

The indicating light is to be internally connected by the user to two isolated terminals in the base assembly allowing complete flexibility in the connection of the light. Switches with an indicating light have a contact rating of NEMA B300.

## Operating Levers

| Description | Cat. No. |
|---|---|
| 6.35 mm (0.25 in.) Steel Rod, Adjustable to 219.0 mm (8.625 in.) Length | 802G-W10 |
| 3.18 mm (0.125 in.) Steel Rod, Adjustable to 219.0 mm (8.625 in.) Length | 802G-W10A |
| 6.35 mm (0.25 in.) Nylon Rod, Adjustable to 219.0 mm (8.625 in.) Length | 802G-W11 |

*802MC-AY5 with*
*802MC-W1A Lever*

## Description

Bulletin 802M compact pre-wired limit switches are factory sealed to meet the demanding requirements for NEMA 1, 4, 6P, 13, and IP67 (IEC529) enclosures. Outstanding features designed into the switch make it ideal for wet environments and washdown applications.

Bulletin 802MC limit switches are also factory sealed against fluid ingress. In addition, they feature a NEMA 4X rating, making the 802MC an ideal solution for washdown applications with harsh chemicals.

A wide variety of operating heads and operating levers are available. Operating heads can be mounted in four positions, 90° apart.

## Sealing System

The cable entrance and wire strands are epoxy sealed to protect against liquids entering or wicking into the switch. The interface between the operating head and base is sealed with a chemically resistant O-ring. The operating shaft for lever type switches is protected by a three-way seal. Push type switches have a special boot to prevent oil and other foreign material from entering the mechanism. A flexible diaphragm seal between the operating head and the switch body helps isolate the switch against the ingress of contaminants. After pre-wiring, the cover is factory installed and epoxy sealed.

## Construction

The body and operating head of the Bulletin 802M and 802MC pre-wired limit switch are constructed from a glass filled polymer. This material is characterized by excellent dimensional stability and is resistant to moisture and numerous chemicals.

The Bulletin 802MC switch also capitalizes on the corrosion-resistant properties of the operating shaft and operating head mounting screws, which are made of Type 316 stainless steel.

The basic switching mechanism has double-throw, double-break, snap-action contacts with minimum contact bounce. The switch is pre-wired and factory sealed with “STO”❶ cable. An optional mini-type or micro-type receptacle can also be supplied. Refer to Modifications on page 5–27 and 5–33.

## Installation

Although physically smaller, the Bulletin 802M switch can be interchanged with a Bulletin 802T front mounted lever operated switch by using the mounting foot adaptor included (see dimensions on page 5–18). Cam tracking characteristics from the top mounting hole of the Bulletin 802M and 802MC switch are identical to the Bulletin 802T nonplug-in rotary operated switch line.

Time saving factory pre-wiring makes the switch economical to use. There is no need to purchase a separate cable grip or cable because internal wiring by the installer is eliminated. Merely connect the STO cable to a junction box. Since the switch body is nonmetallic, no ground wire is required for the switch.

## Lever Type Switches

These switches are operated by means of a lever which is clamped to a knurled shaft extending from the operating head. These devices can be easily field converted to clockwise, counterclockwise, or both directions of operation without any loose parts. Total travel is 86° in either direction. Operating heads are interchangeable and can be mounted in any of four positions 90° apart for maximum flexibility. The head is interlocked with the base unit to resist accidental shearing.

Lever type switches can be equipped with a variety of operating levers: roller lever, adjustable roller lever, micrometer adjustment roller lever, rod lever, one-way rod or roller lever and fork lever.

## Push Type Switches

These switches are actuated by means of a rod or plunger located on the top or side of the operating unit. Pushing the plunger into the head causes the contacts to operate. Two types of plungers are available: rod and roller. Push type switches are supplied in spring return construction.

❶ STO is a common identification of this cable. The more complete identification of the cable used on the Bulletin 802M is STOOW-A which incorporates an oil resistant jacket and conductor insulation, for indoor and outdoor use.

# 802M

## Pre-Wired—Factory Sealed Switches

## Description

The Bulletin 802M compact pre-wired limit switch is factory sealed to meet the demanding requirements for NEMA 1, 4, 6P and 13 enclosures. Outstanding features designed into the switch make it ideal for wet environments and washdown applications.

A wide variety of operating heads and operating levers are available. Operating heads can be mounted in four positions, 90° apart.

## Applications

The Bulletin 802M is designed for dry and wet applications. The superior sealing system has been developed to protect against dust, dirt, and fluids normally found in industrial environments. The device has passed harsh environmental testing such as alternately drenching with a liquid and exposing to dust and abrasive grit with the switch operating 250 times per minute.

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 1, 4, 6P, 13 and IP67 |
| **Pollution Degree** | 3 |
| **Certifications** | UL Listed, CSA Certified and CE Marked for applicable directives |
| **Ambient Temperature [C (F)]** | 0…+80° (+32…+18°) minimum temperature based on the absence of freezing moisture or water. |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, 2 Circuits Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A600 AC-15 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |
| | 480 | 15 | 1.50 | 10 | 7200 | 720 |
| | 600 | 12 | 1.20 | 10 | 7200 | 720 |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, 4 Circuits Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| B300 | 120 | 30 | 3.00 | 5 | 3600 | 360 |
| | 240 | 15 | 1.50 | 5 | 3600 | 360 |

**DC Contact Rating (Maximum per Pole, 2 Circuits Same Polarity)**

| Nominal Voltage | A | Continuous Carrying Current (A) |
|---|---|---|
| 24 | 1.1 | 5 |

The switch is often used in applications subject to washdowns, streams of coolant, or occasionally submerged in fluids commonly found on machines or in industrial processes. This limit switch is being used successfully in High Water Content Fluid (HWCF) applications. Contact your local Rockwell Automation sales office or Allen-Bradley distributor for applications where potentially corrosive fluids are of a particular concern.

## Features

- Pre-wired and factory sealed
- Corrosion-resistant housings
- Corrosion-resistant hardware (802MC)
- Side rotary, adjustable top and top or side push styles with and without rollers
- Double-break fine silver contacts

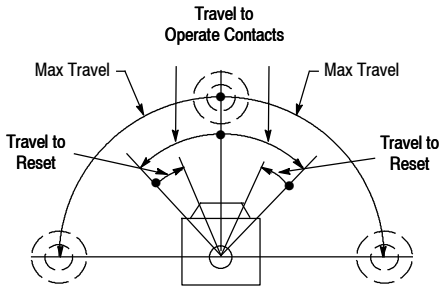
## Pre-Wired—Factory Sealed


Lever Type • Spring Return page 5-17
Lever Type Neutral Position • Spring Return . . . . . page 5-19
Lever Type • Maintained Contact . . . page 5-20
Lever Type Sequential • Spring Return . . page 5-21
Push Type • Spring Return . page 5-22
Wiring Diagrams . . . . . page 5-24
Modifications . . . . . page 5-27
Accessories . . . . . page 5-29

# 802M Lever Type • Spring Return

## Pre-Wired—Factory Sealed Switches

## Range of Operation

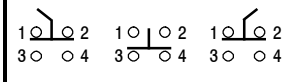
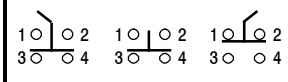
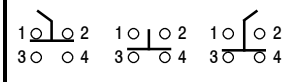
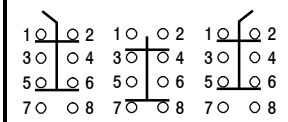
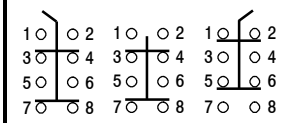
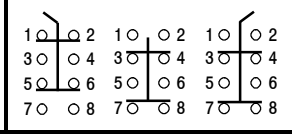


*Complete Switch Without Lever*

*Operator Head Only*

*Switch Body Only*

## Product Selection

| No. of Circuits | Lever Movement vs. Contact Operation | | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Complete Switch w/o Lever ❶ | Operator Head Only | Switch Body Only ❶ |
| 2 | Clockwise or Counterclockwise |  | 0.34 N•m (3 lb•in) | 15° | 86° | 6° | **802M-AY5** | **802M-AX** | 802M-XY5 |
| | | | 0.56 N•m (5 lb•in) | 8° | | 4° | **802M-HY5** | **802M-HX** | |
| | Clockwise |  | 0.34 N•m (3 lb•in) | 15° | | 6° | 802M-A1Y5 | 802M-A1X | |
| | | | 0.56 N•m (5 lb•in) | 8° | | 4° | 802M-H1Y5 | 802M-H1X | |
| | Counterclockwise |  | 0.34 N•m (3 lb•in) | 15° | | 6° | 802M-A2Y5 | 802M-A2X | |
| | | | 0.56 N•m (5 lb•in) | 8° | | 4° | 802M-H2Y5 | 802M-H2X | |
| 4 | Clockwise or Counterclockwise |  | 0.34 N•m (3 lb•in) | 15° | | 6° | **802M-ATY5** | **802M-AX** | 802M-XTY5 |
| | | | 0.56 N•m (5 lb•in) | 8° | | 4° | 802M-HTY5 | 802M-HX | |
| | Clockwise |  | 0.34 N•m (3 lb•in) | 15° | | 6° | 802M-A1TY5 | 802M-A1X | |
| | | | 0.56 N•m (5 lb•in) | 8° | | 4° | 802M-H1TY5 | 802M-H1X | |
| | Counterclockwise |  | 0.34 N•m (3 lb•in) | 15° | | 6° | 802M-A2TY5 | 802M-A2X | |
| | | | 0.56 N•m (5 lb•in) | 8° | | 4° | 802M-H2TY5 | 802M-H2X | |

❶ The standard length of STO cable is 1.52 m (5 ft). For other lengths see Modifications and Accessories.

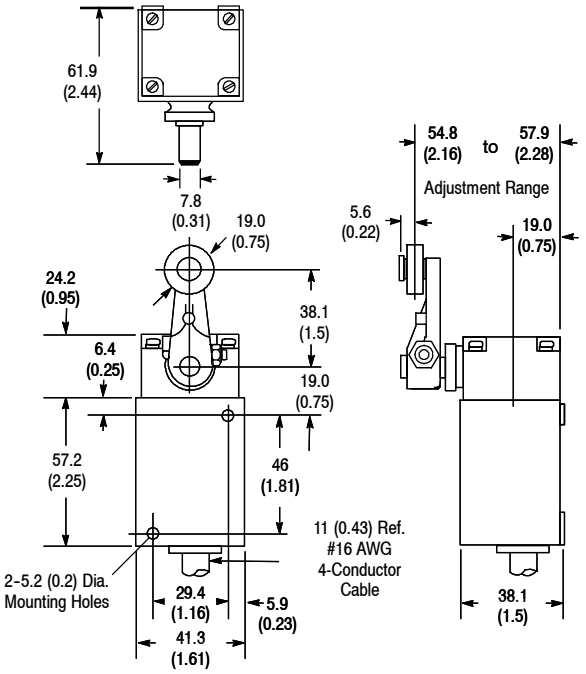
**Levers—See page 5-130 for a complete listing of operating levers.**
**Wiring Diagrams—See page 5-24.**
**Modifications and Accessories—See page 5-27.**

# 802M Lever Type • Spring Return

**Pre-Wired—Factory Sealed Switches**

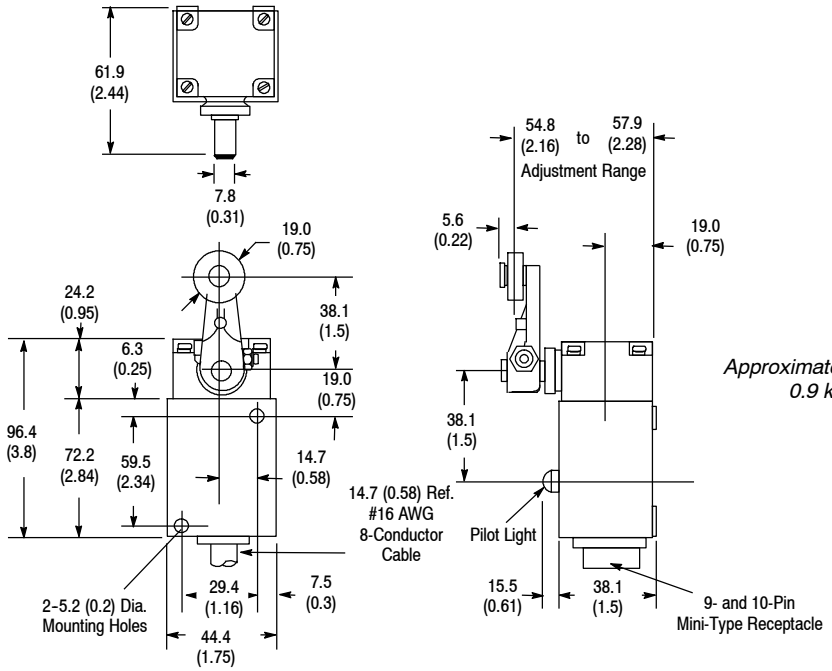
## Approximate Dimensions [mm (in.)]

**2-Circuit**




*Shipping Wt.*
*1lb 0.53 kg (3 oz)*

**4-Circuit**




*Approximate Shipping Wt.*
*0.9 kg (2 lb)*

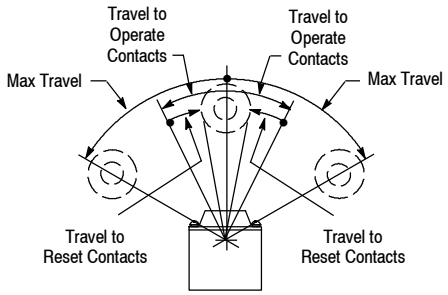
**Note:** Mounting foot adaptor as shown on page 5-23 is for use with 2-circuit 802M type switches only.

**Levers—See page 5-130 for a complete listing of operating levers.**
**Wiring Diagrams—See page 5-24.**
**Modifications and Accessories—See page 5-27.**

# 802M Lever Type Neutral Position • Spring Return

**Pre-Wired—Factory Sealed Switches**

## Range of Operation

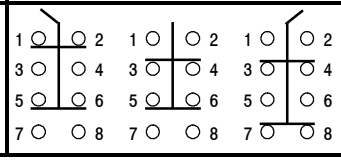


*Complete Switch Without Lever*

*Operator Head Only*

*Switch Body Only*

## Product Selection

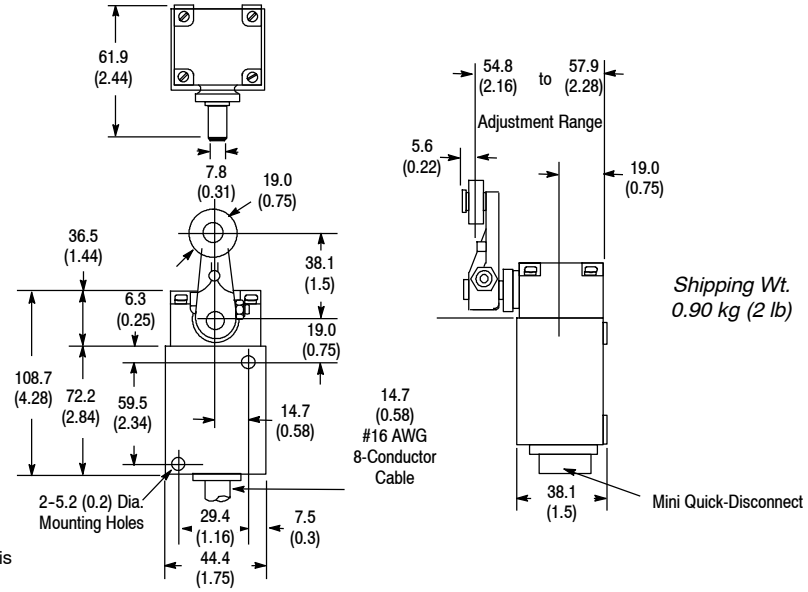
| No. of Circuits | Lever Movement vs. Contact Operation | Torque to Operate (Max) CW | Torque to Operate (Max) CCW | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. Complete Switch w/o Lever ❶❷ | Cat. No. Operator Head Only ❷ | Cat. No. Switch Body Only ❶ |
|---|---|---|---|---|---|---|---|---|---|
| 4 |  | 7 lb•in) (0.79 N•m) | 7.5 lb•in) (0.85 N•m) | 16° | 75° | 7° | 802M-NPY5 | 802M-NPX | 802M-XNPY5 |



❶ The standard length of STO cable is 1.52 m (5 ft). For other lengths see Modifications and Accessories.

❷ Operating lever 802T-W3F should not be used with this switch.

## Approximate Dimensions [mm (in.)]




*Shipping Wt. 0.90 kg (2 lb)*

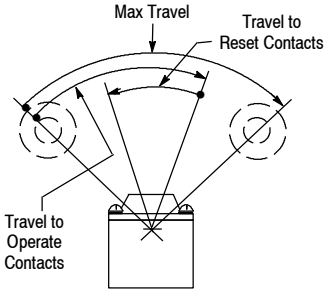
**Note:** Mounting foot adaptor as shown on page 5-23 is for use with 2-circuit 802M type switches only.

**Levers—See page 5-130 for a complete listing of operating levers.**
**Wiring Diagrams—See page 5-24**
**Modifications and Accessories—See page 5-27.**

# 802M Lever Type • Maintained Contact

**Pre-Wired—Factory Sealed Switches**

## Range of Operation

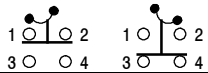
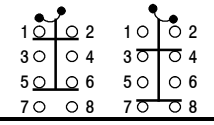


*Complete Switch Without Lever*

*Operator Head Only*

*Switch Body Only*

## Product Selection

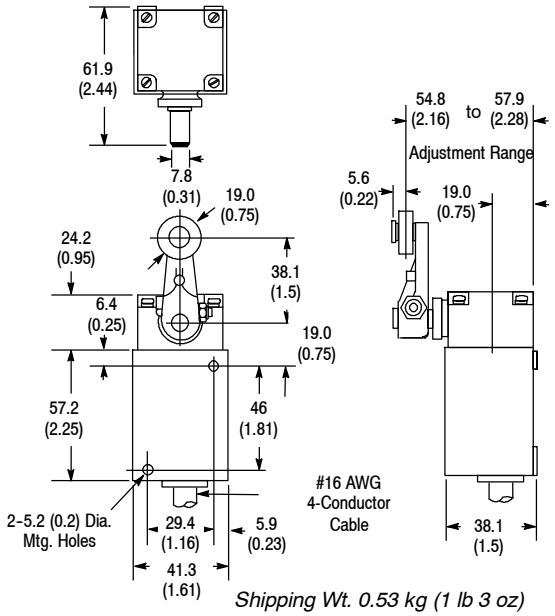
| No. of Circuits | Lever Movement vs. Contact Operation | | Torque to Operate (Max.) | Travel to Operate Contacts (Max.)❷ | Max Travel❷ | Travel to Reset Contacts (Max.) | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Complete Switch w/o Lever ❶ | Operator Head Only | Switch Body Only ❶ |
| 2 | Clockwise or Counterclockwise |  | 0.31 N•m (2.75 lb•in) | 75° | 87° | 35° | 802M-AMY5 | 802M-AMX | 802M-XY5 |
| 4 | Clockwise or Counterclockwise |  | | | | | 802M-AMTY5 | | 802M-XTY5 |

❶ The standard length of STO cable is 1.52 m (5 ft). For other lengths see Modifications and Accessories.

❷ From one maintained position to the other.

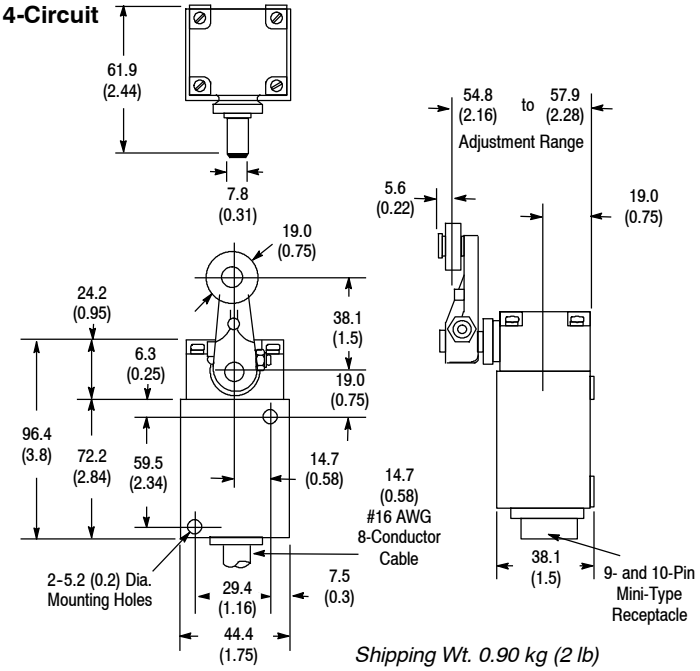
## Approximate Dimensions [mm (in.)]

**2-Circuit**




*Shipping Wt. 0.53 kg (1 lb 3 oz)*

**4-Circuit**



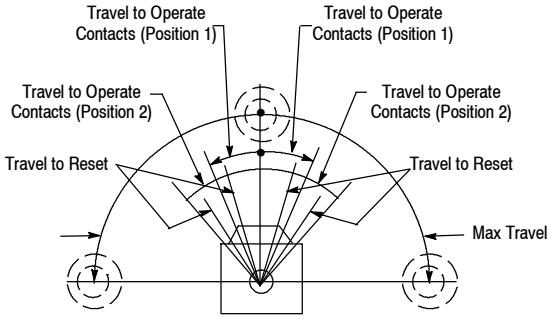

*Shipping Wt. 0.90 kg (2 lb)*

**Levers—See page 5-130 for a complete listing of operating levers.**
**Wiring Diagrams—See page 5-24.**
**Modifications and Accessories—See page 5-27.**

# 802M Lever Type Sequential • Spring Return

**Pre-Wired—Factory Sealed Switches**

## Range of Operation

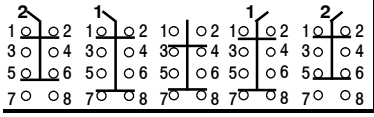


*Complete Switch Without Lever*

*Operator Head Only*

*Switch Body Only*

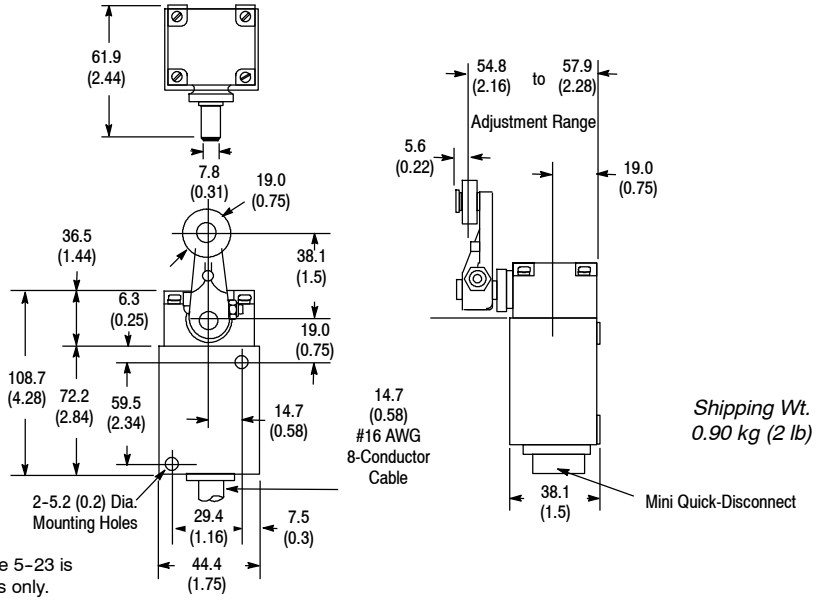
## Product Selection — 4-Circuit

| Lever Movement vs. Contact Operation | Position 1 | Position 2 | To Max Travel | Position 1 | Position 2 | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. Complete Switch w/o Lever ❶❷ | Cat. No. Operator Head Only ❷ | Cat. No. Switch Body Only ❶ |
|---|---|---|---|---|---|---|---|---|---|---|
| Counterclockwise / Clockwise  | 0.79 N•m (7 lb•in) | 0.9 N•m (8 lb•in) | | 10° ± 3° | 20° ± 3° | 88° | 4° ± 3° | 802M-ASY5 | 802M-ASX | 802M-XSY5 |

❶ The standard length of STO cable is 1.52 m (5 ft). For other lengths see Modifications and Accessories.

❷ Operating lever 802T-W3F should not be used with this switch.

## Approximate Dimensions [mm (in.)]




*Shipping Wt. 0.90 kg (2 lb)*

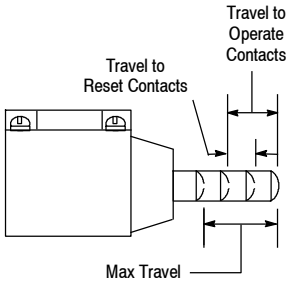
**Note:** Mounting foot adaptor as shown on page 5-23 is for use with 2-circuit 802M type switches only.

**Levers—See page 5-130 for a complete listing of operating levers.**
**Wiring Diagrams—See page 5-24.**
**Modifications and Accessories—See page 5-27.**

# 802M Push Type • Spring Return

## Pre-Wired—Factory Sealed Switches

## Range of Operation



*Switch Body Only*

*Adjustable Top Push Rod Switch and Head*

*Adjustable Side Push Rod Switch and Head*

*Top Push Rod Head*

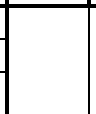
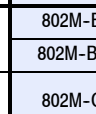
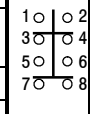
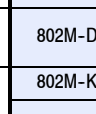
*Side Push Rod Head*

*Top Push Roller Head*

*Side Push Vertical Roller Head*

*Side Push Horizontal Roller Head*

## Product Selection

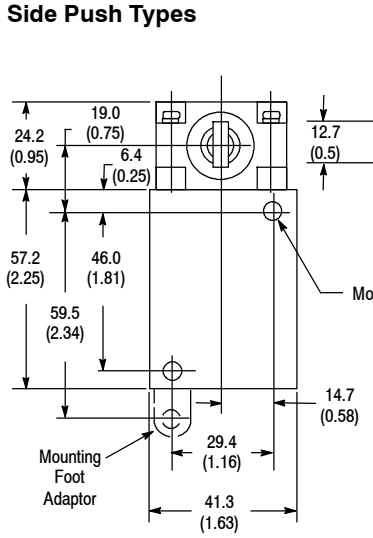
| No. of Circuits | Operator Type | Contact Operation | | Force to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Normal | Operated | | | | | Complete Switch ❶ | Operator Head Only | Switch Body Only ❶ |
| 2 | Top Push Rod |  |  | 13.3 N (3 lb) | 1.45 mm (0.057 in.) | 5.26 mm (0.207 in.) | 0.56 mm (0.022 in.) | 802M-BY5 | 802M-BX | 802M-XY5 |
| | Adjustable Top Push Rod | | | | | | | 802M-BAY5 | 802M-BAX | |
| | Side Push Rod | | | 20 N (4.5 lb) | 2.59 mm (0.102 in.) | 5.16 mm (0.203 in.) | 1.14 mm (0.045 in.) | 802M-CY5 | 802M-CX | |
| | Top Push Roller | | | 14.7 N (3.3 lb) | 1.45 mm (0.057 in.) | 5.26 mm (0.207 in.) | 0.56 mm (0.022 in.) | **802M-DY5** | **802M-DX** | |
| | Side Push Vertical Roller | | | 20 N (4.5 lb) | 2.59 mm (0.102 in.) | 5.1 mm (0.203 in.) | 1.14 mm (0.045 in.) | **802M-KY5** | **802M-KX** | |
| | Side Push Horizontal Roller | | | | | | | 802M-K1Y5 | 802M-K1X | |
| | Adjustable Side Push Rod | | | | | | | 802M-CAFY5 | 802M-CAFX | |
| 4 | Top Push Rod |  |  | 13.3 N (3.5 lb) | 1.45 mm (0.057 in.) | 5.13 mm (0.202 in.) | 0.076 mm (0.030 in.) | 802M-BTY5 | 802M-BX | 802M-XTY5 |
| | Adjustable Top Push Rod | | | | | | | 802M-BATY5 | 802M-BAX | |
| | Side Push Rod | | | 20 N (4.5 lb) | 3.18 mm (0.125 in.) | 5.54 mm (0.218 in.) | 1.14 mm (0.045 in.) | 802M-CTY5 | 802M-CX | |
| | Top Push Roller | | | 14.7 N (3.5 lb) | 1.45 mm (0.057 in.) | 5.13 mm (0.202 in.) | 0.076 mm (0.030 in.) | 802M-DTY5 | 802M-DX | |
| | Side Push Vertical Roller | | | 20 N (4.5 lb) | 3.18 mm (0.125 in.) | 5.54 mm (0.218 in.) | 1.14 mm (0.045 in.) | 802M-KTY5 | 802M-KX | |
| | Side Push Horizontal Roller | | | | | | | 802M-K1TY5 | 802M-K1X | |
| | Adjustable Side Push Rod | | | | 2.59 mm (0.102 in.) | 5.16 mm (0.203 in.) | | 802M-CAFTY5 | 802M-CAFX | |

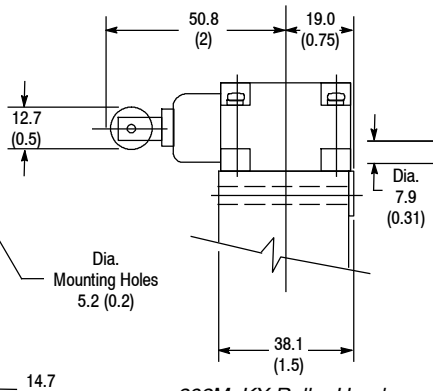
❶ The standard length of STO cable is 1.52 m (5 ft). For other lengths see Modifications and Accessories.

**Wiring Diagrams—See page 5-24.**
**Modifications and Accessories—See page 5-27.**

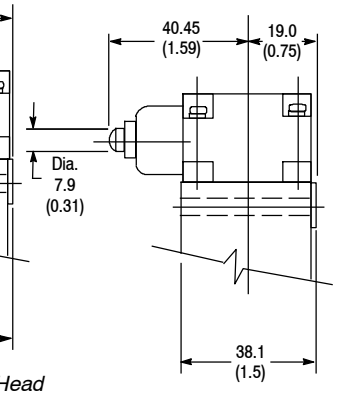
## Approximate Dimensions [mm (in.)]

### Side Push Types

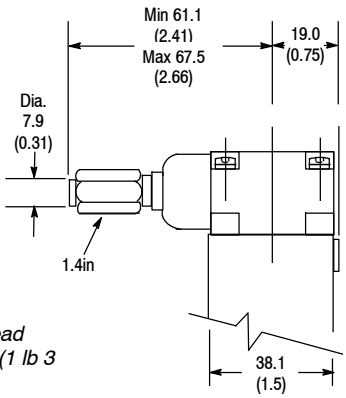



*802M-KX Roller Head*
*Shipping Wt. 0.53 kg (1 lb 3 oz)*

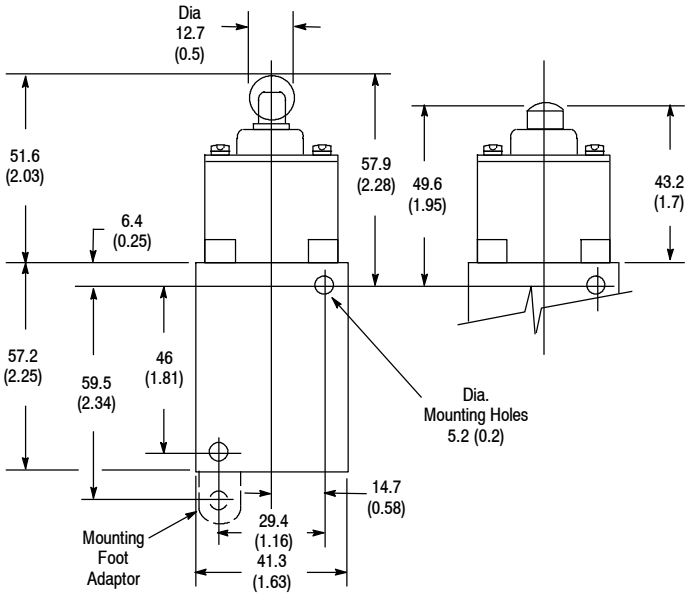



*802M-CX Rod Head*
*Shipping Wt. 0.53 kg (1 lb 3 oz)*

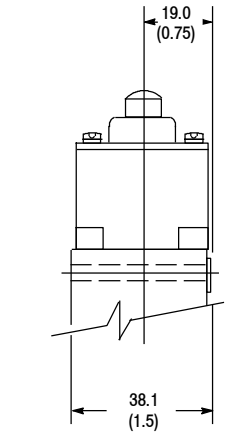



*802M-CAFX Adjustable Head*
*Shipping Wt. 0.53 kg (1 lb 3 oz)*

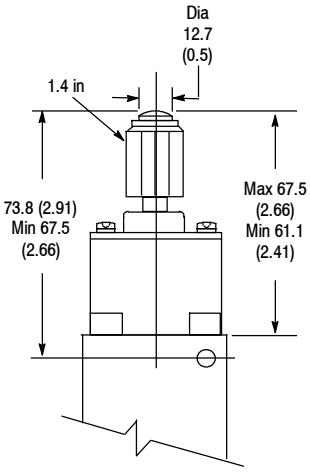
### Top Push Types




*802M-DX Roller Head*
*Shipping Wt. 0.53 kg (1 lb 3 oz)*




*802M-BX Rod Head*
*Shipping Wt. 0.53 kg (1 lb 3 oz)*




*802M-BAX Adjustable Head*
*Shipping Wt. 0.53 kg (1 lb 3 oz)*

**Note:** Mounting foot adaptor as shown above is for use with 2-circuit 802M type switches only.

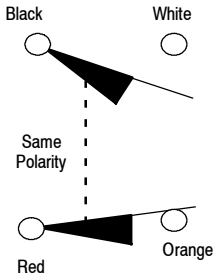
**Wiring Diagrams—See page 5-24.**
**Modifications and Accessories—See page 5-27.**

# 802M Wiring Diagrams for 2-Circuit Models

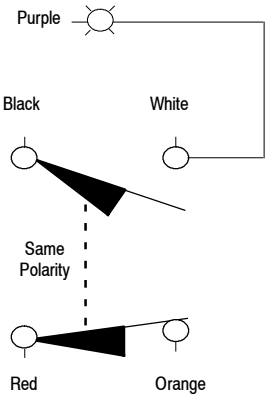
**Pre-Wired—Factory Sealed Switches**

## Cable Models

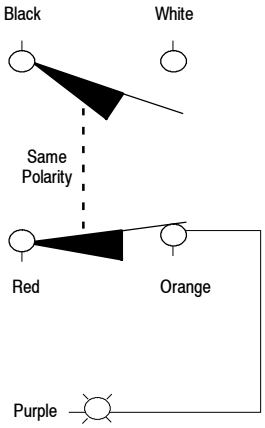
(See Applicable Codes and Laws)




## Cable Models with One Indicating Light



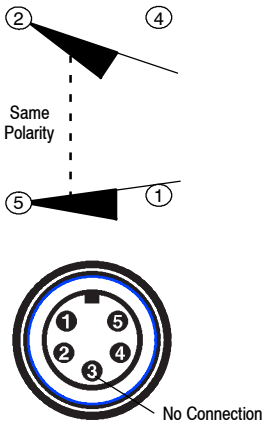

*Light Wired to N.O. (White) Wire*



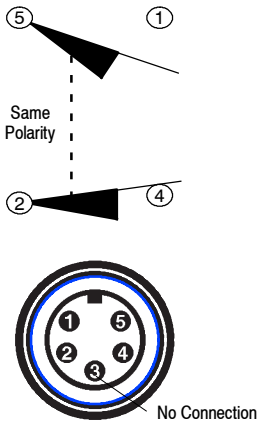

*Light Wired to N.C. (Orange) Wire*

## 5-Pin Mini-Type Receptacle

**"J1" Wiring**

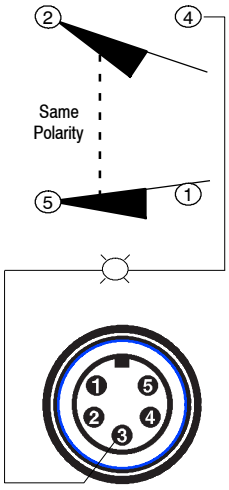



**"J9" Wiring**

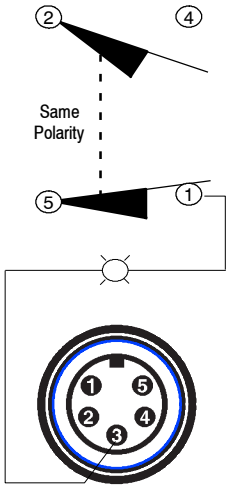



## 5-Pin Mini-Type Receptacle with One Indicating Light

**"J1" Wiring**

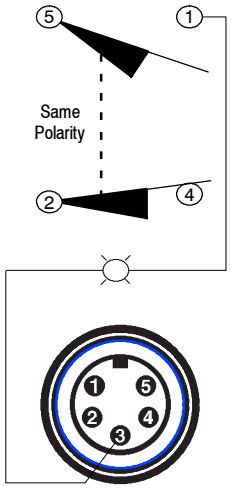



*Light Wired to N.O.*

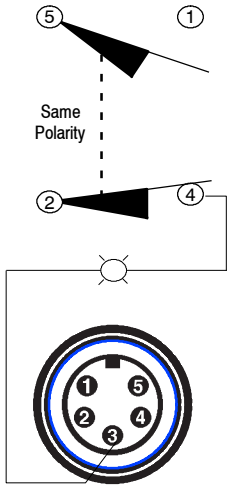



*Light Wired to N.C.*

**"J9" Wiring**




*Light Wired to N.O.*

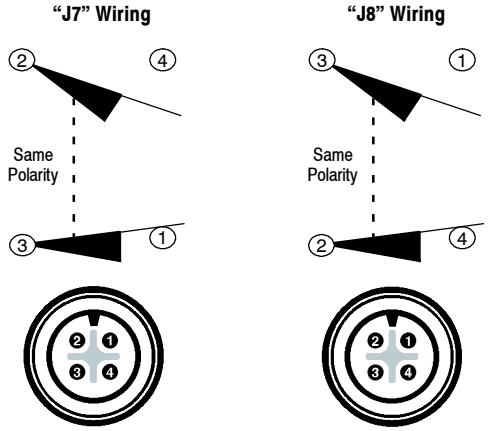



*Light Wired to N.C.*

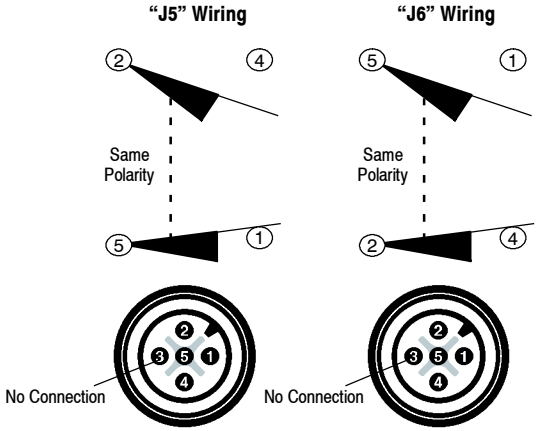
# 802M Wiring Diagrams for 2-Circuit Models



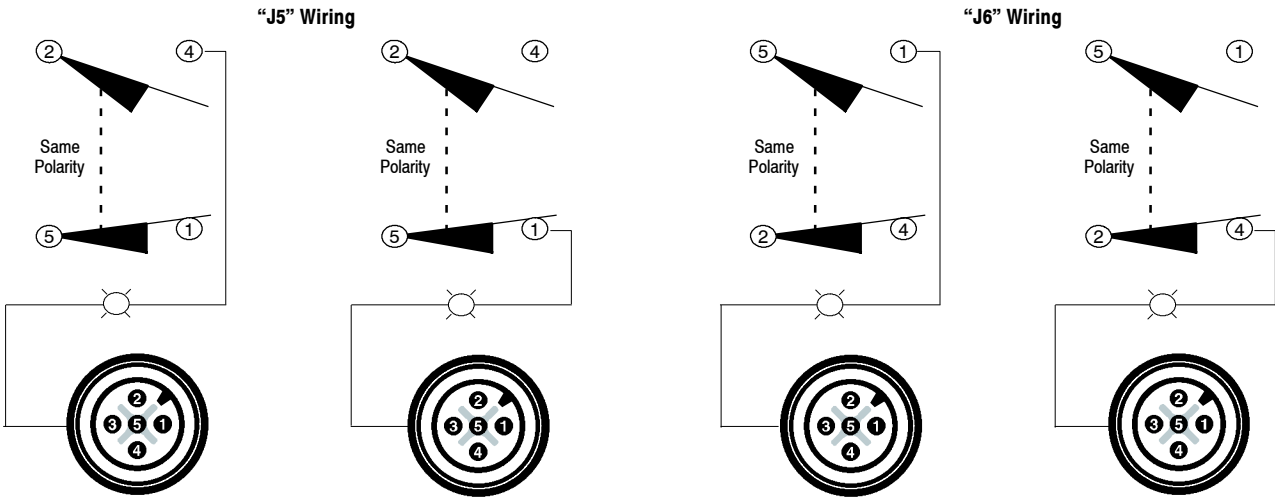
## 4-Pin Micro-Type Receptacle (DC only)




## 5-Pin Micro-Type Receptacle (DC only)




## 5-Pin Micro-Type Receptacle with One Indicating Light (DC only)

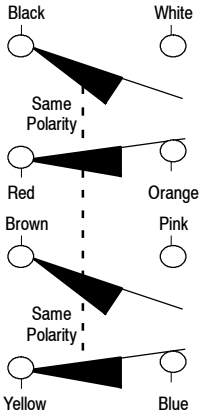


# 802M Wiring Diagrams for 4-Circuit Models

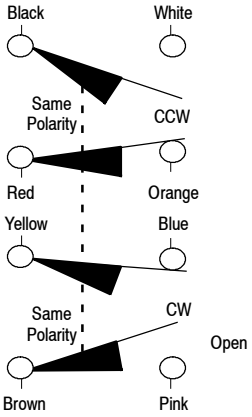
**Pre-Wired—Factory Sealed Switches**

## Cable Models

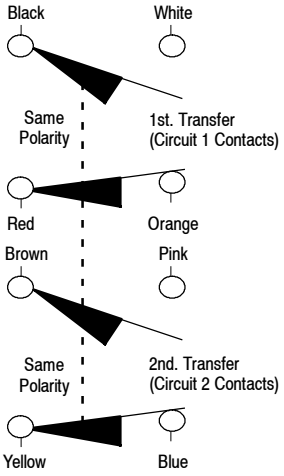
(See Applicable Codes and Laws)



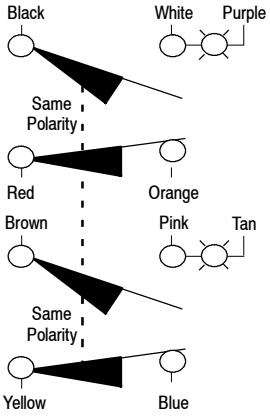

## Neutral Position with Cable



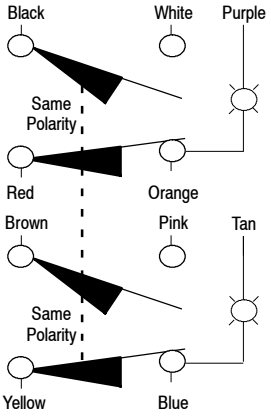

## Sequential with Cable




## Cable Models with Two Indicating Lights

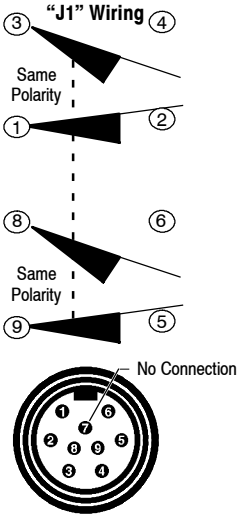



*Light Wired to N.O. (White) Wire, and N.O. (Pink) Wire*

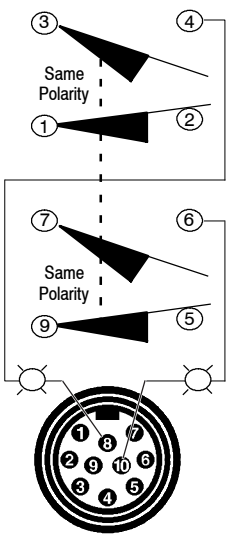



*Light Wired to N.C. (Orange) Wire, and N.C. (Blue) Wire*

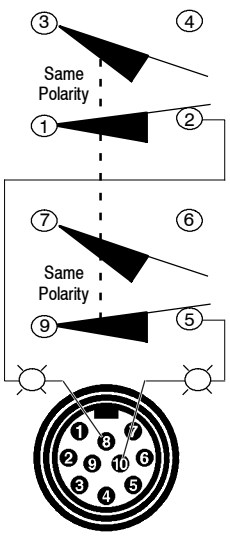
## 9-Pin Mini-Type Receptacle




## 10-Pin Mini-Type Receptacle with Two Indicating Lights




*Light Wired to N.O.*




*Light Wired to N.C.*

## 24V DC Switches

All two-circuit 802M limit switches are available with silver-nickel contacts rated for 24V DC applications. To order a switch rated for 24V DC use, insert the letter **Z** before the cable or connector designation. Example: 802M–A**Z**Y5 is a 24V DC version of the 802M–AY5. The use of the 24V DC micro connector option or 24V DC indicating light option require the switch be rated for 24V DC operation.

## Extended Cable Lengths

The factory installed type STO cable is normally supplied in 1.52 m (5 ft) lengths. Extended cable lengths are available in multiples of four feet. To order, replace the suffix **Y5** in the cat. no. with the appropriate suffix from the table below. Example: To order a lever type two-circuit spring return switch with 1.83 m (8 ft) of STO cable the cat. no. would be 802M–A**Y8**.

**Additional Cable Length**

| Modification | Cat. Number Suffix |
|---|---|
| 1.83 m (8 ft) Cable | Y8 |
| 3.66 m (12 ft) Cable | Y12 |
| 4.78 m (16 ft) Cable | Y16 |

❶ A 5-pin, 9-pin or 10-pin plug-in receptacle is supplied to facilitate retrofitting existing installations. The normal ground wire pin is not required and is not connected inside the switch.

❷ STO is a common identification of this cable. The more complete identification of the cable used on the Bulletin 802M is STOOW-A which incorporates an oil resistant jacket and conductor insulation, for indoor and outdoor use.

## 5-Pin Mini-Type Receptacle❶ (2-Circuit Models Only)

*802M with Mini-Type Receptacle 2-Circuit*

To order a Bulletin 802M pre-wired limit switch with a 5-pin mini connector in place of the 1.52 m (5 ft) of "STO"❷ cable, replace the **Y5** in the cat. no. with the suffix **J1** or **J9** depending upon the wiring configuration required. Maximum voltage rating for this receptacle is 250V AC.

An appropriate female connector with cable (889N–F5AFC–6F) is available on page 8–4 in Connection Systems.

## 9-Pin Mini-Type Receptacle❶ (4-Circuit Models without Indicator Lights Only)

*802M with Mini-Type Receptacle 4-Circuit*

To order a Bulletin 802M pre-wired limit switch with a 9-pin mini connector in place of the 1.52 m (5 ft) of STO cable, replace the **Y5** in the cat. no. with the suffix **J1**. Maximum voltage rating for this receptacle is 250V AC.

An appropriate female connector with cable (889N–F9AF–2) is available on page 8–14 in Connection Systems.

## 10-Pin Mini-Type Receptacle❶ (4-Circuit Models with 2 Indicating Lights Only)

To order a Bulletin 802M pre-wired limit switch with a 10-pin mini connector and two indicating lights, replace the **Y5** in the cat. no. with the suffix **J4**. Maximum voltage rating for this receptacle is 250V AC. Also, specify the indicating lights per the table on page 5–28.

Example: Cat. No. 802M–ATY5 with mini-connector and (2) 120V AC indicating lights wired to one side of each N.O. contact would be Cat. No. 802M–AT**J4**L1F.

An appropriate female connector with cable (889N–F10AF–2) is available on page 8–14 in Connection Systems.

## 4-Pin Micro-Type Receptacle (2-Circuit 24V DC Models Only)

*802M with Micro-Type Receptacle—2-Circuit*

To order a Bulletin 802M pre-wired limit switch with a 4-pin micro connector in place of the 1.52 m (5 ft) of "STO"❷ cable, replace the **Y5** in the cat. no. with the suffix **J7** or **J8** depending upon the wiring configuration required. This option requires that the switch is rated 24V DC.

An appropriate female connector with cable (889D–F4AC–2) is available on page 8–16 in Connection Systems.

## 5-Pin Micro-Type Receptacle (2-Circuit 24V DC Models Only)

To order a Bulletin 802M pre-wired limit switch with a 5-pin micro connector in place of the 1.52 m (5 ft) of "STO"❷ cable, replace the **Y5** in the cat. no. with the suffix **J5** or **J6** depending upon the wiring configuration required. This option requires that the switch is rated 24V DC.

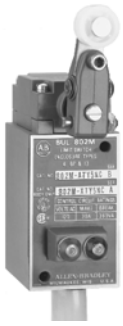
An appropriate female connector with cable (889D–F5AC–2) is available on page 8–16 in Connection Systems.

# 802M Modifications

## Pre-Wired—Factory Sealed Switches

### Indicating Lights

*802M with Indicating Light*
*2-Circuit*

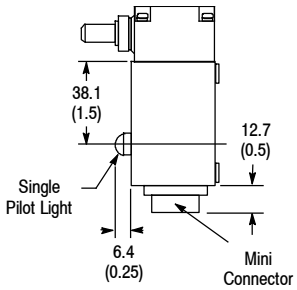


*802M with Indicating Lights*
*4-Circuit*

**2-Circuit**—Bulletin 802M pre-wired limit switches can be supplied with an indicating light which is wired to one side of either the N.O. or N.C. contact. The second lead of the light is available as a fifth conductor for wiring flexibility. See pages 5-24 through 5-25 for wiring diagrams.

To order, add the appropriate suffix listed in the table to the right to the cat. no. Example: Cat. No. 802M-AY5 with a 120V AC LED indicating light wired to one side of the N.O. contact would be Cat. No. 802M-AY5**L1F**.

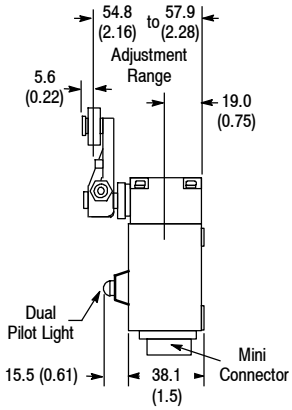
Example: Cat. No. 802M-AY5 with mini-connector and 120V AC indicating light wired to one side of the N.O. contact would be Cat. No. 802M-AJ1**L1F**.




**4-Circuit**—Bulletin 802M pre-wired limit switches can be supplied with 2 indicating lights wired to one side of each N.O. or N.C. contact of the 4-circuit contact block. Second leads from each light are available as ninth and tenth conductors for wiring flexibility. See page 5-26 for wiring diagram.

To order, add the appropriate suffix listed in the table to the right to the cat. no.

Example: Cat. No. 802M-ATY5 with 120V AC LED indicating lights wired to one side of each N.C. contact would be Cat. No. 802M-ATY5**L1C.**




| LED Indicating Lights | | |
|---|---|---|
| **Voltage** | **Wired to ❶** | **Cat. No. Suffix** |
| 24V DC ❷ | N.O. Contact | LF |
| | N.C. Contact | LC |
| 120V AC 50-60Hz | N.O. Contact | L1F |
| | N.C. Contact | L1C |

| Neon Indicating Lights | | |
|---|---|---|
| **Voltage** | **Wired to ❶** | **Cat. No. Suffix** |
| 120V AC 50-60Hz | N.O. Contact | NF |
| | N.C. Contact | NC |
| 240V AC 50-60Hz | N.O. Contact | N5F |
| | N.C. Contact | N5C |

### Fitting for Liquid-Tight Flexible Metal Conduit

802M 2-circuit switches can be obtained provided with a fitting for liquid-tight flexible metal conduit (flexible metal conduit not provided) and a pigtail for wiring. Add the following suffix to the cat. no. (dashes indicate pigtail length):

**GS_** straight-out fitting
**GF_** front oriented 90° elbow fitting
**GL_** left oriented 90° elbow fitting
**GB_** back oriented 90° elbow fitting
**GR_** right oriented 90° elbow fitting.

Example: GS5=5 foot long pigtail. Additional cable length over 1.5 m (5 ft) is available in multiples of 1.2 m (4 ft).

❶ See wiring diagrams page 5-24…5-26.
❷ Requires the switch be rated for 24V DC operation.

## Adaptor Foot

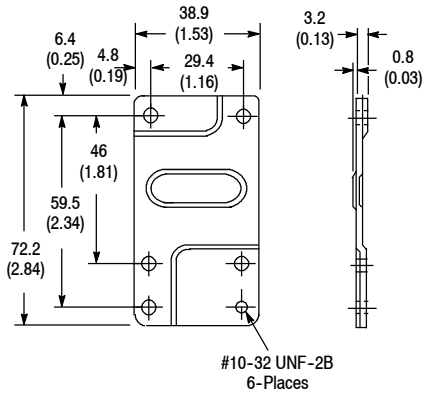
To mount a 2-circuit 802M in the same 1.16 in. x 2.34 in. mounting hole pattern as an 802T, an adaptor foot is required and is included with each 802M as shipped. This accessory is made of steel and is chromate plated to resist corrosion. To obtain replacement adaptor feet, order Cat. No. 40246-008-02.

## Rear Mounting Adaptor Kit

For rear mounting of 2-circuit or 4-circuit Bulletin 802M pre-wired limit switch (not suitable for use on Bulletin 802MC).

Kit includes mounting plate and two screws for mounting adaptor plate to switch. To mount to surface from rear use two #10-32 screws. Select proper screw length to pass through adaptor plate without bottoming against back of limit switch.

Order Cat. No. 802M-N1.




*Approximate Shipping Wt. 0.2 kg (8 oz)*

# 802MC

## Corrosion-Resistant Pre-Wired—Factory Sealed Switches

## Description

The Bulletin 802MC is a pre-wired limit switch especially designed to provide additional corrosion protection in wet or dry locations commonly found in industrial process. By using a polymeric enclosure and Type 316 stainless steel for the exposed metal parts, the Bulletin 802MC provides a tougher defense against environmental contaminants to provide the user with more dependable operation and longer lasting performance. In addition, this switch is factory sealed and is particularly effective in applications where it may be subjected to dust, dirt, streams of liquids or occasionally submerged in fluids.

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 1, 4X, 6P, 13 and IP66/67 (IEC529) |
| **Pollutions Degree** | 3 |
| **Certifications** | UL Listed, CSA Certified and CE Marked for applicable directives |
| **Ambient Temperature [C (F)]❶** | 0…+80° (+32…+180°) |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, 2 Circuits Same Polarity)**

| NEMA Rating Designation | Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A600 AC-15 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |
| | 480 | 15 | 1.50 | 10 | 7200 | 720 |
| | 600 | 12 | 1.20 | 10 | 7200 | 720 |

**DC Contact Rating (Maximum per Pole, 2 Circuits Same Polarity)**

| Nominal Voltage | A | Continuous Carrying Current |
|---|---|---|
| 24 | 1.1 | 5 |

❶ Minimum temperature is based on the absence of freezing moisture or water.

## Applications

Typical examples of Bulletin 802MC applications are plating facilities, chemical or fertilizer plants, meat packing plants, dairies, breweries and other processing industries, where equipment might be hosed down regularly with cleaning solutions.

## Features

- Pre-wired and factory sealed
- Corrosion resistant
- Submersible

## Corrosion-Resistant Pre-Wired

Lever Type • Spring Return page 5-31
Wiring Diagrams . . . . . page 5-32
Modifications and Accessories . . . . . page 5-33

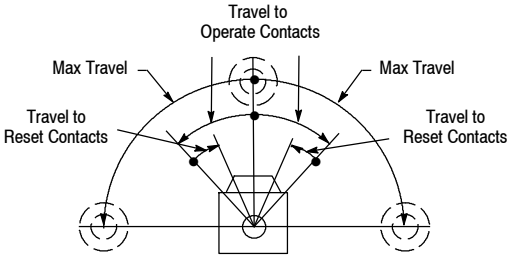


Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

# 802MC Lever Type • Spring Return

## Corrosion-Resistant Pre-Wired—Factory Sealed Switches

## Range of Operation

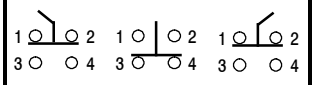
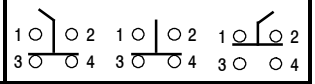
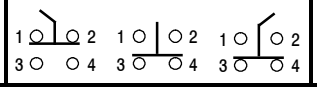


*Complete Switch Without Lever*

*Operator Head Only*

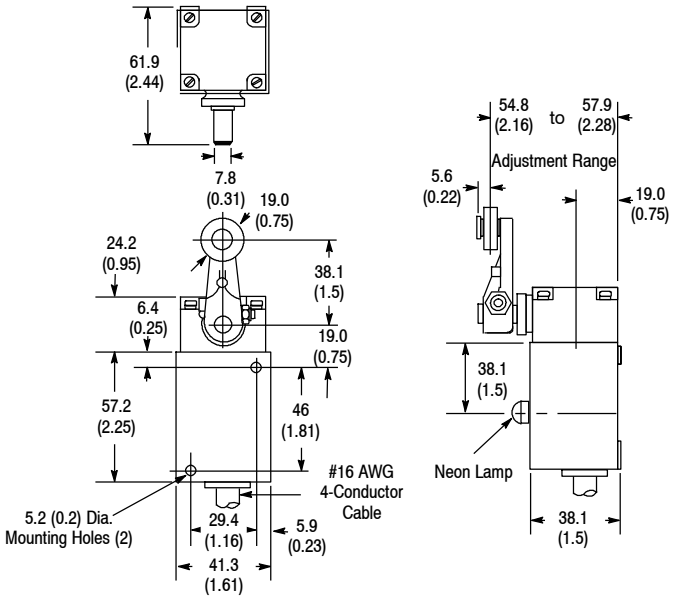
*Base Only*

## Product Selection

| No. of Circuits | Lever Movement vs. Contact Operation | | Torque to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Complete Switch w/o Lever ❶ | Operator Head Only | Switch Only ❶ |
| 2 | Clockwise or Counterclockwise |  | 0.34 N•m (3 lb•in) | 15° | 86° | 6° | **802MC-AY5** | **802MC-AX** | 802MC-XY5 |
| | Clockwise |  | | | | | 802MC-A1Y5 | 802MC-A1X | |
| | Counterclockwise |  | | | | | 802MC-A2Y5 | 802MC-A2X | |

❶ The standard length of STO cable is 1.52 m (5 ft). For other lengths, see Modifications and Accessories.

## Approximate Dimensions [mm (in.)]



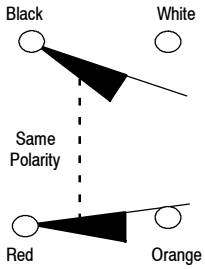

**Levers—See page 5-130 for a complete listing of operating levers.**
**Wiring Diagrams—See page 5-32.**
**Modifications and Accessories—See page 5-33.**

# 802MC Wiring Diagrams

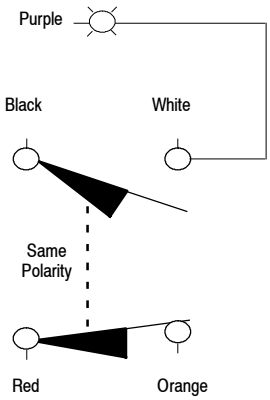
## Corrosion-Resistant Pre-Wired—Factory Sealed Switches

### Cable Models

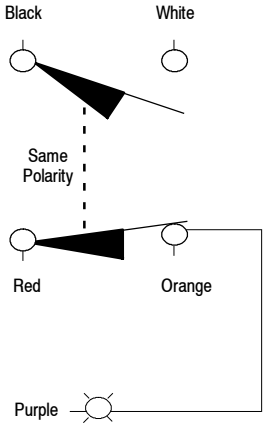
(See Applicable Codes and Laws)




### Cable Models with Indicating Light

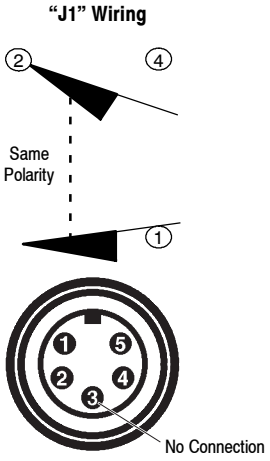


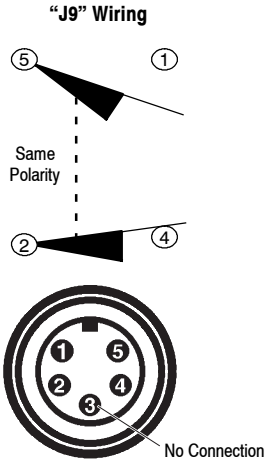

*Light Wired to N.O. (White) Wire*



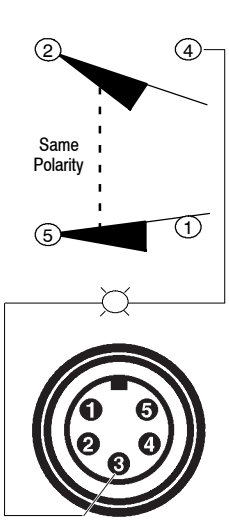

*Light Wired to N.C. (Orange) Wire*

### 5-Pin Mini-Type Receptacle

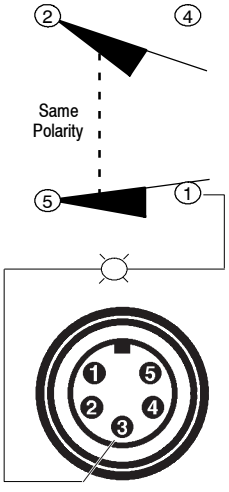


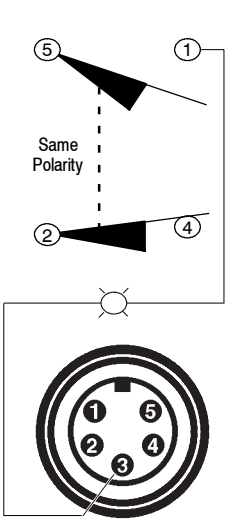

### 5-Pin Mini-Type Receptacle with Indicating Light



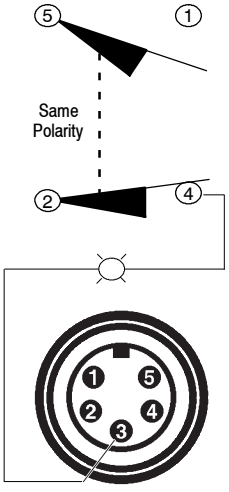

*Light Wired to N.O.*




*Light Wired to N.C.*




*Light Wired to N.O.*




*Light Wired to N.C.*

*Neon Indicating Light*

*5-Pin Mini-Type Receptacle*

## Indicating Light

Bulletin 802MC pre-wired limit switches can be supplied with an indicating light wired to one side of either the N.O. or N.C. contact. The second lead of the light is available as a fifth conductor for wiring flexibility.

To order, add the appropriate suffix listed in the table below to the cat. no.. Example: Cat. No. 802MC–AY5 with a 120V AC LED indicating light wired across the N.O. contact would be Cat. No. 802MC–AY5**L1F**.

**LED Indicating Light**

| Voltage | Wired to | Cat. No. Suffix |
|---|---|---|
| 24V DC ❶ | N.O. Contact | LF |
| | N.C. Contact | LC |
| 120V AC 50–60 Hz | N.O. Contact | L1F |
| | N.C. Contact | L1C |

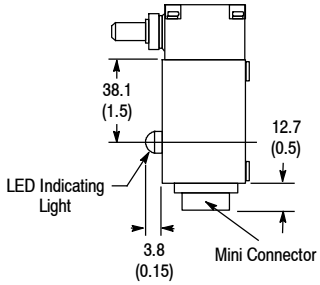
**Neon Indicating Light**

| Voltage | Wired to | Cat. No. Suffix |
|---|---|---|
| 120V AC 50–6 0Hz | N.O. Contact | NF |
| | N.C. Contact | NC |
| 240V AC 50–60 Hz | N.O. Contact | N5F |
| | N.C. Contact | N5C |

## 5-Pin Mini-Type Receptacle❷—2-Circuit Contact Block

To order a Bulletin 802MC pre-wired limit switch with a 5-pin mini connector in place of the 1.52 m (5 ft) of "STO"❸ cable, replace the **Y5** in the cat. no. with the suffix **J1** or **J9** depending upon the wiring configuration required. Maximum voltage rating for this receptacle is 250V AC.

An appropriate female connector with cable (889N–F5AFC–6F) is available on page 8–4 in Connection Systems.




❶ Requires switch to be rated for 24V DC operation.

❷ A 5-pin mini-type receptacle is supplied to facilitate retro-fitting existing installations. The normal ground wire pin is not required and is not connected inside the switch.

❸ STO is a common identification of this cable. The more complete identification of the cable used on the Bulletin 802M is STOOW–A which incorporates an oil resistant jacket and conductor insulation, for indoor and outdoor use.

## Cable Length

The factory installed pre-wired, type STO cable is normally supplied in 1.52 m (5 ft) lengths. Extended cable lengths are available in multiples of 4 feet. To order, replace the suffix **Y5** in the cat. no. with the appropriate suffix from the table below. Example: To order a lever type spring return switch with 1.83 m (8 ft) of STO cable the cat. no. would be 802MC–A**Y8**.

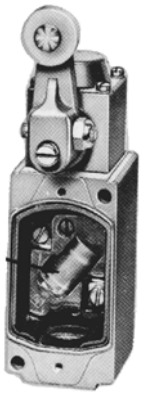
| Modification | Cat. No. Suffix |
|---|---|
| 1.83 m (8 ft) Cable | Y8 |
| 3.66 m (12 ft) Cable | Y12 |
| 4.78 m (16 ft) Cable | Y16 |

## 2-Circuit 24V DC Switches

All 2-circuit 802MC limit switches are available with silver-nickel contacts and rated for 24V DC applications. To order a switch rated for 24V DC use, insert the letter **Z** before the cable or connection designation. Example: 802MC–A**Z**Y5 is a 24V DC version of the 802MC–AY5. The use of the 24V DC pilot light option requires the switch be rated for 24V DC operation.

# 802R
## Sealed Contact Switches

*Sealed Contact Switch*



*802R-AF (cover removed) with 802T-W1 Lever*

## Description

This sealed contact limit switch features a rugged single contact, hermetically sealed in a glass envelope, that has excellent contact reliability even in contaminated atmospheres. The switch is Programmable Controller compatible (24V and above) and is pilot duty rated NEMA B600 for AC and NEMA P300 for DC as shown on page 5–35. The enclosure is NEMA Type 13.

## Lever Type Switches

These switches can be equipped with any one of seven different operating levers: roller lever, adjustable roller lever, micrometer adjustment roller lever, rod lever, one-way rod or roller lever and fork lever. These can be used interchangeably on all lever type switches **except the low operating force switch**, which requires the lever indentified by Cat. No. 802T–W5.

The micrometer adjustment roller lever, Cat. No. 802T–W6, is designed especially for installations where the position of the roller is a critical factor. This lever has a pivoted roller which can be turned laterally. After clamping the lever to the switch shaft, the position of the roller can be precisely adjusted through an arc of 7.5° on either side of the center or straight-line position.

## Push Type Switches

Switches in this category are actuated by means of a rod or plunger located on the top or side of the operating head. Pushing the plunger into the head causes the contacts to operate. Three types of plungers are available: push rod, adjustable push rod and steel push roller.

## Wobble Stick and Cat Whisker Type Switches

Both switches are actuated by a rod or wire extending from the top of the operating head. Moving the rod through a specified angle in any direction causes the contacts to operate. All wobble stick and cat whisker switches are supplied with spring return construction only.

## Ambient Temperature Range

Bulletin 802R limit switches, except devices with wobble stick or cat whisker operators, have an ambient temperature range of –29…+121°C (–20…+250°F). Wobble stick and cat whisker limit switches are rated from –18…+54°C (0…+130°F).
**Note:** Temperature ranges below 0°C (+32°F) are based on the absence of freezing moisture or water.

## Underwriters' Laboratories, Inc. Listed, CSA Certified

These switches are listed by Underwriters' Laboratories, Inc. for use in **Class 1, Division 2, Groups A, B, C and D hazardous locations** as defined by the National Electrical Code.

*802R-AF*

## Description

This sealed contact limit switch features a rugged single contact, hermetically sealed in a glass envelope, that has excellent contact reliability even in contaminated atmospheres. The switch is Programmable Controller compatible (24 volts and above) and is pilot duty rated NEMA B600 for AC and NEMA P300 for DC as shown to the right. The enclosure is NEMA Type 13.

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 13 |
| **Approvals** | UL Listed and CSA Certified |
| **Ambient Temperature [C (F)]** | -29…+121° (-20…+250°)<br>Exception: Wobble stick and cat whisker devices are rated from -18…+54° (0…+130°) |

**AC Contact Rating (Maximum per Pole, 50 or 60 Hz, Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| B600 | 120 | 30 | 3.00 | 5 | 3600 | 360 |
| | 240 | 15 | 1.50 | 5 | 3600 | 360 |
| | 480 | 7.5 | 0.75 | 5 | 3600 | 360 |
| | 600 | 6 | 0.60 | 5 | 3600 | 360 |

**DC Contact Rating (Maximum per Pole, Same Polarity)**

| NEMA Rating Designation | Voltage Range | Current Rating |
|---|---|---|
| P300 | 115…125 | 1.1 A |
| | 230…250 | 0.55 A |

## Features

- PLC compatible
- High contact reliability in contaminated atmospheres

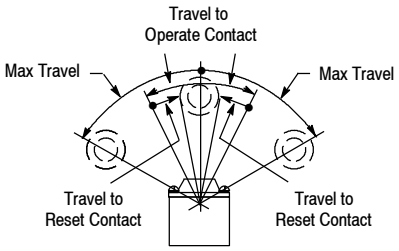
## Sealed Contact

Lever Type • Spring Return page 5-36
Lever Type • Maintained Contact . . . page 5-37
Push Type • Spring Return . page 5-38
Wobble Stick and Cat Whisker • Spring Return . . . . . page 5-39
Modifications and Accessories . . . . . page 5-39

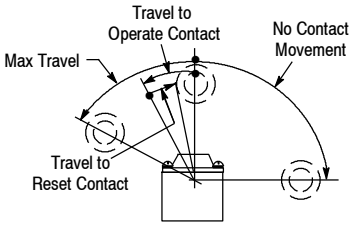
# 802R Lever Type • Spring Return

## Sealed Contact Switches

## Range of Operation




Lever Operation with Standard Levers




Lever Operation When "One-Way" Levers 802T-W7 or W8 Are Used

*802R-AF Without Lever*

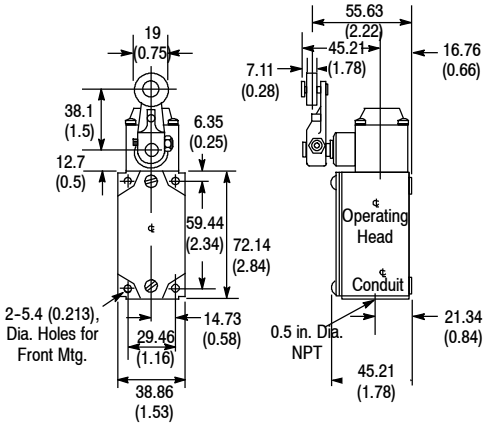
*802R-ALFW5*

## Product Selection—Standard and Low Operating Torque Models

| Lever Movement | Torque to Operate (Max.) | Travel to Operate Contact (Max.) | Max Travel | Travel to Reset Contact (Max.) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N.m (3 lb•in) | 16° | 42° | 9° | N.O. | **802R-AF** |
| | | | | | N.C. | 802R-AC |
| | 0.51 N.m (4.5 lb•in) | 7° | 53° | 3.5° | N.O. | 802R-HF |
| | | | | | N.C. | 802R-HC |
| Clockwise | | | 50° | | N.O. | 802R-H1F |
| | | | | | N.C. | 802R-H1C |
| Counterclockwise | | | | | N.O. | 802R-H2F |
| | | | | | N.C. | 802R-H2C |
| Clockwise Lever cannot move counterclockwise | 0.45 N.m (4 lb•in) | 20° | 91° | 11° | N.O. | 802R-L1F |
| | | | | | N.C. | 802R-L1C |
| Counterclockwise Lever cannot move clockwise | | | | | N.O. | 802R-L2F |
| | | | | | N.C. | 802R-L2C |
| Clockwise or Counterclockwise | 0.09 N•m (0.78 lb•in) | 22° | 43° | 12° | N.O. | 802R-ALFW5 ❶ |
| | | | | | N.C. | 802R-ALCW5 ❶ |
| Clockwise Lever cannot be moved counterclockwise | | | | | N.O. | 802R-AL1FW5 ❶ |
| | | | | | N.C. | 802R-AL1CW5 ❶ |
| Counterclockwise Lever cannot be moved clockwise | | | | | N.O. | 802R-AL2FW5 ❶ |
| | | | | | N.C. | 802R-AL2CW5 ❶ |

❶ These low operating force limit switches can only be supplied with the catalog number **802T-W5** rod lever. The rod can easily be formed to meet special application requirements. The contact is restored to its normal position when pressure on the rod is released.

## Approximate Dimensions [mm (in.)]

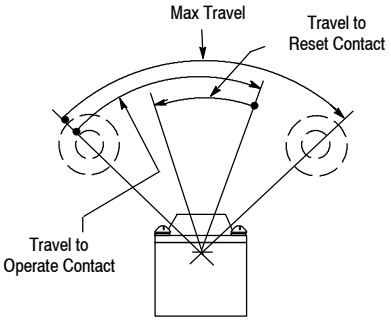



*Standard Switch with 802T-W1 Lever*
*Shipping Wt. 0.35 kg (12.5 oz)*

**Note:** Details regarding wiring Allen-Bradley Limit Switches to Allen-Bradley PLCs can be found in publications 802T-4.0, 4.1, 4.2, and 4.3.

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-39.**

## Range of Operation



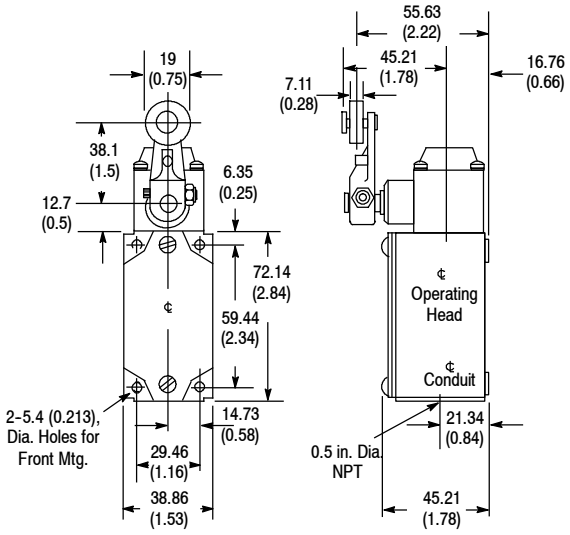
*Switch Without Lever*

## Product Selection

| Lever Movement | Torque to Operate (Max) | Travel to Operate Contact (Max) | Max Travel | Travel to Reset Contact (Max) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.25 N•m (2.25 lb•in) | 70° ❶ | 84° ❶ | 35° | N.O. | 802R-AMF |
| | | | | | N.C. | 802R-AMC |

❶ From one maintained position to the other.

## Approximate Dimensions [mm (in.)]



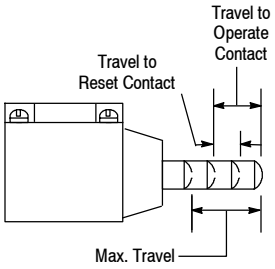

*Standard Switch with 802T-W1 Lever*
*Shipping Wt. 0.35 kg (12.5 oz)*

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-39.**

# 802R Push Type • Spring Return

## Sealed Contact Switches

## Range of Operation

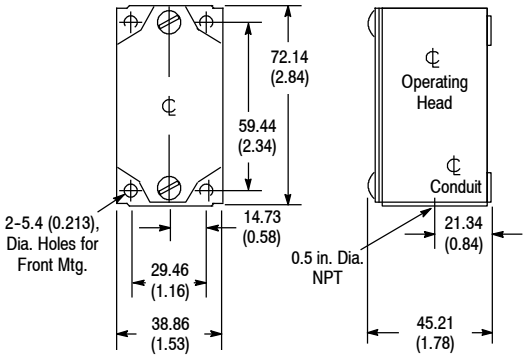


*Top Push Rod* | *Adjustable Top Push Rod* | *Side Push Rod* | *Top Push Roller* | *Side Push Roller*

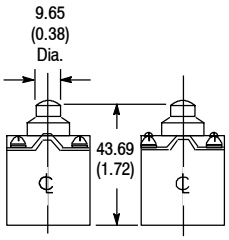
## Product Selection

| Operator Type | Force to Operate (Max) | Travel to Operate Contact (Max) | Max Travel | Travel to Reset Contact (Max) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push Rod | 15.6 N (3.5 lb) | 1.75 mm (0.069 in.) | 5.13 mm (0.202 in.) | 0.71 mm (0.028 in.) | N.O. | 802R-BF |
| | | | | | N.C. | 802R-BC |
| Adjustable Top Push Rod | | | | | N.O. | 802R-BAF |
| | | | | | N.C. | 802R-BAC |
| Side Push Rod | 20.0 N (4.5 lb) | 3.18 mm (0.125 in.) | 5.54 mm (0.218 in.) | 1.45 mm (0.057 in.) | N.O. | 802R-CF |
| | | | | | N.C. | 802R-CC |
| Top Push Roller | 15.6 N (3.5 lb) | 1.75 mm (0.069 in.) | 5.13 mm (0.202 in.) | 0.71 mm (0.028 in.) | N.O. | 802R-DF |
| | | | | | N.C. | 802R-DC |
| Side Push Vertical Roller | 20.0 N (4.5 lb) | 3.18 mm (0.125 in.) | 5.54 mm (0.218 in.) | 1.45 mm (0.057 in.) | N.O. | 802R-KF |
| | | | | | N.C. | 802R-KC |
| Side Push Horizontal Roller | | | | | N.O. | 802R-K1F |
| | | | | | N.C. | 802R-K1C |

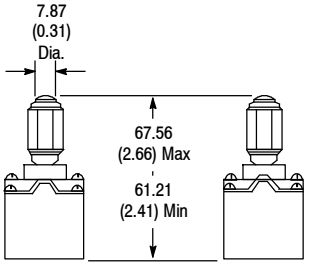
## Approximate Dimensions [mm (in.)]



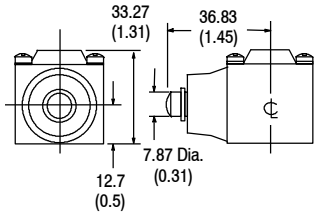

*Standard Switch*
*Shipping Wt. 0.35 kg (12.5 oz)*



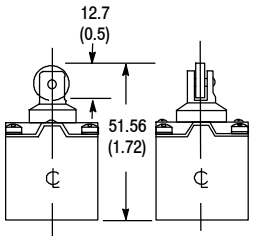

*Z-36615*
*Top Push Rod Head*
*Shipping Wt. 0.12 kg (4.25 oz)*



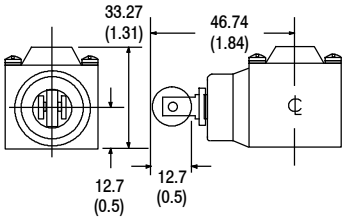

*40182-022-52*
*Adjustable Top Push Rod Head*
*Shipping Wt. 0.12 kg (4.25 oz)*




*Z-36616*
*Side Push Rod Head*
*Shipping Wt. 0.12 kg (4.25 oz)*



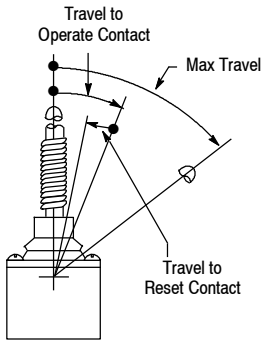

*Z-36618*
*Top Push Roller Head*
*Shipping Wt. 0.12 kg (4.25 oz)*




*Z-36622*
*Side Push Vertical Roller Head*
*Shipping Wt. 0.12 kg (4.25 oz)*

**Modifications and Accessories—See page 5-39.**

## Range of Operation ❶



*Wire Wobble Stick*

*Cat Whisker*

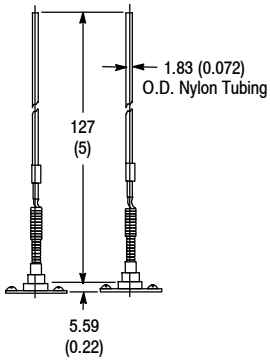
## Product Selection

| Operator Type | Torque to Operate (Max.) | Travel to Operate Contact (Max.) | Max Travel ❶ | Travel to Reset Contact (Max.) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Wire Wobble Stick | 0.51 N•m (4.5 lb•in) | 11° | 11° | 5° | N.O. | 802R-WS1F ❷ |
| | | | | | N.C. | 802R-WS1C ❷ |
| Wire Cat Whisker | 0.06 N•m (8 oz•in) | 25° | 25° | 14° | N.O. | 802R-CWF ❷ |
| | | | | | N.C. | 802R-CWC ❷ |

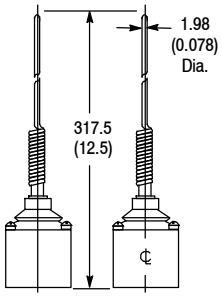
❶ These switches should be mounted in such a way that the wobble or cat whisker will not be deflected beyond the "Maximum Travel" position. This is to avoid excessive backlash, which could cause undesirable repetition of contact action.

❷ Ambient temperature -18°C…54°C (0°F…130°F).

## Approximate Dimensions [mm (in.)]




*Z-35607*
*Cat Whisker Head*
*Shipping Wt. 0.3 kg (1 oz)*




*Z-35617*
*Wire Wobble Stick Head*
*Shipping Wt. 0.17 kg (6 oz)*

### Modification for Transparent Cover

Switches can be furnished with a gasketed, transparent plastic cover. This modification enables the electrician to inspect terminal wiring without removing the switch cover. To order, add the letter **Z** to the cat. no. of the standard switch. Example: Cat. No. 802R-DF becomes Cat. No. 802R-DF**Z**.

### Conduit Seal Cat. No. 802T-N3

A synthetic rubber conduit seal is available to protect the conduit opening against the ingress of oil into the wiring compartment. Each wire hole in the seal has a thin inner wall which is pierced when a wire is passed through. Thus, any unused opening remains sealed.

### Special Conduit Lock Nut Cat. No. 802T-X4

This option, a "Tru-Seal" lock nut with threaded PTFE insert, is a valuable accessory for any Bulletin 802R which is connected by means of conduit.

*Plug-in Style 802T-AP with Lever*

*NonPlug-in Style 802T-A with Lever*

## Description

Bulletin 802T limit switches are ideal for applications in which heavy duty pilot ratings, small size, a high degree of versatility and a rugged NEMA Type 4 and 13 oiltight construction are desirable. An important factor in the automation of industry, these limit switches are being applied extensively on conveyor systems, transfer machines, automatic turret lathes, milling and boring machines, radial drills, and many other types of modern, high speed production equipment.

## High Degree of Versatility

Bulletin 802T limit switches can be mounted in any position, with operating heads that can be rotated and fastened in any one of four positions 90° apart. Most operating levers are interchangeable and can be rotated and clamped in any position through 360°. Accessories can be added to switches already in the field.

## NEMA Type 4, 13 and 6P ❶ Oiltight Construction

802T limit switches feature NEMA Type 4 and 13 construction with synthetic rubber seals to protect the operating parts against entry of oil, dust, abrasives, water and coolant, within the limits of NEMA-specified tests.

❶ Plug-in lever type except low-torque models.

## Rugged, Dependable Contact Block

The contacts used in Bulletin 802T switches are snap-action type with high snap-through force resulting in minimum contact rebound. Double break, fine silver contacts are electrically independent, but cannot be used on opposite polarities.

## Easy Mounting and Wiring

Each switch base has four mounting holes: two “through” holes for front mounting and two tapped holes in the back for rear mounting. The pressure plate type terminals on the contact block face to the front of the switch and have ample wiring space around them. The switch conduit opening is a $^{1}/_{2}$-inch threaded pipe tap in the bottom of the housing.

## Direct Opening Action Position Interlock Switches

Bulletin 802T Direct Opening Action limit switches have been designed for use in control reliable applications and safety applications per ISO 14119.

Direct Opening Action assures that the normally closed contacts open when the limit switch is actuated. This opening will occur even in the event of a contact weld condition, up to 10 Newtons.

## Lever Type Switches

These switches are operated by means of a lever which is clamped to a knurled shaft extending from the operating head.

Lever type switches can be equipped with a variety of operating levers: roller lever, adjustable roller lever, micrometer adjustment roller lever, rod lever, one-way rod or roller lever and fork lever. These can be used interchangeably on all lever type switches except the **low operating force switch.**

## Push Type Switches

These switches are actuated by means of a rod or plunger located on the top or side of the operating head. Pushing the plunger into the head causes the contacts to operate. Two types of plungers are available: rod type and steel roller. Side push rod switches can be supplied in spring return or maintained contact constructions. An adjustable length top push rod is also available. The contacts are snap-acting with high snap-through force resulting in minimum contact rebound.

## Wobble Stick and Cat Whisker Type Switches

Both switches are actuated by a rod or wire extending from the top of the operating head. Moving the rod through a specified angle in any direction causes the contacts to operate. All wobble stick and cat whisker switches are supplied with spring return construction only. The contacts are snap-action type with high snap-through force resulting in minimum contact rebound.

## Dual Switches

The dual switch is actually two limit switches which function independently but have a co mm on enclosure. These switches are used for installations where two switches would be mounted side by side. There is a saving on installation time and fittings (see page 5-71).

## Plug-in Switches

Plug-in style limit switches can reduce costly downtime by eliminating the need for rewiring switches. The head and switch body can be replaced without disturbing the wiring chamber in the base. These units, featuring a castle lock head design, snap-action contacts and reliable plug-in connection are available in 2-circuit or 4-circuit construction. Plug-in style limit switches are listed on page 5-41.

## Four-Circuit NonPlug-in Switches

These switches contain two single pole single throw contact blocks (a total of two N.O. and two N.C. contacts) mounted in a co mm on enclosure. The blocks are mounted one above the other in the vertical limit switch construction, or side by side in the horizontal construction. Switch plungers are mechanically coupled in both constructions. When actuated, contacts in both blocks are operated. These switches in both types of construction are listed on page 5-54.

## General Information

Plug-in Style . . . . . page 5-41
NonPlug-in Style . . . . . page 5-54

## Operating Levers

Lever Selection . . . . . page 5-130

## Description

Bulletin 802T limit switches are ideal for applications in which heavy duty pilot ratings, small size, a high degree of versatility and a rugged NEMA Type 4, 13 and 6P❶ construction are desirable. An important factor in the automation of industry, these limit switches are being applied extensively on conveyor systems, transfer machines, automatic turret lathes, milling and boring machines, radial drills, and many other types of modern, high speed production equipment.

A wide variety of operating heads and operating levers are available. Operating heads can be mounted in four positions, 90° apart.

## Features

- Front mount for simplified mounting
- Plug-in style for ease of wiring
- Side rotary, wobble stick, cat whisker, adjustable top and top or side push styles with and without rollers
- Quick mode change to clockwise and counterclockwise operation only
- Castle lock head design for high durability

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 4, 13, 6P❶ and IP67 |
| **Pollution Degree** | 3 |
| **Certifications** | UL Listed, CSA Certified CE Marked for applicable directives |
| **Ambient Temperature [C (F)]❷** | -18…+110° (0…+230°)<br>Exception: Wobble stick and cat whisker devices are rated from -18…+54° (0…+130°) |

**AC Contact Rating (Maximum per Pole, 50 or 60 Hz, 2 Circuits Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A600 AC-15 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |
| | 480 | 15 | 1.50 | 10 | 7200 | 720 |
| | 600 | 12 | 1.20 | 10 | 7200 | 720 |
| B600❸ AC-15 | 120 | 30 | 3.00 | 5 | 3600 | 360 |
| | 240 | 15 | 1.50 | 5 | 3600 | 360 |
| | 480 | 7.5 | 0.75 | 5 | 3600 | 360 |
| | 600 | 6 | 0.60 | 5 | 3600 | 360 |

**AC Contact Rating (Maximum per Pole, 50 or 60 Hz, 4 Circuits Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A300 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |

**DC Contact Rating (Maximum per Pole)**

| Circuits | Voltage Range | Current Rating |
|---|---|---|
| 2 | 115-125 | 0.4 A |
| | 230-250 | 0.2 A |
| | 550-600 | 0.1 A |
| 4 | 115-125 | 0.4 A |
| | 230-250 | 0.2 A |

## Plug-in Style

Lever Type • Spring Return page 5-42
Standard and Low Operating Torque Models

Lever Type • Maintained . . page 5-44
Contact and Neutral Position

Push Type • Spring Return . page 5-45

Wobble Stick and Cat . . . . . page 5-47
Whisker • Spring Return

Modifications and . . . . . page 5-53
Accessories

## 802T Operating Levers

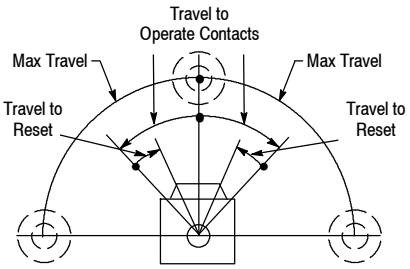
Lever Selection . . . . . page 5-130

❶ Plug-in lever type except low-torque models.
❷ Temperature range below 0 °C (+32 °F) is based on the absence of freezing moisture or water. See page 5-53 for low temperature options.
❸ Low operating torque-spring return ratings only.

# 802T Lever Type • Spring Return

## Plug-in Style Oiltight Switches

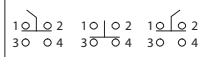
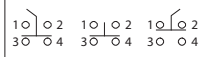
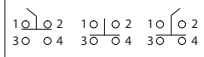
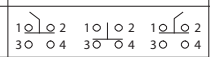
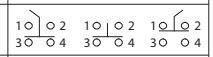
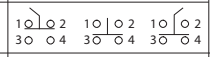
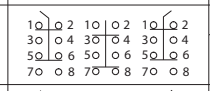
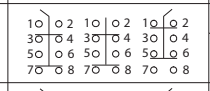
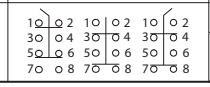
## Range of Operation



*Switch Without Lever*

*Switch Without Lever and Base*

## Product Selection—Standard and Low Operating Torque Models

| Number of Circuits | Lever Movement vs. Contact Operation | | Torque/Force to Operate, Max. | Travel to Operate Contacts, Max. | Max. Travel | Travel to Reset Contacts, Max. | Cat. No. Switch w/o Lever | Cat. No. Switch w/o Lever and Base |
|---|---|---|---|---|---|---|---|---|
| 2 | Clockwise or Counterclockwise |  | 0.29 N•m (2.6 lb•in) Nominal | 13° | 90° | 7° | 802T-AP | 802T-AP1 |
| | | | | 18° | | | ★ 802T-A5P | ★ 802T-A5P1 |
| | | | 0.56 N•m (5 lb•in) | 5° Nominal | | 2.5° Nominal | 802T-FP | 802T-FP1 |
| | | | | 9° | | 4° | 802T-HP | 802T-HP1 |
| | Clockwise |  | 0.29 N•m (2.6 lb•in) | 13° | | 7° | 802T-A1P | 802T-A1P1 |
| | | | | 18° | | | ★ 802T-A3P | ★ 802T-A3P1 |
| | | | 0.56 N•m (5 lb•in) | 9° | | 4° | 802T-H1P | 802T-H1P1 |
| | Counterclockwise |  | 0.29 N•m (2.6 lb•in) | 13° | | 7° | 802T-A2P | 802T-A2P1 |
| | | | | 18° | | | ★ 802T-A4P | ★ 802T-A4P1 |
| | | | 0.56 N•m (5 lb•in) | 9° | | 4° | 802T-H2P | 802T-A2P1 |
| | Clockwise or Counterclockwise |  | 0.16 N•m (1.5 lb•in) | 13° | | 7° | 802T-ALP | 802T-ALP1 |
| | Clockwise |  | | | | | ‡ 802T-AL1P | ‡ 802T-AL1P1 |
| | Counterclockwise |  | | | | | 802T-AL2P | 802T-AL2P1 |
| 4 | Clockwise or Counterclockwise |  | 0.45 N•m (4 lb•in) | 13° | 90° | 7° | 802T-ATP | 802T-ATP1 |
| | | | 0.79 N•m (7 lb•in) | 9° | | 4° | 802T-HTP | 802T-HTP1 |
| | Clockwise |  | 0.45 N•m (4 lb•in) | 13° | | 7° | 802T-A1TP | 802T-A1TP1 |
| | | | 0.79 N•m (7 lb•in) | 9° | | 4° | 802T-H1TP | 802T-H1TP1 |
| | Counterclockwise |  | 0.45 N•m (4 lb•in) | 13° | | 7° | 802T-A2TP | 802T-A2TP1 |
| | | | 0.79 N•m (7 lb•in) | 9° | | 3.5° | 802T-H2TP | 802T-H2TP1 |

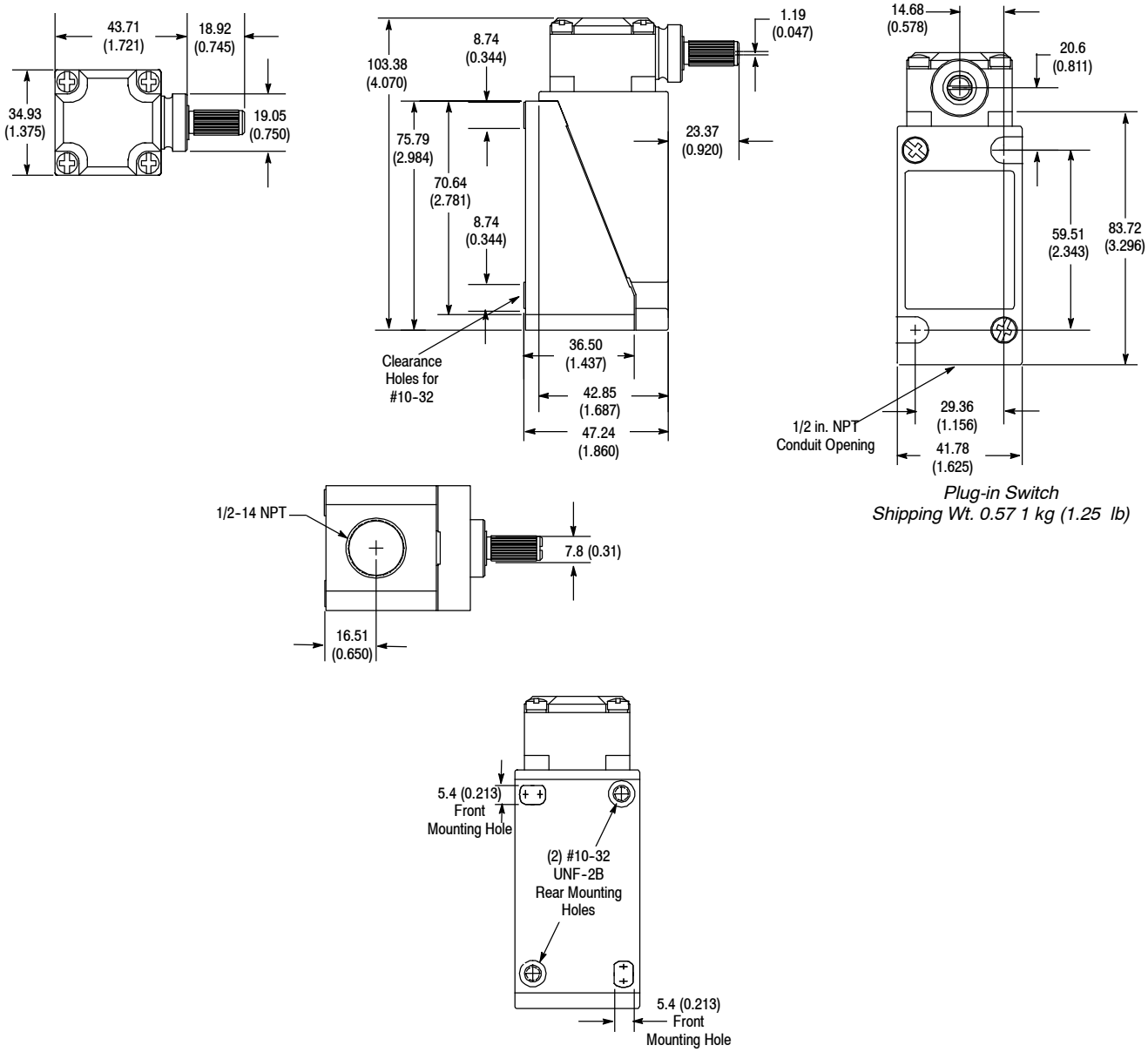
★ Fluorinated elastomer shaft seal is supplied with these devices.
‡ Low operating torque model.

**Approximate Dimensions—See page 5-43.**
**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-53.**



New

## Approximate Dimensions [mm (in.)]



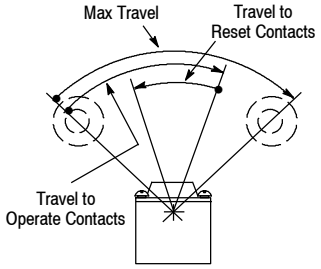

*Plug-in Switch*
*Shipping Wt. 0.57 1 kg (1.25 lb)*

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-53.**

# 802T Lever Type • Maintained Contact and Neutral Position

## Plug-in Style Oiltight Switches

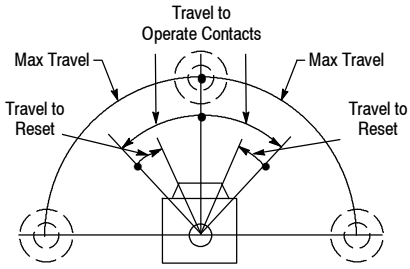
### Range of Operation




*Maintained Contact Models*

*Switch Without Lever*

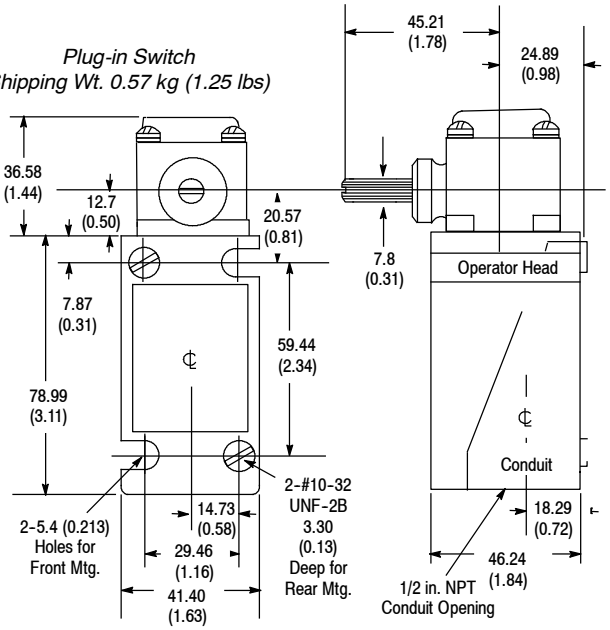
*Switch Without Lever and Base*



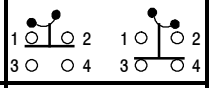
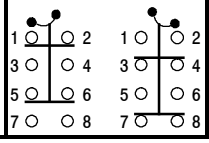

*Neutral Position Models*

### Approximate Dimensions [mm (in.)]

*Plug-in Switch*
*Shipping Wt. 0.57 kg (1.25 lbs)*

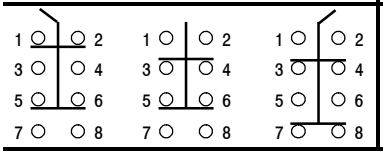



### Product Selection—Maintained Contact Models

| No. of Circuits | Lever Movement vs. Contact Operation | | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. Switch w/o Lever | Cat. No. Switch w/o Lever & Base |
|---|---|---|---|---|---|---|---|---|
| 2 | Clockwise or Counterclockwise |  | 0.31 N•m (2.75 lb•in) | 70° ❶ | 88° ❶ | 32° | **802T-AMP** | 802T-AMP1 |
| 4 | Clockwise or Counterclockwise |  | 0.32 N•m (2.8 lb•in) | | | | **802T-AMTP** | 802T-AMTP1 |

❶ From one maintained position to another.

### Product Selection—Neutral Position Models

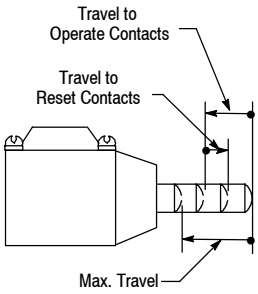
| Lever Movement vs. Contact Operation | Torque to Operate (Max.) Clockwise | Torque to Operate (Max.) Counter-clockwise | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. Switch w/o Lever | Cat. No. Switch w/o Lever & Base |
|---|---|---|---|---|---|---|---|
|  | 0.28 N•m (2.5 lb•in) | 0.47 N•m (4.2 lb•in) | 13° | 75° | 7° | **802T-NPTP** | 802T-NPTP1 |

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-53.**

# 802T Push Type • Spring Return

## Plug-in Style Oiltight Switches

## Range of Operation



*Top Push Rod* | *Adjustable Top Push Rod* | *Side Push Rod* | *Top Push Roller* | *Side Push Horizontal Roller*

## Product Selection

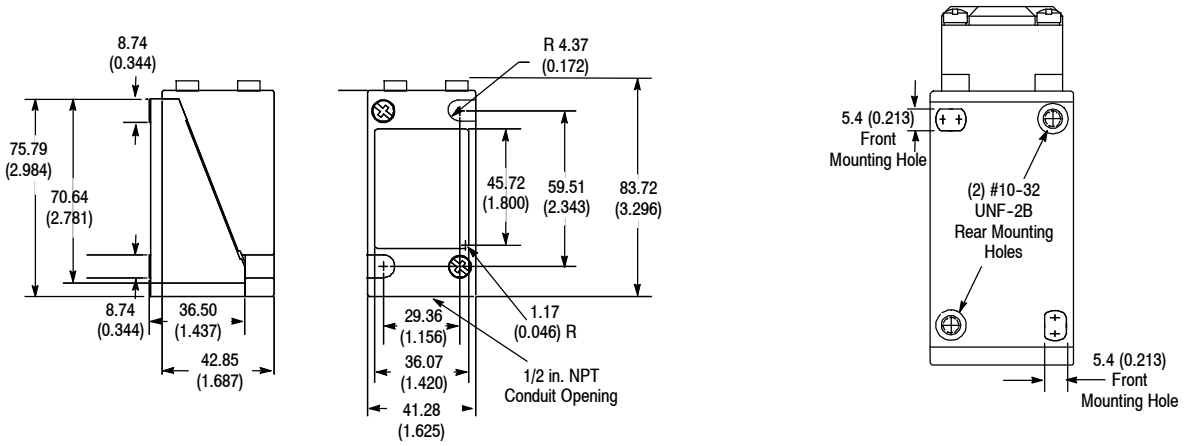
| Number of Circuits | Contact Operation | | Operator Type | Torque/Force to Operate, Max. | Travel to Operate Contacts, Max. | Maximum Travel | Travel to Reset Contacts, Max. | Cat. No. | |
|---|---|---|---|---|---|---|---|---|---|
| | Normal | Operated | | | | | | Switch w/o Lever | Switch w/o Lever and Base |
| 2 | 1○ ○2<br>3○ ○4 | 1○ ○2<br>3○ ○4 | Top Push Rod | 13.8 N (3.1 lb) | 1.4 mm (0.057 in.) | 6.0 mm (0.236 in.) | 0.9 mm (0.034 in.) | 802T-BP | 802T-BP1 |
| | | | Adjustable Top Push Rod | | | | | 802T-BAP | 802T-BAP1 |
| | | | Side Push Rod | 16.4 N (3.7 lb) | 3.3 mm (0.131 in.) | 5.7 mm (0.226 in.) | 1.9 mm (0.074 in.) | 802T-CP | 802T-CP1 |
| | | | Top Push Roller | 13.8 N (3.1 lb) | 1.4 mm (0.057 in.) | 6.0 mm (0.236 in.) | 0.9 mm (0.034 in.) | 802T-DP | 802T-DP1 |
| | | | Side Push Vertical Roller | 16.4 N (3.7 lb) | 3.3 mm (0.131 in.) | 5.7 mm (0.226 in.) | 1.9 mm (0.074 in.) | 802T-KP | 802T-KP1 |
| | | | Side Push Horizontal Roller | | | | | 802T-K1P | 802T-K1P1 |
| 4 | 1○ ○2<br>3○ ○4<br>5○ ○6<br>7○ ○8 | 1○ ○2<br>3○ ○4<br>5○ ○6<br>7○ ○8 | Top Push Rod | 22.2 N (5.0 lb) | 1.4 mm (0.057 in.) | 6.0 mm (0.236 in.) | 0.9 mm (0.034 in.) | 802T-BTP | 802T-BTP1 |
| | | | Adjustable Top Push Rod | | | | | 802T-BATP | 802T-BATP1 |
| | | | Side Push Rod | 24.9 N (5.6 lb) | 3.3 mm (0.131 in.) | 5.7 mm (0.226 in.) | 1.9 mm (0.074 in.) | 802T-CTP | 802T-CTP1 |
| | | | Top Push Roller | 22.2 N (5.0 lb) | 1.4 mm (0.057 in.) | 6.0 mm (0.236 in.) | 0.9 mm (0.034 in.) | 802T-DTP | 802T-DTP1 |
| | | | Side Push Vertical Roller | 24.9 N (5.6 lb) | 3.3 mm (0.131 in.) | 5.7 mm (0.226 in.) | 1.9 mm (0.074 in.) | 802T-KTP | 802T-KTP1 |
| | | | Side Push Horizontal Roller | | | | | 802T-K1TP | 802T-K1TP1 |

**Modifications and Accessories—See page 5-53.**

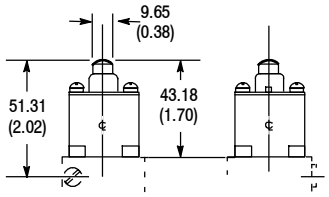
# 802T Push Type • Spring Return

## Plug-in Style Oiltight Switches

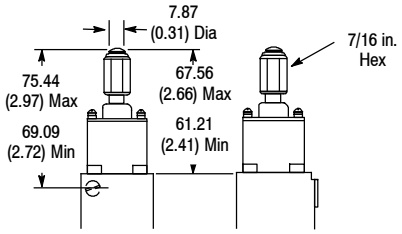
### Approximate Dimensions [mm (in.)]



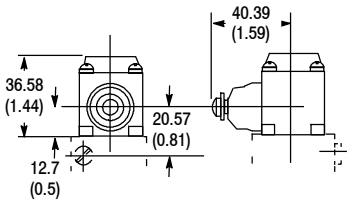

*Switch Body*



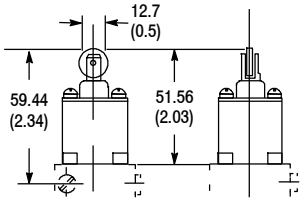

*40146-013-59*
*Top Push Rod Head*
*Shipping Wt. 0.142 kg (5 oz)*



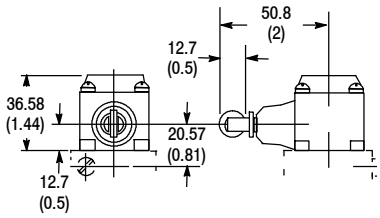

*40146-013-65*
*Adjusted Top Push Rod Head*
*Shipping Wt. 0.142 kg (5 oz)*




*40146-017-63*
*Side Push Rod Head*
*Shipping Wt. 0.142 kg (5 oz)*




*40146-013-60*
*Top Push Roller Head*
*Shipping Wt. 0.142 kg (5 oz)*



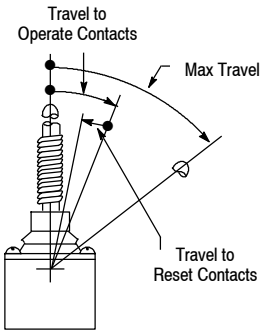

*40146-017-64*
*Side Push Roller Head*
*Shipping Wt. 0.142 kg (5 oz)*

**Modifications and Accessories—See page 5-53.**

# 802T Wobble Stick and Cat Whisker • Spring Return

## Plug-in Style Oiltight Switches

## Range of Operation❶

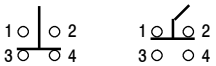


*Wobble Stick*
*Nylon Extension*

*Wobble Stick*
*Wire Extension*

*Wire Cat*
*Whisker*

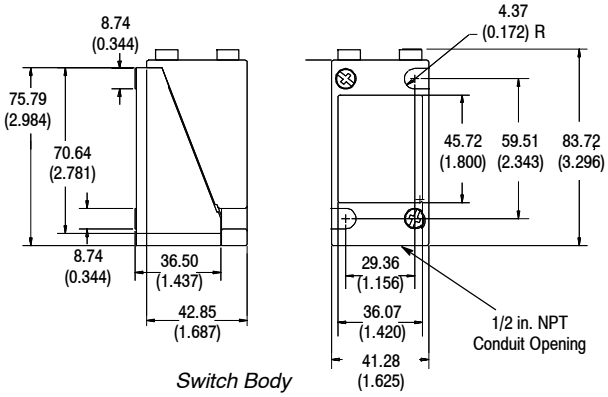
## Product Selection

| Operator Type | Contact Operation | Torque to Operate (Max.) ❷ | Travel to Operate Contacts (Max.)❷ | Max Travel❶❷ | Travel to Reset Contacts (Max.)❷ | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Complete Switch | Switch Without Base |
| Nylon Wobble Stick |  | 0.51 N•m (4.5 lb•in) | 9° | 10° | 5° | **802T-WSP** | 802T-WSP1 |
| Wire Wobble Stick | | | | | | **802T-WS1P** | 802T-WS1P1 |
| Wire Cat Whisker | | 0.06 N•m (8 oz•in) | 21° | 28° | 14° | **802T-CWP** | 802T-CWP1 |

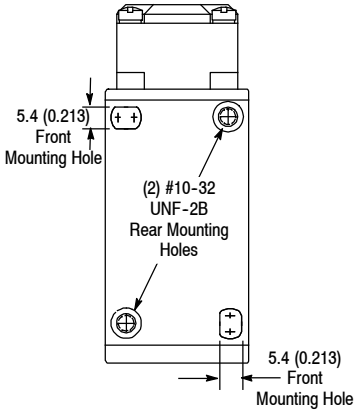


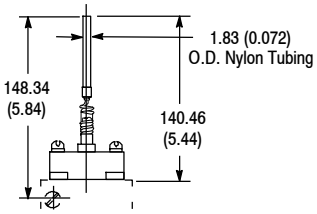
❶ These switches should be mounted in such a way that the wobble stick or cat whisker will not be deflected beyond the "Maximum Travel" position, as this could cause undesirable repetition of contact action on rebound.
❷ Operating travels and torque are measured at rigid section of stick or cat whisker.

## Approximate Dimensions [mm (in.)]

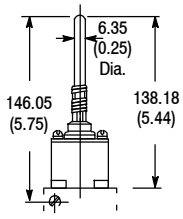



*Switch Body*

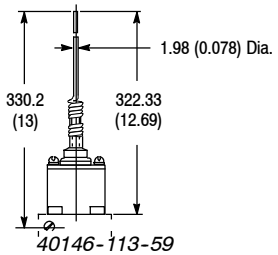



*40146-126-53*
*Cat Whisker Head*
*Shipping Wt. 0.09 kg (3 oz)*




*40146-113-53*
*Nylon Wobble Stick Head*
*Shipping Wt. 0.2 kg (7 oz)*




*40146-113-59*
*Wire Wobble Stick Head*
*Shipping Wt. 0.17 kg (6 oz)*

**Modifications and Accessories—See page 5-53.**

# 802T Low Energy

## Plug-in Style Oiltight Switches

## Specifications

| | |
|---|---|
| Certifications | UL Listed, CSA Certified and CE Marked for all applicable directives |
| **Environmental** | |
| Enclosure Type Rating | NEMA 4, 13, and 6P❷ |
| Ambient Temperature [C (F)] ❶ | -18…+110° (0…+230°)<br>-40…110° (-40…230°) low temp. model |
| Input Voltage | 5…28V DC |
| DC Contact Rating | 0.40V A load per pole max<br>0.025V A load per pole min |

## Description

Intended for direct connection to PLCs and other low energy circuits, the components and design of these low energy limit switches are optimized for long life.

The primary concern of low energy switching is contact contamination. Since low energy loads do not arc or burn the contacts clean, contaminants may cause erratic switch behavior. Rockwell Automation's low energy limit switches are designed with welded gold and silver alloy contacts to provide a protective barrier against surface oxides. A stationary waffle shape contact optimizes contact pressure to stabilize the contact resistance in the region of the micro load. A prism shaped crossbar contact provides high pressure to penetrate foreign particles which could prevent contact closure. These low energy limit switches are suitable for machine connectivity and low voltage facilities. They have a low input voltage of 5...28V DC with contact ratings of 0.025V A min. and 0.40V A max. per pole.

Bulletin 802T low energy limit switches are ideal for applications in which heavy duty pilot ratings, a high degree of versatility and a rugged NEMA Type 4, 13 and 6P rating are required. Similar to our full line of standard 802T plug-in style limit switches, our low energy limit switches exist in lever type spring return and push type spring return. Operating heads can be mounted in four positions, 90° apart.

In today's age of low energy controls, electromechanical switches are more frequently interfacing directly with low energy circuits. Switching low energy loads presents a unique challenge. Rockwell Automation is perfectly situated to assist you with all your low energy switching needs.

## Features

- Welded gold and silver alloy contacts provide a barrier against surface oxides
- Stationary waffle shape contact reduces the impact of contamination build-up
- Prism shaped crossbar contact provides high pressure to penetrate foreign particles which could prevent contact closure
- Snap-acting spanner replicates same reliability performance of our legacy NEMA products
- Lever type and push type operating styles
- Plug-in style for ease of wiring and conduit and mini-receptacle wiring options
- Enclosure rating NEMA 4, 13 and 6P❷
- UL Listed, CSA Certified and CE Marked for applicable directives
- 5…28V DC and 0.025V A min. and 0.40V A max. load per pole

## Plug-in Style

Lever Type • Spring Return page 5-49
Push Type • Spring Return . page 5-51

❶ Temperature range below 0°C (+32°F) is based on the absence of freezing moisture or water.
❷ 6P only applies to lever type, except low torque.

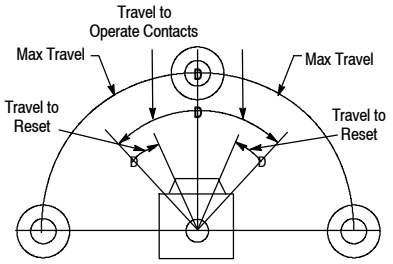


Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

# 802T Low Energy Lever Type • Spring Return

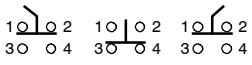
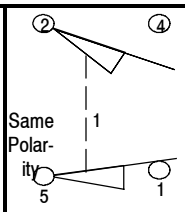
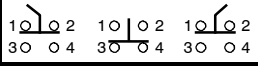
## Plug-in Style Oiltight Switches

## Range of Operation



Switch
without Lever

## Product Selection—Standard and Low Operating Torque Models

| No. of Circuits | Contact Operation for Clockwise or Counterclockwise Movement | Max. Torque to Operate [N•m (lb•in.)] | Max. Travel to Operate (degrees) | Maximum Travel (degrees) | Max. Travel to Reset (degrees) | Switch Type | Cat. No. Switch w/o Lever |
|---|---|---|---|---|---|---|---|
| 2 |  | 0.29 (2.6) | 13 | 90 | 7 | Conduit | **802T-AGP** |
| All low energy limit switches are designed to operate in an ambient temperature of -18…110°C (0…230°F). This 802T-AGPE limit switch is modified for low temperature operation at -40…110°C (-40…230°F). All other specifications are identical to the 802T-AGP. | | | | | | Conduit/Low Temp. | 802T-AGPE |
| Identical to 802T-AGP but with pre-wired five-pin mini connector. | | | |   | | Mini Connector | 802T-AGPJ1 ❶ |
| 2 |  | 0.106 (1.3) max. | 13 | 90 | 7 | Conduit/Low Torque | **802T-ALGP** |

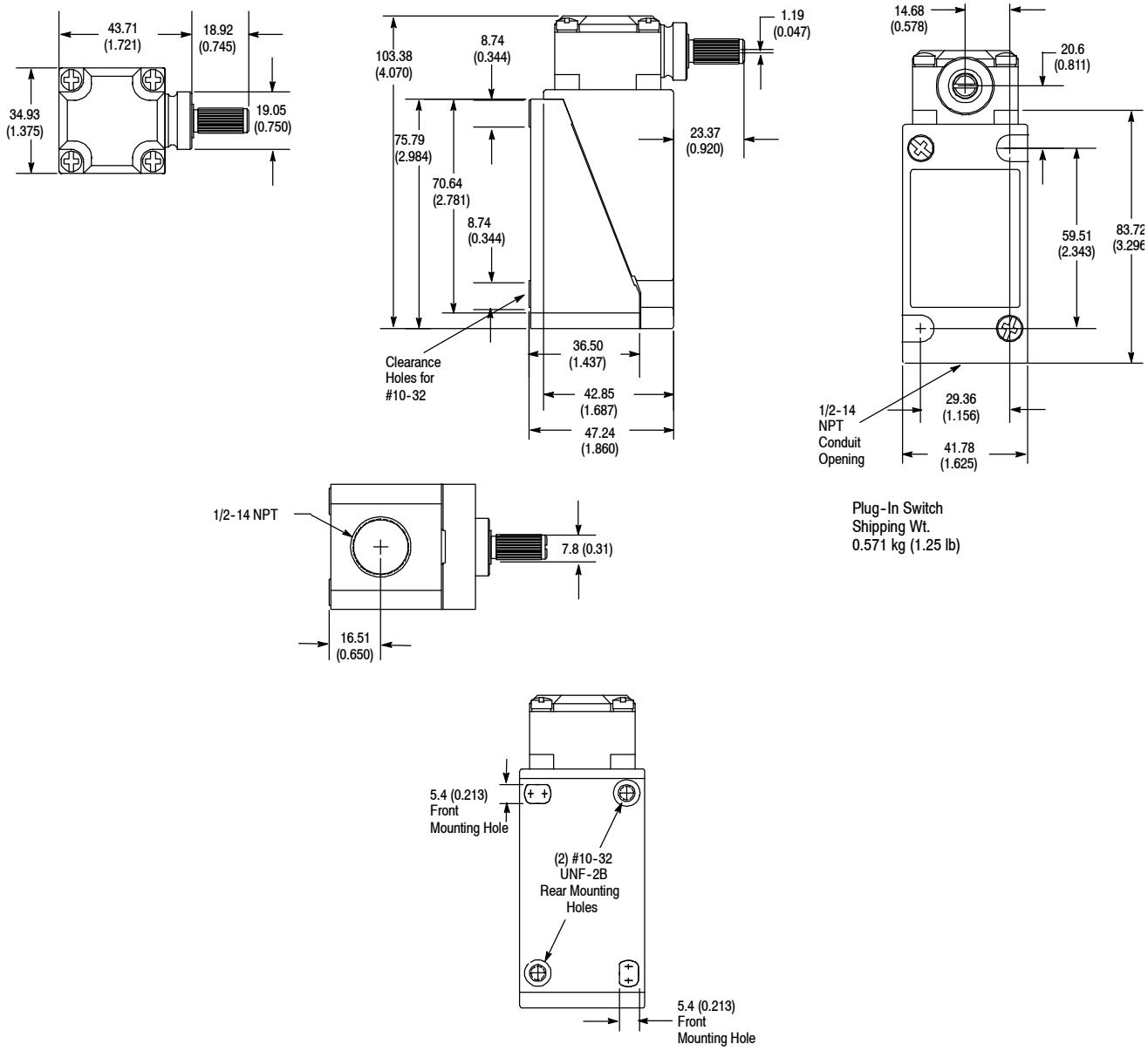
❶ Recommended standard cordset is 889N-F5AFC-6F—straight female 5-pin mini to flying leads, 1.8 m (6 ft) long. For additional cable lengths or styles, see page 8-4.

**Levers—See page 5-130 for a complete listing of operating levers.**

# 802T Low Energy Lever Type • Spring Return

## Plug-in Style Oiltight Switches

### Approximate Dimensions [mm (in.)]

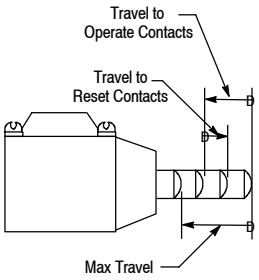



Plug-In Switch
Shipping Wt.
0.571 kg (1.25 lb)

# 802T Low Energy Push Type • Spring Return

## Plug-in Style Oiltight Switches

## Range of Operation



Side Push Rod

Top Push Roller

Side Push Vertical Roller

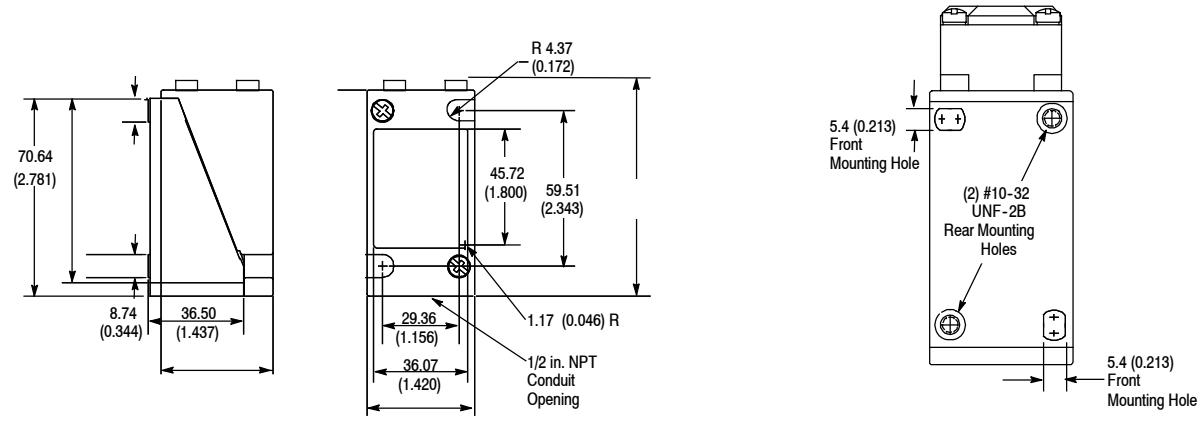
## Product Selection

| No. of Circuits | Contact Operation | | Operator Type | Force to Operate [N•m(lb] | Travel to Operate [mm (in.)] | Maximum Travel [mm (in.)] | Travel to Reset [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|---|---|---|
| | Normal | Operated | | | | | | |
| 2 | | | Side Push Rod | 16.4 (3.68) max. | 3.3 (0.131) max. | 5.7 (0.226) | 1.3 (0.052) max. | 802T-CGP |
| | | | Top Push Roller | 13.8 (3.1) max. | 1.4 (0.057) max. | 6.0 (0.236) | 0.7 (0.028) | **802T-DGP** |
| | | | Side Push Vertical Roller | 16.4 (3.68) max. | 3.3 (0.131) max. | 5.7 (0.226) | 1.3 (0.052) max. | 802T-KGP |

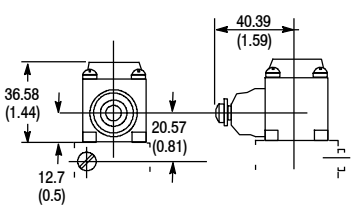
# 802T Low Energy Push Type • Spring Return

## Plug-in Style Oiltight Switches

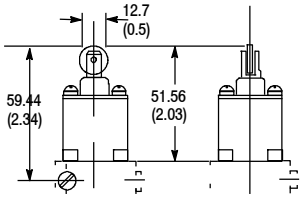
### Approximate Dimensions [mm (in.)]



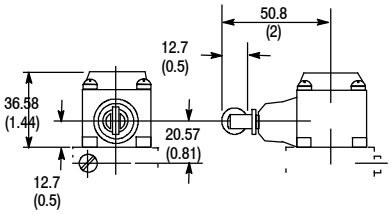

*Switch Body*




*40146-017-63*
*Side Push Rod Head*
*Shipping Wt. 0.142kg (5oz)*




*40146-013-60*
*Top Push Roller Head*
*Shipping Wt. 0.142kg (5oz)*




*40146-017-64*
*Side Push Roller Head*
*Shipping Wt. 0.142kg (5oz)*

*Manifold Mount*

*Indicating Light*

## Manifold Mount

All two-circuit plug-in limit switches can be supplied with a special terminal base which permits mounting the switch manifold style on a machine base, panel or raceway. As shown above, this base is supplied with a wiring hole and gasket on the back.

To order a manifold mount switch, add the letter **U** to the listed cat. no.. Example: Cat. No. 802T–AP becomes Cat. No. 802T–AP**U**.

## Indicating Light

Bulletin 802T two-circuit plug-in limit switches (except for the cat whisker, wobble stick, and manifold mount devices) can be supplied with an indicating light. To order add the letter **N** for 120V AC, 50/60 Hz or **N5** for 240V AC 50/60 Hz. Example: Cat. No. 802T–AP becomes Cat. No. 802T–AP**N**.

The indicating light is internally connected to two isolated terminals in the base assembly allowing the user to wire the light to either the N.O. or the N.C. contact. Switches with an indicating light have a contact rating of NEMA A300.

Where an indicator light and a pre-wired 5-pin mini connector are used, the light is pre-wired to the N.C. contact with J1 wiring and to the N.O. contact with J9 wiring. Indicating lights are not available on 4-circuit 802T switches.

## Fluorinated Elastomer Seals

To order limit switches with all fluorinated elastomer seals, add the letter **V** to the end of the listed cat. no. Not available on manifold mount, low operating torque, low temperature or limit switches with an indicating light.

To order lever type limit switches with the fluorinated elastomer shaft seal only, add **V1** to the end of the listed cat. no.

## Base Assembly

The limit switch base, including the terminal block, is available as a separate unit per the following table.

| | Cat. No. |
|---|---|
| 2–Circuit Base | **802T–X7** |
| 2–Circuit Base with Indicating Light | **802T–X7 N** |
| 2–Circuit Manifold Mount Base | **802T–X7U** |
| 4–Circuit Base | **802T–X8** |

## Low Temperature Operation

Plug-in limit switches are designed to operate in an ambient temperature range of –18…+110°C (0…+230°F), –18…+54°C (0…+130°F) for wobble stick and cat whisker. Special limit switches modified for low temperature operation at –40…+110°C (–40…+230°F) are available. Temperature ranges below 0°C (+32°F) are based on absence of freezing moisture or water. To order, add the letter **E** to cat. no. **Not available** on wobble stick, cat whisker or pre-wired cable switches; standard on low torque and maintained devices.

## Pre-Wired Cable

To order factory installed pre-wired type **"STOOW-A"** cable for 2-circuit (5-conductor) and 4-circuit (9-conductor) switches, add the suffix **Y** plus the number of feet required. Example: To order an 802T-AP with 2.4 m (5 ft) of cable the cat. no. would become 802T–AP**Y5**.

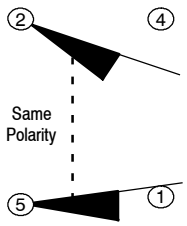
The standard cable length is 2.4 m (5 ft). Extended cable lengths are available in multiples of 1.22 m (4 ft) only.

## Mini-Type Receptacles

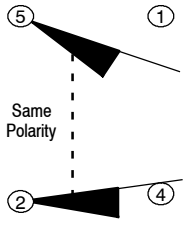
To order a bulletin 802T pre-wired limit switch with a five-pin (2 circuit) or nine pin (4 circuit) mini connector, add the suffix **J1** or **J9** depending on desired wiring (J9 wiring not available for 4-circuit models).

### 5-Pin Mini-Type Receptacle

**"J1" Wiring**



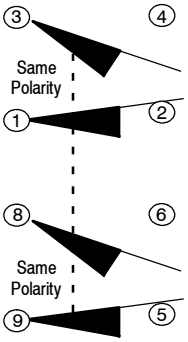
**"J9" Wiring**



An appropriate female connector with cable (889N–F5AFC–6F) is available on page 8–4 in Connection Systems.

### 9-Pin Mini-Type Receptacle

**"J1" Wiring ("J9" wiring not available for 4 circuit)**



An appropriate female connector with cable (889N–F9AF–2) is available on page 8–14 in Connection Systems.

# 802T

## NonPlug-in Style Oiltight Switches

## Description

Bulletin 802T limit switches are ideal for applications in which heavy duty pilot ratings, small size, a high degree of versatility and a rugged NEMA Type 13 oiltight construction are desirable. An important factor in the automation of industry, these limit switches are being applied extensively on conveyor systems, transfer machines, automatic turret lathes, milling and boring machines, radial drills, and many other types of modern, high speed production equipment.

A wide variety of operating heads and operating levers are available. Operating heads can be mounted in four positions, 90° apart.

## Features

- Side rotary, wobble stick, cat whisker, adjustable top and top or side push styles, with or without rollers
- Rugged construction
- Proven reliability

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 13, IP54 |
| **Pollution Degree** | 3 |
| **Certifications** | UL Listed, CSA Certified and CE Marked for applicable directives |
| **Ambient Temperature [C (F)]❶** | Nonplug-in limit switches are designed to operate in an ambient temperature range of -18…+54° (0…+130°). |

**AC Contact Rating (Maximum per Pole, 50 or 60 Hz, Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A600 AC-15 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |
| | 480 | 15 | 1.50 | 10 | 7200 | 720 |
| | 600 | 12 | 1.20 | 10 | 7200 | 720 |

**DC Contact Rating (Maximum per Pole, Same Polarity)**

| Voltage Range | Current Rating |
|---|---|
| 115-125 | 0.4 A |
| 230-250 | 0.2 A |
| 550-600 | 0.1 A |

❶ Temperature range below 0°C (+32°F) is based on the absence of freezing moisture or water. See page 5-73 for Extended Temperature Option.

## NonPlug-in Style

### 2-Circuit


Lever Type • Spring Return page 5-55
Standard and Low Operating Torque Models

Lever Type with DeviceNet page 10-15
Output • Spring Return

Lever Type • Maintained . . . page 5-56
Contact and Neutral Position

Lever Type with Time . . . . . page 5-57
Delay • Spring Return (1-Circuit)

Push Type • Spring Return . page 5-59
and Maintained Contact

Wobble Stick and Cat . . . . . page 5-61
Whisker • Spring Return


### 4-Circuit Vertical Construction


Lever Type • Spring . . . . . page 5-62
Return & Maintained Contact

Push Type • Spring . . . . . page 5-63
Return & Maintained Contact

Wobble Stick and Cat . . . . . page 5-65
Whisker • Spring Return


### 4-Circuit Horizontal Construction


Lever Type • Spring Return page 5-66

Lever Type • Maintained . . . page 5-67
Contact

Push Type • Spring . . . . . page 5-68
Return & Maintained Contact

Wobble Stick & Cat . . . . . page 5-70
Whisker • Spring Return

Dual Switch Lever and . . . . page 5-71
Push Types • Spring Return

Air-Operated • Spring Return page 5-72

Modifications and . . . . . page 5-73
Accessories

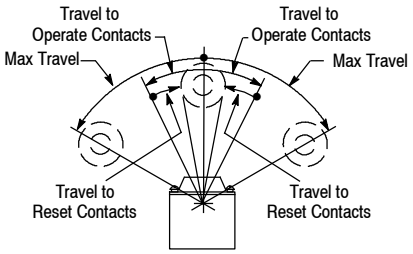

## Operating Levers


Lever Selection . . . . . page 5-130

# 802T 2-Circuit Lever Type • Spring Return

## NonPlug-in Style Oiltight Switches

### Range of Operation

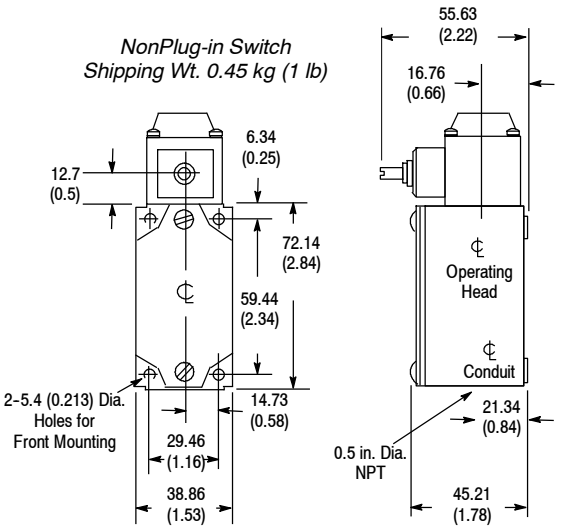



*Lever Operation with Standard Levers*

*802T-A*

*802T-ALW5*

### Approximate Dimensions [mm (in.)]




### Product Selection—Standard and Low Operating Torque Models

| Lever Movement vs. Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N•m (3 lb•in) | 16.5° | 43° | 8° | **802T-A** |
| | 0.51 N•m (4.5 lb•in) | 6° | 50° | 3° | **802T-H** |
| Clockwise | 0.40 N•m (3.5 lb•in) | 16.5° | 43° | 8° | 802T-A1 |
| | 0.51 N•m (4.5 lb•in) | 6.5° | 50° | 3° | 802T-H1 |
| Counterclockwise | 0.40 N•m (3.5 lb•in) | 16.5° | 43° | 8° | 802T-A2 |
| | 0.51 N•m (4.5 lb•in) | 6.5° | 50° | 3° | 802T-H2 |
| Clockwise Lever cannot move counterclockwise | 0.45 N•m (4 lb•in) | 20° | 91° | 11° | 802T-L1 |
| Counterclockwise Lever cannot move clockwise | | | | | 802T-L2 |
| Clockwise or Counterclockwise | 0.09 N•m (12.5 oz•in) | 22° | 43° | 12° | 802T-ALW5❶ |
| Clockwise | | | | | 802T-AL1W5❶ |
| Counterclockwise | | | | | 802T-AL2W5❶ |

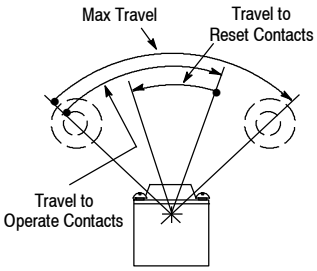
❶ These low operating torque limit switches can only be supplied with cat. no. **802T-W5** rod lever. The rod can easily be formed to meet special application requirements.

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**

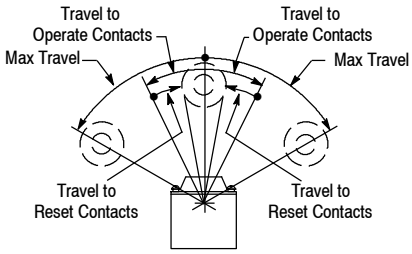
# 802T 2-Circuit Lever Type • Maintained Contact and Neutral Position

## NonPlug-in Style Oiltight Switches

## Range of Operation




*Maintained Contact Models*

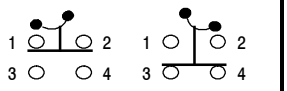
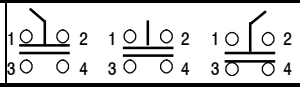



*Neutral Position Models*

*802T-AM*

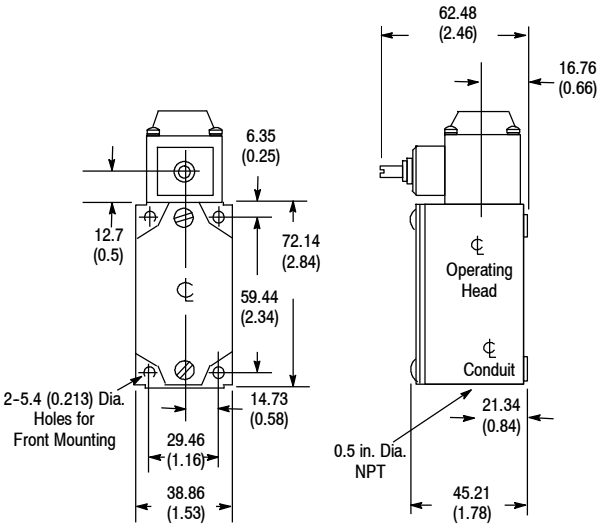
*802T-NP*

## Product Selection

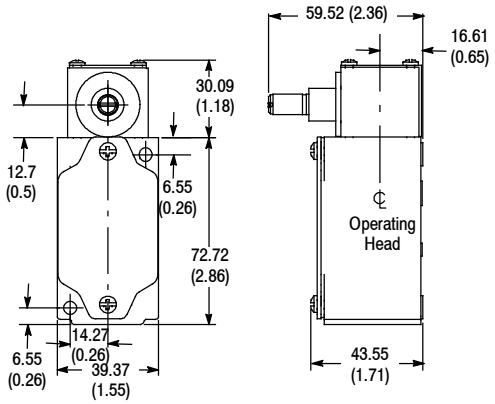
| Contact Type | Lever Movement vs. Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|---|
| Maintained |  | 0.25 N•m (2.25 lb•in) | 70° ❶ | 84° ❶ | 50° | **802T-AM** |
| Neutral Position |  | | 12° | 53° | 6° | **802T-NP** |

❶ From one maintained position to the other.

## Approximate Dimensions [mm (in.)]




*NonPlug-in Switch*
*Shipping Wt. 0.45 kg (1 lb)*
*802T-AM*




*NonPlug-in Switch*
*Shipping Wt. 0.45 kg (1 lb)*
*802T-NP*

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**

# 802T 1-Circuit Lever Type with Time Delay • Spring Return

## NonPlug-in Style Oiltight Switches

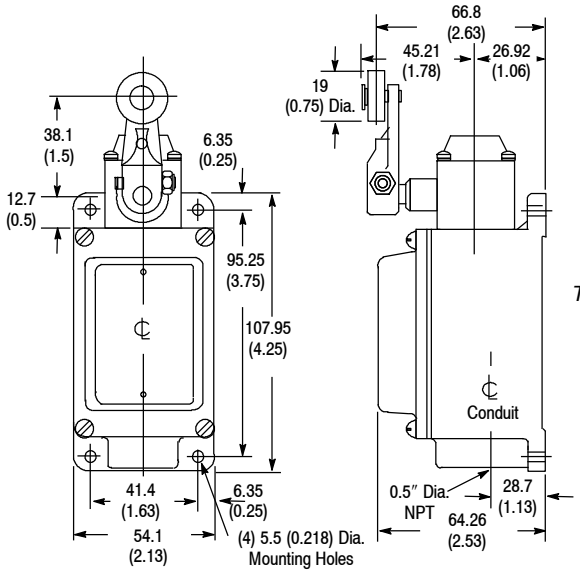
*802T-R1TD with 802T-W1 Lever*

## Product Selection

| Lever Movement vs. Contact Operation❸ | | | Torque to Operate (Max.) | Travel to Operate Contact (Max.) | Overtravel | Max Travel | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | On-Delay❷❹❺ | Off-Delay❷❻ |
| Clockwise<br>Lever cannot move counterclockwise | 1 ○ ○ 2 | 1 ○ ○ 2 | 0.23 N•m (2 lb•in) | 45°❶ | 45°❶ | Approx. 90° | 802T-R1TD | 802T-R7TD |
| | 1 ○ ○ 2 | 1 ○ ○ 2 | | | | | 802T-R3TD | 802T-R5TD |
| Counterclockwise<br>Lever cannot move clockwise | 1 ○ ○ 2 | 1 ○ ○ 2 | | | | | 802T-R2TD | 802T-R8TD |
| | 1 ○ ○ 2 | 1 ○ ○ 2 | | | | | 802T-R4TD | 802T-R6TD |

❶ Required for Timing Accuracy.
❷ The time delay is adjustable from 0.5…15 seconds ± 25%.
❸ Contacts are rated for 3 A, 120V AC maximum.
❹ The lever travel must be faster than the timing setting.
❺ Time delay occurs after lever is moved to operated position
❻ Time delay occurs after lever is moved from operated to normal position

## Approximate Dimensions [mm (in.)]




*Time Delay Switch with 802T-W1 Lever*
*Shipping Wt. 0.90 kg (2 lbs)*

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**

# 802T 2-Circuit Push Type • Spring Return and Maintained Contact

## NonPlug-in Style Oiltight Switches

*Top Push Rod*

*Adjustable Top Push Rod*

*Side Push Rod*

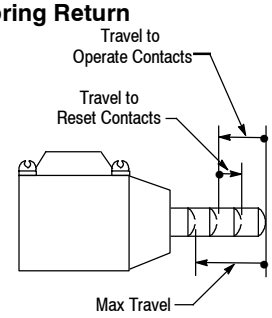
*Top Push Roller*

*Side Push Roller*

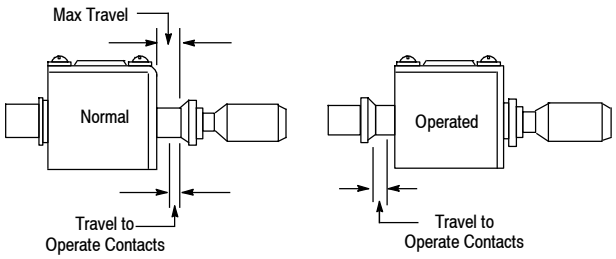
*Side Push Rod Maintained*

## Range of Operation

### Spring Return




### Maintained




## Product Selection

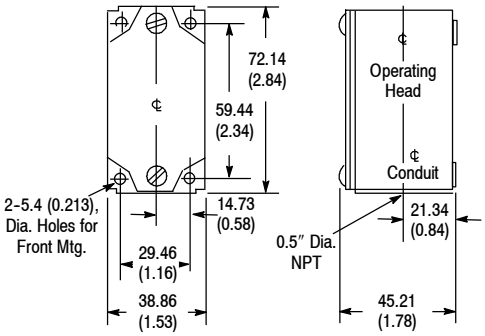
| Operator Type | Contact Operation: Normal | Contact Operation: Operated | Force to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|---|---|
| Top Push Rod | 1 ○ ○ 2 / 3 ○ ○ 4 | 1 ○ \| ○ 2 / 3 ○ ○ 4 | 15.6 N (3.5 lb) | 1.9 mm (0.075 in.) | 5.1 mm (0.202 in.) | 0.8 mm (0.030 in.) | **802T-B** |
| Adjustable Top Push Rod | | | | | | | 802T-BA |
| Top Push Roller | | | | | | | **802T-D** |
| Side Push Rod | 1 ○ \| ○ 2 / 3 ○ ○ 4 | 1 ○ ○ 2 / 3 ○ ○ 4 | 20.0 N (4.5 lb) | 3.2 mm (0.125 in.) | 5.5 mm (0.218 in.) | 1.5 mm (0.057 in.) | **802T-C** |
| Side Push Vertical Roller | | | | | | | **802T-K** |
| Side Push Horizontal Roller | | | | | | | 802T-K1 |
| Maintained Contact Side Push Rod | | | 35.6 N (8 lbs) | 4.87 mm (0.192 in.) Nominal | 5.96 mm (0.235 in.) | 5.30 mm (0.209 in.) Nominal | 802T-CM |

**Modifications and Accessories—See page 5-73.**

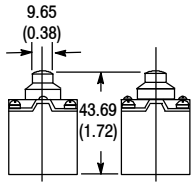
# 802T 2-Circuit Push Type • Spring Return and Maintained Contact

**NonPlug-in Style Oiltight Switches**

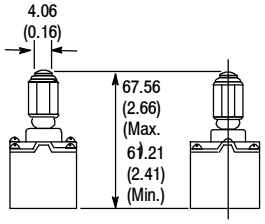
## Approximate Dimensions [mm (in.)]



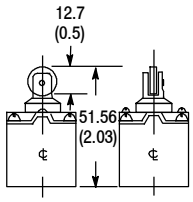

*NonPlug-in Switch*
*Shipping Wt. 0.45 kg (1 lb)*



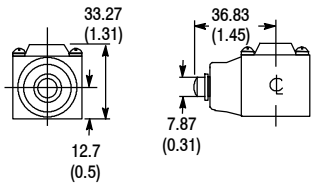

*802T-B Top Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*



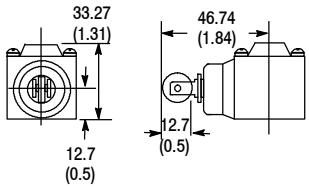

*802T-BA Adjustable*
*Top Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*



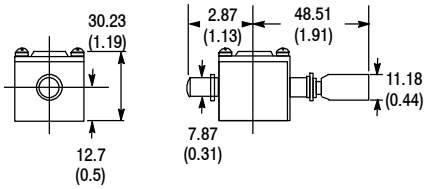

*802T-D Top Push Roller Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*802T-C Side Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*802T-K Side Push Roller Head*
*Shipping Wt. 0.128 kg (4.5 oz)*



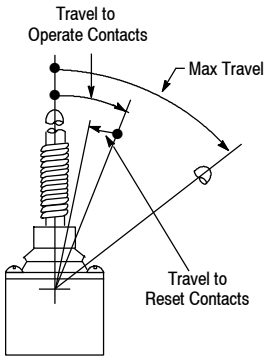

*802T-CM Maintained Side Push Rod Head*
*Shipping Wt. 4.5 oz (0.128 kg)*

**Modifications and Accessories—See page 5-73.**

# 802T 2-Circuit Wobble Stick and Cat Whisker • Spring Return

## NonPlug-in Style Oiltight Switches

## Range of Operation

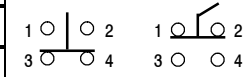


*Wobble Stick*
*Nylon Extension*

*Wobble Stick*
*Wire Extension*

*Cat Whisker*

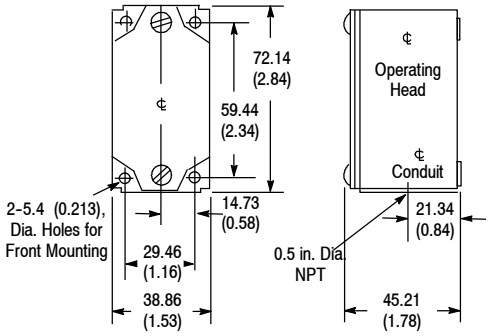
## Product Selection

| Operator Type | Contact Operation | Torque to Operate (Max.)❶ | Travel to Operate Contacts (Max.)❶ | Max Travel❶ | Travel to Reset Contacts (Max.)❶ | Cat. No. |
|---|---|---|---|---|---|---|
| Nylon Wobble Stick |  | 0.51 N•m (4.5 lb•in) | 9° | 10° | 4° | **802T-WS** |
| Wire Wobble Stick | | | | | | 802T-WS1 |
| Wire Cat Whisker | | 0.06 N•m (8 oz•in) | 21° | 22° | 14° | 802T-CW |

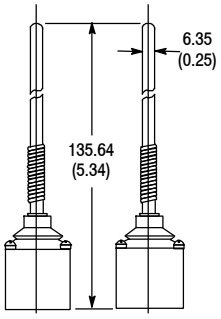


❶ Operating travels and torque are measured at rigid section of stick or cat whisker.

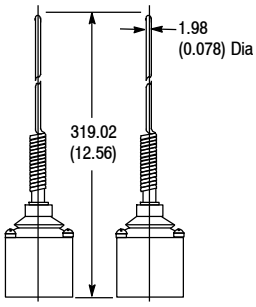
## Approximate Dimensions [mm (in.)]



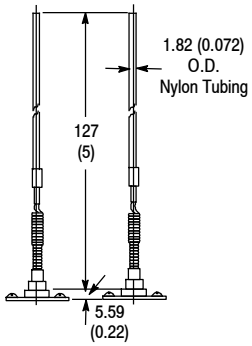

*NonPlug-in Switch*
*Shipping Wt.*
*0.45 kg (1 lb)*




*Z-18210 Nylon*
*Wobble Stick Head*
*Shipping Wt.*
*0.128 kg (4.5 oz)*




*Z-18211 Wire*
*Wobble Stick Head*
*Shipping Wt.*
*0.149 kg (5.25 oz)*



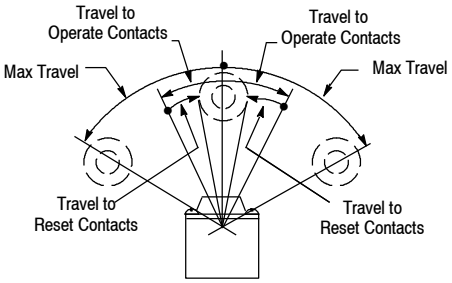

*Z-25142*
*Cat Whisker Head*
*Shipping Wt.*
*0.028 kg (1 oz)*

**Modifications and Accessories—See page 5-73.**

# 802T Vertical 4-Circuit Push Type • Spring Return & Maintained Contact

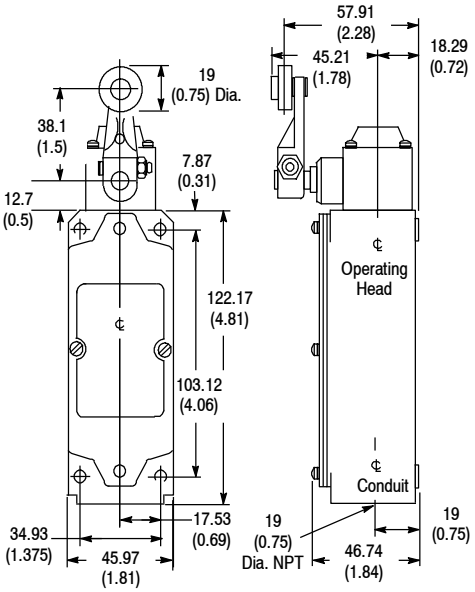
**NonPlug-in Style Oiltight Switches**

## Range of Operation



*Switch Without Lever*

## Approximate Dimensions [mm (in.)]




*4 Circuit NonPlug-in Switch with 802T-W1 Lever*
*Shipping Wt. 0.57 kg (1.25 lb)*

## Product Selection

| Lever Movement vs. Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N•m (3 lb•in) | 18° | 42° | 14° | 802T-AT |
| | 0.68 N•m (6 lb•in) | 9° | 50° | 6° | 802T-HT |
| Clockwise | 0.40 N•m (3.5 lb•in) | 18° | 42° | 14° | 802T-A1T |
| | 0.68 N•m (6 lb•in) | 9° | 50° | 6° | 802T-H1T |
| Counterclockwise | 0.40 N•m (3.5 lb•in) | 18° | 42° | 14° | 802T-A2T |
| | 0.68 N•m (6 lb•in) | 9° | 50° | 6° | 802T-H2T |
| Clockwise Lever cannot move counterclockwise | 0.45 N•m (4 lb•in) | 28° | 91° | 18° | 802T-L1T |
| Counterclockwise Lever cannot move clockwise | | | | | 802T-L2T |
| Maintained Contact Clockwise or Counterclockwise | 0.34 N•m (3 lb•in) | 75° | 84° From one maintained position to the other | 50° | 802T-AMT |

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

# 802T Vertical 4-Circuit Push Type • Spring Return & Maintained Contact

## NonPlug-in Style Oiltight Switches

*Top Rod*

*Adjustable Top Push Rod*

*Side Rod*

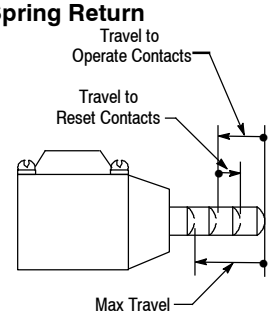
*Top Roller*

*Side Roller*

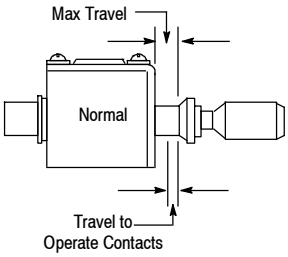
*Side Rod*

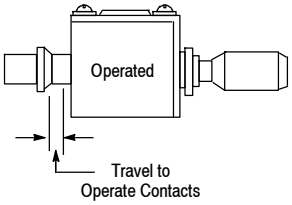
## Range of Operation

### Spring Return

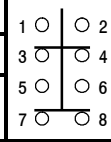
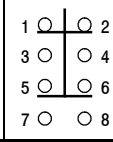
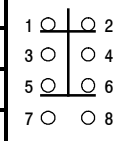
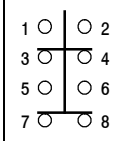



### Maintained




## Product Selection

| Operator Type | Contact Operation | | Force to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Catalog Number ❶ |
|---|---|---|---|---|---|---|---|
| | Normal | Operated | | | | | |
| Top Push Rod |  |  | 24.4 N (5.5 lb) | 3.6 mm (0.140 in.) | 6.0 mm (0.234 in.) | 1.6 mm (0.062 in.) | 802T-BT |
| Adjustable Top Push Rod | | | | | | | 802T-BAT |
| Side Push Rod | | | 28.9 N (6.5 lb) | | | 2.4 mm (0.094 in.) | 802T-CT |
| Top Push Roller |  |  | 24.4 N (5.5 lb) | | | 1.6 mm (0.062 in.) | 802T-DT |
| Side Push Vertical Roller | | | 28.9 N (6.5 lb) | | | 2.4 mm (0.094 in.) | 802T-KT |
| Side Push Horizontal Roller | | | | | | | 802T-K1T |
| Maintained Contact Side Push Rod | | | 62.2 N (14 lb) | 3.93 mm (0.155 in.) Nominal | 5.96 mm (0.235 in.) | 5.30 mm (0.180 in.) Nominal | 802T-CMT |

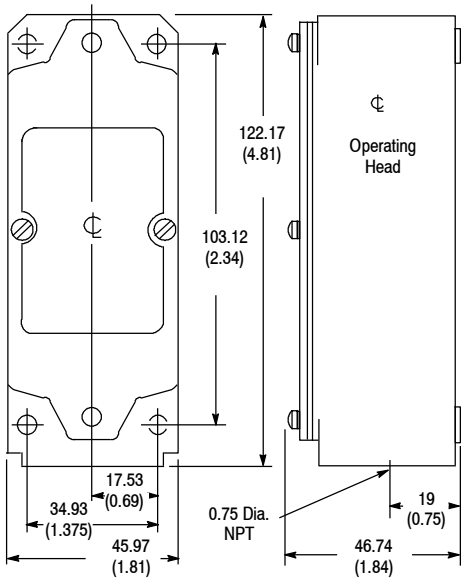
❶ These devices are not available with fluorinated elastomer seals or neon indicating lights.

**Modifications and Accessories—See page 5-73.**

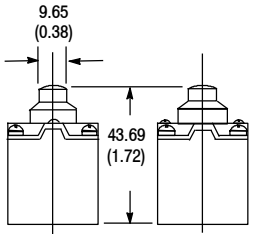
# 802T Vertical 4-Circuit Push Type • Spring Return & Maintained Contact

**NonPlug-in Style Oiltight Switches**

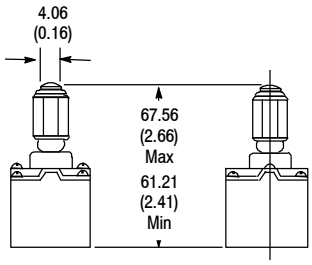
## Approximate Dimensions [mm (in.)]



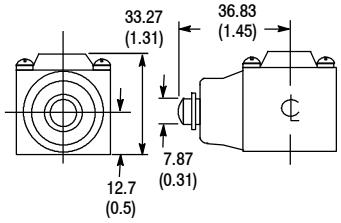

*NonPlug-in Switch*
*Shipping Wt. 0.57 kg (1.25 lb)*



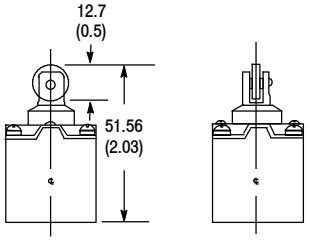

*802T-BT*
*Top Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*



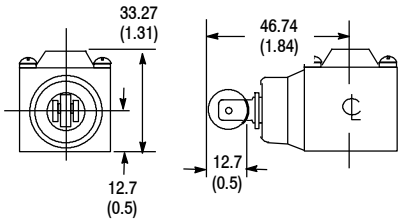

*Adjustable Top Push Rod Head*
*for 802T-BAT*
*Shipping Wt. 0.128 kg (4.5 oz)* ❶



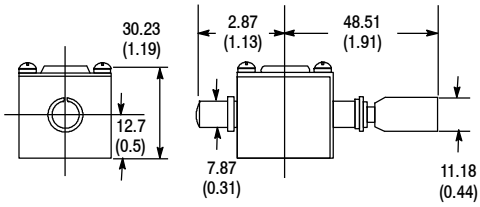

*802T-CT*
*Side Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*802T-DT*
*Top Push Roller Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*802T-KT*
*802T-K1T*
*Side Push Roller Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*802T-CMT*
*Maintained Side Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*

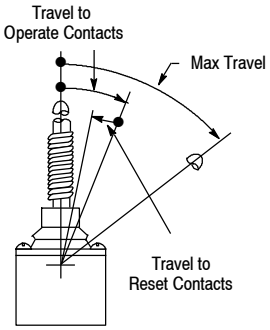
❶ Not a saleable item.

**Modifications and Accessories—See page 5-73.**

# 802T Vertical 4-Circuit Wobble Stick and Cat Whisker • Spring Return

## NonPlug-in Style Oiltight Switches

## Range of Operation

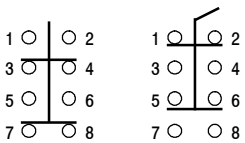



*Travels Are Measured at Rigid Section of Stick or Whisker*

*Wobble Stick*

*Cat Whisker*

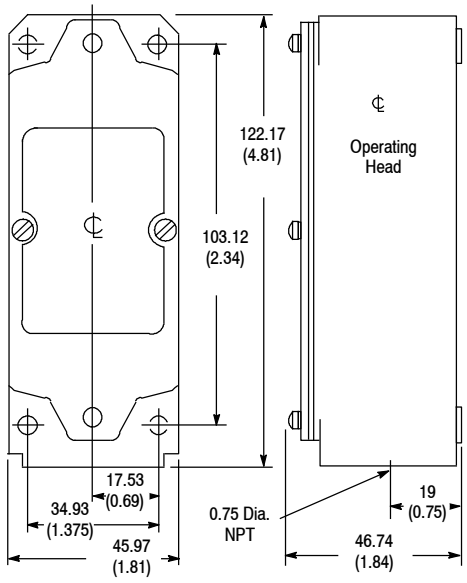
## Product Selection

| Operator Type | Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel ❶ | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|---|
| Nylon Wobble Stick |  | 0.79 N•m (7 lb•in) | 12° | 12° | 9° | 802T-WST |
| Wire Cat Whisker | | | | | | 802T-WS1T |

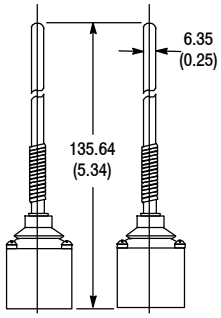


❶ These switches should be mounted in such a way that the wobble stick or cat whisker will not be deflected beyond the "Maximum Travel" position, as this could cause undesirable repetition of contact action on rebound.

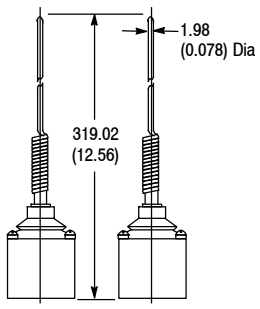
## Approximate Dimensions [mm (in.)]




*NonPlug-in Switch Shipping Wt. 0.45 kg (1 lb)*




*Z-18210 Nylon Wobble Stick Head Shipping Wt. 0.128 kg (4.5 oz)*



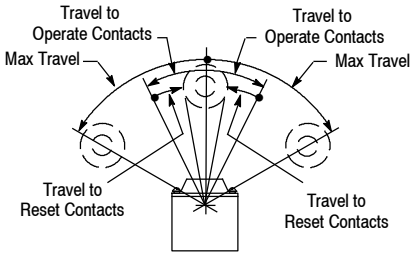

*Z-18211 Wire Wobble Stick Head Shipping Wt. 0.149 kg (5.25 oz)*

**Modifications and Accessories—See page 5-73.**

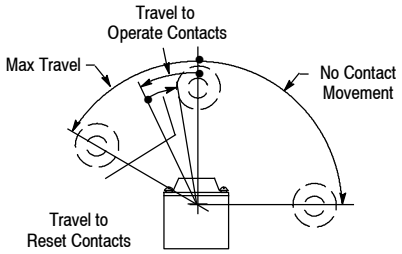
# 802T Horizontal 4-Circuit Lever Type • Spring Return

## NonPlug-in Style Oiltight Switches

## Range of Operation




*Lever Operation When Standard Levers Are Used*



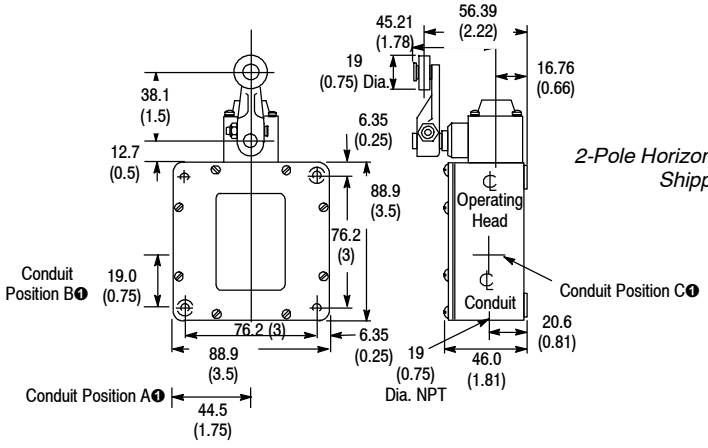

*Lever Operation When 802T-W7 and W8 "One-Way" Levers Are Used*

*Switch Without Lever*

## Product Selection

| Lever Movement vs. Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N•m (3 lb•in) | 14° | 42° | 8° | 802T-ATH |
| | 0.68 N•m (6 lb•in) | 6° | 50° | 3° | 802T-HTH |
| Clockwise | 0.39 N•m (3.5 lb•in) | 14° | 42° | 8° | 802T-A1TH |
| | 0.68 N•m (6 lb•in) | 6° | 50° | 3° | 802T-H1TH |
| Counterclockwise | 0.39 N•m (3.5 lb•in) | 14° | 42° | 8° | 802T-A2TH |
| | 0.68 N•m (6 lb•in) | 6° | 50° | 3° | 802T-H2TH |
| Clockwise Lever cannot move counterclockwise | 0.45 N•m (4 lb•in) | 20° | 91° | 11° | 802T-L1TH |
| Counterclockwise Lever cannot move clockwise | | | | | 802T-L2TH |

## Approximate Dimensions [mm (in.)]




*2-Pole Horizontal Switch with 802T-W1 Lever Shipping Wt. 0.91 kg (2 lbs)*

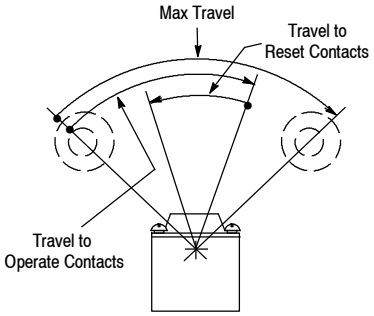
❶Conduit positions for modifications S1, S2, S3

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**

# 802T Horizontal 4-Circuit Lever Type • Maintained Contact

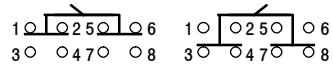


## Range of Operation

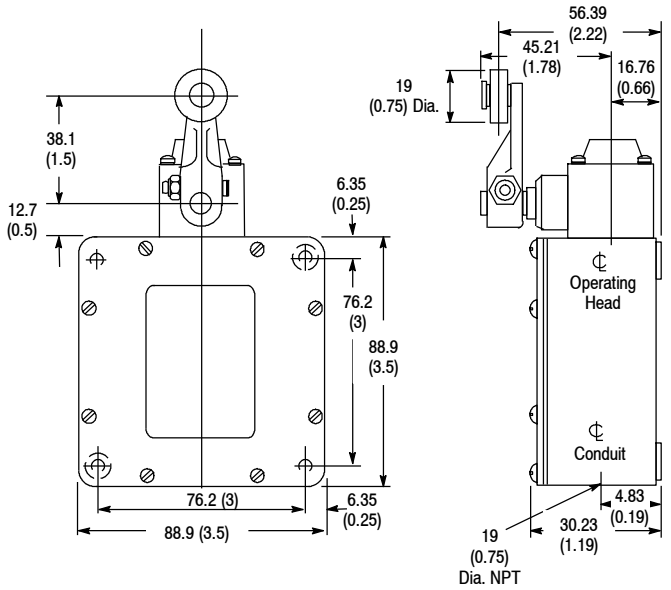


*Switch*
*Without Lever*

## Product Selection

| Lever Movement vs. Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|
| Clockwise or Counterclockwise  | 0.34 N•m (3 lb•in) | 70° | 84° From one maintained position to the other | 35° | 802T-AMTH |

## Approximate Dimensions [mm (in.)]




*2-Pole Horizontal Switch*
*with 802T-W1 Lever*
*Shipping Wt. 0.91 kg (2 lb)*

**Levers—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**

# 802T Horizontal 4-Circuit Push Type • Spring Return & Maintained Contact

**NonPlug-in Style Oiltight Switches**

*Top Push Rod*

*Adjustable Top Push Rod*

*Side Push Rod*

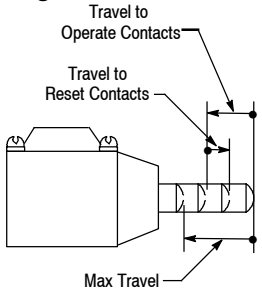
*Top Push Roller*

*Side Push Roller*

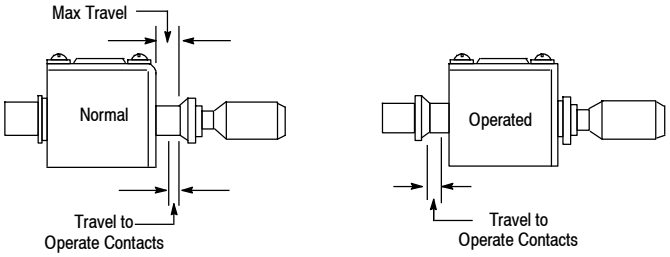
*Side Push Rod Maintained Contact*

## Range of Operation

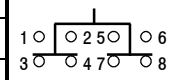
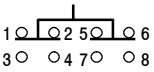
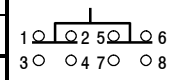
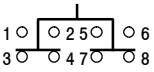
### Spring Return




### Maintained




## Product Selection

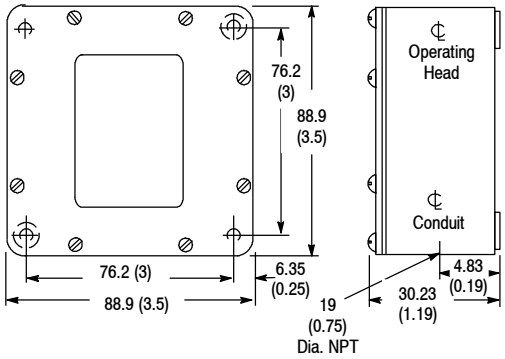
| Operator Type | Contact Operation: Normal | Contact Operation: Operated | Force to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|---|---|
| Top Push Rod |  |  | 24.4 N (5.5 lbs) | 2.4 mm (0.094 in.) | 5.9 mm (0.234 in.) | 1.2 mm (0.046 in.) | 802T-BTH |
| Adjustable Top Push Rod | | | | | | | 802T-BATH |
| Top Push Roller | | | | | | | 802T-DTH |
| Side Push Rod |  |  | | 2.8 mm (0.109 in.) | | 1.6 mm (0.062 in.) | 802T-CTH |
| Side Push Vertical Roller | | | | | | | 802T-KTH |
| Side Push Horizontal Roller | | | | | | | 802T-K1TH |
| Maintained Contact Side Push Rod | | | 62.2 N (14 lbs) | 4.87 mm (0.192 in.) Nominal | 5.96 mm (0.235 in.) | 5.30 mm (0.209 in.) Nominal | 802T-CMTH |

**Modifications and Accessories—See page 5-73.**

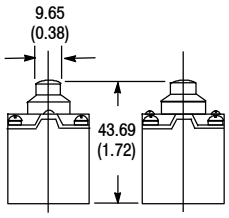
# 802T Horizontal 4-Circuit Push Type • Spring Return & Maintained Contact



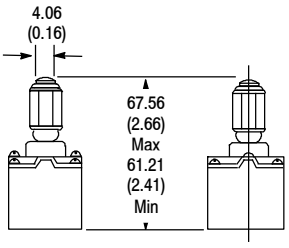
## Approximate Dimensions [mm (in.)]



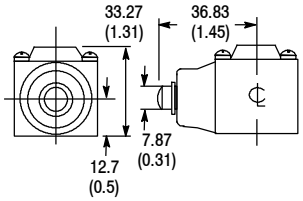

*2-Pole Horizontal Switch Base*
*Shipping Wt. 0.91 kg (2 lb)*



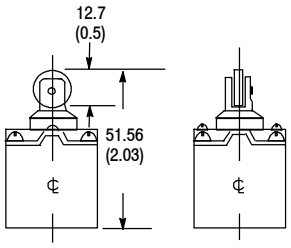

*Z-19243*
*Top Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*



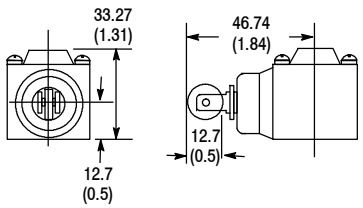

*Adjustable Top Push Rod Head*
*for 802T-KTH*
*Shipping Wt. 0.128 kg (4.5 oz)* ❶



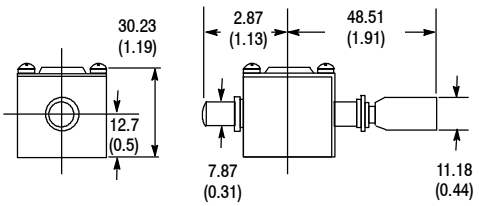

*Z-21165*
*Side Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*Z-19241*
*Top Push Roller Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*Z-21166*
*Side Push Roller Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*Z-21168*
*Maintained Side Push Rod Head*
*Shipping Wt. 0.128 kg (4.5 oz)*

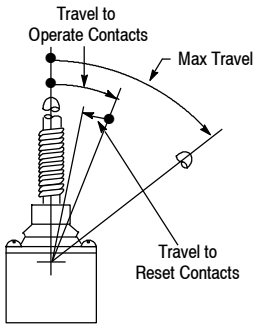
❶ Not a saleable item.

**Modifications and Accessories—See page 5-73.**

# 802T Horizontal 4-Circuit Wobble Stick & Cat Whisker • Spring Return

## NonPlug-in Style Oiltight Switches

## Range of Operation ❶

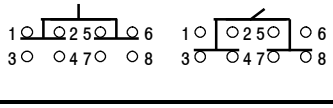



*Travels Are Measured at Rigid Section of Stick*

*Wobble Stick*

*Cat Whisker*

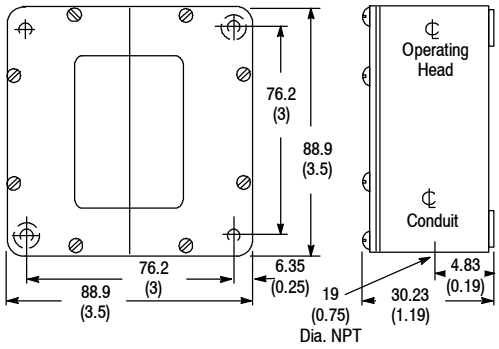
## Product Selection

| Operator Type | Contact Operation | Torque to Operate (Max.) | Travel to Operate Contacts (Max.) | Max Travel ❶ | Travel to Reset Contacts (Max.) | Cat. No. |
|---|---|---|---|---|---|---|
| Nylon Wobble Stick |  | 0.79 N•m (7 lb•in) | 12° | 12° | 9° | 802T-WSTH |
| Wire Cat Whisker | | | | | | 802T-WS1TH |

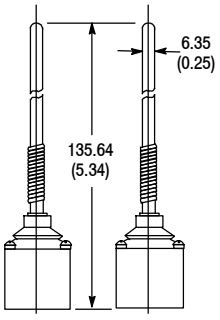


❶ These switches should be mounted in such a way that the wobble stick or cat whisker will not be deflected beyond the "Maximum Travel" position, as this could cause undesirable repetition of contact action on rebound.

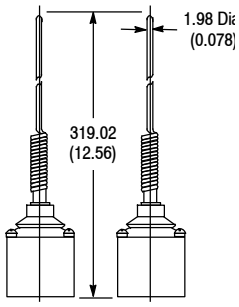
## Approximate Dimensions [mm (in.)]




*2-Pole Horizontal Switch*
*Shipping Wt. 0.91 kg (2 lb)*




*Z-29195 Nylon Wobble Stick Head*
*Shipping Wt. 0.128 kg (4.5 oz)*




*Z-32109 Wire Wobble Stick Head*
*Shipping Wt. 0.149 kg (5.25 oz)*

**Modifications and Accessories—See page 5-73.**

# 802T Dual Switch Lever and Push Types • Spring Return

## NonPlug-in Style Oiltight Switches

*Dual Switch with 802T-W1 Levers*

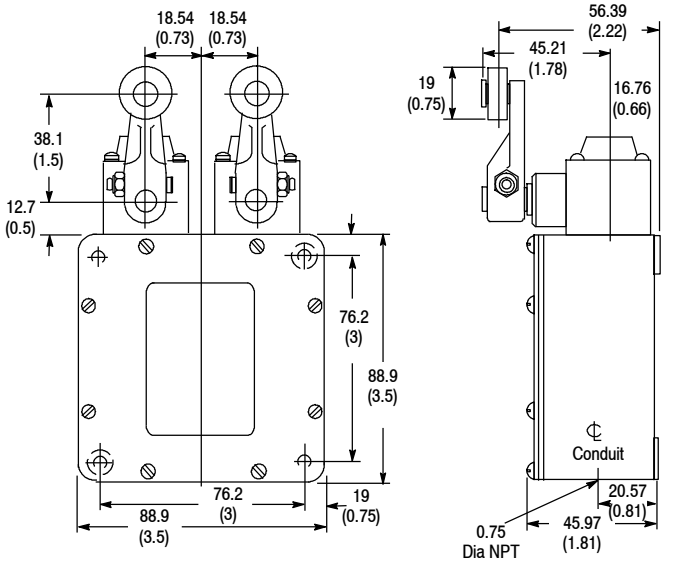
## Product Selection❶

| | | Right Hand Switch | | | | | |
|---|---|---|---|---|---|---|---|
| | | **802T-A** | **802T-H** | **802T-A1** | **802T-A2** | **802T-C** | **802T-D** |
| **Left Hand Switch** | 802T-A | 802T-AD | 802T-AHD | 802T-AA1D | 802T-AA2D | 802T-ACD | 802T-ADD |
| | 802T-H | 802T-HAD | 802T-HD | 802T-HA1D | 802T-HA2D | 802T-HCD | 802T-HDD |
| | 802T-A1 | 802T-A1AD | 802T-A1HD | 802T-A1D | 802T-A1A2D | 802T-A1CD | 802T-A1DD |
| | 802T-A2 | 802T-A2AD | 802T-A2HD | 802T-A2A1D | 802T-A2D | 802T-A2CD | 802T-A2DD |
| | 802T-C | 802T-CAD | 802T-CHD | 802T-CA1D | 802T-CA2D | 802T-CD | 802T-CDD |
| | 802T-D | 802T-DAD | 802T-DHD | 802T-DA1D | 802T-DA2D | 802T-DCD | 802T-DD |

❶ Ordering Information—Refer to limit switch listings on pages 5-55 and 5-59 determine which units and levers are correct for the desired application. Select left limit switch from left hand vertical column. Select right hand switch from right hand horizontal column. The correct cat. no. is found at the intersecting box.

❷ Most levers listed on page 5-130 can be used. When dual limit switch combinations are desired, consult your local Rockwell Automation sales office or Allen-Bradley Distributor(see page 13-1).

## Approximate Dimensions [mm (in.)]




*Dual Switch with 802T-W1 Levers*
*Shipping Wt. 0.91 kg (2 lbs)*

**Levers❷—See page 5-130 for a complete listing of operating levers.**
**Modifications and Accessories—See page 5-73.**

# 802T Air-Operated • Spring Return

## NonPlug-in Style Oiltight Switches

### Product Selection

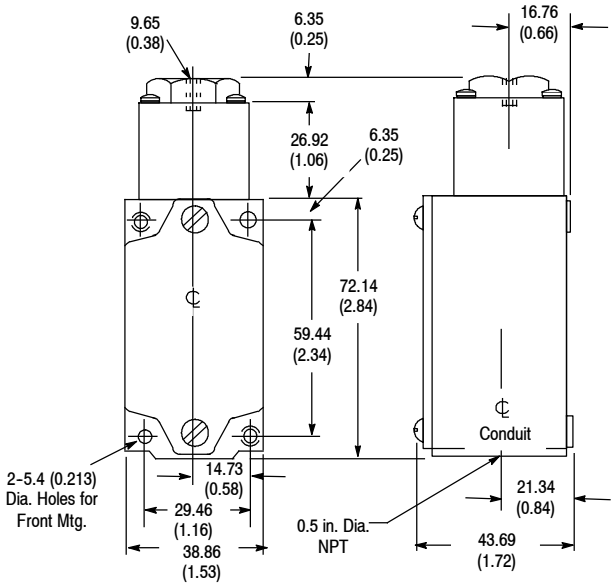
| Contact Operation❶ | Cat. No. | |
|---|---|---|
| | Single Unit ❷ | Double Unit ❸ |
| Will operate when 25 psi (172 kPa) ±25% of air pressure is applied, and will reset with a pressure drop of 6…15 psi (41…103 kPa). Maximum allowable pressure is 100 psi (680 kPa). | 802T-P | 802T-2P |

❶ When the switch is in the reset state a small rod protrudes from the top of the die casting. The rod is flush with the surface when the switch trips on higher pressure. The switch can be manually operated by pressing down on the rod.

❷ Contact operation similar to 2-circuit devices.

❸ Contact operation similar to 4-circuit horizontal construction devices.

### Approximate Dimensions [mm (in.)]




*Air-Operated Switch*
*Shipping Wt. 0.34 kg (12 oz)*

**Modifications and Accessories—See page 5-73.**

*Cavity Mounting*

*Front View* *Rear View*

*802T-AO with 802T-W1A Lever*

*Manifold Mounting*

*802T-AMU with 802T-W4A Lever*

## Cavity Mounting

Except for the types identified by Cat. Nos. 802T-B, 802T-D, 802T-WS, 802T-WS1, and 802T-CW, Bulletin 802T switches can be supplied in a special construction for cavity mounting in a machine base or panel. With this construction, the actuator and contact block are mounted on the back of a gasket steel plate. To order a switch for cavity mounting, add the letter **O** to the cat. no. of the corresponding surface mounted switch. Example: Cat. No. 802T-A becomes cat. no. 802T-A**O** (shown).

## Manifold Mounting

All two-circuit Bulletin 802T switches can be supplied with a special base which permits mounting the switch manifold style on a machine base, panel or raceway. This base is equipped with a wiring hole and synthetic rubber gasket on the back (see illustration).

To order a switch with a manifold mounting base, add the letter **U** to the cat. no. Example: Cat. No. 802T-AM becomes cat. no. 802T-AM**U** (shown).

## Transparent Cover

Switches can be furnished with a gasket, transparent plastic cover. This modification enables the electrician to inspect terminal wiring without removing the switch cover. Not available on cat whisker, time delay or cavity style mounted limit switches.

To order a switch with a transparent cover, add the letter **Z** to the cat. no. of the switch. For example: Cat. No. 802T-D becomes Cat. No. 802T-D**Z**.

## Extended Temperature Operation

Bulletin 802T nonplug-in limit switches are designed to operate in a temperature range of -18…+54°C (0…+130°F). Special limit switches modified for extended temperature operation -29…+121°C (-20…+250°F) are available.

**Note:** Temperature ranges below 0°C (+32°F) are based on the absence of freezing moisture or water.

To order a Bulletin 802T modified for extended temperature operation, insert the letter **E** after the operating head designation. Example: Cat. No. 802T-A becomes Cat. No. 802T-A**E**. (Cat. Nos. 802T-WS, WS1, CW, P, 2P and the time delay limit switches are not available for extended temperature operation. Cat. Nos. 802T-A3 and A4 are available for extended temperature operation except with a reduction in damping.)

## Special Conduit Positions

Dual operating head switches can be obtained with up to three conduit openings. The location of conduit openings A, B, and C are illustrated in the dimension drawing on page 5-66. The conduit opening in Position A is 3/4 in. NPT, the conduit openings in Position B and C are 1/2 inch NPT. To order a switch with special conduit positioning, add the suffix **S1**, **S2** or **S3** to the cat. no. per the following:

S1=Position A+B
S2=Position A+C
S3=Position B+C

## Neon Indicating Lights (2-Circuit Models Only)

Two circuit Bulletin 802T surface mounted limit switches can be supplied with two neon indicating lights—AC 208/240V, 50…60 Hz and 120V, 50…60 Hz. To order, add the letter **N** for 120V or **N5** for 240V before the lever designation. Example: Cat. No. 802T-A1 with indicating lights would be 802T-A1**N**. Not available on 4-circuit devices.

In addition, indicating light kits as shown in the table below are available for field installation on two circuit devices.

| Limit Switch Construction | Light Kit Cat. No. | |
|---|---|---|
| | 120V AC 50…60 Hz | 208/240V AC 50…60 Hz |
| Surface Mounted | **802T-N1** | **802T-N4** |
| Neutral Position | **802T-N2** | **802T-N10** |

## Conduit Seal

A synthetic rubber conduit seal is available to protect the conduit opening against entry of oil and moisture. The seal can be added easily before switch installation and should be installed so that the 5/8 inch diameter projection (the other projection is 23/32 inch diameter) faces against the shoulder at the bottom of the pipe tap. The seal can accommodate up to four wires of #12 gauge or smaller. Each wire hole in the seal has a thin inner wall which is pierced when a wire is passed through. Thus, any unused opening remains sealed. The seat is designed for single contact block, surface mounted base limit switches having 1/2 inch conduit openings.

Conduit seal Cat. No. . . . . **802T-N3**

## Special Conduit Lock Nut

This option, a “Tru-Seal” nut with threaded PTFE insert, is a valuable accessory for any Bulletin 802T which is connected by means of conduit.

“Tru-Seal” lock nut for 1/2 inch conduit Cat. No. . . . . **802T-X4**

# 802X

## Watertight or Hazardous Location Switches

## Description

Bulletin 802X NEMA Type 7 and 9 limit switches are designed for use in atmospheres and locations defined as Class I, Groups B, C or D, Division 1, Class II, Groups E, F or G, or Class III in the National Electrical Code. Typical applications for this switch include refineries, distilleries, grain elevators and flour mills. For Class I, Division 2 locations, a Bulletin 802R limit switch may also be used (see page 5–34).

Bulletin 802X NEMA Type 4 watertight limit switches are designed for use indoors in locations where their internal parts require protection against seepage of water and splashing, falling or hose-directed water within the limits of the NEMA specified tests for Type 4 watertight enclosures. They are not sleet- (ice-) proof. Typical applications are dairies and food processing plants.

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 7 and 9/Class I, Groups B, C and D or Class II, Groups E, F and G or Class III; NEMA 4/nonhazardous locations |
| **Certifications** | UL Listed and CSA Certified |
| **Ambient Temperature [C (F)]❶** | Push type with spring return and all lever types except neutral position: -46…+121° (-50…+250°)<br>Wobble stick and cat whisker devices: -29…+54° (-20…+130°)<br>Side push maintained: -46…+121° (-50…+250°)<br>Neutral position: -18…+121° (0…+250°). |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, same polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A600 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |
| | 480 | 15 | 1.50 | 10 | 7200 | 720 |
| | 600 | 12 | 1.20 | 10 | 7200 | 720 |

**DC Contact Rating (Maximum per Pole)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| P150 | 125 | 1.1 | | 5 | 138 | |

❶ Temperature ranges below 0°C (+32°F) are based on the absence of freezing moisture or water.

A wide variety of operating heads and operating levers are available. Operating heads can be mounted in four positions, 90° apart. The enclosure base has two through holes for front mounting, two tapped holes for rear mounting and two tapped holes for side mounting.

## Features

- Multiple operator styles: side rotary, wobble stick, cat whisker, adjustable top push and top or side push with or without rollers

## Watertight or Hazardous Location

Lever Type • Spring Return page 5–75
Standard and Neutral Position Models

Lever Type • . . . . . page 5–76
Maintained Contact

Push Type • Spring Return . page 5–77

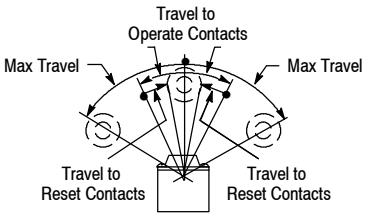
Push Type • . . . . . page 5–79
Maintained Contact

Wobble Stick and . . . . . page 5–80
Cat Whisker • Spring Return

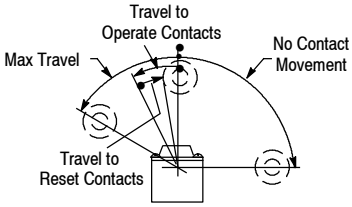
# 802X Lever Type • Spring Return

## Watertight or Hazardous Location Switches

## Range of Operation




*Lever Operation When Levers Except 802T-W7 and W8 Are Used*



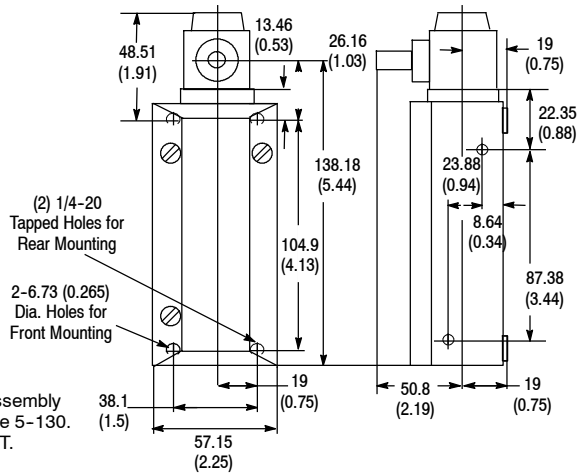

*Lever Operation When 802T-W7 and W8 "One-Way" Levers Are Used*

*Switch Without Lever*

## Product Selection—Standard and Neutral Position Models

| Lever Movement vs. Contact Operation | Torque to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. NEMA 4 | Cat. No. NEMA 7 and 9 |
|---|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N•m (3 lb•in) | 16.5° | 43° | 8° | **802X-A4** | **802X-A7** |
| | 0.51 N•m (4.5 lb•in) | 6° | 50° | 3° | — | **802X-H7** |
| Clockwise | 0.34 N•m (3.5 lb•in) | 16.5° | 43° | 8° | 802X-A14 | 802X-A17 |
| | 0.51 N•m (4.5 lb•in) | 6° | 50° | 3° | — | 802X-H17 |
| Counterclockwise | 0.34 N•m (3.5 lb•in) | 16.5° | 43° | 8° | 802X-A24 | 802X-A27 |
| | 0.51 N•m (4.5 lb•in) | 6° | 50° | 3° | — | 802X-H27 |
| Clockwise | 0.45 N•m (4 lb•in) | 20° | 91° | 11° | 802X-L14 | 802X-L17 |
| Counterclockwise | | | | | 802X-L24 | 802X-L27 |
| Neutral Position Switch with Normally Open Contacts | 0.25 N•m (2.25 lb•in) | 12° | 53° | 6° | — | 802X-NP7 |

## Approximate Dimensions [mm (in.)]




**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

*Approximate Shipping Wt. 0.9 kg (2 lbs)*

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. x 0.25 in. deep C'Bore for front mounting.*

*2—1/4-20 x 0.56 in. deep Tapped holes for rear mounting.*

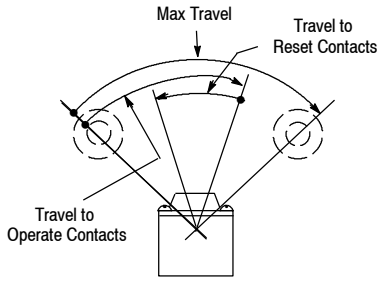
*2—1/4-20 x 0.5 in. deep Tapped holes for side mounting.*

**Levers—See page 5-130 for a complete listing of operating levers.**

# 802X Lever Type • Maintained Contact

## Watertight or Hazardous Location Switches

### Range of Operation



*Switch Without Lever*

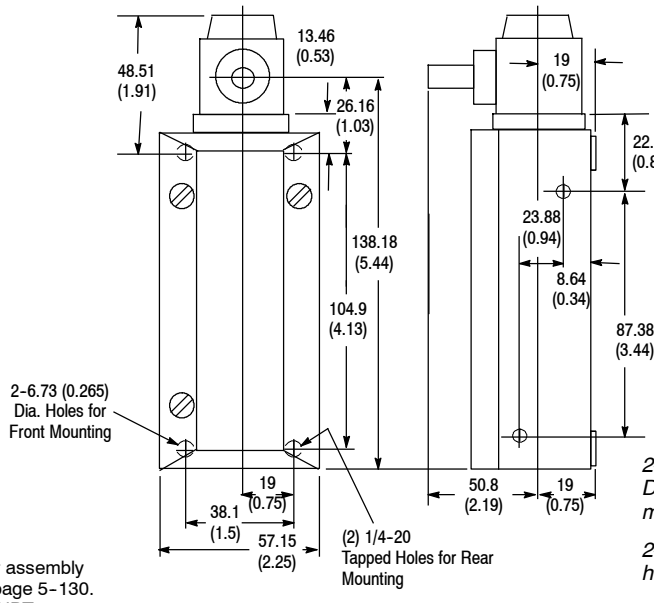
### Product Selection

| Lever Movement vs. Contact Operation | Torque to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | NEMA 4 | NEMA 7 & 9 |
| Clockwise or Counterclockwise | 0.25 N•m (2.25 lb•in) | 70° ❶ | 84° ❶ | 35° | 802X-AM4 | **802X-AM7** |



❶ From one maintained position to the other.

### Approximate Dimensions [mm (in.)]




*Approximate Shipping Wt. 0.9 kg (2 lbs)*

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. x 0.25 in. deep C'Bore for front mounting.*

*2—1/4-20 x 0.56 in. deep Tapped holes for rear mounting.*

*2—1/4-20 x 0.5 in. deep Tapped holes for side mounting.*

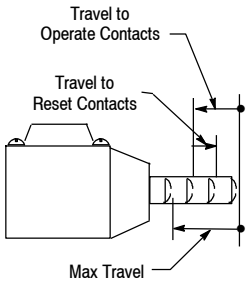
**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

**Levers—See page 5-130 for a complete listing of operating levers.**

# 802X Push Type • Spring Return

## Watertight or Hazardous Location Switches

## Range of Operation



*Top Push Rod*

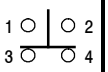
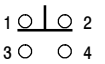
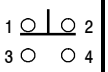
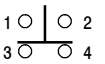
*Adjustable Top Push Rod*

*Side Push Rod*

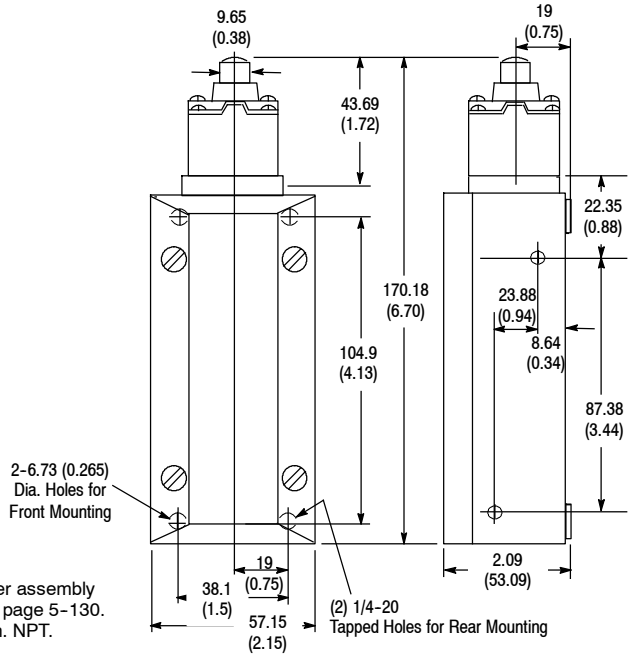
*Top Push Roller*

*Side Push Roller*

## Product Selection

| Operator Type | Contact Operation | | Force to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Operated | | | | | NEMA 4 | NEMA 7 and 9 |
| Top Push Rod |  |  | 15.6 N (3.5 lbs) | 1.9 mm (0.075 in.) | 5.1 mm (0.202 in.) | 0.8 mm (0.030 in.) | 802X-B4 | **802X-B7** |
| Adjustable Top Push Rod | | | | | | | 802X-BA4 | 802X-BA7 |
| Side Push Rod | | | 20.0 N (4.5 lbs) | 3.2 mm (0.125 in.) | 5.5 mm (0.218 in.) | 1.5 mm (0.057 in.) | 802X-C4 | 802X-C7 |
| Top Push Roller |  |  | 15.6 N (3.5 lbs) | 1.9 mm (0.075 in.) | 5.1 mm (0.202 in.) | 0.8 mm (0.030 in.) | 802X-D4 | 802X-D7 |
| Side Push Vertical Roller | | | 20.0 N (4.5 lbs) | 3.2 mm (0.125 in.) | 5.5 mm (0.218 in.) | 1.5 mm (0.057 in.) | 802X-K4 | 802X-K7 |
| Side Push Horizontal Roller | | | | | | | 802X-K14 | 802X-K17 |

## Approximate Dimensions [mm (in.)]




**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

*Approximate Shipping Wt. 0.9 kg (2 lbs)*

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. x 0.25in deep C'Bore for front mounting.*

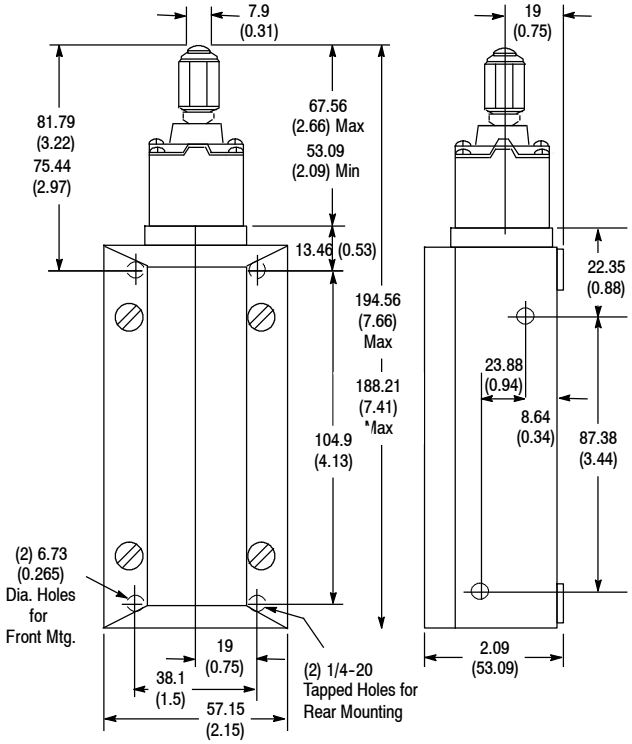
*2—1/4-20 x 0.56in deep Tapped holes for rear mounting.*

*2—1/4-20 x 0.5in deep Tapped holes for side mounting.*

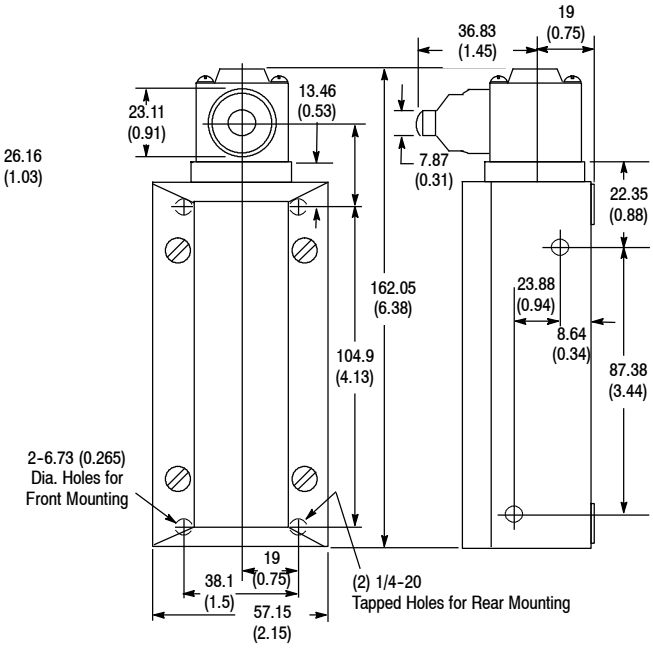
# 802X Push Type • Spring Return

## Watertight or Hazardous Location Switches

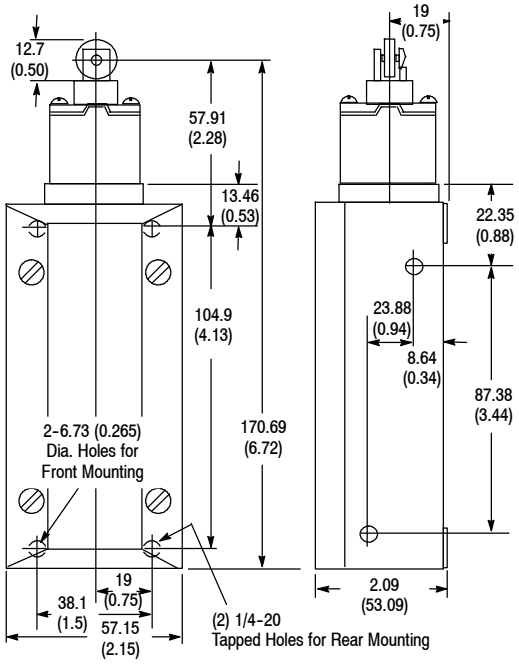
### Approximate Dimensions [mm (in.)]



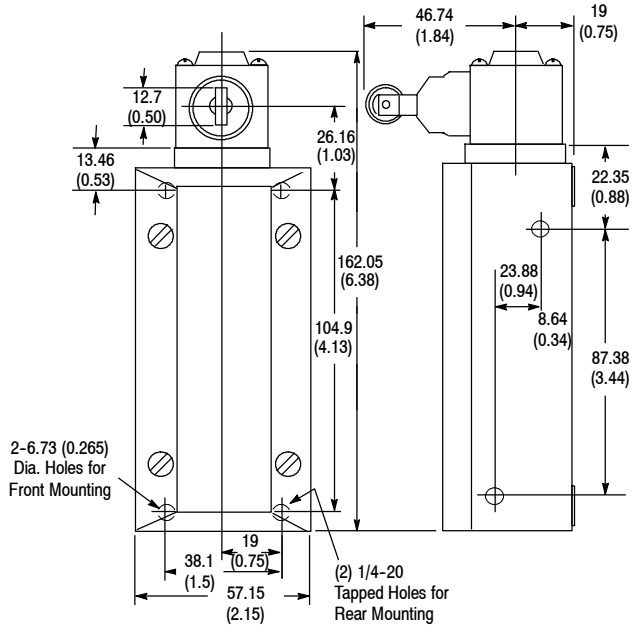

*Bulletin 802X*
*Adjustable Top Push Rod Type*




*Bulletin 802X*
*Side Push Rod Type*




*Bulletin 802X*
*Top Push Roller Type*




*Bulletin 802X*
*Side Push Roller Type*

*Approximate Shipping Wt. 0.9 kg (2 lbs)*

**Note:** For operating head and lever assembly dimensions not shown, see page 5-130.
Conduit pipe opening 1/2 in. NPT.

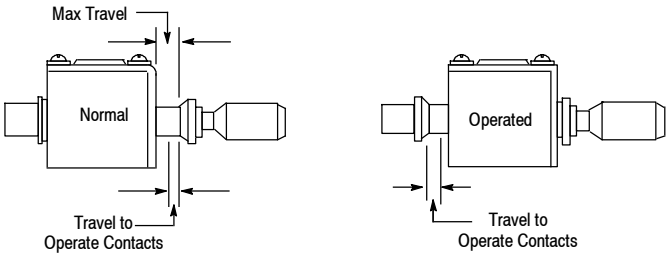
*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. x 0.25 in. deep C'Bore for front mounting.*

*2—1/4-20 x 0.56 in. deep Tapped holes for rear mounting.*

*2—1/4-20 x 0.5 in. deep Tapped holes for side mounting.*

## Range of Operation

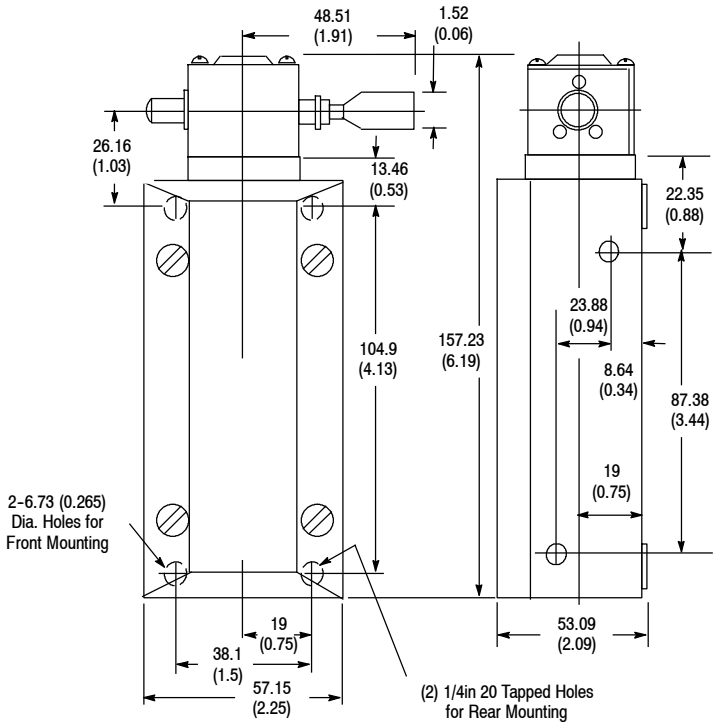


*Side Push Rod*

## Product Selection

| Operator Type | Contact Operation | | Force to Operate (Max) | Travel to Operate Contacts | Max Travel | Travel to Reset Contacts (Max) | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Operated | | | | | NEMA 4 | NEMA 7 and 9 |
| Side Push Rod | 1 2 3 4 | 1 2 3 4 | 35.49 N (8 lbs) | 4.81 mm (0.192 in.) Nominal | 5.96 mm (0.235 in.) | 5.30 mm (0.209 in.) Nominal | — | 802X-CM7 |

## Approximate Dimensions [mm (in.)]

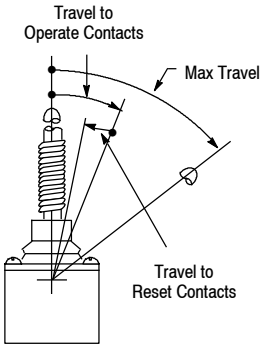



**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

# 802X Push Type • Wobble Stick and Cat Whisker • Spring Return

## Watertight or Hazardous Location Switches

## Range of Operation ❶




*Travels are measured at rigid section of stick or whisker.*

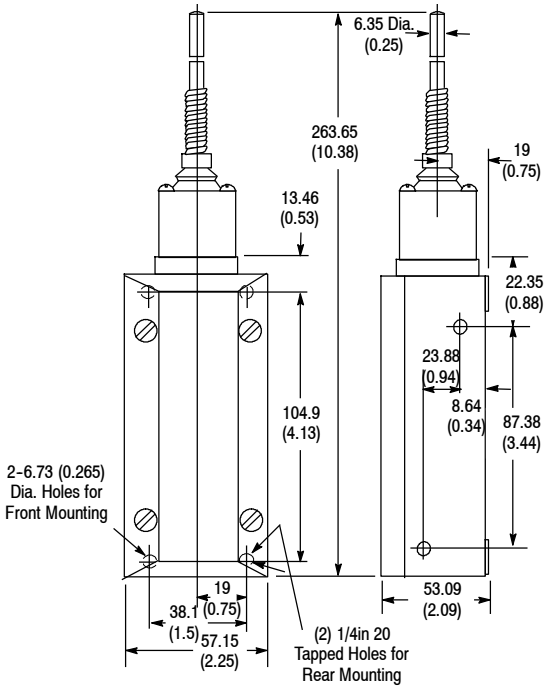
*Wobble Stick* *Cat Whisker*

## Product Selection

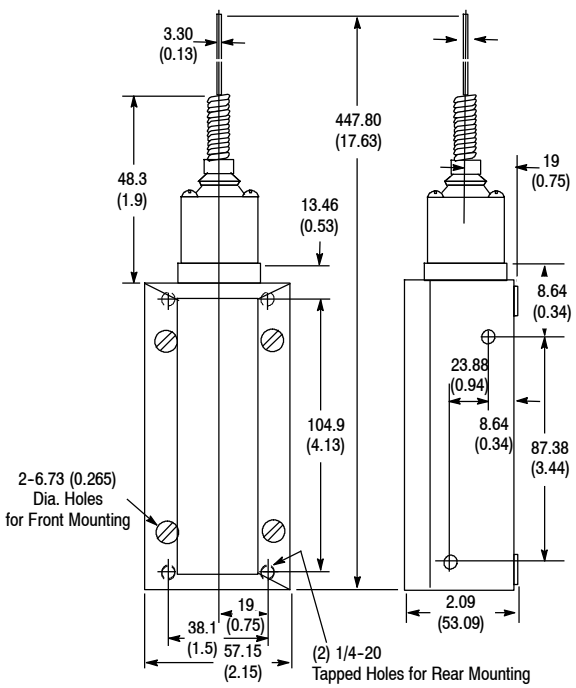
| Operator Type | Contact Operation | | Torque to Operate (Max) | Travel to Operate Contacts (Max) | Max Travel ❶ | Travel to Reset Contacts (Max) | Cat. No. | |
|---|---|---|---|---|---|---|---|---|
| | Normal | Operated | | | | | NEMA 4 | NEMA 7 & 9 |
| Nylon Wobble Stick | 1 ○ ○ 2<br>3 ○ ○ 4 | 1 ○ ○ 2<br>3 ○ ○ 4 | 0.51N.m (4.5lb in.) | 9° | 10° | 4° | 802X-WS4 | 802X-WS7 |
| Wire Cat Whisker | | | | | | | 802X-WS14 | 802X-WS17 |

❶ These switches should be mounted in such a way that the wobble stick will not be deflected beyond the "Maximum Travel" position, as this could cause undesirable repetition of contact action on rebound.

## Approximate Dimensions [mm (in.)]




*802X-WS4 and 802X-WS7*




*Bulletin 802X Wire Wobble Stick Type*

**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

## Description

Bulletin 802XR NEMA Type 7 and 9 limit switches for hazardous locations are designed to operate in atmospheres and locations defined as Class I, Groups B, C or D or Class II, Groups E, F or G in the National Electrical Code. Typical applications for this switch include refineries, distilleries, grain elevators and flour mills. For Class I, Division 2 locations, a Bulletin 802R limit switch may also be used (see page 5-34).

As an added protection, the contact is hermetically sealed in a glass envelope for excellent contact reliability even in contaminated atmospheres. This switch is Programmable Controller compatible (24V and above) and is pilot duty rated NEMA B600 for AC and NEMA P300 for DC as shown in the specification.

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 7 and 9 |
| **Certifications** | UL Listed and CSA Certified |
| **Ambient Temperature [C (F)]** ❶ | -29…+121° (-20…+250°) except devices with wobble stick operators. Wobble stick models are rated from -18…+54° (0…+130°) |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, Same Polarity)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| B600 | 120 | 30 | 3.00 | 5A | 3600 | 360 |
| | 240 | 15 | 1.50 | 5A | 3600 | 360 |
| | 480 | 7.5 | 0.75 | 5A | 3600 | 360 |
| | 600 | 6 | 0.60 | 5A | 3600 | 360 |

**DC Contact Rating (Maximum per Pole)**

| NEMA Rating Designation | Voltage Range | Current Rating |
|---|---|---|
| P300 | 115-125 | 1.1 A |
| | 230-250 | 0.55 A |

**Note**: Temperature range below 0°C (+32°F) is based on the absence of freezing moisture or water.

## Features

- Class I, Groups B, C, and D or Class II, Groups E, F and G
- Side rotary, wobble stick, adjustable top and top or side push styles with and without rollers

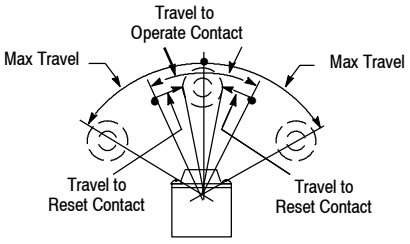
## Sealed Contact

Lever Type • Spring Return page 5-82
Lever Type • Maintained Contact . . . . . page 5-83
Push Type • Spring Return . page 5-84
Cat Whisker • Spring Return . . . . . page 5-86

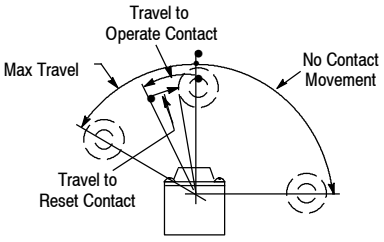
# 802XR Lever Type • Spring Return

## Sealed Contact Hazardous Location Switches

## Range of Operation




*Lever Operation With Standard Levers*




*Lever Operation With W7 and W8 "One-Way" Levers*

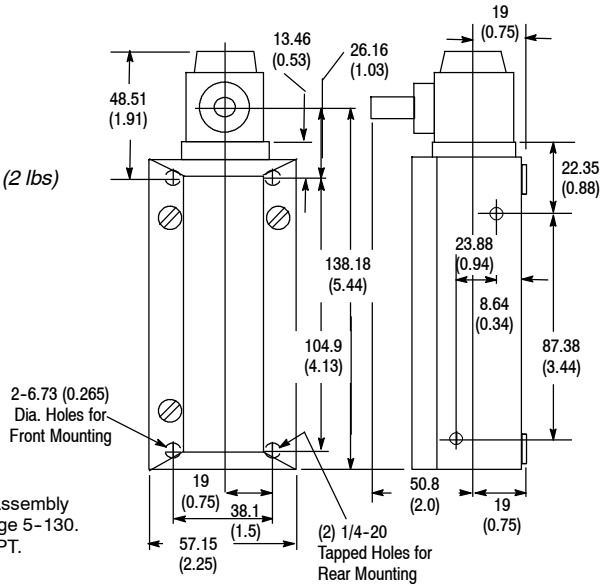
*Switch Without Lever*

## Product Selection

| Lever Movement | Torque to Operate (Max) | Travel to Operate Contact (Max) | Max Travel | Travel to Reset Contact (Max) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N•m (3 lb•in) | 16° | 42° | 9° | N.O. | **802XR-AF7** |
| | | | | | N.C. | 802XR-AC7 |
| | 0.51 N•m (4.5 lb•in) | 7° | 53° | 3.5° | N.O. | 802XR-HF7 |
| | | | | | N.C. | 802XR-HC7 |
| Clockwise | 0.167 N•m (1.5 lb•in) | 17° | 42° | 10° | N.O. | 802XR-A3F7 |
| | | | | | N.C. | 802XR-A3C7 |
| | 0.51 N•m (4.5 lb•in) | 7° | 50° | 3.5° | N.O. | 802XR-H1F7 |
| | | | | | N.C. | 802XR-H1C7 |
| Counterclockwise | 0.167 N•m (1.5 lb•in) | 17° | 42° | 10° | N.O. | 802XR-A4F7 |
| | | | | | N.C. | 802XR-A4C7 |
| | 0.51 N•m (4.5 lb•in) | 7° | 50° | 3.5° | N.O. | 802XR-H2F7 |
| | | | | | N.C. | 802XR-H2C7 |
| Clockwise<br>Lever cannot move counterclockwise | 0.45 N•m (4 lb•in) | 20° | 91° | 11° | N.O. | 802XR-L1F7 |
| | | | | | N.C. | 802XR-L1C7 |
| Counterclockwise<br>Lever cannot move clockwise | | | | | N.O. | 802XR-L2F7 |
| | | | | | N.C. | 802XR-L2C7 |

## Approximate Dimensions [mm (in.)]

*Approximate Shipping Wt. 0.9 kg (2 lbs)*




**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. C'Bore 0.25 in. deep for front mounting.*

*2—1/4-20 Tapped holes 0.56 in. deep for rear mounting.*

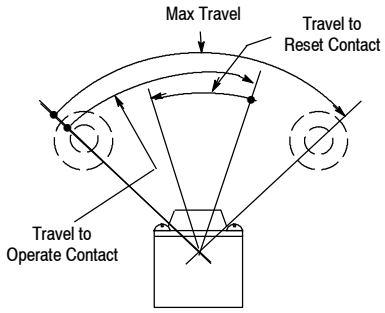
*2—1/4-20 Tapped holes 0.5 in. deep for side mounting.*

**Levers—See page 5-130 for a complete listing of operating levers.**

# 802XR Lever Type • Maintained Contact

## Sealed Contact Hazardous Location Switches

### Range of Operation



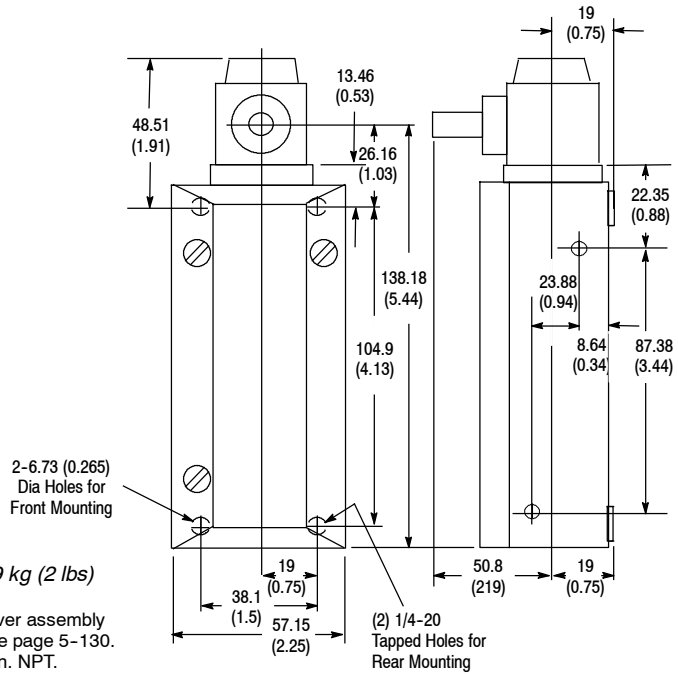
*Switch*
*Without Lever*

### Product Selection

| Lever Movement | Torque to Operate (Max) | Travel to Operate Contact (Max) | Max Travel | Travel to Reset Contact (Max) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Counterclockwise | 0.25 N•m (2.25 lb•in) | 70° ❶ | 84° ❶ | 35° | N.O. | 802XR-AMF7 |
| | | | | | N.C. | 802XR-AMC7 |

❶ From one maintained position to the other.

### Approximate Dimensions [mm (in.)]




*Approximate Shipping Wt. 0.9 kg (2 lbs)*

**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. C'Bore 0.25 in. deep for front mounting.*

*2—1/4-20 Tapped holes 0.56 in. deep for rear mounting.*

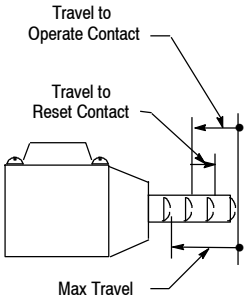
*2—1/4-20 Tapped holes 0.5 in. deep for side mounting.*

**Levers—See page 5-130 for a complete listing of operating levers.**

# 802XR Push Type • Spring Return

## Sealed Contact Hazardous Location Switches

## Range of Operation



*Top Push Rod*

*Adjustable Top Push Rod*

*Side Push Rod*

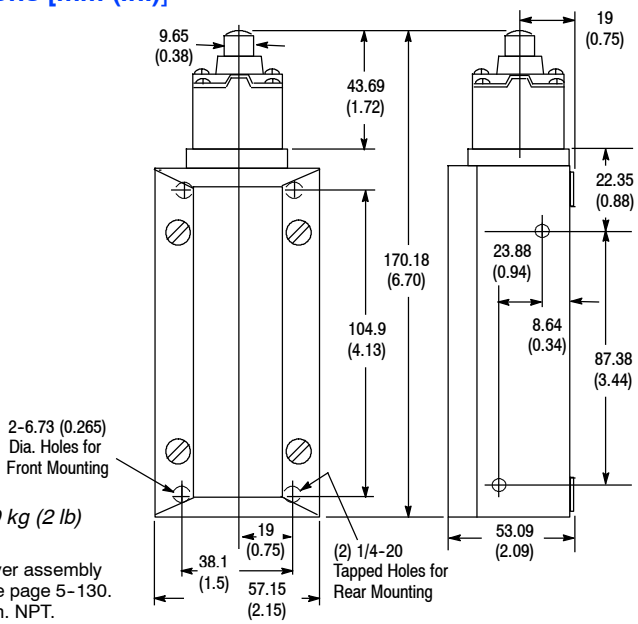
*Top Push Roller*

*Side Push Roller*

## Product Selection

| Operator Type | Force to Operate (Max) | Travel to Operate Contact (Max) | Max Travel | Travel to Reset Contact (Max) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push Rod | 13.4 N (3 lb) | 1.75 mm (0.069 in.) | 5.1 mm (0.202 in.) | 0.71 mm (0.028 in.) | N.O. | 802XR-BF7 |
| | | | | | N.C. | 802XR-BC7 |
| Adjustable Top Push Rod | 15.6 N (3.5 lb) | | | | N.O. | 802XR-BAF7 |
| | | | | | N.C. | 802XR-BAC7 |
| Side Push Rod | 20.0 N (4.5 lb) | 3.2 mm (0.125 in.) | 5.5 mm (0.218 in.) | 1.5 mm (0.057 in.) | N.O. | 802XR-CF7 |
| | | | | | N.C. | 802XR-CC7 |
| Top Push Roller | 15.6 N (3.5 lb) | 1.75 mm (0.069 in.) | 5.1 mm (0.202 in.) | 0.71 mm (0.028 in.) | N.O. | 802XR-DF7 |
| | | | | | N.C. | 802XR-DC7 |
| Side Push Vertical Roller | 20.0 N (4.5 lb) | 3.2 mm (0.125 in.) | 5.5 mm (0.0218 in.) | 1.5 mm (0.057 in.) | N.O. | 802XR-KF7 |
| | | | | | N.C. | 802XR-KC7 |
| Side Push Horizontal Roller | | | | | N.O. | 802XR-K1F7 |
| | | | | | N.C. | 802XR-K1C7 |

## Approximate Dimensions [mm (in.)]




*Approximate Shipping Wt. 0.9 kg (2 lb)*

**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

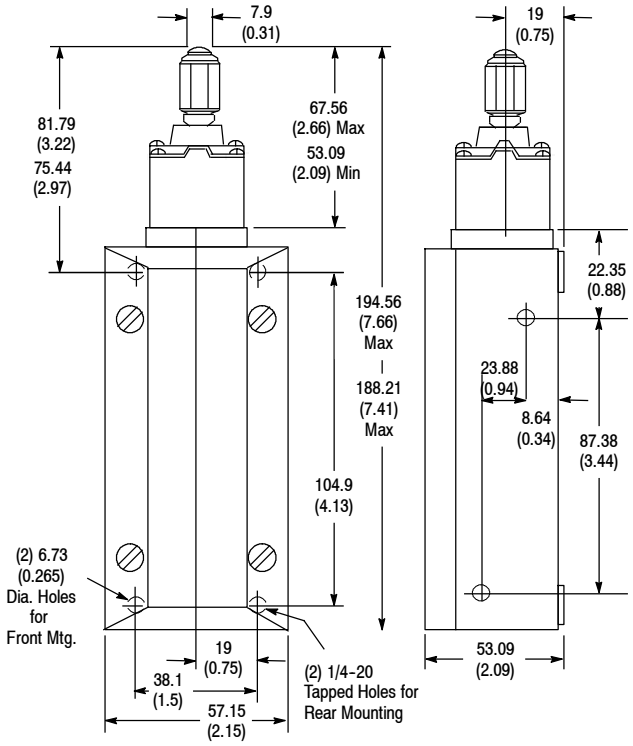
*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. C'Bore 0.25 in. deep for front mounting.*

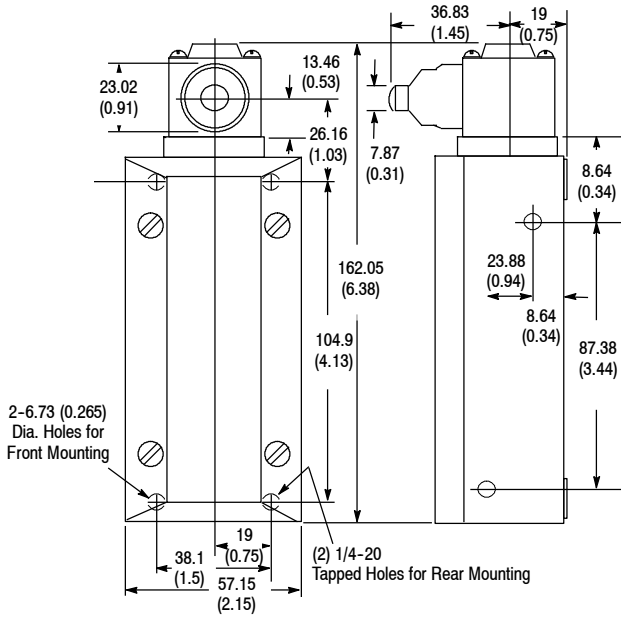
*2—1/4-20 Tapped holes 0.56 in. deep for rear mounting.*

*2—1/4-20 Tapped holes 0.5 in. deep for side mounting.*

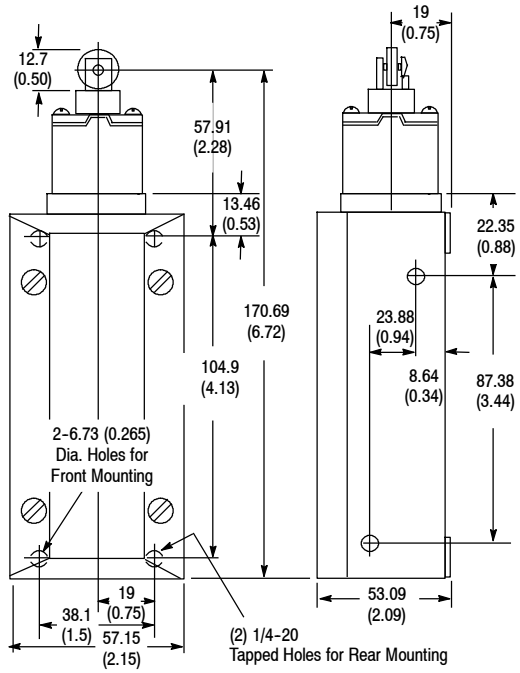
## Approximate Dimensions [mm (in.)]



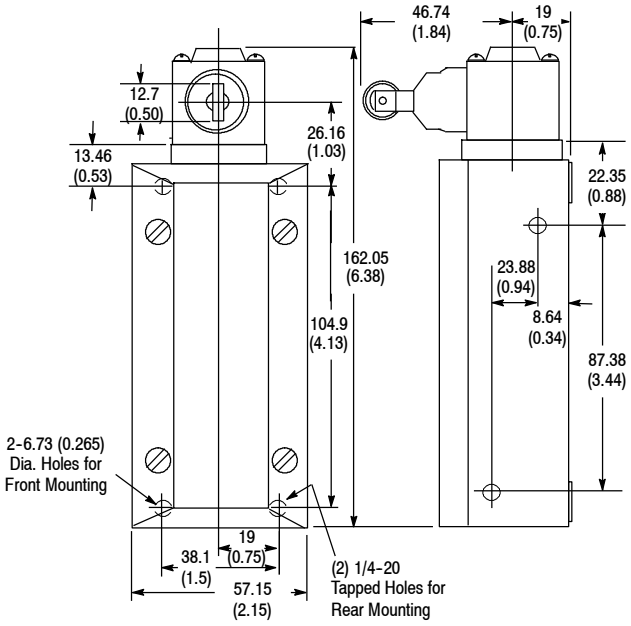

*Bulletin 802XR Adjustable Top Push Rod Type*




*Bulletin 802XR Side Push Rod Type*




*Bulletin 802XR Top Push Roller Type*




*Bulletin 802XR Side Push Roller Type*

*Approximate Shipping Wt. 0.9 kg (2 lb)*

**Note:** For operating head and lever assembly dimensions not shown, see page 5-130.
Conduit pipe opening 1/2 in. NPT.

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. C'Bore 0.25 in. deep for front mounting.*

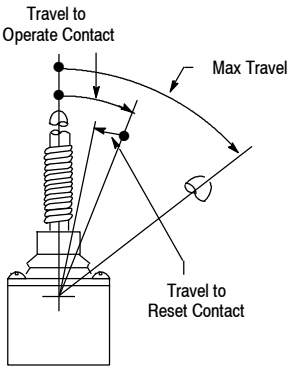
*2—1/4-20 Tapped holes 0.56 in. deep for rear mounting.*

*2—1/4-20 Tapped holes 0.5 in. deep for side mounting.*

# 802XR Cat Whisker • Spring Return

## Sealed Contact Hazardous Location Switches

## Range of Operation ❶




*Travels Are Measured at Rigid Section of Operator*

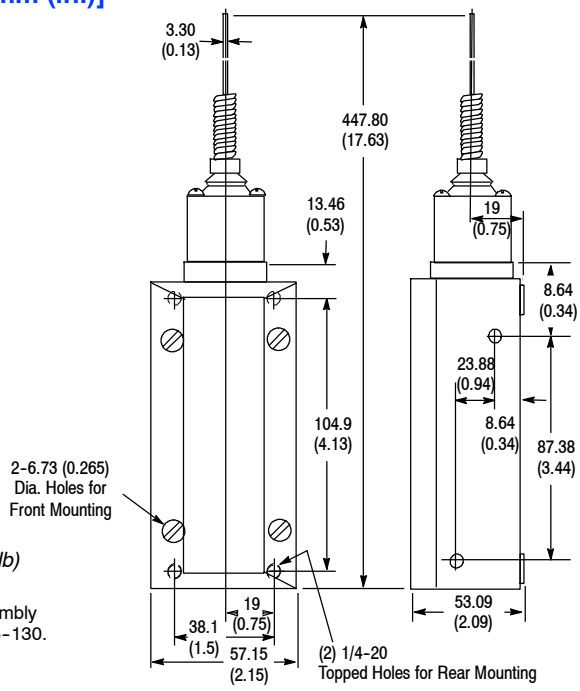
*Cat Whisker*

## Product Selection

| Operator Type | Torque to Operate (Max) | Travel to Operate Contact (Max) | Max Travel ❶ | Travel to Reset Contact (Max) | Contact Type | Cat. No. |
|---|---|---|---|---|---|---|
| Wire Cat Whisker | 0.51 N•m (4.5 lb•ft) | 11° | 11° | 5° | N.O. | 802XR-WS1F7 |
| | | | | | N.C. | 802XR-WS1C7 |

❶ These switches should be mounted in such a way that the operator will not be deflected beyond the "Maximum Travel" position, as this could cause undesirable repetition of contact action on rebound.

## Approximate Dimensions [mm (in.)]




*Approximate Shipping Wt. 0.9 kg ( 2lb)*

**Note:** For operating head and lever assembly dimensions not shown, see page 5-130. Conduit pipe opening 1/2 in. NPT.

*Mounting Hole Dimensions*

*2—0.265 Dia. through hole with 0.500 Dia. C'Bore 0.25 in. deep for front mounting.*

*2—1/4-20 Tapped holes 0.56 in. deep for rear mounting.*

*2—1/4-20 Tapped holes 0.5 in. deep for side mounting.*

# 802B Compact, Precision and Small Precision

*Compact*

*Precision*

*Small Precision*

## Description

Bulletin 802B consists of different body styles: compact, precision and small precision. Each style has been designed to withstand the rugged environments that industrial applications demand. Each style utilizes industry standard mounting dimensions and operating characteristics. The 802B family of limit switches can be mounted in areas that traditional NEMA limit switches can not, due to their size and mounting options.

The 802B compact limit switch uses a die-cast housing with a 3m prewired cable. This limit switch is available with 13 unique head configurations. Each head style can be ordered as a standard model, LED indicator model, or as a low current model. The compact limit switch maintains NEMA 6 and IP67 enclosure ratings by utilizing a triple seal construction.

The 802B precision limit switch uses a die-cast housing with 1/2 NPT conduit entry. This limit switch is available with 5 unique head configurations. Each different head is available as standard or with a rubber boot for additional sealing. Two different mounting styles are available. Side mount or flange rubber boot for additional sealing. Two different mounting styles are available: side mount or flange mount.

The 802B small precision limit switch is similar to the 802B Precision limit switch with some additional features. This switch offers an enclosure rating of

NEMA 6 and IP67 which is achieved by a rubber cable gland sealing the control cable entry. This limit switch offers 12 different head configurations, including some that are unique to this product offering.

## Specifications

| | Compact | Precision | Small Precision |
|---|---|---|---|
| **Certifications** | UL Listed, CSA Certified and CE Marked for all applicable directives | UL Listed, CSA Certified and CE Marked for all applicable directives | UL Recognized, CSA Certified and CE Marked for all applicable directives |
| **Enclosure Rating** | NEMA 1,3,4,6,12,13 and IP67 | NonBooted: NEMA 1 and IP60<br>Booted: NEMA 1,3,4, and IP65 | NEMA 1, 3, 4, 6, 13 and IP67 |
| **Mechanical Life** | Approx. 10,000,000 operations ❶ | Approx. 10,000,000 operations ❶ | Approx. 10,000,000 operations ❷ |
| **Electrical Life** | Approx. 200,000 operations (3 A 250 V AC, resistive load) ❶ | Approx. 500,000 operations (15 A 250 V AC, resistive load) ❶ | Approx. 500,000 operations (10 A 250 V AC, resistive load) ❷ |
| **Operating Speed** | | | |
| **Top Push** | 0.1 mm…0.5 m per second | 0.01 mm…0.5 m per second | 0.05 mm…0.5 m per second |
| **Side Rotary** | 1 mm…1 m per second | — | — |
| **Lever Type** | — | 0.02 mm…0.5 m per second | — |
| **Operating Frequency** | | | |
| **Mechanical** | 120 operations/minute | 120 operations/minute | 120 operations/minute |
| **Electrical** | 30 operations/minute | 20 operations/minute | 20 operations/minute |
| **Operating Temperature [C (F)]** | -10…70° (14…158°) with no icing | -10…80° (14…176°) with no icing | -10…80° (14…176°) with no icing |
| **Short Circuit Protection** | Quick blow fuse suitable for rated current is recommended | Quick blow fuse suitable for rated current is recommended | Quick blow fuse suitable for rated current is recommended |
| **Contact Type** | SPDT Form C | SPDT Form C | SPDT Form C |

❶ Life expectancy has been calculated at an operating temperature of 5…35°C (41…95°F) and an operating humidity of 40…70%.

❷ Life expectancy has been calculated at an operating temperature of 20°C (68°F) and an operating humidity of 65%.

## Features

- Rugged die-cast housing
- Industry standard dimensions
- Compact size
- Multiple mounting options
- Wide range of operating voltage and current ratings

## Style

Compact . . . . . page 5-88
Precision . . . . . page 5-97
Small Precision . . . . . page 5-105

# 802B Compact, Precision and Small Precision

## Specifications

### Compact

| Rated Voltage | Non-Inductive Resistive Load | Inductive Load | | | Inrush Current | |
|---|---|---|---|---|---|---|
| | | Inductive | Motor Load | | | |
| | | | N/O | N/C | N/O | N/C |
| **Standard Models** | | | | | | |
| 125V AC | 5 A | 3 A | 1.3 A | 2.5 A | 10 A max | 20 A max |
| 250V AC | 5 A | 2 A | 0.8 A | 1.5 A | | |
| 8V DC | 5 A | 5 A | 3 A | 3 A | | |
| 14V DC | 5 A | 4 A | 3 A | 3 A | | |
| 30V DC | 4 A | 3 A | 3 A | 3 A | | |
| 125V DC | 0.4 A | 0.4 A | 0.05 A | 0.05 A | | |
| 250V DC | 0.2 A | 0.2 A | 0.03 A | 0.03 A | | |
| **AC LED Models** | | | | | | |
| 125V AC | 5 A | 3 A | 1.3 A | 2.5 A | | |
| 125V DC | 0.4 A | 0.4 A | 0.05 A | 0.05 A | | |
| **DC LED Models** | | | | | | |
| 30V DC | 4 A | 3 A | 3 A | 3 A | | |
| **Low Current Models** | | | | | | |
| 125V AC | 0.1 A | — | | | | |
| 8V DC | 0.1 A | | | | | |
| 14V DC | 0.1 A | | | | | |
| 30V DC | 0.1 A | | | | | |

**UL/CSA Approved Ratings**

| NEMA Rating Designation | Rated Voltage | A | | Continuous Current | Volt | Amps |
|---|---|---|---|---|---|---|
| | | Make | Break | | | |
| B300 | 120V AC | 30 | 3 | 5 | 3,600 | 360 |
| | 240V AC | 15 | 1.5 | | | |
| **AC LED Versions** | | | | | | |
| B150 | 120V AC | 30 | 3 | 5 | 3,600 | 360 |

**Leakage Current for LED Models**

| | Voltage | Leakage Current | Resistance | | |
|---|---|---|---|---|---|
| AC LED | 125 | 1.7 mA | 68 kΩ | | |
| DC LED | 30 | | 15 kΩ | | |

### Precision

| Rated Voltage | Non-Inductive Resistive Load | Inductive Load | | | Inrush Current | | UL/CSA Approved Ratings | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Inductive | Motor Load | | | | | | |
| | | | N/O | N/C | N/O | N/C | Rated Voltage | Current | Horsepower |
| 125V AC | 15 A | 15 A | 2.5 A | 5 A | 15 A max | 30 A max | 120V AC | 15 A | 1/8 HP 1/4 HP |
| 250V AC | 15 A | 2.5 A | 1.5 A | 3 A | | | 250V AC | 15 A | |
| 480V AC | 10A | 1.5 A | 0.75 A | 1.5 A | | | 480V AC | 15 A | |
| 125V DC | 0.5 A | 0.5 A | 0.05 A | | | | 125V DC | 0.5 A | — |
| 250V DC | 0.25 A | 0.25 A | 0.03 A | | | | 250V DC | 0.25 A | |

### Small Precision

| Rated Voltage | Non-Inductive Resistive Load | Inductive Load | | | Inrush Current | | UL/CSA Approved Ratings | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Inductive | Motor Load | | | | NEMA Rating Designation | Rated Voltage | A | | Continuous Current | Volt | Amps |
| | | | N/O | N/C | N/O | N/C | | | Make | Break | | | |
| 125V AC | 10A | 10 A | 2.5 A | 5 A | 15 A max | 30 A max | A300 | 120V AC | 60 | 6 | 10 | 7,200 | 720 |
| 250V AC | 10A | 10 A | 1.5 A | 3 A | | | | 240V AC | 30 | 3 | | | |
| 8V DC | 10A | 6 A | 2.5 A | 5 A | | | | | | | | | |
| 14V DC | 10A | 6 A | 2.5 A | 5 A | | | | | | | | | |
| 30V DC | 6A | 5 A | 2.5 A | 5 A | | | | | | | | | |
| 125V DC | 0.5 A | 0.05 A | 0.05 A | | | | | | | | | | |
| 250V DC | 0.25 A | 0.03 A | 0.03 A | | | | | | | | | | |

*Rotary Arm*

*Center Rotary Arm*

*Wobble Stick*

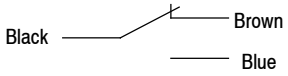
## Product Selection

| Head Type | Torque to Operate | Travel to Operate | Reference Value | | Output Type | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | Max Travel | Travel to Reset | | Pre-leaded | Quick-Disconnect❶ |
| Rotary Arm | 0.216 N•m (2 lb•in.) | 25° | 70° | 3° | Standard | **802B-CSAAXSXC3** | 802B-CSAAXSXD4 |
| | | | | | | | 802B-CSAAXSXR4 |
| | | | | | AC LED | 802B-CSAAXSLC3 | 802B-CSAAXSLR4 |
| | | | | | DC LED | 802B-CSDAXSLC3 | 802B-CSDAXSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDAXSXC3 | — |
| Center Rotary Arm | 0.216 N•m (2 lb•in.) | 10 ±3° | 65° | 4° | Standard | 802B-CSAA2XSXC3 | — |
| | | | | | AC LED | 802B-CSAA2XSLC3 | — |
| | | | | | DC LED | 802B-CSDA2XSLC3 | — |
| | | | | | Low Voltage/Current | 802B-CSDA2XSXC3 | — |
| Wobble Stick | 0.118 N•m (1.04 lb•in.) | 15° | 18° (Nominal Value) | 11° (Nominal Value) | Standard | **802B-CSACXSXC3** | 802B-CSACXSXD4 |
| | | | | | | | 802B-CSACXSXR4 |
| | | | | | AC LED | 802B-CSACXSLC3 | — |
| | | | | | DC LED | 802B-CSDCXSLC3 | — |
| | | | | | Low Voltage/Current | 802B-CSDCXSXC3 | — |

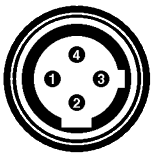
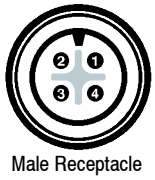
## Wiring

**Pre-leaded Models**

| COM | NO | NC | Ground |
|---|---|---|---|
| Black | Blue | Brown | Green/Yellow |




**Quick-Disconnect Models**

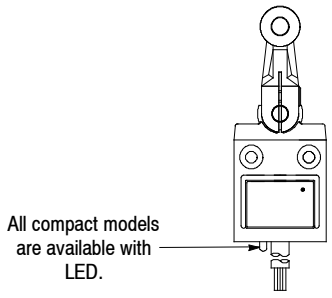
| AC QD Pin-out: | | DC QD Pin-out: | |
|---|---|---|---|
| Pin 1 = Common |  | Pin 1 = N/O |  |
| Pin 2 = N/O | | Pin 2 = Common | |
| Pin 3 = N/C | | Pin 3 = Grnd. | |
| Pin 4 = Grnd. | Male Receptacle | Pin 4 = N/C | Male Receptacle |





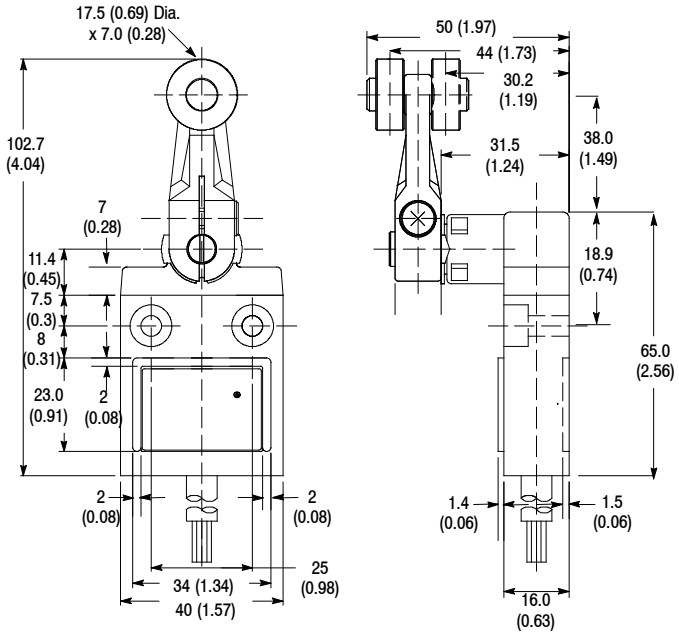
❶ For quick-disconnect versions the last two digits indicate connector type:
802B-xxxxxxxD4 Indicates a 4-pin DC micro style connector
802B-xxxxxxxR4 Indicates a 4-pin AC micro style connector

QD is on a 6 inch pigtail.

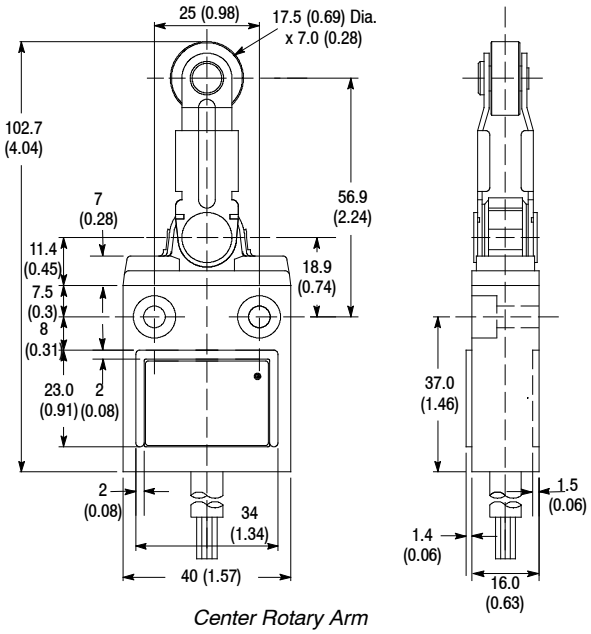



An appropriate female connector with cable is available in Connection Systems.
4-pin micro DC = (889D-F4AC-2) on page 8-16
4-pin micro DC = (889R-F4AEA-2) on page 8-28

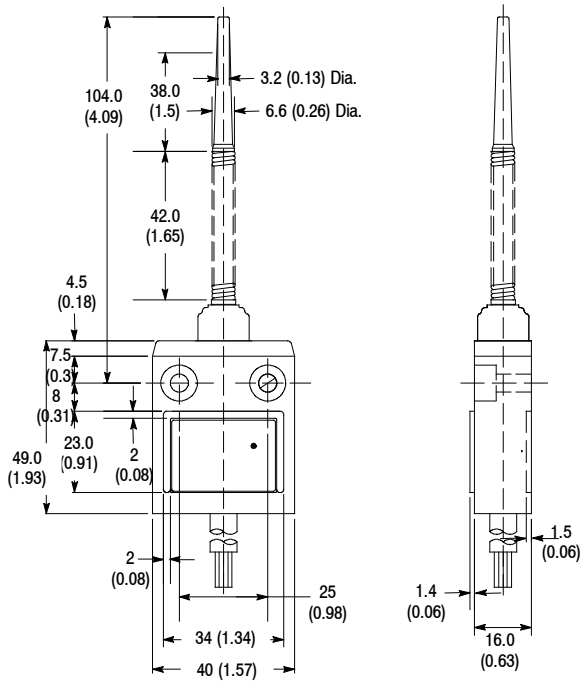
## Approximate Dimensions [mm (in.)]




*Rotary Arm*




*Center Rotary Arm*




*Wobble Stick*

Counter Bore = 102. mm Dia
Mounting Hole = 5.1 mm Dia
Counter Bore Depth = 5.8 mm
Mounting Hole Depth = 10.1 mm
Cable Dia. = 8.5 mm

*Top Push*

*Top Push Bevel*

*Top Push Roller*

*Top Push Cross Roller*

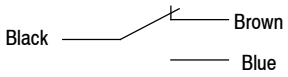
## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Output Type | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Pre-leaded | Quick-Disconnect❶ |
| Top Push | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | **802B-CSABXSXC3** | 802B-CSABXSXD4 |
| | | | | | | | 802B-CSABXSXR4 |
| | | | | | AC LED | 802B-CSABXSLC3 | 802B-CSABXSLR4 |
| | | | | | DC LED | 802B-CSDBXSLC3 | 802B-CSDBXSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDBXSXC3 | — |
| Top Push Bevel | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | 802B-CSAB1XSXC3 | — |
| | | | | | AC LED | 802B-CSAB1XSLC3 | — |
| | | | | | DC LED | 802B-CSDB1XSLC3 | — |
| | | | | | Low Voltage/Current | 802B-CSDB1XSXC3 | — |
| Top Push Roller | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | **802B-CSADXSXC3** | 802B-CSADXSXD4 |
| | | | | | | | 802B-CSADXSXR4 |
| | | | | | AC LED | 802B-CSADXSLC3 | 802B-CSADXSLR4 |
| | | | | | DC LED | 802B-CSDDXSLC3 | 802B-CSDDXSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDDXSXC3 | — |
| Top Push Cross Roller | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | **802B-CSAD1XSXC3** | 802B-CSAD1XSXD4 |
| | | | | | | | 802B-CSAD1XSXR4 |
| | | | | | AC LED | 802B-CSAD1XSLC3 | 802B-CSAD1XSLR4 |
| | | | | | DC LED | 802B-CSDD1XSLC3 | 802B-CSDD1XSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDD1XSXC3 | — |

## Wiring

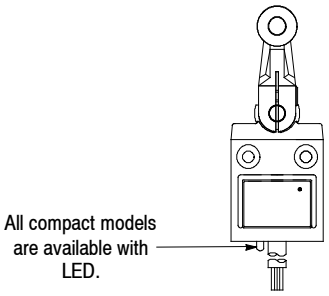
**Pre-leaded Models**

| COM | NO | NC | Ground |
|---|---|---|---|
| Black | Blue | Brown | Green/Yellow |




**Quick-Disconnect Models**

| AC QD Pin-out: | | DC QD Pin-out: | |
|---|---|---|---|
| Pin 1 = Common | | Pin 1 = N/O | |
| Pin 2 = N/O | | Pin 2 = Common | |
| Pin 3 = N/C | | Pin 3 = Grnd. | |
| Pin 4 = Grnd. | Male Receptacle | Pin 4 = N/C | Male Receptacle |




❶ For quick-disconnect versions the last two digits indicate connector type:
802B-xxxxxxxD4 Indicates a 4-pin DC micro style connector
802B-xxxxxxxR4 Indicates a 4-pin AC micro style connector

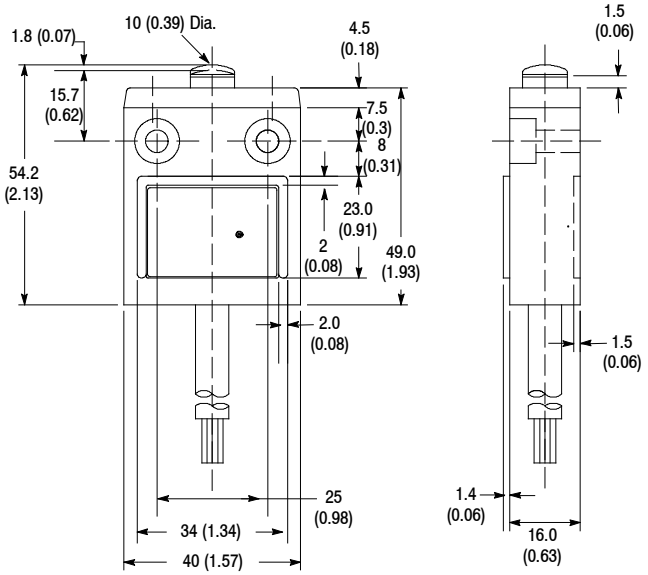
QD ia on a 6 in. pigtail.

An appropriate female connector with cable is available in Connection Systems.
4-pin micro DC = (889D-F4AC-2) on page 8-16
4-pin micro DC = (889R-F4AEA-2) on page 8-28

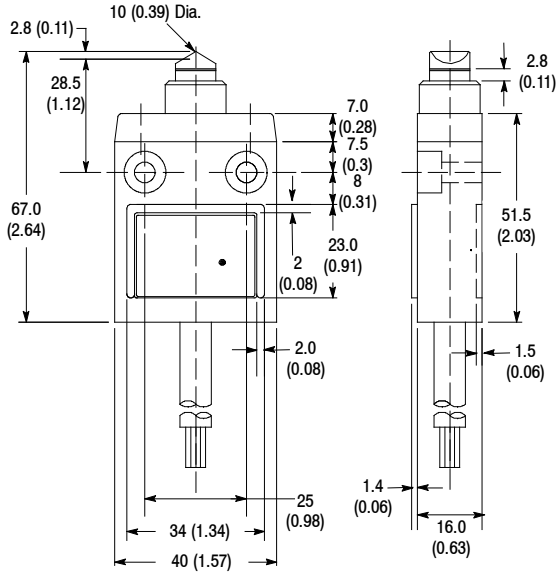
# 802B Compact

## Small Metal Body

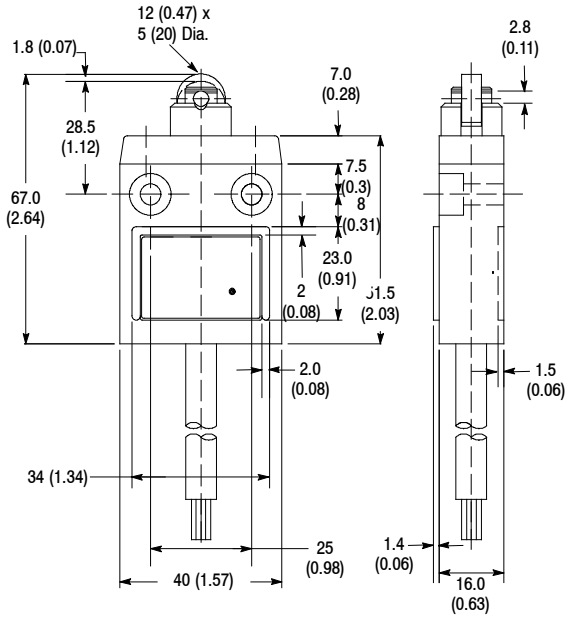
### Approximate Dimensions [mm (in.)]



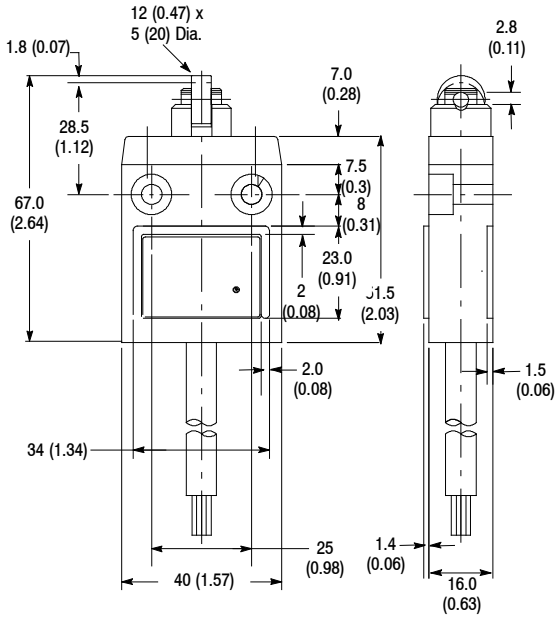

*Top Push*




*Top Push Bevel*




*Top Push Roller*




*Top Push Cross Roller*

*Top Push*
*Panel Mount*

*Top Push Roller*
*Panel Mount*

*Top Push Cross*
*Roller Panel Mount*

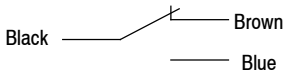
## Product Selection

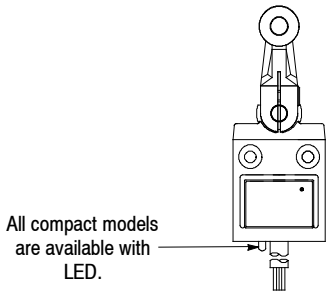
| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Output Type | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push Panel Mount | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | 802B-CPABXSXC3 |
| | | | | | AC LED | 802B-CPABXSLC3 |
| | | | | | DC LED | 802B-CPDBXSLC3a. |
| | | | | | Low Voltage/Current | 802B-CPDBXSXC3 |
| Top Push Roller Panel Mount | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | 802B-CPADXSXC3 |
| | | | | | AC LED | 802B-CPADXSLC3 |
| | | | | | DC LED | 802B-CPDDXSLC3 |
| | | | | | Low Voltage/Current | 802B-CPDDXSXC3 |
| Top Push Cross Roller Panel Mount | 11.77 N (2.65 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | 802B-CPAD1XSXC3 |
| | | | | | AC LED | 802B-CPAD1XSLC3 |
| | | | | | DC LED | 802B-CPDD1XSLC3 |
| | | | | | Low Voltage/Current | 802B-CPDD1XSXC3 |

## Wiring

**Preleaded Models**

| COM | NO | NC | Ground |
|---|---|---|---|
| Black | Blue | Brown | Green/Yellow |

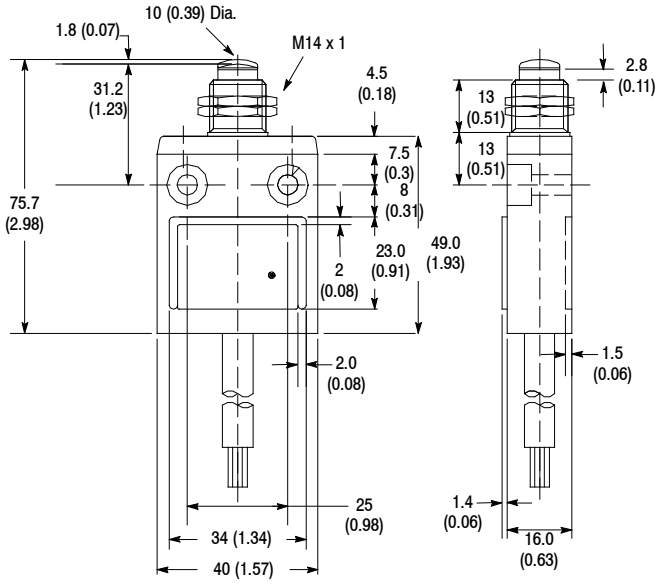


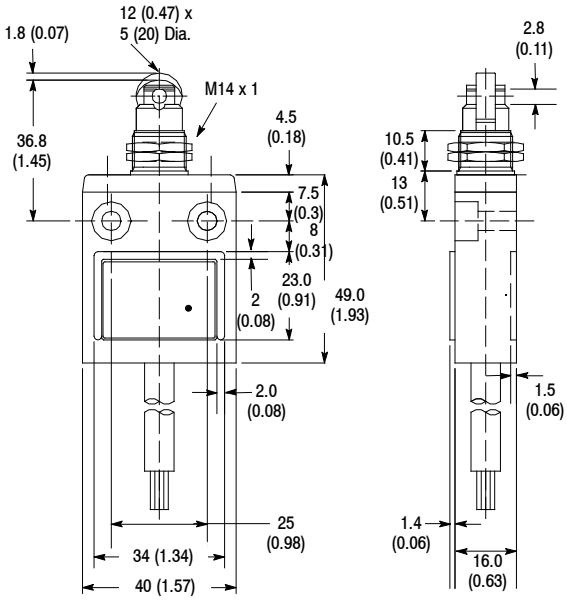
# 802B Compact

## Small Metal Body

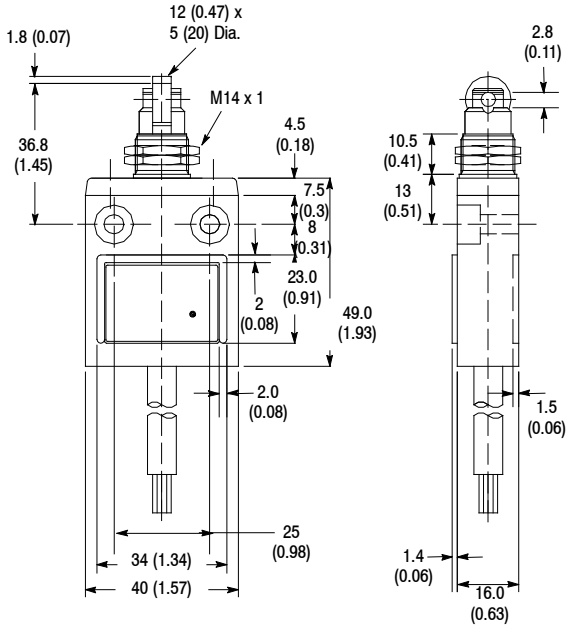
### Approximate Dimensions [mm (in.)]




*Top Push Panel Mount*




*Top Push Roller Panel Mount*




*Top Push Cross Roller Panel Mount*

*Top Push Booted Head*

*Top Push Roller Booted Head*

*Top Push Cross Roller Booted Head*

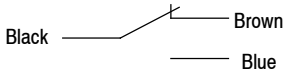
## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Output Type | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Pre-leaded | Quick-Disconnect❶ |
| Top Push Booted Head | 17.65 N (3.97 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | **802B-CSABBSXC3** | 802B-CSABBSXD4 |
| | | | | | | | 802B-CSABBSXR4 |
| | | | | | AC LED | 802B-CSABBSLC3 | 802B-CSABBSLR4 |
| | | | | | DC LED | 802B-CSDBBSLC3 | 802B-CSDBBSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDBBSXC3 | — |
| Top Push Roller Booted Head | 17.65 N (3.97 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | 802B-CSADBSXC3 | 802B-CSADBSXD4 |
| | | | | | | | 802B-CSADBSXR4 |
| | | | | | AC LED | 802B-CSADBSLC3 | 802B-CSADBSLR4 |
| | | | | | DC LED | 802B-CSDDBSLC3 | 802B-CSDDBSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDDBSXC3 | — |
| Top Push Cross Roller Booted Head | 17.65 N (3.97 lb) | 1.8 mm (0.071 in.) | 5 mm (0.197 in.) | 0.2 mm (0.008 in.) | Standard | 802B-CSAD1BSXC3 | 802B-CSAD1BSXD4 |
| | | | | | | | 802B-CSAD1BSXR4 |
| | | | | | AC LED | 802B-CSAD1BSLC3 | 802B-CSAD1BSLR4 |
| | | | | | DC LED | 802B-CSDD1BSLC3 | 802B-CSDD1BSLD4 |
| | | | | | Low Voltage/Current | 802B-CSDD1BSXC3 | — |

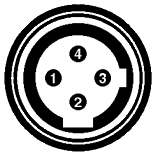
## Wiring

**Preleaded Models**

| COM | NO | NC | Ground |
|---|---|---|---|
| Black | Blue | Brown | Green/Yellow |

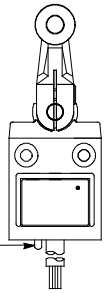



**Quick-Disconnect Models**

| AC QD Pin-out: | | DC QD Pin-out: | |
|---|---|---|---|
| Pin 1 = Common |  | Pin 1 = N/O | |
| Pin 2 = N/O | | Pin 2 = Common | |
| Pin 3 = N/C | | Pin 3 = Grnd. | |
| Pin 4 = Grnd. | Male Receptacle | Pin 4 = N/C | Male Receptacle |







All compact models are available with LED.

❶ For quick-disconnect versions the last two digits indicate connector type:
802B-xxxxxxD4 Indicates a 4-pin DC micro style connector
802B-xxxxxxR4 Indicates a 4-pin AC micro style connector

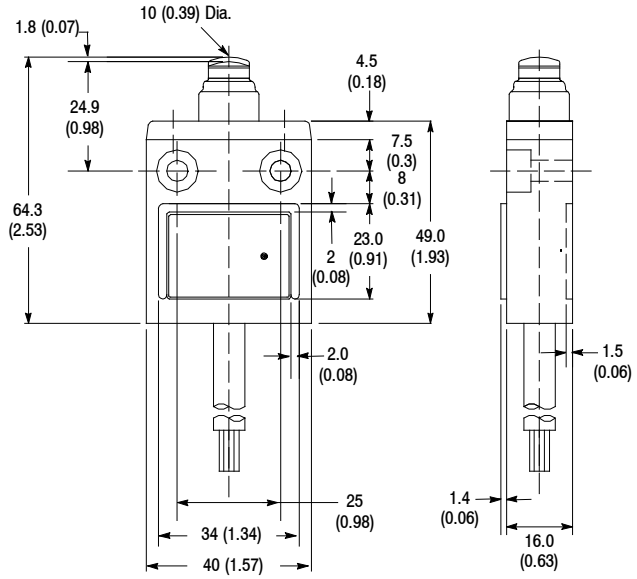
QD is on a 6 in. pigtail.

An appropriate female connector with cable is available in Connection Systems.
4-pin micro DC = (889D-F4AC-2) on page 8-16
4-pin micro DC = (889R-F4AEA-2) on page 8-28

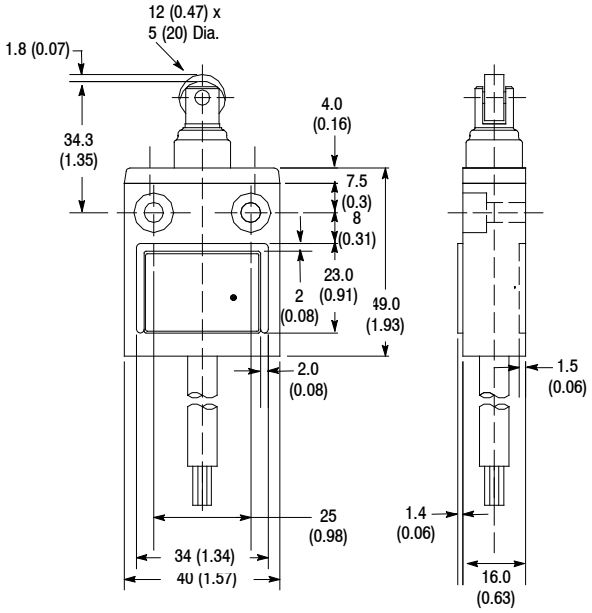
# 802B Compact

## Small Metal Body

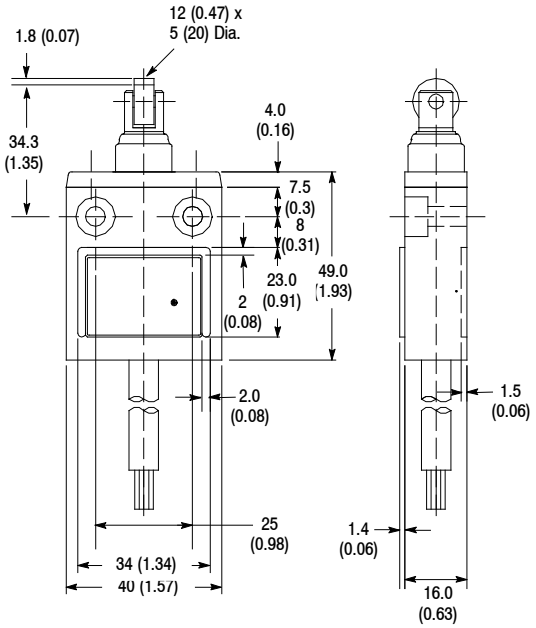
### Approximate Dimensions [mm (in.)]




*Top Push Sealed Head*




*Top Push Roller Sealed Head*




*Top Push Cross Roller Sealed Head*

*Top Push* | *Top Push Roller* | *Top Push Cross Roller* | *Roller Lever* | *One-Way Roller Lever*

## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Mounting Style | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push | 2.45…3.43 N (0.55…0.77 lb) | 0.4 mm (0.016 in.) | 5.9 mm (0.232 in.) | 0.05 mm (0.002 in.) | Side | 802B-PSABXSX |
| Top Push Roller | | 0.5 mm (0.020 in.) | 4.1 mm (0.161 in.) | | | 802B-PSADXSX |
| Top Push Cross Roller | | | | | | 802B-PSAD1XSX |
| Roller Lever | 5.59 N (1.28 lb) | 4 mm (0.157 in.) | 10 mm (0.394 in.) | 0.4 mm (0.016 in.) | | 802B-PSARXSX |
| One-Way Roller Lever | | | | | | 802B-PSAR2XSX |

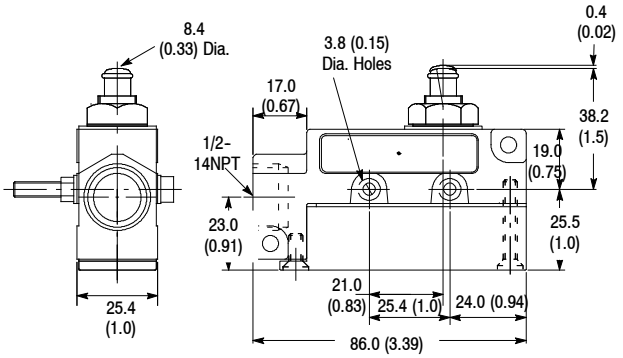
## Wiring Diagrams

| 1 | 3 | 2 | |
|---|---|---|---|
| ⊕ Com | ⊕ N.O. | ⊕ N.C. | Com 1 — NC 2, NO 3 |

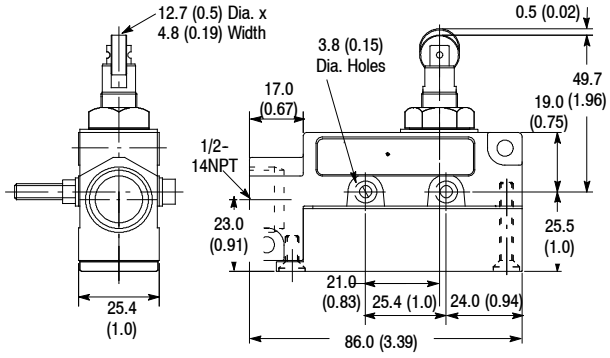
# 802B Precision

## Small Metal Body

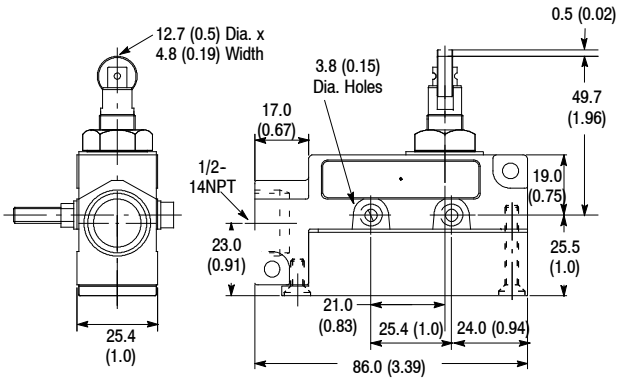
### Approximate Dimensions [mm (in.)]



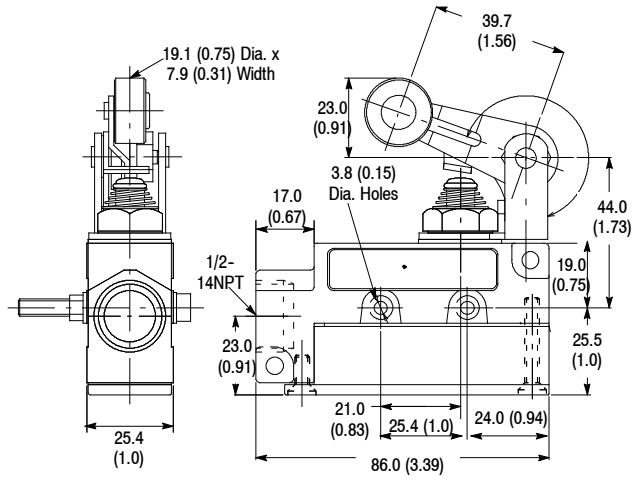

*802B-PSABXSX*



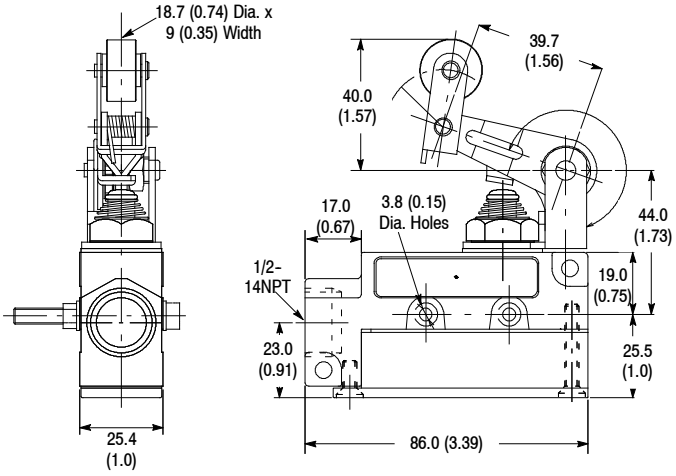

*802B-PSADXSX*



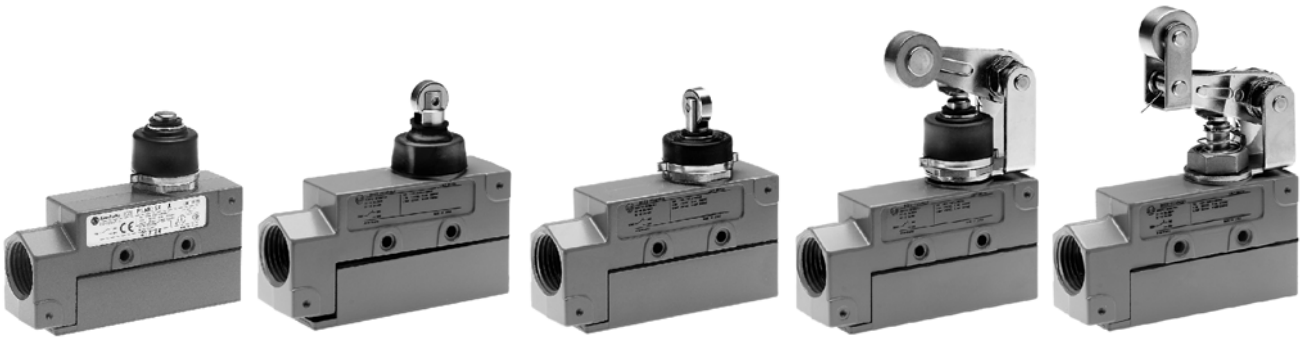

*802B-PSD1XSX*




*802B-PSARXSX*




*802B-PSAR2XSX*



*Top Push Booted* | *Top Push Roller Booted* | *Top Push Cross Roller Booted* | *Roller Lever Booted* | *One-Way Roller Lever Booted*

## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Mounting Style | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push Booted | 7.85 N (1.76 lb) | 2 mm (0.079 in.) | 7 mm (0.276 in.) | 0.1 mm (0.004 in.) | Side | **802B-PSABBSX** |
| Top Push Roller Booted | 4.9 N (1.09 lb) | 1 mm (0.039 in.) | 4.5 mm (0.177 in.) | 0.12 mm (0.005 in.) | | **802B-PSADBSX** |
| Top Push Cross Roller Booted | | | | | | 802B-PSAD1BSX |
| Roller Lever Booted | 6.28 N (1.40 lb) | 5 mm (0.197 in.) | 11 mm (0.433 in.) | 0.4 mm (0.016 in.) | | **802B-PSARBSX** |
| One-Way Roller Lever Booted | | | | | | 802B-PSAR2BSX |

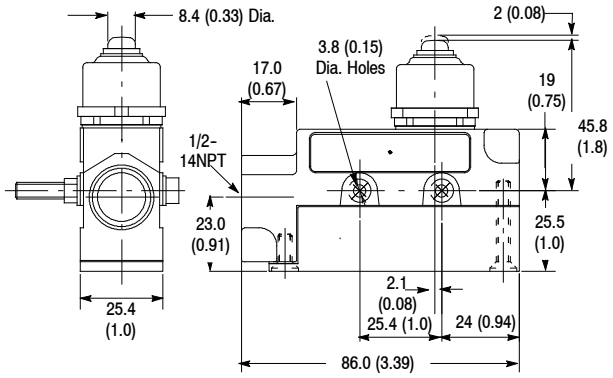
## Wiring Diagrams

| 1 | 3 | 2 | |
|---|---|---|---|
| ⊕ Com | ⊕ N.O. | ⊕ N.C. | Com 1 — NC 2<br>NO 3 |

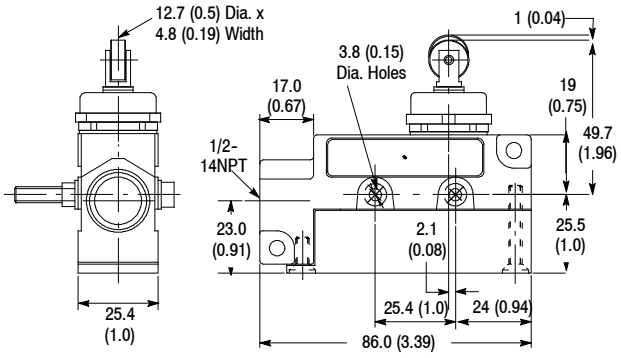
# 802B Precision

## Small Metal Body

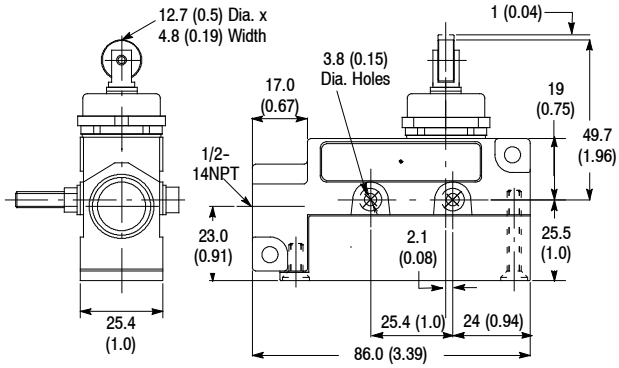
### Approximate Dimensions [mm (in.)]



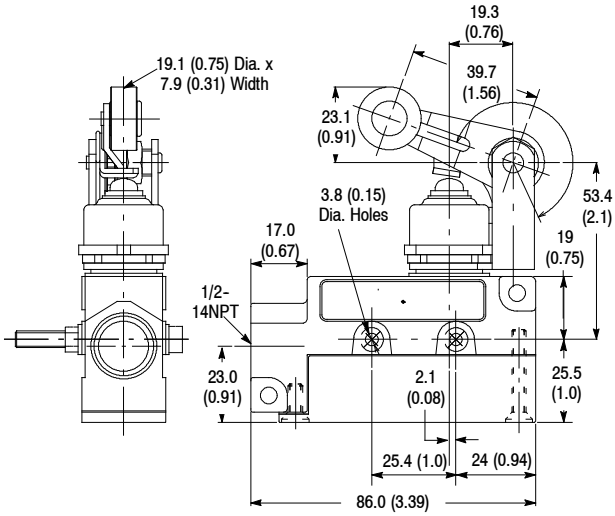

*802B-PSABBSX*



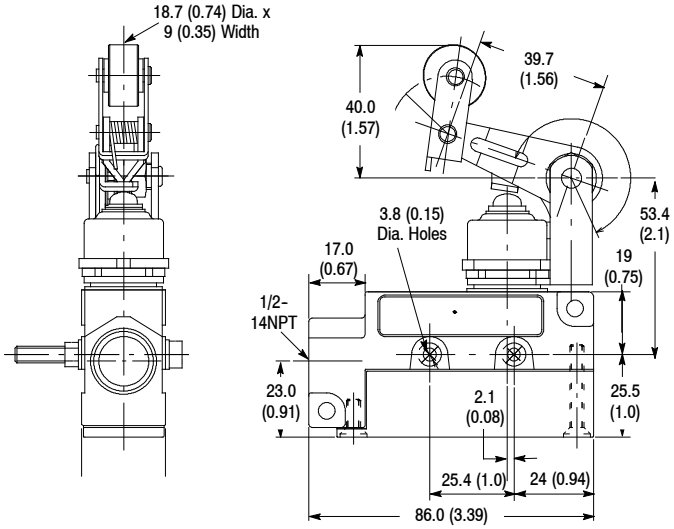

*802B-PSADBSX*




*802B-PSAD1BSX*




*802B-PSARBSX*




*802B-PSAR2BSX*

*Top Push* | *Top Push Roller* | *Top Push Cross Roller* | *Roller Lever* | *One-Way Roller Lever*

## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Mounting Style | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push | 2.45…3.43 N (0.55…0.77 lb) | 0.4 mm (0.016 in.) | 5.9 mm (0.232 in.) | 0.05 mm (0.002 in.) | Flange | 802B-PFABXSX |
| Top Push Roller | | 0.5 mm (0.020 in.) | 4.1 mm (0.161 in.) | | | 802B-PFADXSX |
| Top Push Cross Roller | | | | | | 802B-PFAD1XSX |
| Roller Lever | 5.59 N (1.28 lb) | 4 mm (0.157 in.) | 10 mm (0.394 in.) | 0.4 mm (0.016 in.) | | 802B-PFARXSX |
| One-Way Roller Lever | | | | | | 802B-PFAR2XSX |

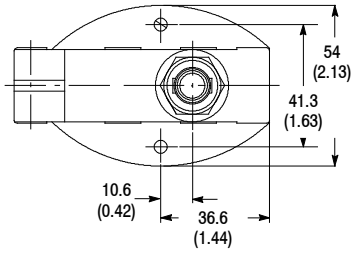
## Wiring Diagrams

| 1 | 3 | 2 | |
|---|---|---|---|
| ⊕ Com | ⊕ N.O. | ⊕ N.C. | Com 1 — NC 2, NO 3 |

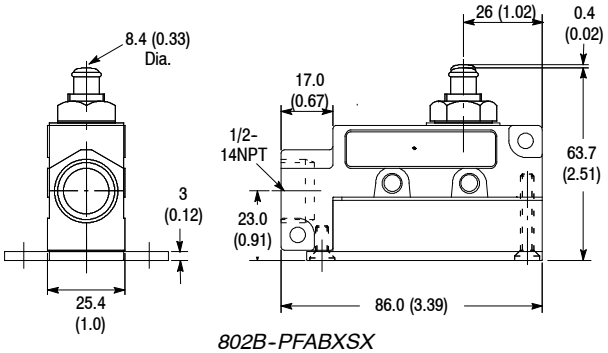
# 802B Precision

## Small Metal Body

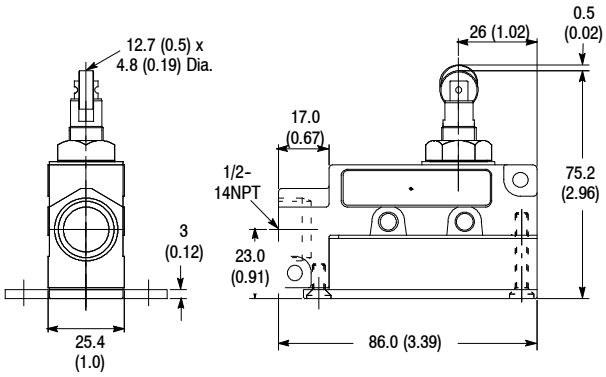
### Approximate Dimensions [mm (in.)]



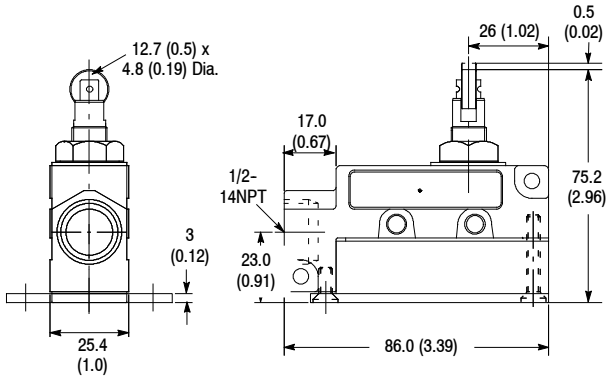

*Top View*



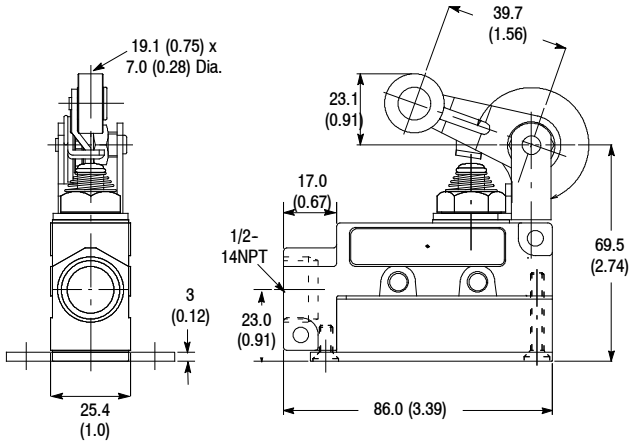

*802B-PFABXSX*



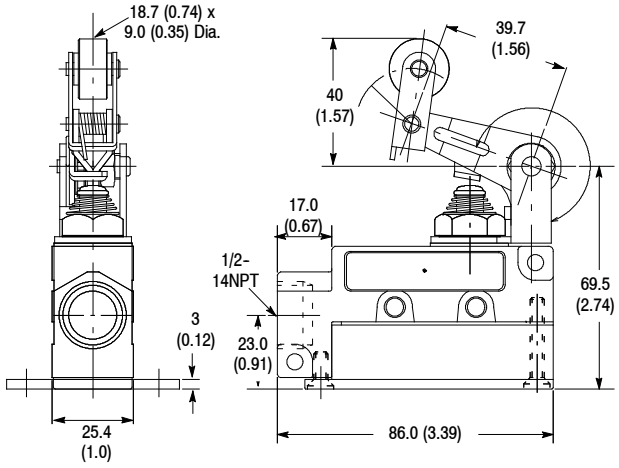

*802B-PFADXSX*




*802B-PFAD1XSX*




*802B-PFARXSX*




*802B-PFAR2XSX*

*Top Push Booted*

*Top Push Roller Booted*

*Top Push Cross Roller Booted*

*Roller Lever Booted*

*One-Way Roller Lever Booted*

## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Mounting Style | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push Booted | 7.85 N (1.76 lb) | 2 mm (0.079 in.) | 7 mm (0.276 in.) | 0.1 mm (0.004 in.) | Flange | 802B-PFABBSX |
| Top Push Roller Booted | 4.9 N (1.09 lb) | 1 mm (0.039 in.) | 4.5 mm (0.177 in.) | 0.12 mm (0.005 in.) | | 802B-PFADBSX |
| Top Push Cross Roller Booted | | | | | | 802B-PFAD1BSX |
| Roller Lever Booted | 6.28 N (1.40 lb) | 5 mm (0.197 in.) | 11 mm (0.433 in.) | 0.4 mm (0.016 in.) | | 802B-PFARBSX |
| One-Way Roller Lever Booted | | | | | | 802B-PFAR2BSX |

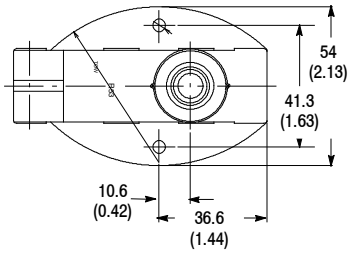
## Wiring Diagrams

| 1 | 3 | 2 | |
|---|---|---|---|
| ⊕ Com | ⊕ N.O. | ⊕ N.C. | Com 1 — NC 2<br>NO 3 |

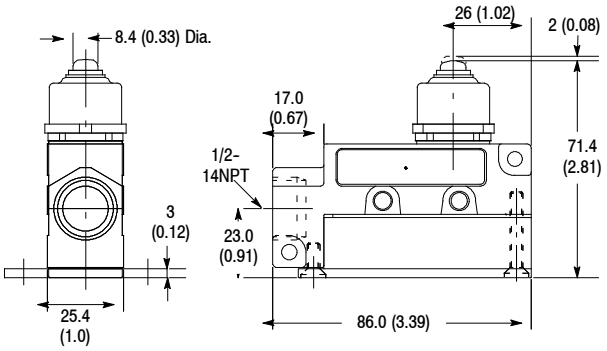
# 802B Precision

## Small Metal Body

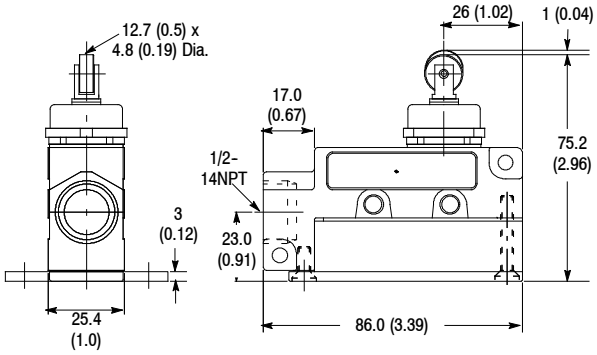
### Approximate Dimensions [mm (in.)]



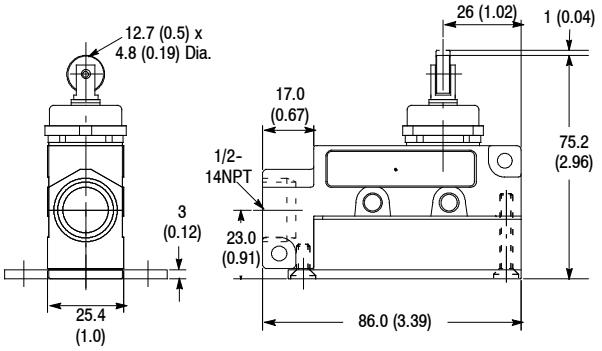

*Top View*



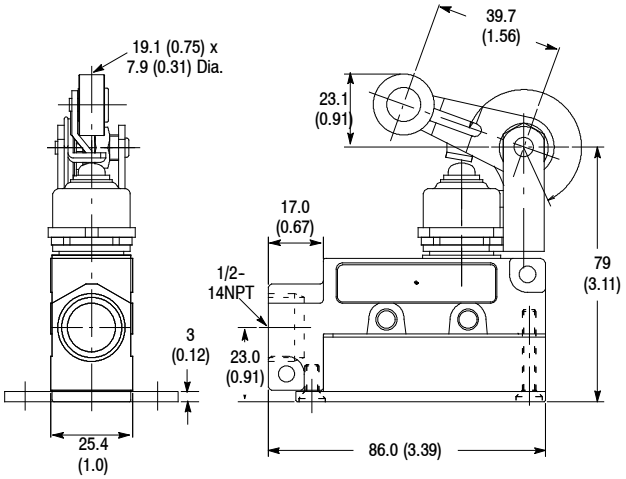

*802B-PFABBSX*



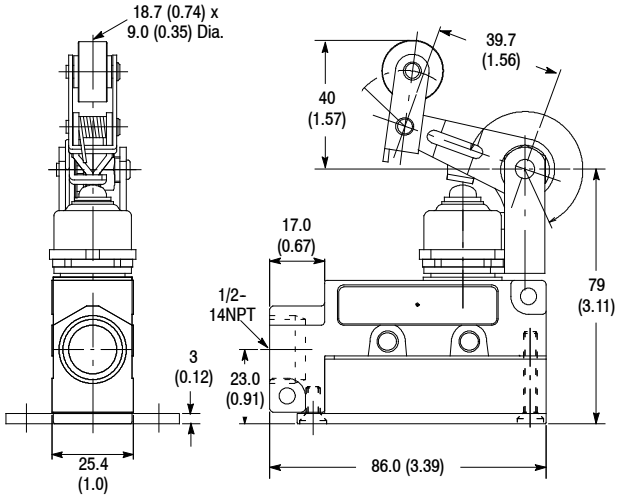

*802B-PFADBSX*




*802B-PFAD1BSX*




*802B-PFARBSX*




*802B-PFAR2BSX*

# 802B Small Precision

## Small Metal Body

*Top Push*

*Top Push Panel Mount*

*Top Roller Panel Mount*

*Top Push Cross Roller Panel Mount*

*Top Push Roller Booted*

*Top Push Cross Roller Booted*

## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Mounting Style | Cat. No. |
|---|---|---|---|---|---|---|
| Top Push | 11.8 N (2.65 lb) | 1.5 mm (0.059 in.) | 3.9 mm (0.154 in.) | 0.2 mm (0.008 in.) | Side | 802B-SSABXSX |
| Top Push Panel Mount | | | 4.5 mm (0.177 in.) | | | 802B-SPABXSX |
| Top Push Roller Panel Mount | | | | | | 802B-SPADXSX |
| Top Push Cross Roller Panel Mount | | | | | | 802B-SPAD1XSX |
| Top Push Roller Booted | 6.86 N (1.54 lb) | | 4 mm (0.157 in.) | | | **802B-SSADBSX** |
| Top Push Cross Roller Booted | | | | | | 802B-SSAD1BSX |

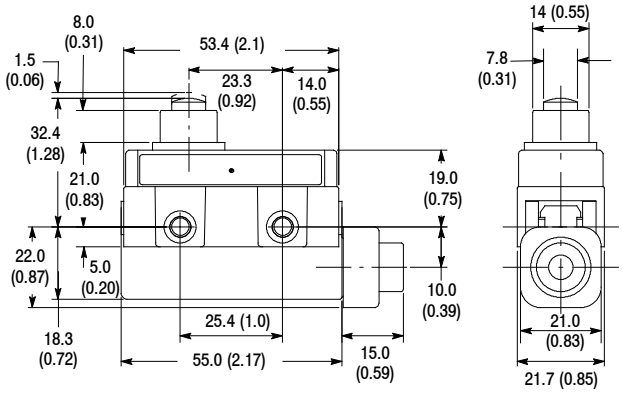
## Wiring Diagrams

| 1 | 3 | 2 | |
|---|---|---|---|
| ⊕ **Com** | ⊕ **N.O.** | ⊕ **N.C.** | Com 1 — NC 2<br>NO 3 |

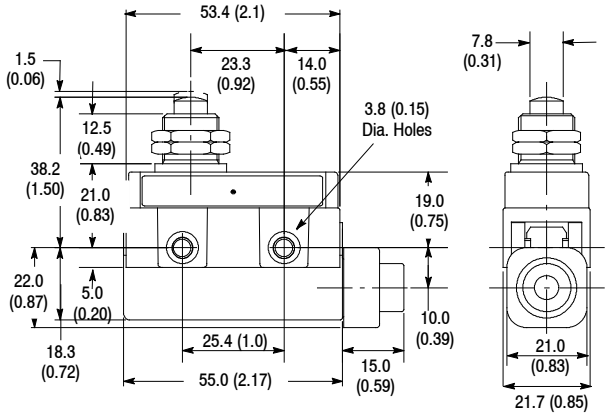
# 802B Small Precision

## Small Metal Body

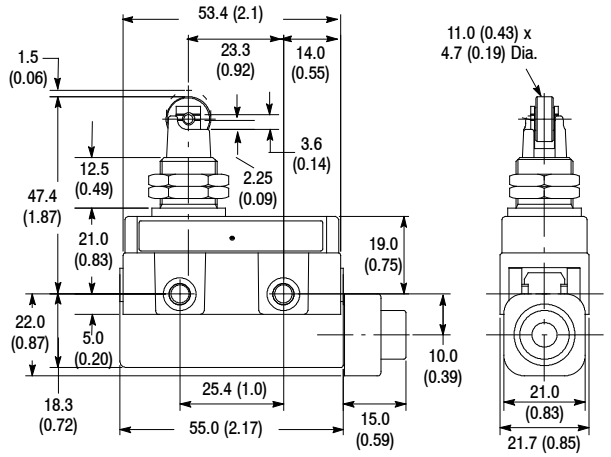
### Approximate Dimensions [mm (in.)]



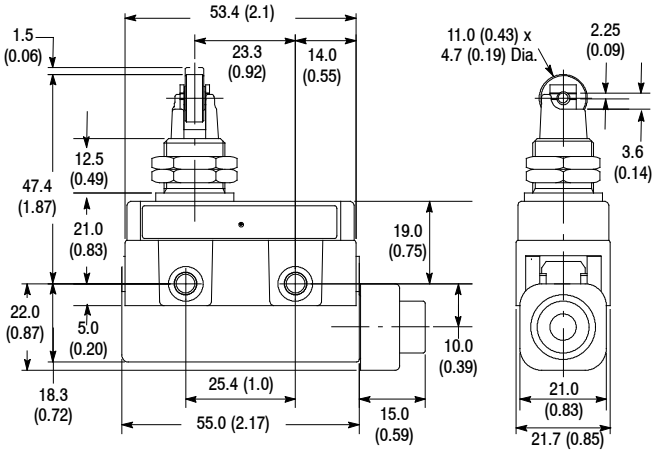

*802B-SSABXSX*




*802B-SPABXSX*

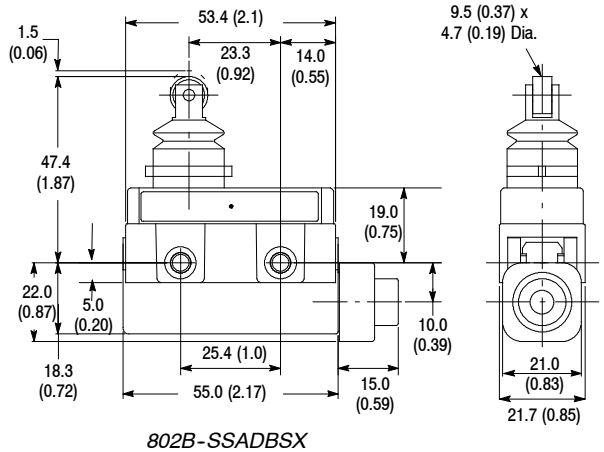



*802B-SPADXSX*

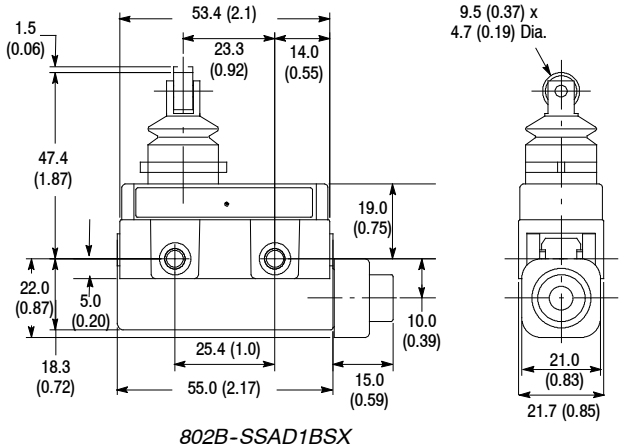



*802B-SPAD1XSX*

7.8
(0.31)




*802B-SSADBSX*




*802B-SSAD1BSX*

# 802B Small Precision

## Small Metal Body

*Short Hinge Lever*

*Hinge Lever*

*Short Roller Lever*

*Roller Lever*

*Short One-Way Roller Lever*

*One-Way Roller Lever*

## Product Selection

| Head Type | Force to Operate | Travel to Operate | Max Travel | Travel to Reset | Mounting Style | Cat. No. |
|---|---|---|---|---|---|---|
| Short Hinge Lever | 3.92 N (0.88 lb) | 6.2±1.2 mm (0.244 in.) | 12.2 mm (0.480 in.) | 1 mm (0.04 in.) | Side | 802B-SSAH1XSX |
| Hinge Lever | 2.75 N (0.62 in.) | 8.2±1.2 mm (0.323 in.) | 16.6 mm (0.645 in.) | 1.4 mm (0.055 in.) | | 802B-SSAHXSX |
| Short Roller Lever | 3.92 N (0.88 lb) | 6.2±1.2 mm (0.244 in.) | 12.2 mm (0.480 in.) | 1 mm (0.04 in.) | | 802B-SSAR1XSX |
| Roller Lever | 2.75 N (0.62 in.) | 8.3±1.2 mm (0.327 in.) | 16.7 mm (0.657 in.) | 1.4 mm (0.055 in.) | | 802B-SSARXSX |
| Short One-Way Roller Lever | 3.92 N (0.88 lb) | 6.2±1.2 mm (0.244 in.) | 12.2 mm (0.480 in.) | 1 mm (0.04 in.) | | 802B-SSAR3XSX |
| One-Way Roller Lever | 2.75 N (0.62 in.) | 8.2±1.2 mm (0.244 in.) | 16.6 mm (0.654 in.) | 1.4 mm (0.055 in.) | | 802B-SSAR2XSX |

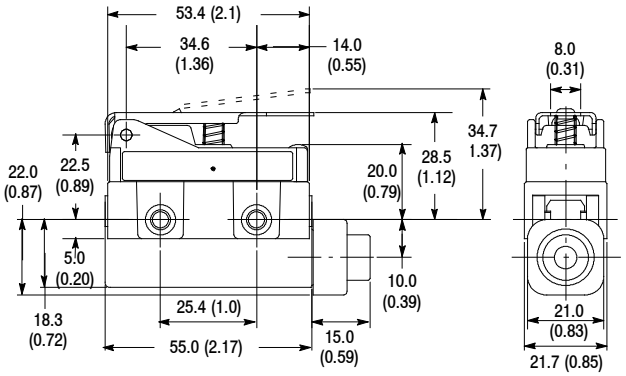
## Wiring Diagrams

| 1 | 3 | 2 | |
|---|---|---|---|
| ⊕ Com | ⊕ N.O. | ⊕ N.C. | Com 1 — NC 2<br>NO 3 |

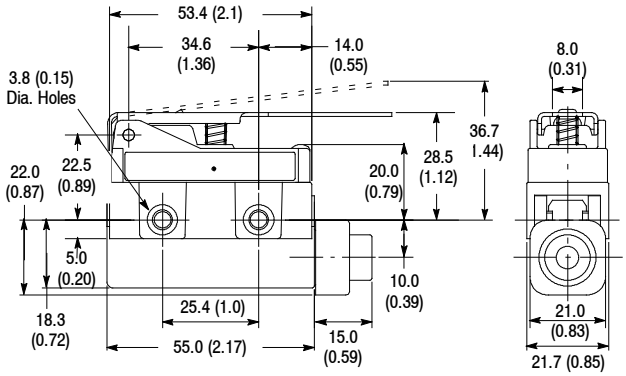
# 802B Small Precision

## Small Metal Body

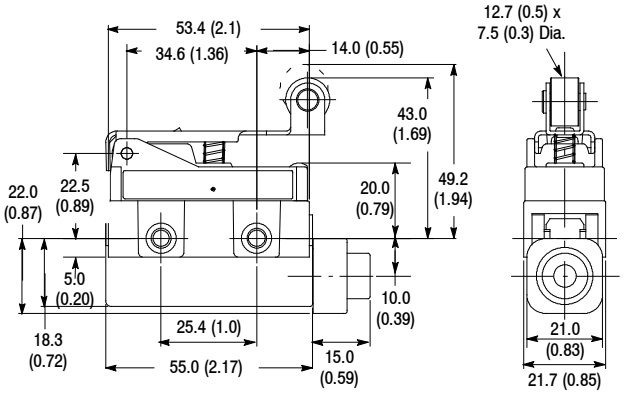
### Approximate Dimensions [mm (in.)]



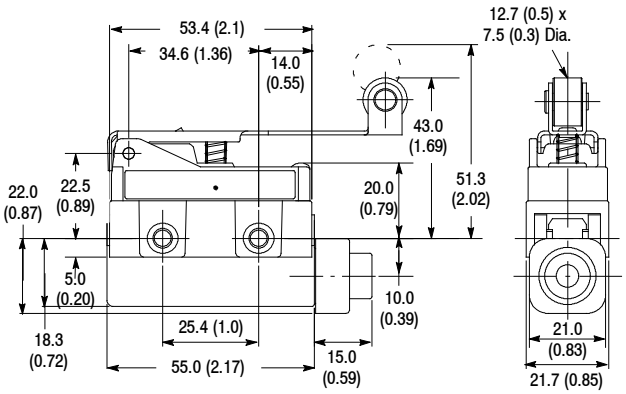

*802B-SSAH1XSX*



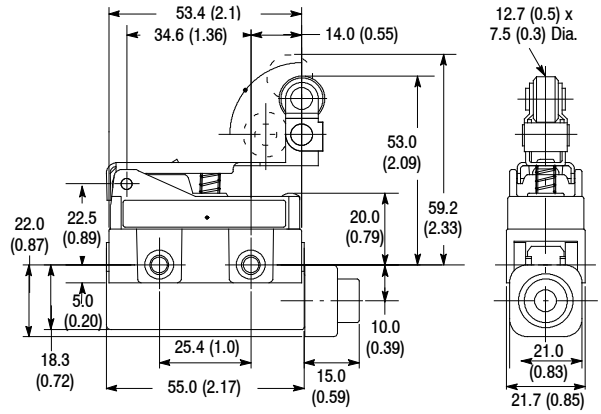

*802B-SSAHXSX*



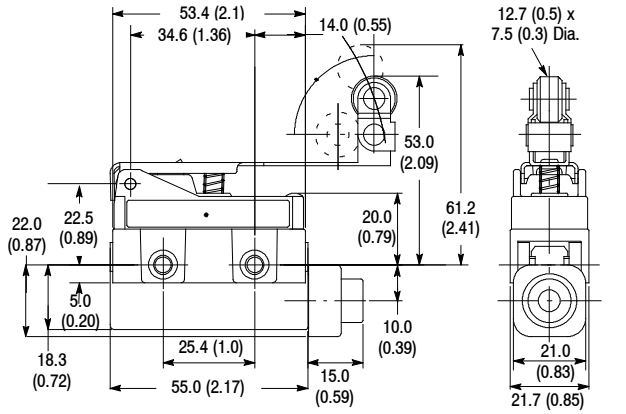

*802B-SSAR1XSX*




*802B-SSARXSX*




*802B-SSAR3XSX*




*802B-SSAR2XSX*

# 802T Safety Limit Switches

## Direct Opening Action Position Interlock Switches

## Description

Bulletin 802T direct opening action limit switches have been designed for use in control reliable applications and safety applications per ISO 14119. These limit switches utilize the same mounting dimensions as other NEMA style limit switches. The rugged metal construction and plug-in body are designed for use in harsh industrial environments.

Direct opening action assures that the normally closed contacts open when the limit switch is actuated. This opening will occur even in the event of a contact weld condition, up to 10 Newtons.

**ATTENTION**

To ensure that the normally closed (safety) contacts open, the limit switch actuator must be displaced beyond the point of Direct Opening Action (see specifications).

## Features

- Direct opening action
- Snap acting contacts
- Rugged metal construction
- Long life and reliability
- Plug-in design
- NEMA 6P/IP67 sealing
- Equal length mounting back base

## Specifications

| | |
|---|---|
| **Enclosure Rating** | NEMA 4, 6P, 12, 13 and IP67 |
| **Pollution Degree** | 3 |
| **Certifications** | cULus Listed, TÜV, and CE Marked for all applicable directives |
| **Standards** | EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/EN60947-5-1, ANSI B11.19, AS4024-1 |
| **Category** | Cat. 1 Device per EN954-1 Dual channel interlocks suitable for Cat. 3 or 4 systems |
| **Operating Temperature [C (F)]** | -18…+110° (0…+230°) |
| **Cable Versions Temperature [C (F)]** | -18…60° (0…140°) |
| **Storage Temperature [C (F)]** | -40…121° (-40…250°) |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, 2 Circuits)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A600 AC-15 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |
| | 480 | 15 | 1.50 | 10 | 7200 | 720 |
| | 600 | 12 | 1.20 | 10 | 7200 | 720 |

**AC Contact Rating (Maximum per Pole, 50 or 60Hz, 4 Circuits)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| A300 AC-15 | 120 | 60 | 6.00 | 10 | 7200 | 720 |
| | 240 | 30 | 3.00 | 10 | 7200 | 720 |

**DC Contact Rating (Maximum per Pole)**

| NEMA Rating Designation | Max Voltage | A | | Continuous Carrying Current | VA | |
|---|---|---|---|---|---|---|
| | | Make | Break | | Make | Break |
| Q300 DC 13 | 250 | 0.27 | 0.27 | 2.5 | 69 | 69 |
| | 125 | 0.55 | 0.55 | 2.5 | 69 | 69 |

**Low Voltage DC**

24 V DC @ 1.1 Amps resistive load

## Typical Applications

- Machine guards
- Access gates and doors
- Cranes or hoists
- Transfer stations
- Indexing tables
- Robotic cells

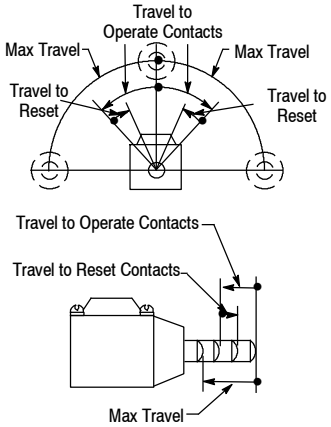
## Direct Opening Action

Lever Type • Spring Return page 5-110
Top Push Roller • Spring Return . . . . . page 5-110
Side Push Verticle Roller • Spring Return . . . . . page 5-110
Side Push Horizontal Roller • Spring Return . . . . . page 5-110
Dimensions . . . . . page 5-111
Modifications . . . . . page 5-112

# 802T Safety Limit Switches

## Direct Opening Action Position Interlock Switches

### Range of Operation



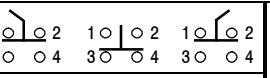
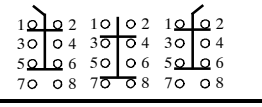
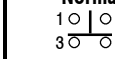
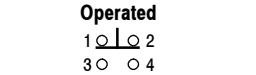
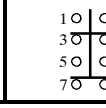
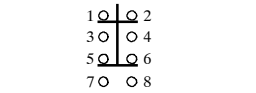
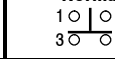
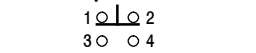
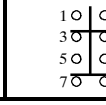
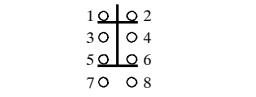
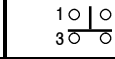
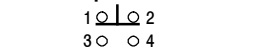
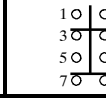
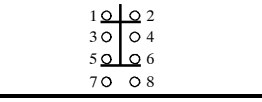
*Lever Type Spring Return*

*Top Push Roller Spring Return*

*Side Push Verticle Roller Spring Return*

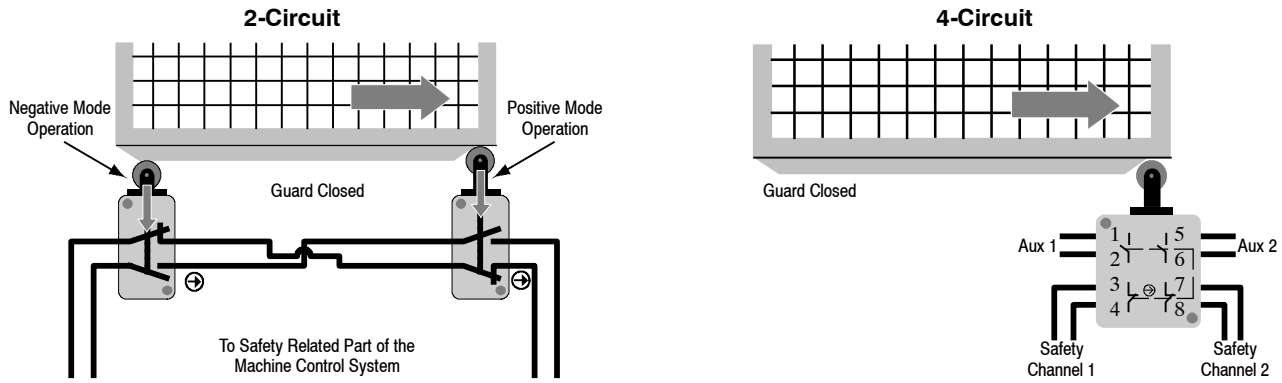
*Side Push Horizontal Roller Spring Return*

### Selection Guide

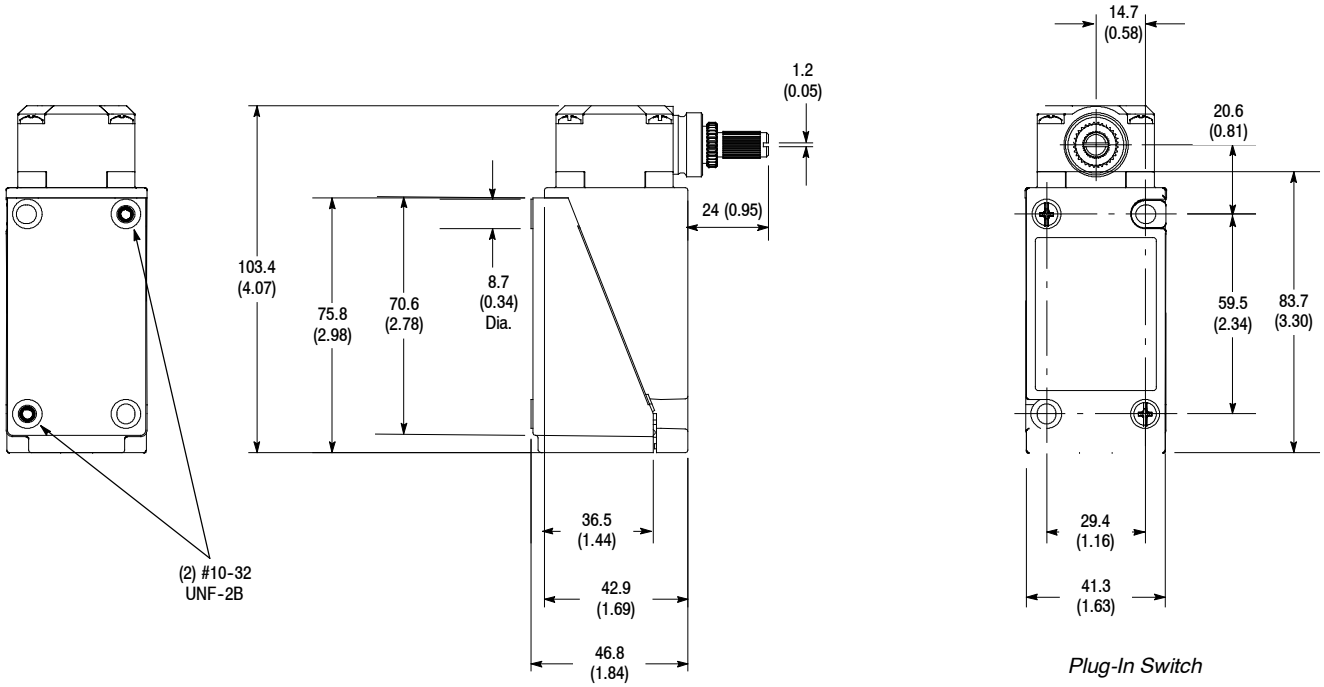
| Number of Circuits | Lever Movement vs. Contact Operation | | Torque/ Force to Operate (Max) | Travel to Operate (Max) | Torque/ Force to Operate Direct Opening Action (Min) | Travel to Operate Direct Opening Action (Min) | Max Travel | Travel to Reset Contacts (Max) | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|
| **Lever Type • Spring Return** | | | | | | | | | |
| 2 | Clockwise or Counter Clockwise |  | 0.45 N•m (4.0 lb•in) | 13° | 0.90 N•m (8.0 lb•in) | 25° | 90° | 7° | **Switch w/o Lever 802T-APD** |
| 4 | |  | | | | | | | **802T-ATPD** |
| **Top Push Roller • Spring Return** | | | | | | | | | |
| 2 | **Normal**  | **Operated**  | 28.47 N•m (6.4 lb•ft) | 1.17 mm (0.046 in.) | 66.72 N (15.0 lb•in) | 2.29 mm (0.090 in.) | 5.99 mm (0.236 in.) | 0.64 mm (0.025 in.) | **Complete Switch** 802T-DPD |
| 4 |  |  | | | | | | | 802T-DTPD |
| **Side Push Verticle Roller • Spring Return** | | | | | | | | | |
| 2 | **Normal**  | **Operated**  | 24.5 N•m (5.5 lb•ft) | 2.08 mm (0.082 in.) | 53.4 N (12.0 lb•ft) | 4.19 mm (0.165 in.) | 5.74 mm (0.226 in.) | 1.14 mm (0.045 in.) | **Complete Switch** 802T-KPD |
| 4 |  |  | | | | | | | 802T-KTPD |
| **Side Push Horizontal Roller • Spring Return** | | | | | | | | | |
| 2 | **Normal**  | **Operated**  | 24.5 N•m (5.5 lb•ft) | 2.08 mm (0.082 in.) | 53.4 N (12.0 lb•ft) | 4.19 mm (0.165 in.) | 5.74 mm (0.226 in.) | 1.14 mm (0.045 in.) | **Complete Switch** 802T-K1PD |
| 4 |  |  | | | | | | | 802T-K1TPD |

**Modifications and Accessories—See page 5-112.**

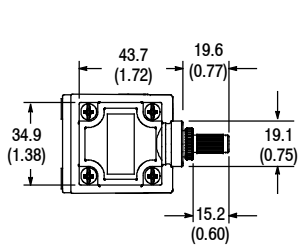
## Typical Example of a Dual Channel Safety Application



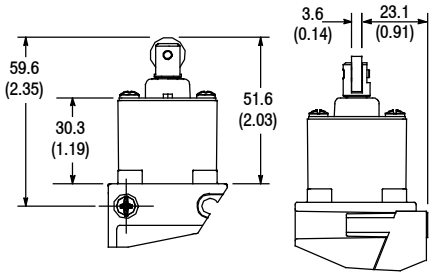

## Approximate Dimensions [mm (in.)]



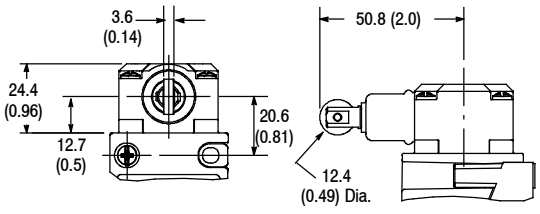

*Plug-In Switch*




*Lever Type Head*




*Top Push Roller Head*




*Side Push Roller Head*

# 802T Safety Limit Switches

## Direct Opening Action Position Interlock Switches

## Modifications

### Metric Conduit Entry

To order a limit switch with a 20 mm conduit entry, add the suffix **S6** to the Cat. No. example: 802T–APD**S6**.

### Pre-wired Cable

To order factory installed pre-wired type STOOW–A cable (5 conductor), add the suffix **Y** plus the number of feet required. The standard cable length is 1.52 m (5 ft). Extended cable lengths are available in multiples of 1.22 m (4 ft) only.

Example: To order a limit switch with a factory installed 1.52 m (5 ft) cable, the Cat. No. would become 802T–APD**Y5**. To order a limit switch with a factory installed 2.44 m (8 ft) cable, the Cat. No. would become 802T–APD**Y8**.

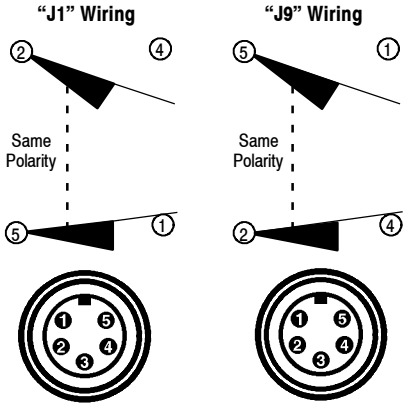
### Mini Style Quick-Disconnect

To order a Bulletin 802T pre-wired limit switch with a 5-pin (2 circuit) or 9-pin (4 circuit) mini connector, add the suffix **J1** or **J9** depending on desired wiring (**J9** wiring not available for four-circuit models) to the Cat. No. example: 802T–APD**J1.**

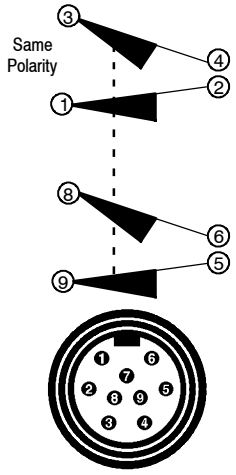
An appropriate female connector with cable is available in Connection Systems.

5-pin mini = (889N-F5AFC-6F) on page 8-4
9-pin mini = (889N-F9AF-2) on page 8-14
5-pin mini = (889R-F5AEA-2) on page 8-28
5-pin mini = (889D-F5AC-2) on page 8-16

**5-Pin Mini-Type Receptacle (2 circuit)**

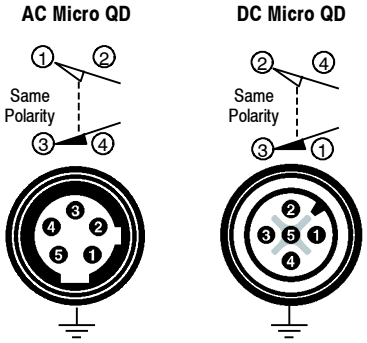



**9-Pin Mini-Type Receptacle (4 circuit)**
**"J1" Wiring ("J9" wiring not available for 4 circuit)**




### Micro Style Quick-Disconnect

Micro quick-disconnects are available with a 5-pin 2 keyway AC or 5-pin single keyway DC. To order a limit switch with a AC micro quick-disconnect, add the suffix **R5** to the cat. no. To order a limit switch with a DC micro quick-disconnect, add the suffix **D5** to the Cat. No. example: 802T–APDR5 and 802T–APDD5.




*Pin 5 = Ground*

### Levers

| Type | Roller | | | Cat. No. |
|---|---|---|---|---|
| | Material | Diameter [mm (in.)] | Width [mm (in.)] | |
| Non-Adj. Cast Lever 1.5 in. Radius Roller on Front | Nylon | 19 (0.75) | 7.11 (0.28) | 802T-W1 |
| | Nylon | 19 (0.75) | 25.4 (1.0) | 802T-W1H |
| | Steel | 19 (0.75) | 6.35 (0.25) | 802T-W1A |
| | Ball Bearing | 19 (0.75) | 5.84 (0.23) | 802T-W1B |

22 mm Small Plastic

22 mm Compact Metal

30 mm Large Metal

15 mm Plastic

## General Description

The 440P limit switch family offers a full range of international-style solutions for both safety and standard sensing applications. Available in four different body styles—30 mm metal, 22 mm metal and plastic and 15 mm plastic—with a broad selection of operator types, circuit arrangements and connection options, the Bul. 440P is ideal for a wide variety of applications. These include material handling, packaging, elevators, escalators, scissor lifts, industrial trucks and tractors, cranes and hoists, overhead door, as well as general safety guarding applications.

## Mechanical Enclosure

The large metal-body (440P-M) models feature die-cast alloy construction and conform to EN 50041 (30 mm x 60 mm), while the small plastic (440P–C) models are constructed of a glass-filled polymer and conform to EN 50047 (22 mm). Both body types are IP66 rated and available with M20 or 1/2 in. NPT conduit opening or in micro quick-disconnect versions. The 15 mm plastic models (440P–M18001 and 440P–M18002) are constructed of glass-filled polyester and are IP30 rated. The 22 mm metal models (440P-A) have a painted body and are IP65, IP66, IP67, and IP69K (pre-leaded cable versions). Pre-leaded cable and micro quick disconnect configurations are offered.

## Actuator Type

The Bul. 440P international-style limit switches are available with a wide variety of actuators to solve a broad range of applications. All lever-type switches include their respective actuator arm. Bul. 440P actuators are offered as replaceable products.

The large, metal-body style is available in the following operator types:

- Metal roller plunger
- Metal dome plunger
- Short lever with metal or plastic roller
- Adjustable lever with plastic or large rubber roller
- Metal rod lever
- Metal spring rod
- Telescopic arm

The compact metal body style is available in the following operator types:

- Roller plunger
- Dome plunger
- Short lever with plastic or 1 in. wide plastic roller
- Cross roller plunger
- Adjustable lever with plastic or metal roller

All, except the lever versions, are available with panel mount threading.

The small, plastic-body style is available in the following operator types:

- Adjustable lever with plastic or large rubber roller
- Short lever with plastic or metal roller
- Hinge lever
- Roller plunger
- Dome plunger
- Offset hinge lever

The 15 mm plastic-body switch is available with a roller plunger actuator.

## Contact Arrangements

All 440P international-style limit switches contain positive opening-action contacts, making them ideal for safety-related applications. The small, plastic models include a choice of snap-acting, slow-break/make with 2- or 3-contacts configurations, while the large metal switches contain snap-acting, slow-break contacts in 2-, 3-, or 4-contact configurations. The 15 mm plastic versions are slow-break, 2-circuit models. The small metal models are all snap-acting.

# 440P Safety Limit Switches

## 22 mm Compact Metal Position Switches

## Description

The 22 mm IEC-style metal safety limit switches have been developed to provide a small metal case with a choice of actuator heads.

## Features

- Rugged die-cast enclosure
- Positive operation, forced disconnection of contacts (direct-opening action)
- Snap-acting contact actuation
- Contacts 1 N.C. + 1 N.O. or 2 N.C.
- Pre-wired 2 m (6.5 ft) cable with bottom or side out exit; 4-pin or 5-pin male micro M12 connector attached to a 152 mm (6 in.) pigtail

| ATTENTION | For safety applications it is important that upon actuation, the guard or other moving objects should not pass completely over the switch and allow the plunger or lever to return to its original position. |
|---|---|

## Specifications

| | | | | | | |
|---|---|---|---|---|---|---|
| **Safety Ratings** | | | | | | |
| Standards | EN 954-1, ISO 13849-1, IEC/EN 60204-1, NFPA 79, EN 1088, ISO 14119, IEC/EN 60947-5-1, ANSI B11.19, AS 4024.1 | | | | | |
| Safety Classification | Cat.1 Device per EN 954-1 Dual channel limit switch suitable for Cat. 3 or 4 systems when ganged together | | | | | |
| Certifications | UL Listed, TÜV and CE Marked for all applicable directives | | | | | |
| **Outputs** | | | | | | |
| Safety Contacts ★ | 1 N.C. snap-acting, 2 N.C. slow-acting | | | | | |
| Auxiliary Contacts | 1 N.O. snap-acting | | | | | |
| Thermal Current $I_{th}$ | 10 A | | | | | |
| Rated Insulation Voltage | 300V AC | | | | | |
| **Contact Rating** | | | | | | |
| **Maximum AC Contact Rating Per Pole‡** | | | | | | |
| **NEMA Rating Designation** | **Max. Voltage** | **Amperes** | | **Continuous Carrying Current [A]** | **Volt Amperes** | |
| | | **Make** | **Break** | | **Make** | **Break** |
| AC15/B300 | 120 | 30 | 3.0 | 5 | 3600 | 360 |
| | 240 | 15 | 1.5 | | | |
| **Maximum DC Contact Rating Per Pole‡** | | | | | | |
| DC13/Q300 | 240 | 0.27 | 0.27 | 2.5 | 69 | 69 |
| **Operating Characteristics** | | | | | | |
| Actuation Speed, Max. | 250 mm/s | | | | | |
| Actuation Speed, Min. | 100 mm/min. | | | | | |
| Actuation Frequency, Max. | 6000 ops/hr | | | | | |
| Mechanical Life | 1 x $10^7$ operations with no electrical load | | | | | |
| **Environmental** | | | | | | |
| Enclosure Type Rating | Type 1, IP65, IP66, IP67, and IP69K (preleaded versions) | | | | | |
| Operating Temperature [C (F)] | 2…+70° (35.6…+158°) | | | | | |
| Pollution Degree | 3 | | | | | |
| **Physical Characteristics** | | | | | | |
| Housing Material | Die-cast alloy | | | | | |
| Actuator Material | Various polymers and metals | | | | | |
| Mounting | 2 x M4, any position | | | | | |
| Vibration | IEC 68-2-6 (10…55 Hz, 0.35 mm amplitude) | | | | | |
| Shock | IEC 68-2-7 (30 Gn 3 pulses per axis) | | | | | |
| Connection | 2 m (6.5 ft) cable or micro quick disconnect on a 6 in. pigtail | | | | | |
| Color | Red body/black head | | | | | |

★ The safety contacts are described as normally closed (N.C.) i.e., with the guard closed, actuator in place (where relevant) and the machine able to be started.

‡ Maximum for:

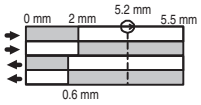
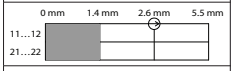
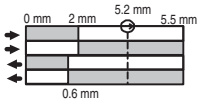
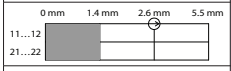
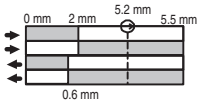
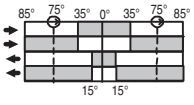
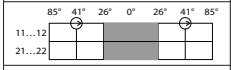
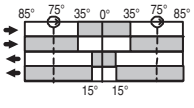
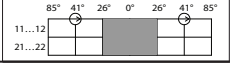
| 4-pin Male Micro M12 Connectors (D4 suffix) | |
|---|---|
| **AC** | **DC** |
| 30V, 3 A | 30V, 3 A |

| 5-pin Male Micro M12 Connectors (D5 suffix) | |
|---|---|
| **AC** | **DC** |
| 60V, 3 A | 60V, 3 A |



New

## Product Selection

| Operator Type | Contact: Safety | Contact: Aux. | Contact: Type | Max Force/ Torque to Operate | Contact Opening Characteristics (□ Open ■ Closed ⊖ Positive Opening Point) | Cat. No. 2 m (6.5 ft) Bottom Cable Style | Cat. No. 2 m (6.5 ft) Side Cable Style | Cat. No. 4-pin Micro QD Style | Cat. No. 5-pin Micro QD Style |
|---|---|---|---|---|---|---|---|---|---|
| | 1 N.C. | 1 N.O. | Snap Acting | 10 N (2.25 lb) |  | 440P-ARPS11C | 440P-ARPS11CS | 440P-ARPS11D4 | 440P-ARPS11D5 |
| ***Roller Plunger*** | 2 N.C. | — | — | |  | 440P-ARPB02C | 440P-ARPB02CS | 440P-ARPB02D4 | 440P-ARPB02D5 |
| ***Roller Plunger Panel Mount*** | 1 N.C. | 1 N.O. | Snap Acting | |  | 440P-ARP1S11C | 440P-ARP1S11CS | — | 440P-ARP1S11D5 |
| | 1 N.C. | 1 N.O. | Snap Acting | | | 440P-ADPS11C | 440P-ADPS11CS | 440P-ADPS11D4 | 440P-ADPS11D5 |
| ***Dome Plunger*** | 2 N.C. | — | — | |  | 440P-ADPB02C | 440P-ADPB02CS | 440P-ADPB02D4 | 440P-ADPB02D5 |
| ***Dome Plunger Panel Mount*** | 1 N.C. | 1 N.O. | Snap Acting | | | 440P-ADP1S11C | 440P-ADP1S11CS | — | 440P-ADP1S11D5 |
| ***Cross Roller Plunger*** | 1 N.C. | 1 N.O. | Snap Acting | |  | 440P-ACRS11C | 440P-ACRS11CS | 440P-ACRS11D4 | 440P-ACRS11D5 |
| ***Cross Roller Plunger Panel Mount*** | 1 N.C. | 1 N.O. | Snap Acting | | | 440P-ACR1S11C | 440P-ACR1S11CS | — | 440P-ACR1S11D5 |
| ***Short Lever Wide Roller*** | 1 N.C. | 1 N.O. | Snap Acting | 0.2 N•m (1.77 lb•in) |  | 440P-AWLS11C | 440P-AWLS11CS | 440P-AWLS11D4 | 440P-AWLS11D5 |
| | 1 N.C. | 1 N.O. | Snap Acting | | | 440P-ASLS11C | 440P-ASLS11CS | 440P-ASLS11D4 | 440P-ASLS11D5 |
| ***Short Lever Nylon Roller*** | 2 N.C. | — | — | |  | 440P-ASLB02C | 440P-ASLB02CS | 440P-ASLB02D4 | 440P-ASLB02D5 |
| ***Adj. Lever Nylon Roller*** | 1 N.C. | 1 N.O. | Snap Acting | |  | 440P-AALS11C | 440P-AALS11CS | 440P-AALS11D4 | 440P-AALS11D5 |
| | 1 N.C. | 1 N.O. | Snap Acting | | | 440P-AA1LS11C | 440P-AA1LS11CS | 440P-AA1LS11D4 | 440P-AA1LS11D5 |
| ***Adj. Lever Metal Roller*** | 2 N.C. | — | — | |  | 440P-AA1LB02C | 440P-AA1LB02CS | 440P-AA1LB02D4 | 440P-AA1LB02D5 |

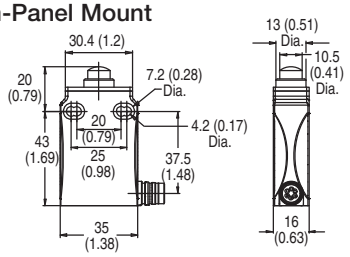
# 440P Safety Limit Switches

## 22 mm Compact Metal Position Switches

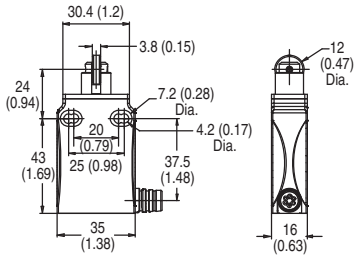
### Approximate Dimensions—mm (inches)

*Dimensions are not intended to be used for installation purposes.*

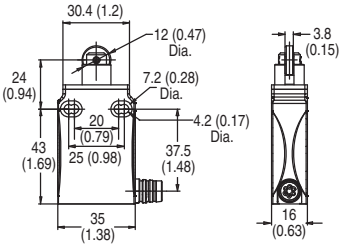
#### Non-Panel Mount



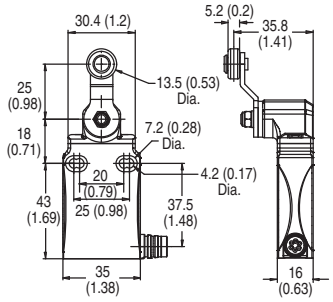

***Dome Plunger***



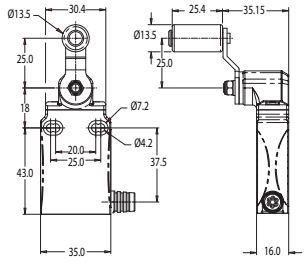

***Cross Roller Plunger***



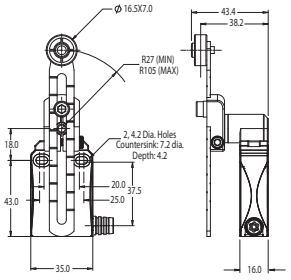

***Roller Plunger***



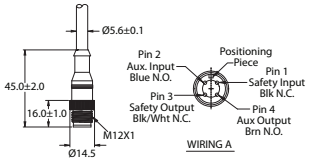

***Lever Type***



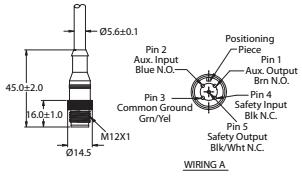

***Wide Roller Plunger***




***Adjustable Lever Type***




***4-pin Micro Quick Disconnect***

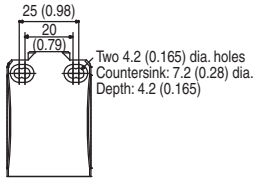



***5-pin Micro Quick Disconnect***

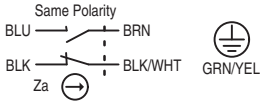
**Note:** Only non-panel mount pre-leaded side out models shown. Body dimensions for panel mount models as well as pre-leaded bottom out and 4-pin/5-pin micro connector mounted on a 6 in. pigtail models are identical. For other dimension drawings, refer to Installation and Operating Instructions.

- Side cable style shows strain relief only. Units include a 2 m integral cable.
- Bottom cable style units have same dimensions as side cable style.
- Panel mount clearance hole = 13 mm (0.51 in.)

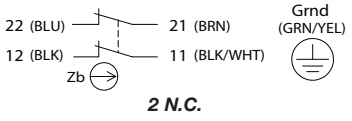
#### Counter Sinkhole




### Typical Wiring Diagrams




***1 N.C.***




***2 N.C.***

# 440P Safety Limit Switches

## 22mm Plastic Position Switches

## Description

The 22 mm plastic safety limit switches conform to EN 50047 and have been developed to provide a range of options including a choice of snap acting, slow break/make with 2- or 3-circuit configurations and a choice of actuator heads. The distance between the mounting holes is 22 mm.

The operator heads can be rotated in 90° increments for easy mounting.

Allen-Bradley Guardmaster limit switches can be used in other applications other than guard doors, for example on moving machine beds, crane arms, lifts, elevators, etc.

Operation of these limit switches is achieved by the sliding action of the guard or other moving object deflecting the plunger or lever.

**ATTENTION**

For safety applications it is important that upon actuation, the guard or other moving objects should not pass completely over the switch and allow the plunger or lever to return to its original position.

## Specifications

| | |
|---|---|
| **Standards** | EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/ EN60947-5-1, ANSI B11.19, AS4024.1 |
| **Category** | Cat. 1 Device per EN954-1 Dual channel interlocks suitable for Cat. 3 or 4 systems |
| **Approvals** | cULus, TÜV, CCC and CE Marked for all applicable directives |
| **Safety Contacts** | 1 N.C. snap acting, 2 N.C., 3 N.C. or 4 N.C. slow acting |
| **Auxiliary Contacts** | 1 N.O. (with 2 N.C.) |
| **Designation/Utilization Cat.** | **Contact Specifications❶** |
| **A600/AC-15 (Ue)** | 600 V 500 V 240 V 120 V |
| **(Ie)** | 1.2 A 1.4 A 3 A 6 A |
| **Q600/DC-13 (Ue)** | 600 V 500 V 250 V 125 V |
| **(Ie)** | 0.4 A 0.55 A 1.1 A 2.2 A |
| **Thermal Current (Ith)** | 10 A |
| **Rated Insulation Voltage** | 600 V AC |
| **Rated Impulse withstand Volt** | 2500 V |
| **Travel for Positive Opening** | Various (see Product Selection table) |
| **Max Switching Speed** | 250 mm/s |
| **Min Switching Speed** | 100 mm/min |
| **Max Switching Frequency** | 6000 operation per hour |
| **Case Material** | UL approved glass-filled polybutylene terephthalate |
| **Roller Material** | Various polymers |
| **Enclosure Protection** | IP 66 |
| **Operating Temperature [C (F)]** | -25…+65° (-13…+149°) |
| **Pollution Degree** | 3 |
| **Mechanical. Life Expectancy** | 1 x $10^7$ operations with no electrical load |
| **Conduit Entry** | M20 or 1/2 inch NPT |
| **Fixing** | 2 x M4 |
| **Mounting** | Any position |
| **Color** | Red |

❶ Maximum for:

| Two-Circuit D4 4-Pin Micro Connector | |
|---|---|
| AC | DC |
| 250V, 2.5 A | 250V, 2.5 A |
| **Three-Circuit R6 6-Pin Micro Connector** | |
| AC | DC |
| 30V, 2 A | 30V, 2 A |

## Features

- Large selection of actuator heads
- Positive operation, forced disconnection of contacts
- Snap-acting, slow make before break or slow break before make contact blocks
- Contacts 1 N.C. + 1 N.O., 2 N.C. + 1 N.O. 3 N.C., 2 N.C. + 1 N.O.
- Conforms to EN 50047, EN 1088, EN 60947-5-1, EN 292 and EN 60204-1

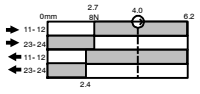
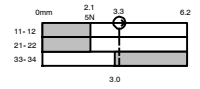
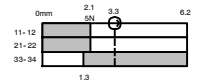
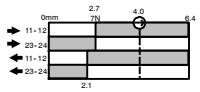
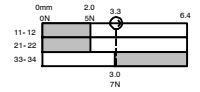
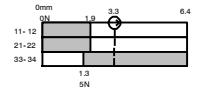
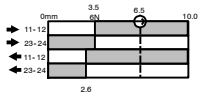
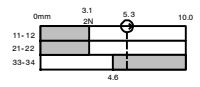
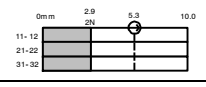
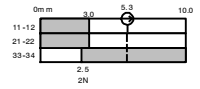
## Safety Limit Switches

Product Selection . . . . . page 5-117
Wiring . . . . . page 5-119
Dimensions . . . . . page 5-120



New

## Product Selection

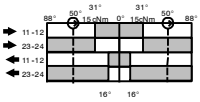
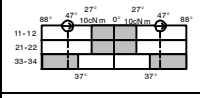
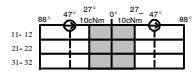
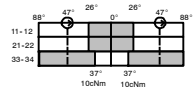
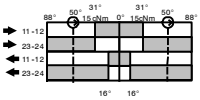
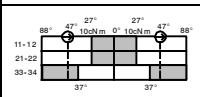
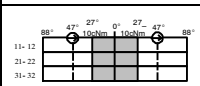
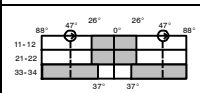
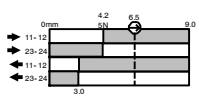
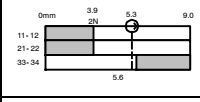
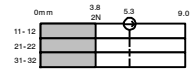
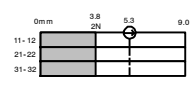
| Operator Type | Contact | | Contact Type | Typical Force/ Torque to Operate | Contact Opening Characteristics<br>□ Open ■ Closed<br>❸ Positive Opening Point | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | Safety | Aux. | | | | 1/2 inch NPT Conduit | M20 Conduit | Quick Disconnect ❶ |
| Roller Plunger | 1 N.C. | 1 N.O. | Snap Acting | 5 N |  | 440P-CRPS11E | **440P-CRPS11B** | 440P-CRPS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 6 N |  | 440P-CRPB12E | 440P-CRPB12B | 440P-CRPB12R6 |
| | 3 N.C. | — | — | 5 N | | 440P-CRPB03E | 440P-CRPB03B | 440P-CRPB03R6 |
| | 2 N.C. | 1 N.O. | MBB | 6 N |  | 440P-CRPM12E | 440P-CRPM12B | 440P-CRPM12R6 |
| Dome Plunger | 1 N.C. | 1 N.O. | Snap Acting | 5 N |  | 440P-CDPS11E | 440P-CDPS11B | 440P-CDPS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 6 N |  | 440P-CDPB12E | 440P-CDPB12B | 440P-CDPB12R6 |
| | 3 N.C. | — | — | 5 N | | 440P-CDPB03E | 440P-CDPB03B | 440P-CDPB03R6 |
| | 2 N.C. | 1 N.O. | MBB | 6 N |  | 440P-CDPM12E | 440P-CDPM12B | 440P-CDPM12R6 |
| Hinge Lever | 1 N.C. | 1 N.O. | Snap Acting | 5 N |  | 440P-CHLS11E | **440P-CHLS11B** | 440P-CHLS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 6 N |  | 440P-CHLB12E | 440P-CHLB12B | 440P-CHLB12R6 |
| | 3 N.C. | — | — | 5 N |  | 440P-CHLB03E | 440P-CHLB03B | 440P-CHLB03R6 |
| | 2 N.C. | 1 N.O. | MBB | 6 N |  | 440P-CHLM12E | 440P-CHLM12B | 440P-CHLM12R6 |
| Recommended standard cordset, 2 m, 4-pin, DC micro (M12) connector (see page 8-1 for additional lengths). | | | | | | | | 889D-F4AC-2 |
| Recommended standard cordset, 2 m, 6-pin AC micro connector (see page 8-1 for additional lengths). | | | | | | | | 889R-F6ECA-2 |

❶ D4 suffix uses a 4-pin DC micro (M12) connector.
R6 suffix uses a 6-pin AC micro (dual keyway) connector.

# 440P Safety Limit Switches

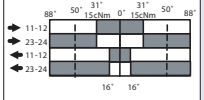
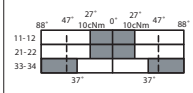
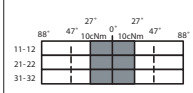
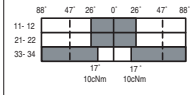
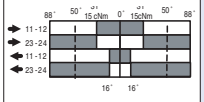
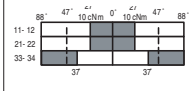
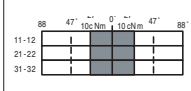
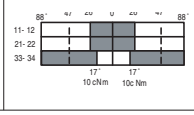
## 22mm Plastic Position Switches

### Product Selection (continued)

| Operator Type | Contact | | Contact Type | Typical Force/ Torque to Operate | Contact Opening Characteristics<br>□ Open ■ Closed<br>● Positive Opening Point | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | Safety | Aux. | | | | 1/2 inch NPT Conduit | M20 Conduit | Quick Disconnect ❶ |
| <br>Short Lever<br> | 1 N.C. | 1 N.O. | Snap Acting | 0.15 N•m |  | 440P-CSLS11E | **440P-CSLS11B** | 440P-CSLS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 0.14 N•m |  | 440P-CSLB12E | 440P-CSLB12B | 440P-CSLB12R6 |
| | 3 N.C. | — | — | 0.14 N•m |  | 440P-CSLB03E | 440P-CSLB03B | 440P-CSLB03R6 |
| | 2 N.C. | 1 N.O. | MBB | 0.14 N•m |  | 440P-CSLM12E | 440P-CSLM12B | 440P-CSLM12R6 |
| <br>Short Lever Metal Roller<br> | 1 N.C. | 1 N.O. | Snap Acting | 0.15 N•m |  | 440P-CMHS11E | 440P-CMHS11B | 440P-CMHS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 0.14 N•m |  | 440P-CMHB12E | 440P-CMHB12B | 440P-CMHB12R6 |
| | 3 N.C. | — | — | 0.14 N•m |  | 440P-CMHB03E | 440P-CMHB03B | 440P-CMHB03R6 |
| | 2 N.C. | 1 N.O. | MBB | 0.14 N•m |  | 440P-CMHM12E | 440P-CMHM12B | 440P-CMHM12R6 |
| <br>Offset Hinge<br> | 1 N.C. | 1 N.O. | Snap Acting | 5 N |  | 440P-COHS11E | 440P-COHS11B | 440P-COHS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 6 N |  | 440P-COHB12E | 440P-COHB12B | 440P-COHB12R6 |
| | 3 N.C. | — | — | 5 N |  | 440P-COHB03E | 440P-COHB03B | 440P-COHB03R6 |
| | 2 N.C. | 1 N.O. | MBB | 6 N |  | 440P-COHM12E | 440P-COHM12B | 440P-COHM12R6 |
| Recommended standard cordset, 2 m, 4-pin, DC micro (M12) connector (see page 8-1 for additional lengths) | | | | | | | | 889D-F4AC-2 |
| Recommended standard cordset, 2 m, 6-pin AC micro connector (see page 8-1 for additional lengths) | | | | | | | | 889R-F6ECA-2 |

❶ D4 suffix uses a 4-pin DC micro (M12) connector.
R6 suffix uses a 6-pin AC micro (dual keyway) connector.

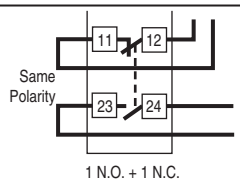
## Product Selection (continued)

| Description | Contact | | | Typical Force/Torque to Operate | Contact Opening Characteristics<br>□Open ■Closed<br>⊖ Positive Opening Point | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | Safety | Auxiliary | Type | | | 1/2 inch NPT Conduit | M20 Conduit | Connector Style★ |
| | 1 N.C. | 1 N.O. | Snap acting | 0.15 N•m |  | 440P-CALS11E | 440P-CALS11B | 440P-CALS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 0.14 N•m |  | 440P-CALB12E | 440P-CALB12B | 440P-CALB12R6 |
| | 3 N.C. | — | — | 0.14 N•m |  | 440P-CALB03E | 440P-CALB03B | 440P-CALB03R6 |
| Adjustable Lever ‡ | 2 N.C. | 1 N.O. | MBB | 0.14 N•m |  | 440P-CALM12E | 440P-CALM12B | 440P-CALM12R6 |
| | 1 N.C. | 1 N.O | Snap acting | 0.15 N•m |  | 440P-CRRS11E | 440P-CRRS11B | 440P-CRRS11D4 |
| | 2 N.C. | 1 N.O. | BBM | 0.14 N•m |  | 440P-CRRB12E | 440P-CRRB12B | 440P-CRRB12R6 |
| | 3 N.C. | — | — | 0.14 N•m |  | 440P-CRRB03E | 440P-CRRB03B | 440P-CRRB03R6 |
| Rubber Roller ‡ | 2 N.C. | 1 N.O. | MBB | 0.14 N•m |  | 440P-CRRM12E | 440P-CRRM12B | 440P-CRRM12R6 |
| Recommended standard cordset, 2 m, 4-pin, DC Micro (M12) connector. | | | | | | | | 889D-F4AC-2 |
| Recommended standard cordset, 2 m, 6-pin, AC Micro (M12) connector. | | | | | | | | 889R-F6ACA-2 |

★ D4 suffix uses a 4-pin DC Micro (M12) connector and R6 suffix uses a 6-pin AC Micro (dual keyway) consumer.
‡ Not positive opening

## Typical Wiring Diagrams §

### Two-Circuit Type D4 4-Pin Micro Connector

| Connector Pinout | | 1 N.C. + 1 N.O. | |
|---|---|---|---|
| | | Terminal | Contact |
|  | 1 | 11 | N.C. |
| | 3 | 12 | |
| | 2 | 23 | N.O. |
| | 4 | 24 | |

§ See Product Selection tables for positive opening circuits.

### Connector Ratings

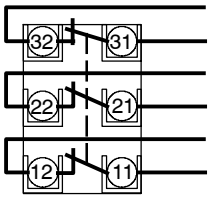
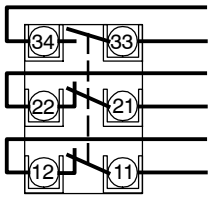
| | Max. Ratings | | Applicable Standards |
|---|---|---|---|
| | AC | DC | |
| 4-Pin Micro (M12) | 250V, 2.5 A | 250V, 2.5 A | IEC 61076-2-101:2003 |
| 6-Pin Micro (M12) | 30V, 2 A | 30V, 2 A | |

# 440P Safety Limit Switches

## 22mm Plastic Position Switches

### Typical Wiring Diagrams (continued) ❶

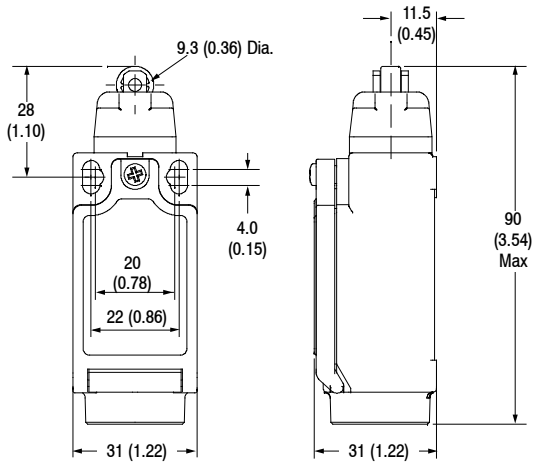
**Three-Circuit Type R6 6-Pin Micro Connector**

| Same Polarity | Connector Pinout | | 2 N.C. + 1 N.O. | | 3 N.C. | |
|---|---|---|---|---|---|---|
| | | | Terminal | Contact | Terminal | Contact |
|  |  | | 1 | 11 | N.C. | 11 | N.C. |
| | | | 5 | 12 | | 12 | |
| | | | 2 | 21 | N.C. | 21 | N.C. |
| | | | 6 | 22 | | 22 | |
| | | | 3 | 33 | N.O. | 31 | N.C. |
| | | | 4 | 34 | | 32 | |

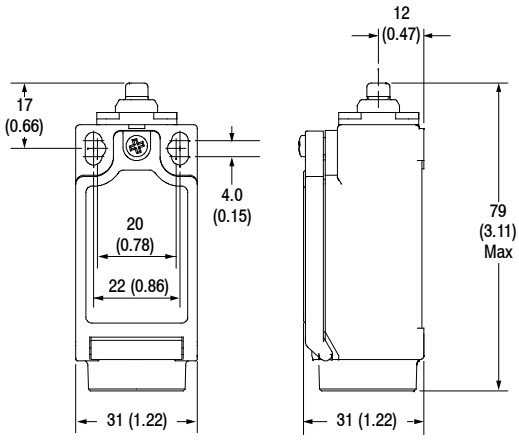
❶ See Product Selection tables for positive opening points.

### Approximate Dimensions [mm (in.)]

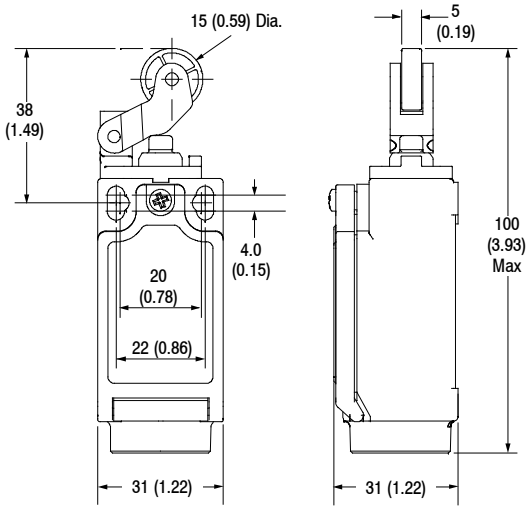
*Dimensions are not intended to be used for installation purposes.*



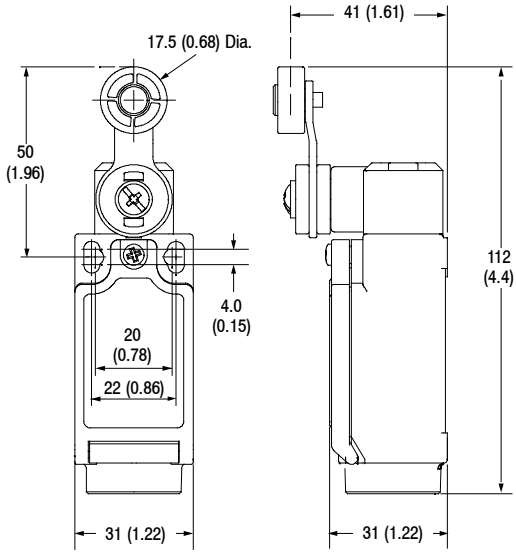

*Roller Plunger*




*Dome Plunger*



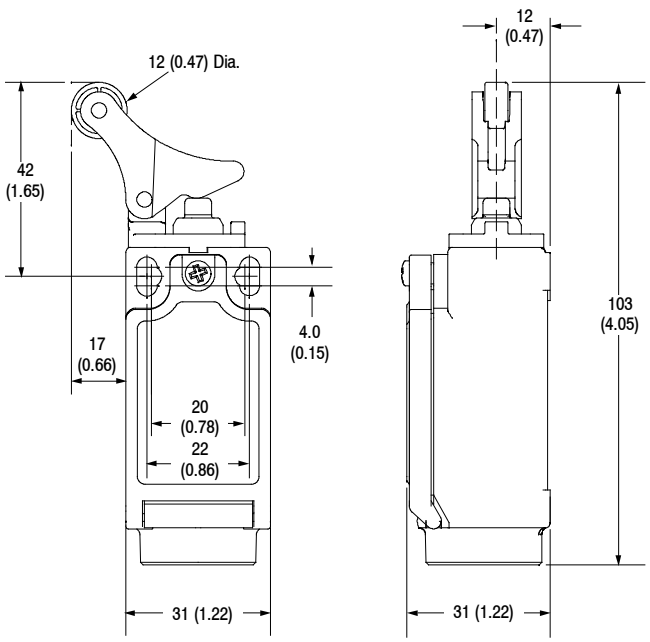

*Hinge Lever*



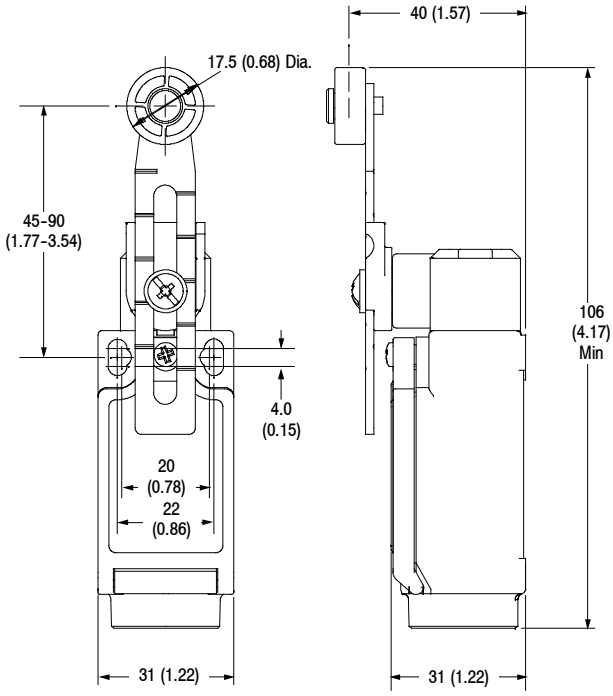

*Short Lever*
*(Metal & Plastic Roller)*

## Approximate Dimensions [mm (in.)]

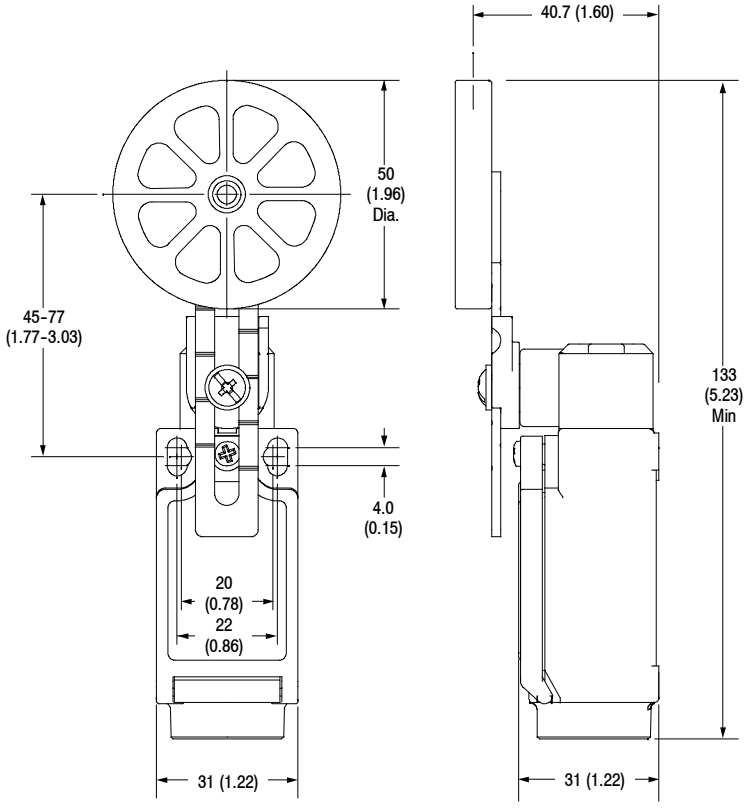
*Dimensions are not intended to be used for installation purposes.*




*Offset Hinge*




*Adjustable Lever*




*Rubber Roller*

# 440P Safety Limit Switches

## 30mm Metal Position Switches

The 30 mm metal safety limit switches conform to EN 50041 and have been developed to provide a range of options including a choice of snap-acting, slow-acting, and break before make (BBM) with 2-, 3-, and 4-circuit configurations and a choice of actuator heads. The distance between the horizontal mounting holes is 30 mm.

The operator heads can be rotated in 90° increments for easy mounting.

Allen-Bradley/Guardmaster limit switches can be used in other applications other than guard doors, for example on moving machine beds, crane arms, lifts, elevators, etc.

Operation of these limit switches is achieved by the sliding action of the guard or other moving object deflecting the plunger or lever.

**ATTENTION**

For safety applications it is important that upon actuation, the guard or other moving objects should not pass completely over the switch and allow the plunger or lever to return to its original position.

## Specifications

| | | | | | |
|---|---|---|---|---|---|
| **Standards** | EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/ EN60947-5-1, ANSI B11.19, AS4024.1 | | | | |
| **Category** | Cat. 1 Device per EN954-1 Dual channel interlocks suitable for Cat. 3 or 4 systems | | | | |
| **Approvals** | cULus, TÜV, CE and CCC Marked for all applicable directives | | | | |
| **Safety Contacts** | 1 N.C. snap acting, 2 N.C., 3 N.C. or 4 N.C. slow acting | | | | |
| **Auxiliary Contacts** | 1 N.O. (with 2 N.C.) | | | | |
| **Designation/Utilization Cat.** | **Contact Specifications❶** | | | | |
| **A600/AC-15** | **(Ue)** | 600 V | 500 V | 240 V | 120 V |
| | **(Ie)** | 1.2 A | 1.4 A | 3 A | 6 A |
| **Q600/DC-13** | **(Ue)** | 600 V | 500 V | 250 V | 125 V |
| | **(Ie)** | 0.1 A | 0.13 A | 0.27 A | 09.55 A |
| **Thermal Current (Ith)** | 8 A | | | | |
| **Rated Insulation Voltage** | 600 V AC | | | | |
| **Rated Impulse withstand Volt** | 2500 V | | | | |
| **Travel for Positive Opening** | Various (see Product Selection table) | | | | |
| **Max Switching Speed** | 250 mm/s | | | | |
| **Min Switching Speed** | 100 mm/min | | | | |
| **Max Switching Frequency** | 6000 operation per hour | | | | |
| **Case Material** | Die cast alloy | | | | |
| **Actuator Material** | See Product Selection table | | | | |
| **Enclosure Protection** | IP66 | | | | |
| **Operating Temperature [C (F)]** | -25...+65° (-13...+149°) | | | | |
| **Pollution Degree ❷** | 3 | | | | |
| **Mechanical Life Expectancy** | 1 x $10^7$ operations with no electrical load | | | | |
| **Conduit Entry** | M20 or 1/2 inch NPT | | | | |
| **Fixing** | 2 x M5 | | | | |
| **Mounting** | Any position | | | | |
| **Color** | Red | | | | |

❶ Maximum for:

| Two-Circuit N5 5-Pin Mini Connector | |
|---|---|
| AC | DC |
| 300V, 2.5 A | 300V, 2.5 A |
| **Four-Circuit M9 12-Pin M23 Connector** | |
| AC | DC |
| 60V, 2.5 A | 60V, 2.5 A |

❷ Conductive pollution occurs, or dry, nonconductive pollution occurs which becomes conductive due to condensation.

## Features

- Large selection of actuator heads
- Positive operation, forced disconnection of contacts
- Snap-acting, slow make before break or slow break before make contact blocks
- Contacts 1 N.C. + 1 N.O., 2 N.C. + 1 N.O. 3 N.C., 2 N.C. + 2 N.O., 3 N.C. + 1 N.O., or 4 N.C.
- Conforms to EN 50041, EN 1088, EN 60947-5-1, EN 292 and EN 60204-1

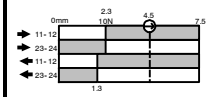
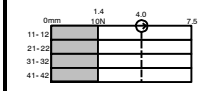
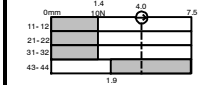
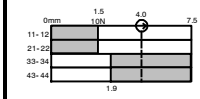
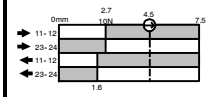
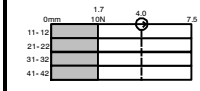
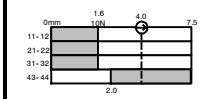
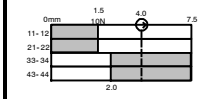
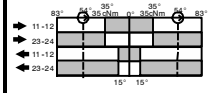
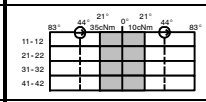
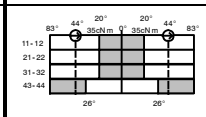
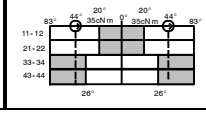
## Safety Limit Switches

Product Selection . . . . . page 5-123
Wiring . . . . . page 5-126
Dimensions . . . . . page 5-126



New

## Product Selection

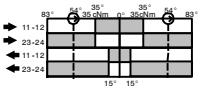
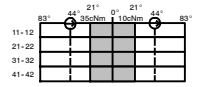
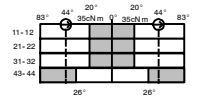
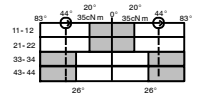
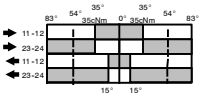
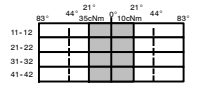
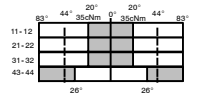
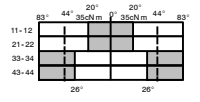
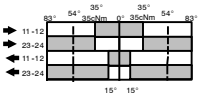
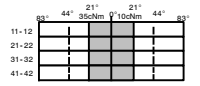
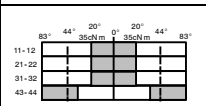
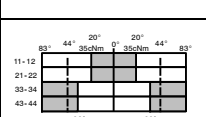
| Operator Type | Contacts | | Contact Type | Typical Force/ Torque to Operate | Contact Opening Characteristics<br>□ Open ■ Closed<br>❸ Positive Opening Point | Cat. No. | | |
|---|---|---|---|---|---|---|---|---|
| | Safety | Aux. | | | | 1/2 inch NPT Conduit | M20 Conduit | Quick Disconnect ❶ |
| <br>Metal Roller Plunger | 1 N.C. | 1 N.O. | Snap Acting | 13 N |  | 440P-MRPS11E | **440P-MRPS11B** | 440P-MRPS11N5 |
| | 4 N.C. | — | — | 11 N |  | 440P-MRPB04E | 440P-MRPB04B | 440P-MRPB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 11 N |  | 440P-MRPB13E | 440P-MRPB13B | 440P-MRPB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 11 N |  | **440P-MRPB22E** | 440P-MRPB22B | 440P-MRPB22M9 |
| <br>Metal Dome Plunger | 1 N.C. | 1 N.O. | Snap Acting | 13 N |  | 440P-MDPS11E | 440P-MDPS11B | 440P-MDPS11N5 |
| | 4 N.C. | — | — | 11 N |  | 440P-MDPB04E | 440P-MDPB04B | 440P-MDPB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 11 N |  | 440P-MDPB13E | 440P-MDPB13B | 440P-MDPB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 11 N |  | 440P-MDPB22E | 440P-MDPB22B | 440P-MDPB22M9 |
| <br>Metal Short Lever | 1 N.C. | 1 N.O. | Snap Acting | 0.34 N•m |  | **440P-MSLS11E** | **440P-MSLS11B** | 440P-MSLS11N5 |
| | 4 N.C. | — | — | 0.20 N•m |  | 440P-MSLB04E | 440P-MSLB04B | 440P-MSLB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.34 N•m |  | 440P-MSLB13E | 440P-MSLB13B | 440P-MSLB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.34 N•m |  | 440P-MSLB22E | 440P-MSLB22B | 440P-MSLB22M9 |
| Recommended standard cordset, 2 m, 5-pin mini connector (see page 8-1 for additional lengths). | | | | | | | | 889N-F5AE-6F |
| Recommended standard cordset, 2 m, 12-pin 9 wire (see page 8-1 for additional lengths). | | | | | | | | 889M-F12X9AE-2 |

❶ N5 = 5-pin mini connector.
M9 = 12-pin M23 connector (use 9 wire).

# 440P Safety Limit Switches

## 30mm Metal Position Switches

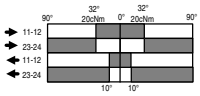
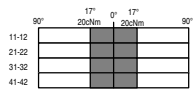
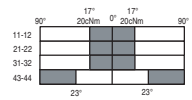
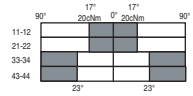
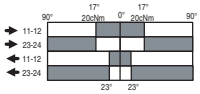
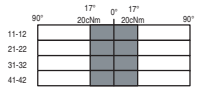
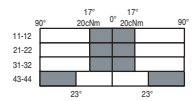
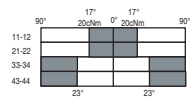
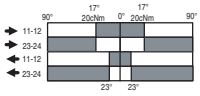
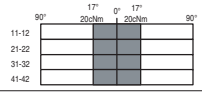
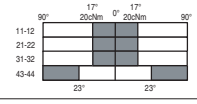
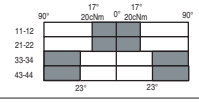
### Product Selection (continued)

| Operator Type | Contacts: Safety | Contacts: Aux. | Contact Type | Typical Force/ Torque to Operate | Contact Opening Characteristics (□ Open ■ Closed ◕ Positive Opening Point) | Cat. No.: 1/2 inch NPT Conduit | Cat. No.: M20 Conduit | Cat. No.: Quick Disconnect ❶ |
|---|---|---|---|---|---|---|---|---|
| Metal Short Lever, Metal Roller | 1 N.C. | 1 N.O. | Snap Acting | 0.34 N•m |  | 440P-MMHS11E | 440P-MMHS11B | 440P-MMHS11N5 |
| | 4 N.C. | — | — | 0.20 N•m |  | 440P-MMHB04E | 440P-MMHB04B | 440P-MMHB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.34 N•m |  | 440P-MMHB13E | 440P-MMHB13B | 440P-MMHB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.34 N•m |  | 440P-MMHB22E | 440P-MMHB22B | 440P-MMHB22M9 |
| Metal Adjustable Lever ❷ | 1 N.C. | 1 N.O. | Snap Acting | 0.34 N•m |  | **440P-MALS11E** | 440P-MALS11B | 440P-MALS11N5 |
| | 4 N.C. | — | — | 0.20 N•m |  | 440P-MALB04E | 440P-MALB04B | 440P-MALB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.34 N•m |  | 440P-MALB13E | 440P-MALB13B | 440P-MALB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.34 N•m |  | **440P-MALB22E** | 440P-MALB22B | 440P-MALB22M9 |
| Metal Rod Lever ❷ | 1 N.C. | 1 N.O. | Snap Acting | 0.34 N•m |  | 440P-MARS11E | 440P-MARS11B | 440P-MARS11N5 |
| | 4 N.C. | — | — | 0.20 N•m |  | 440P-MARB04E | 440P-MARB04B | 440P-MARB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.34 N•m |  | 440P-MARB13E | 440P-MARB13B | 440P-MARB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.34 N•m |  | 440P-MARB22E | 440P-MARB22B | 440P-MARB22M9 |
| Recommended standard cordset, 2 m, 5-pin mini connector (see page 8-1 for additional lengths). | | | | | | | | 889N-F5AE-6F |
| Recommended standard cordset, 2 m, 12-pin 9 wire (see page 8-1 for additional lengths). | | | | | | | | 889M-F12X9AE-2 |

❶ N5 = 5-pin mini connector.
M9 = 12-pin M23 connector (use 9 wire).

❷ Not positive opening

## Product Selection (continued)

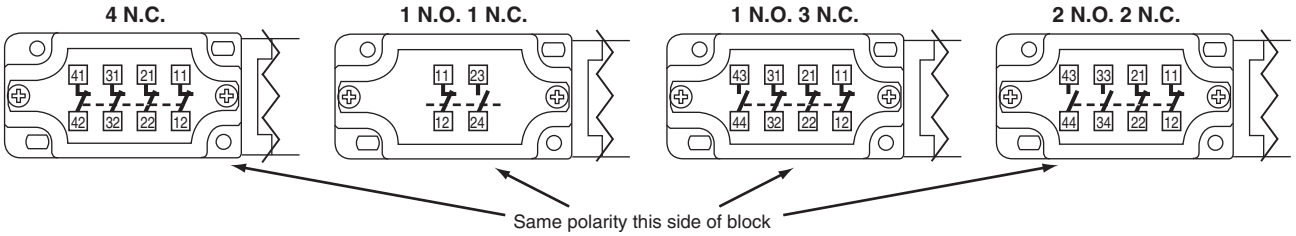
| Description | Safety Contacts | Auxiliary Contacts | Contact Type | Typical Force/Torque to Operate | Contact Opening Characteristics □ Open ■ Closed ⊖ Positive Opening Point | Cat. No. 1/2 inch NPT Conduit | Cat. No. M20 Conduit | Cat. No. Connector ★ |
|---|---|---|---|---|---|---|---|---|
| ***Metal Spring Rod ‡*** | 1 N.C. | 1 N.O. | Snap Acting | 0.20 N•m (1.77 lb•in) |  | 440P-MSRS11E | 440P-MSRS11B | 440P-MSRS11N5 |
| | 4 N.C. | — | — | 0.20 N•m (1.77 lb•in) |  | 440P-MSRB04E | 440P-MSRB04B | 440P-MSRB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.20 N•m (1.77 lb•in) |  | 440P-MSRB13E | 440P-MSRB13B | 440P-MSRB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.20 N•m (1.77 lb•in) |  | 440P-MSRB22E | 440P-MSRB22B | 440P-MSRB22M9 |
| ***Telescopic Arm ‡*** | 1 N.C. | 1 N.O. | Snap Acting | 0.20 N•m (1.77 lb•in) |  | 440P-MTAS11E | 440P-MTAS11B | 440P-MTAS11N5 |
| | 4 N.C. | — | — | 0.20 N•m (1.77 lb•in) |  | 440P-MTAB04E | 440P-MTAB04B | 440P-MTAB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.20 N•m (1.77 lb•in) |  | 440P-MTAB13E | 440P-MTAB13B | 440P-MTAB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.20 N•m (1.77 lb•in) |  | 440P-MTAB22E | 440P-MTAB22B | 440P-MTAB22M9 |
| ***Large Rubber Roller‡*** | 1 N.C. | 1 N.O. | Snap Acting | 0.20 N•m (1.77 lb•in) |  | 440P-MRRS11E | 440P-MRRS11B | 440P-MRRS11N5 |
| | 4 N.C. | — | — | 0.20 N•m (1.77 lb•in) |  | 440P-MRRB04E | 440P-MRRB04B | 440P-MRRB04M9 |
| | 3 N.C. | 1 N.O. | BBM | 0.34 N•m (3.01 lb•in) |  | 440P-MRRB13E | 440P-MRRB13B | 440P-MRRB13M9 |
| | 2 N.C. | 2 N.O. | BBM | 0.34 N•m (3.01 lb•in) |  | 440P-MRRB22E | 440P-MRRB22B | 440P-MRRB22M9 |
| Recommended standard cordset, 2 m, 5-pin mini connector. | | | | | | | | 889N-F5AE-6F |
| Recommended standard cordset, 2 m, 12-pin 9-wire. | | | | | | | | 889M-F12X9AE-2 |

★ N5 = 5-pin mini connector.
M9 = 12-pin M23 connector (use 9 wire).
‡ Not positive opening

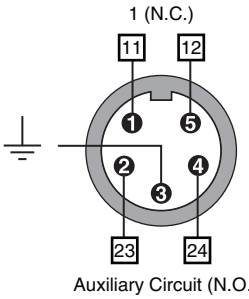
# 440P Safety Limit Switches

## 30 mm Metal Position Switches

### Typical Wiring Diagrams



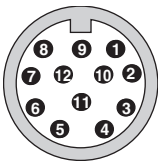

### N5 Connector 2 Circuit 5-Pin Mini Connector




### Connector Ratings

| | Max. Ratings | | Applicable Standards |
|---|---|---|---|
| | AC | DC | |
| 5-Pin Mini (M12) | 300V, 2.5 A | 300V, 2.5 A | IEC 61076-2-101:2003 |
| 12-Pin (M23) | 60V, 2.5 A | 60V, 2.5 A | |

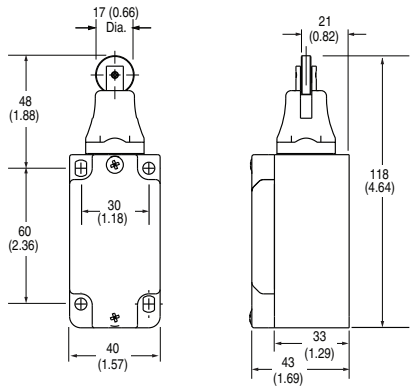
### M9 12-Pin M23 Connector



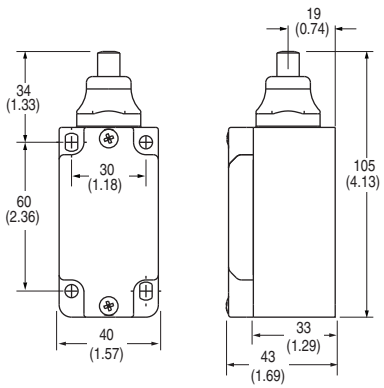

| Connector Pinout | | 4 N.C. | | 3 N.C. 1 N.O. | | 3 N.C. | |
|---|---|---|---|---|---|---|---|
| | | Terminal | Contact | Terminal | Contact | Terminal | Contact |
| | 1 | 11 | N.C. | 11 | N.C. | 11 | N.C. |
| | 3 | 12 | | 12 | | 12 | |
| | 4 | 21 | N.C. | 21 | N.C. | 21 | N.C. |
| | 6 | 22 | | 22 | | 22 | |
| | 7 | 31 | N.C. | 31 | N.C. | 33 | N.O. |
| | 8 | 32 | | 32 | | 34 | |
| | 9 | 41 | N.C. | 43 | N.O. | 43 | N.O. |
| | 10 | 42 | | 44 | | 44 | |
| | 12 | Ground | | | | | |

### Approximate Dimensions—mm (inches)

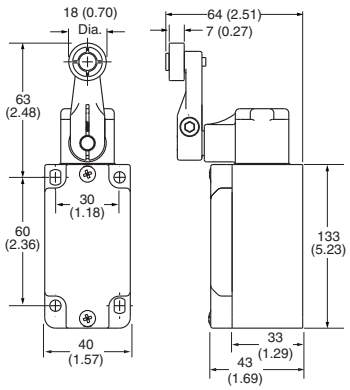
*Dimensions are not intended to be used for installation purposes.*




**Roller Plunger**




**Dome Plunger**




**Short Lever, (Metal & Plastic Roller)**



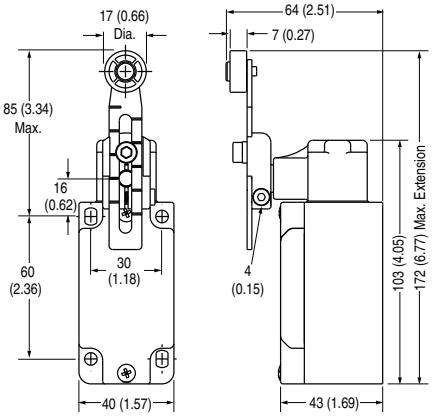
New



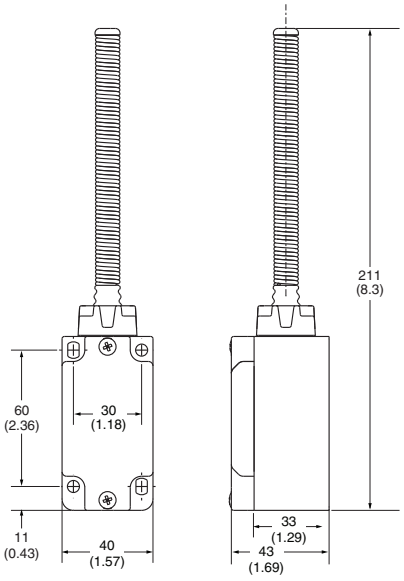
Allen-Bradley

## Approximate Dimensions—mm (inches) (continued)

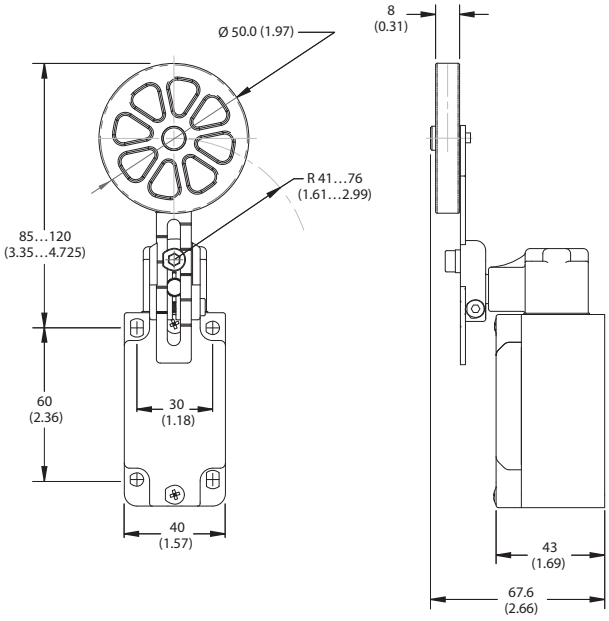
Dimensions are not intended to be used for installation purposes.



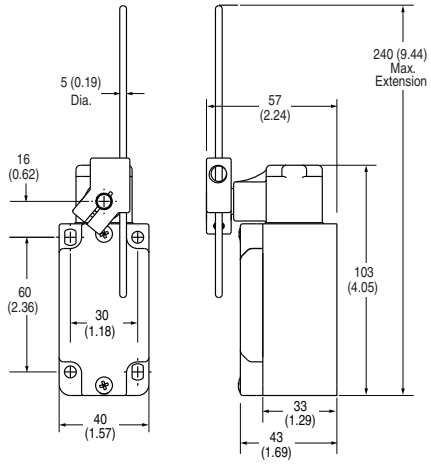

*Adjustable Lever*



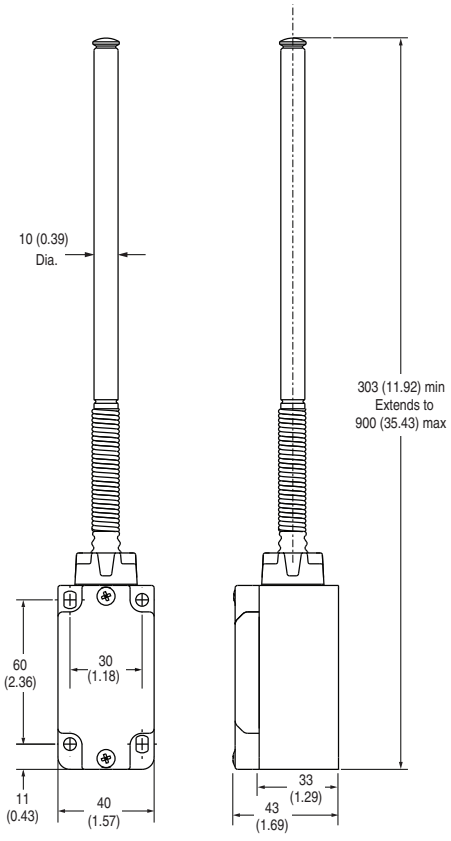

*Spring Rod*




*Adjustable Lever with Rubber Roller*




*Rod Lever*




*Telescopic Arm*

# 802K General Purpose Limit Switches

## 30 mm Metal Position Switches

## Description

The 30 mm metal limit switches conform to EN 50041 and have been developed to provide a range of options including a choice of snap-acting, slow-acting, and break before make (BBM) with 2- and 4-circuit configurations and a choice of actuator heads. The distance between the horizontal mounting holes is 30 mm.

The operator heads can be rotated in 90° increments for easy mounting.

Allen-Bradley limit switches can be used in applications such as moving machine beds, crane arms, lifts, elevators, etc.

Operation of these limit switches is achieved by the sliding action of the moving object deflecting the plunger or lever.

| ATTENTION | |
|---|---|
| | It is important that upon actuation, moving objects should not pass completely over the switch and allow the plunger or lever to return to its original position. |

## Specifications

| | | | | | |
|---|---|---|---|---|---|
| **Safety Ratings** | | | | | |
| Standards | | EN954-1, ISO13849-1, IEC/EN60204-1, NFPA79, EN1088, ISO14119, IEC/ EN60947-5-1, ANSI B11.19, AS4024.1 | | | |
| Certifications | | cULus and CE Marked for all applicable directives | | | |
| **Outputs** | | | | | |
| Contacts | | 1 N.C. snap acting, 2 N.C. or 4 N.C. slow acting | | | |
| Auxiliary Contacts | | 1 N.O. (with 1 N.C.) or 2 N.O. (with 2 N.C.) | | | |
| Thermal Current ($I_{lth}$) | | 8 A | | | |
| Rated Insulation Voltage | | 600V AC | | | |
| **Utilization Category** | | **Contact Specification** | | | |
| A600/AC-15 | (Ue) | 600V | 500V | 240V | 120V |
| | (Ie) | 1.2 A | 1.4 A | 3.0 A | 6.0 A |
| N600/DC-13 | (Ue) | 600V | 500V | 250V | 125V |
| | (Ie) | 0.4 A | 0.55 A | 1.1 A | 2.2 A |
| **Operating Characteristics** | | | | | |
| Actuation Speed, Max. | | 250 mm/s | | | |
| Actuation Speed, Min. | | 100 mm/min | | | |
| Actuation Frequency, Max. | | 6000 operations per hour | | | |
| Mechanical Life | | 1 x $10^7$ operations with no electrical load | | | |
| **Environmental** | | | | | |
| Enclosure Type Rating | | IP66 | | | |
| Operating Temperature [C (F)] | | -25…+65 ° (-13…+149 °) | | | |
| Pollution Degree★ | | 3 | | | |
| **Physical Characteristics** | | | | | |
| Housing Material | | Die-cast alloy | | | |
| Actuator Material | | Various polymers and metals | | | |
| Mounting | | 2 x M5, any position | | | |
| Vibration | | IEC 68-2-6 (10…55 Hz, 0.35 amplitude) | | | |
| Shock | | IEC 68-2-7 (30 Gn 3 pulses per axis) | | | |
| Conduit Entry | | M20 or 1/2 inch NPT | | | |
| Color | | Black | | | |

★ Conductive pollution occurs, or dry, nonconductive pollution occurs which becomes conductive due to condensation.

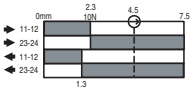
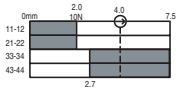
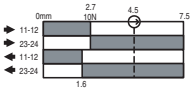
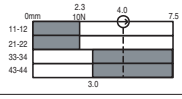
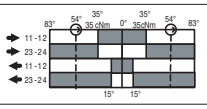
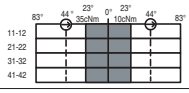
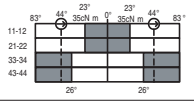
## Features

- Large selection of actuator heads
- Positive operation, forced disconnection of contacts
- Snap-acting or slow break before make contact blocks
- Contacts 1 N.C. + 1 N.O., 2 N.C. + 2 N.O., or 4 N.C.
- Conforms to EN 50041, EN 1088, EN 60947-5-1, EN 292, and EN 60204-1

# 802K General Purpose Limit Switches

## 30 mm Metal Position Switches

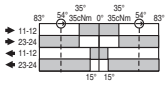
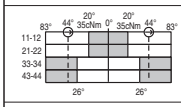
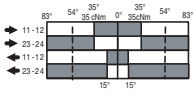
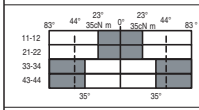
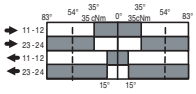
### Product Selection

| Description | Contact | | | Typical Force/Torque to Operate | Contact Opening Characteristics<br>□ Open ■ Closed<br>⊖ Positive Opening Point | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | Safety | Auxiliary | Type | | | 1/2 inch NPT Conduit | M20 Conduit |
| <br>***Metal Roller Plunger*** | 1 N.C. | 1 N.O. | Snap Acting | 13 N (2.9 lb) |  | 802K-MRPS11E | — |
| | 2 N.C. | 2 N.O. | BBM | 11 N (2.5 lb) |  | 802K-MRPB22E | — |
| <br>***Metal Dome Plunger*** | 1 N.C. | 1 N.O. | Snap Acting | 13 N (2.9 lb) |  | 802K-MDPS11E | — |
| | 2 N.C. | 2 N.O. | BBM | 11 N (2.5 lb) |  | 802K-MDPB22E | 802K-MDPB22B |
| <br>***Metal Short Lever*** | 1 N.C. | 1 N.O. | Snap Acting | 0.34 N•m (3.01 lb•in) |  | 802K-MSLS11E | 802K-MSLS11B |
| | 4 N.C. | — | — | 0.20 N•m (1.77 lb•in) |  | 802K-MSLB04E | — |
| | 2 N.C. | 2 N.O. | BBM | 0.34 N•m (3.01 lb•in) |  | 802K-MSLB22E | 802K-MSLB22B |
| Recommended standard cordset, 2 m, 5-pin mini connector. | | | | | | | 889N-F5AE-6F |
| Recommended standard cordset, 2 m, 12-pin 9-wire. | | | | | | | 889M-F12X9AE-2 |

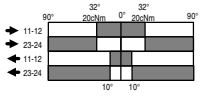
# 802K General Purpose Limit Switches

## 30 mm Metal Position Switches

### Product Selection (continued)

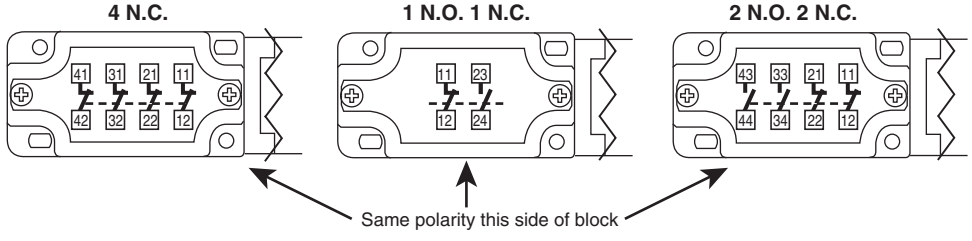
| Description | Safety Contacts | Auxiliary Contacts | Contact Type | Typical Force/Torque to Operate | Contact Opening Characteristics<br>□Open ■Closed<br>⊖ Positive Opening Point | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | 1/2 inch NPT Conduit | M20 Conduit |
| <br>***Metal Short Lever, Metal Roller*** | 1 N.C. | 1 N.O. | Snap Acting | 0.34 N•m (3.01 lb•in) |  | 802K-MMHS11E | 802K-MMHS11B |
| | 2 N.C. | 2 N.O. | BBM | |  | 802K-MMHB22E | — |
| <br>***Metal Adjustable Lever ‡*** | 1 N.C. | 1 N.O. | Snap Acting | |  | 802K-MALS11E | 802K-MALS11B |
| | 2 N.C. | 2 N.O. | BBM | |  | 802K-MALB22E | 802K-MALB22B |
| <br>***Metal Rod Lever ‡*** | 1 N.C. | 1 N.O. | Snap Acting | |  | 802K-MARS11E | — |
| Recommended standard cordset, 2 m, 5-pin mini connector. | | | | | | | 889N-F5AE-6F |
| Recommended standard cordset, 2 m, 12-pin 9-wire. | | | | | | | 889M-F12X9AE-2 |

‡ Not positive opening

| Description | Safety Contacts | Auxiliary Contacts | Contact Type | Typical Force/Torque to Operate | Contact Opening Characteristics<br>□Open ■Closed<br>⊖ Positive Opening Point | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | 1/2 inch NPT Conduit | M20 Conduit |
| <br>***Metal Spring Rod ‡*** | 1 N.C. | 1 N.O. | Snap Acting | 0.20 N•m (1.77 lb•in) |  | 802K-MSRS11E | 802K-MSRS11B |
| Recommended standard cordset, 2 m, 5-pin mini connector. | | | | | | | 889N-F5AE-6F |
| Recommended standard cordset, 2 m, 12-pin 9-wire. | | | | | | | 889M-F12X9AE-2 |

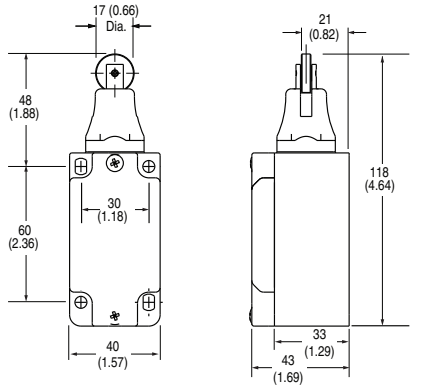
‡ Not positive opening

### Typical Wiring Diagrams

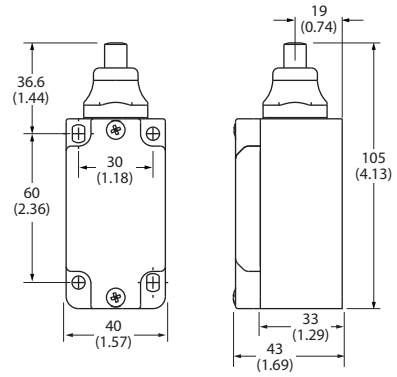


## Approximate Dimensions—mm (inches)

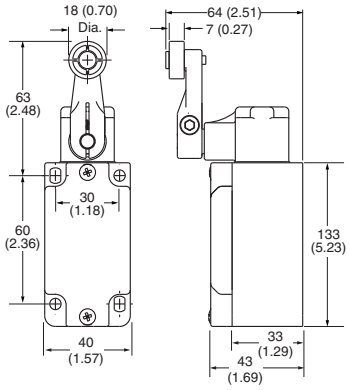
*Dimensions are not intended to be used for installation purposes.*



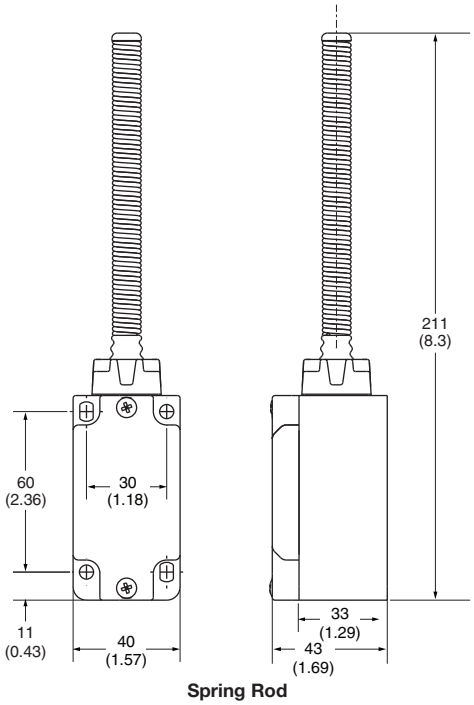

**Roller Plunger**



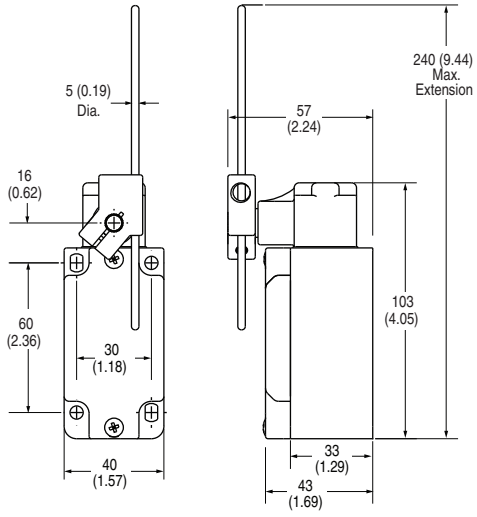

**Dome Plunger**



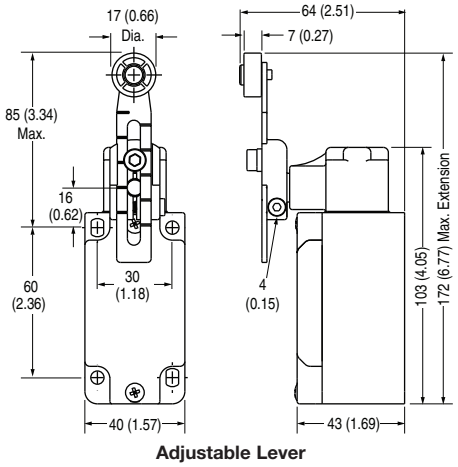

**Short Lever**
**(Metal & Plastic Roller)**




**Spring Rod**




**Rod Lever**




**Adjustable Lever**

# 440P Safety Limit Switches

## 15mm Plastic Position Interlock Switches

*Imp 1*

*Imp 2*

## Description

The Imp offers safety switch performance of bigger units in the most compact case available. Designed with two mounting hole options and a choice of actuator positions, the Imp will fit in the most confined spaces.

## Features

- Positive operation, forced disconnection of contacts
- Contacts, 1 N.C. & 1 N.O.

## Specifications

| | |
|---|---|
| **Standards** | EN60947-5-1,EN292-1, EN60204-1, EN1088 |
| **Certifications** | CE Marked for all applicable directives and CSA NRTL/C |
| **Safety Contacts** | 1 N.C. positive break |
| **Utilization Category** | AC 15 |
| **AC (Ue)** | 500 V 250 V 100 V |
| **(Ie)** | 1 A 2 A 5 A |
| **DC** | 250 V 0.5 A, 24 V 2 A |
| **Max. Switched Current/ Voltage/Load** | 500 V/500 VA |
| **Thermal Current (Ith)** | 10 A |
| **Minimum Current** | 5 V 5 mA DC |
| **Safety Contact Gap** | >2 x 2 mm (0.079 in.) |
| **Rated Insulation Voltage** | (Ui) 500 V |
| **Rated Impulse Withstand Voltage** | (Uimp) 2500 V |
| **Auxiliary Contacts** | 1 N.O. |
| **Pollution Degree** | 3 |
| **Actuator Travel for Positive Opening** | 2.5 mm (0.098 in.) |
| **Break Contact Min. Force** | 10 N (2.25 lb) |
| **Maximum Actuator Travel** | 5 mm (0.197 in.) |
| **Maximum Actuation Speed** | 160 mm (6.29 in.) per sec |
| **Maximum Actuation Frequency** | 2 Cycle per sec |
| **Case Material** | UL approved glass filled polyester |
| **Actuator Material** | Acetal |
| **Protection** | IP30 |
| **Conduit Entry** | 3x breakouts |
| **Operating Temperature [C (F)]** | -25…+80° (-13…+176°) |
| **Mounting** | 2 x M3 front or 2 x M4 top |
| **Mechanical Life** | 10,000,000 operations |
| **Electrical Life** | 1,000,000 operations |
| **Color** | Red |

## Position Interlock Switch

Selection Guide . . . . . page 5-129
Dimensions . . . . . page 5-129
Wiring Diagram . . . . . page 5-129
Operating Levers . . . . . page 5-130

# 440P Safety Limit Switches

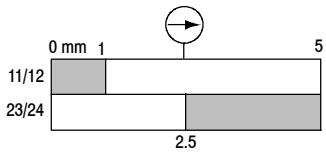
## 15mm Plastic Position Interlock Switches

## Range of Operation

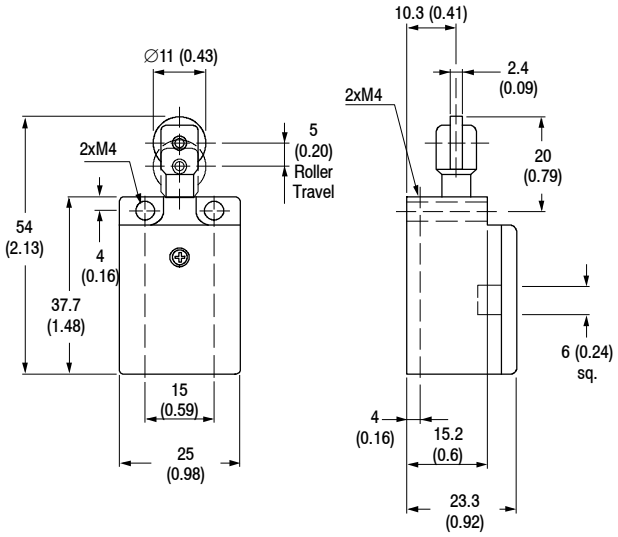
*Imp 1*

*Imp 2*

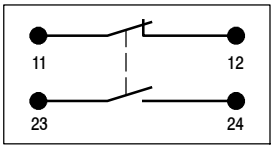
## Selection Guide

| Contact Action<br>☐ Contact Open ▩ Contact Closed | Conduit | Contact | | Type | Operator Type | | Cat. No. |
|---|---|---|---|---|---|---|---|
|  | 3x breakouts | Slow break before make | 1 N.O. & 1 N.C. | Imp 1 (roller parallel to switch front) | Top Push Roller | | 440P-M18001 |
| | | | | Imp 2 (roller perpendicular to switch front) | Top Push Cross Roller | | 440P-M18002 |

## Approximate Dimensions [mm (in.)]




## Wiring Diagram




1 N.O. & 1 N.C.

# Operating Levers

**For use with 802T, 802M, 802MC, 802X, 802XR**

## Roller Levers

| Type | Roller | | | Cat. No. |
|---|---|---|---|---|
| | Material | Dia. | Width | |
| *Non-Adj. Cast Lever 0.75″ Radius* | Metal | 0.75″ | 0.27″ | 802T-W9A |
| *Non-Adj. Cast Lever 1.5″ Radius Roller on Front* | Nylon | 0.75″ | 0.28″ | **802T-W1** |
| | Nylon | 0.75″ | 1″ | **802T-W1H** |
| | Dual Nylon | 0.75″ | 1″ each | 802T-W1HH |
| | Steel | 0.75″ | 0.25″ | **802T-W1A** |
| | Steel | 0.75″ | 0.75″ | 802T-W1N |
| | Ball Bearing | 0.75″ | 0.23″ | **802T-W1B** |
| | Beryllium Copper (Nonsparking) | 0.75″ | 0.28″ | 802T-W1J |
| | Nylon | 0.75″ | 0.75″ | 802T-W1L |
| *Non-Adj. Cast Lever 1.5″ Radius Roller on Rear* | Nylon | 0.75″ | 0.28″ | 802T-W1E |
| | Nylon | 0.75″ | 1″ | **802T-W1D** |
| | Nylon | 1.5″ | 0.28″ | 802T-W1G |
| | Steel | 0.75″ | 0.25″ | **802T-W1F** |
| | Steel | 0.75″ | 0.75″ | **802T-W1C** |
| | Nylon | 0.75″ | 0.75″ | 802T-W1M |
| *Non-Adj. Steel Lever 2.0″ Radius Roller on Front* | Nylon | 0.75″ | 0.28″ | 802T-W20 |
| | Nylon | 0.75″ | 1″ | 802T-W20D |
| | Steel | 0.75″ | 0.25″ | 802T-W20A |
| | Steel | 0.75″ | 0.75″ | 802T-W20B |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W20C |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-W20E |
| *Non-Adj. Steel Lever 2.0″ Radius Roller on Rear* | Nylon | 0.75″ | 0.28″ | 802T-W20J |
| | Nylon | 0.75″ | 1″ | 802T-W20K |
| | Steel | 0.75″ | 0.25″ | 802T-W20L |
| | Steel | 0.75″ | 0.75″ | 802T-W20M |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W20N |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-W20P |
| *Non-Adj. Steel Lever 2 1/8″ Radius Roller on Front* | Nylon | 0.75″ | 0.75″ | 802T-W18 |
| | Nylon | 0.75″ | 1″ | 802T-W18A |

**Approximate Dimensions—See page 5-133.**

| Type | Roller | | | Cat. No. |
|---|---|---|---|---|
| | Material | Dia. | Width | |
| *Non-Adj. Steel Lever 2.5″ Radius Roller on Front* | Nylon | 0.75″ | 0.28″ | 802T-W25 |
| | Nylon | 0.75″ | 1″ | 802T-W25D |
| | Steel | 0.75″ | 0.25″ | 802T-W25A |
| | Steel | 0.75″ | 0.75″ | 802T-W25B |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W25C |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-W25E |
| *Non-Adj. Steel Lever 2.5″ Radius Roller on Rear* | Nylon | 0.75″ | 0.28″ | 802T-W25J |
| | Nylon | 0.75″ | 1″ | 802T-W25K |
| | Steel | 0.75″ | 0.25″ | 802T-W25L |
| | Steel | 0.75″ | 0.75″ | 802T-W25M |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W25N |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-W25P |
| *Non-Adj. Steel Lever 3.0″ Radius Roller on Front* | Nylon | 0.75″ | 0.28″ | 802T-W30 |
| | Nylon | 0.75″ | 1″ | 802T-W30D |
| | Steel | 0.75″ | 0.25″ | 802T-W30A |
| | Steel | 0.75″ | 0.75″ | 802T-W30B |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W30C |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-W30E |
| *Non-Adj. Steel Lever 3.0″ Radius Roller on Rear* | Nylon | 0.75″ | 0.28″ | 802T-W30J |
| | Nylon | 0.75″ | 1″ | 802T-W30K |
| | Steel | 0.75″ | 0.25″ | 802T-W30L |
| | Steel | 0.75″ | 0.75″ | 802T-W30M |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W30N |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-W30P |
| *Adjustable Lever 1.19″ to 3″ Radius* | Nylon | 0.75″ | 0.28″ | **802T-W2** |
| | Nylon | 0.75″ | 1″ | **802T-W2D** |
| | Nylon | 1.5″ | 0.28″ | **802T-W2A** |
| | Steel | 0.75″ | 0.25″ | **802T-W2B** |
| | Ball Bearing | 0.75″ | 0.23″ | **802T-W2C** |
| | Steel | 1.4″ | 0.27″ | 802T-W2E |
| | Rubber | 1.5″ | 0.5″ | 802T-W2R |
| | Beryllium Copper | 0.75″ | 0.28″ | 802T-NX94 |
| *Adjustable Lever 1.19″ to 3.5″ Radius* | Nylon | 0.75″ | 0.28″ | **802T-W17** |
| | Metal | | | 802T-W17B |
| | Nylon | 1.5″ | | 802T-W17A |

# Operating Levers

**For use with 802T, 802M, 802MC, 802X, 802XR**

## Roller Levers (continued)

| Type | Roller Material | Roller Dia. | Roller Width | Cat. No. |
|---|---|---|---|---|
| *Fork Lever 1.5″ Radius* | Nylon; L.H. Roller on Front; R.H. Roller on Back | 0.75″ | 0.28″ | 802T-W4 |
| | Steel; L.H. Roller on Front; R.H. Roller on Back | 0.75″ | 0.25″ | 802T-W4B |
| | Nylon; Both Rollers on Front | 0.75″ | 0.28″ | **802T-W4A** |
| | Nylon; Both Rollers on Rear | 0.75″ | 0.28 | 802T-NX115 |
| | Nylon; Both Rollers on Front | 0.75″ | 1″ | 802T-W4F |
| | Steel; Both Rollers on Front | 0.75″ | 0.25″ | **802T-W4C** |
| | Nylon; L.H. Roller on Back; R.H. Roller on Front | 0.75″ | 0.28″ | 802T-W4D |
| *Micrometer Adjustment Lever ❹ 1.5″ Radius* | Nylon R.H. Adj. | 0.75″ | 0.28″ | 802T-W6 |
| | Steel R.H. Adj. | 0.75″ | 0.25″ | **802T-W6A** |
| | Ball Bearing R.H. Adj. | 0.75″ | 0.23″ | 802T-W6B |
| | Nylon L.H. Adj. | 0.75″ | 0.28″ | 802T-W6C |
| | Steel L.H. Adj. | 0.75″ | 0.25″ | 802T-W6D |
| | Ball Bearing L.H. Adj. | 0.75″ | 0.23″ | 802T-W6E |
| | Nylon R.H. Adj. | 0.75″ | 1″ | 802T-W6F |
| *Non-Adj. One-Way Lever 1.5″ Radius* | Nylon | 0.75″ | 0.28″ | 802T-W7❶ |
| | Steel | 0.75″ | 0.25″ | 802T-W7A❶ |
| | Ball Bearing | 0.75″ | 0.23″ | 802T-W7B❶ |
| *Non-Adj. Offset Lever 1.44″ Radius Roller on Front* | Nylon | 0.75″ | 0.28″ | 802T-W12❷ |
| | Steel | 0.75″ | 0.25″ | **802T-W12A❷** |
| | Bearing Roller | 0.75″ | 0.23″ | 802T-W12B |
| *Non-Adj. Offset Lever 1.44″ Radius Roller on Rear* | Nylon | 0.75″ | 0.28″ | 802T-W12E |
| | Steel | 0.75″ | 0.25″ | 802T-W12F |

**Approximate Dimensions—See page 5-133.**

## Roller Levers—Corrosion-Resistant

| Type | Material | Roller Dia. | Roller Width | Cat. No. |
|---|---|---|---|---|
| *1.5″ Radius Roller on Front* | Type 316 stainless steel roller, roller pin and clamp pin<br>One-piece cast aluminum arm is protected with TUFRAM®❸ | 0.75″ | 0.25″ | **802MC-W1A** |
| *1.5″ Radius Roller on Rear* | Nylon Roller<br>One-piece cast aluminum arm is protected with TUFRAM®❸ | 1.5″ | 0.28″ | 802MC-W1G |
| *Non-Adj. Offset Lever 1.44″ Radius Roller on Front* | Nylon Roller<br>One-piece cast aluminum arm is protected with TUFRAM®❸ | 0.75″ | 0.28″ | 802MC-W12 |
| *Adjustable 1.19″-3″ Radius* | Type 316 stainless steel roller, roller pin, clamp pin and adjustable lever arm<br>Block is cast aluminum protected with TUFRAM®❸ | 0.75″ | 0.25″ | **802MC-W2B** |

❶ Do not use on maintained contact limit switches.

❷ When mounted on Plug-In devices, the offset lever provides equivalent cam tracking to the NonPlug-In devices using catalog number 802T-W1 levers.

❸ TUFRAM is a synergistic coating which combines the advantages of anodizing with a controlled infusion of PTFE for added corrosion resistance.

❹ The micrometer adjustment roller lever is designed especially for installations where the position of the roller is a critical factor. This lever has a pivoted roller which can be turned laterally. After clamping the lever to the switch shaft, the position of the roller can be precisely adjusted through an arc of 7.5° on either side of the center or straight-line position.

# Operating Levers

**For use with 802T, 802M, 802MC, 802X, 802XR**

## Rod Levers

| Type | Material | Dia. | Cat. No. |
|---|---|---|---|
| | Stainless Steel Rod 5″ Long | 0.13″ | **802T-W3❷** |
| | Stainless Steel Rod 8.5″ Long | 0.13″ | **802T-W3B❷** |
| | Stainless Steel Rod 12″ Long | 0.13″ | 802T-NX50 |
| | Stainless Steel Rod 11.5″ Long | 0.13″ | **802T-W3A** |
| | | 0.08″ | **802T-W3F❸** |
| | Stainless Steel Rod 14″ Long | 0.13″ | 802T-NX159 |
| | Nylon Rod 12″ Long | 0.25″ | **802T-W3C** 802T-NX142 ❺ |
| | Stainless Steel Rod 5″ Long | 0.06″ | **802T-W5❷** |
| | Stainless Steel Rod 5″ Long One-Way | 0.06″ | 802T-W8❶ |
| | Nylatron Looped Rod 6″ Long 2″ Wide Loop | 0.18″ | **802T-W14** |
| | Nylatron Looped Rod 9″ Long 2″ Wide Loop | 0.18″ | 802T-NX119 |
| | Steel Rod 9″ Long | 0.25″ | 802T-W16 |
| | Nylon Rod 9″ Long | 0.25″ | 802T-W16A |

## Rod Levers—Corrosion-Resistant

| Type | Material | Dia. | Cat. No. |
|---|---|---|---|
| | Type 316 stainless steel rod 5″ long<br>Block is cast aluminum protected with TUFRAM®❹ | 0.13″ | **802MC-W3** |
| | Type 316 stainless steel rod 11.5″ long<br>Block is cast aluminum protected with TUFRAM®❹ | 0.08″ | **802MC-W3A** |
| | Nylon Rod 12″ long<br>Block is cast aluminum protected with TUFRAM®❹ | 0.25″ | **802MC-W3C** |
| | Nylon Rod Only | 0.25″ | WF25507 |

**Approximate Dimensions—See page 5-133.**

❶ Do not use on maintained contact limit switches.

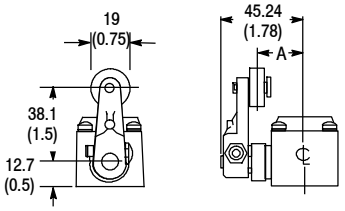
❷ Recommended for use with low operating torque switches.

❸ Not for use with 802M-NPY5 or 802M-ASY5 type switches.

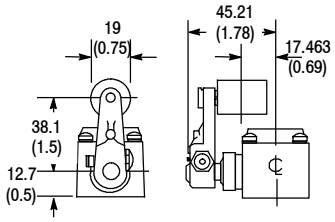
❹ TUFRAM® is a synergistic coating which combines the advantages of anodizing with a controlled infusion of PTFE for added corrosion resistance.

❺ Recommended for high impact applications.

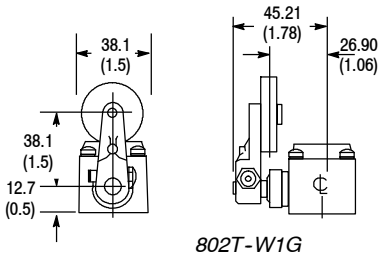
## Approximate Dimensions [mm (in.)]



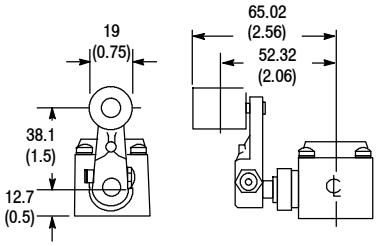

*802T-W1C (Dim. A = 0.81″);*
*802T-W1E and 802T-W1F (Dim. A = 1.03″)*
*Shipping Wt. 57g (2oz). (W1C), 1 oz. (W1E), 43g (1.5oz) (W1F)*



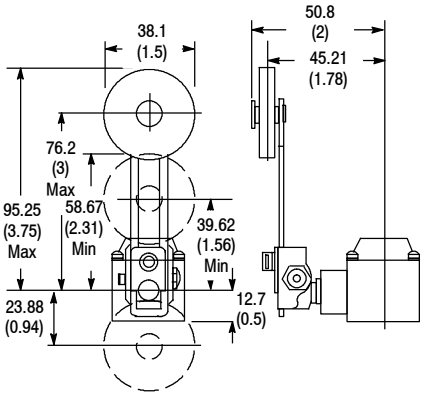

*802T-W1D*
*Shipping Wt. 43g (1.5oz)*



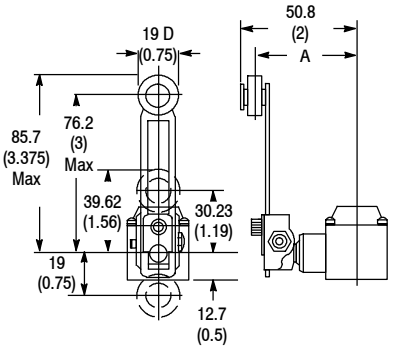

*802T-W1G*
*Shipping Wt. 28g (1oz)*



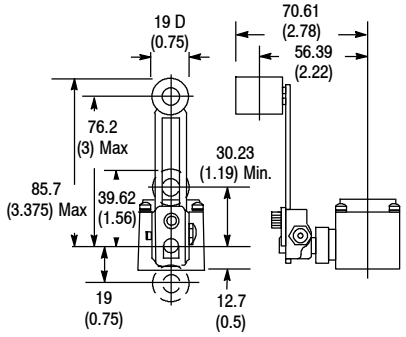

*802T-W1H*
*Shipping Wt. 43g (1.5o )*



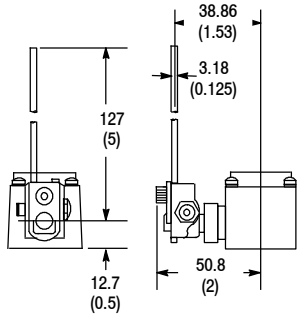

*802T-W2A*
*Shipping Wt. 57g (2oz)*



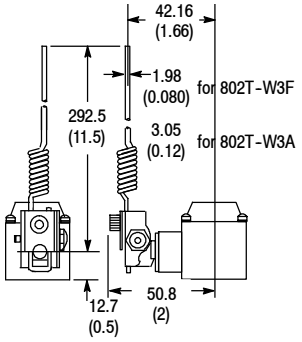

*802T-W2 & 802T-W2B (Dim. A = 1.78″);*
*802T-W2C (Dim. A = 1.81″)*
*Shipping Wt. 57g (2oz)*



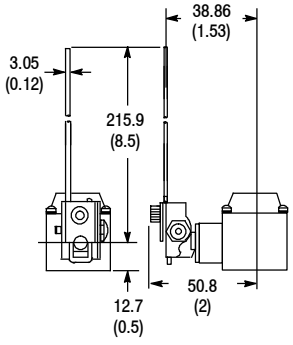

*802T-W2D*
*Shipping Wt. 57g (2oz)*



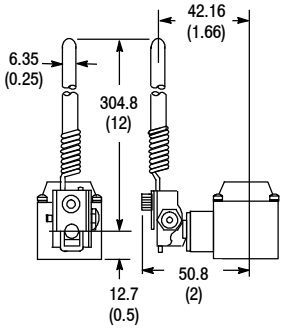

*802T-W3*
*Shipping Wt. 43g (1.5oz)*



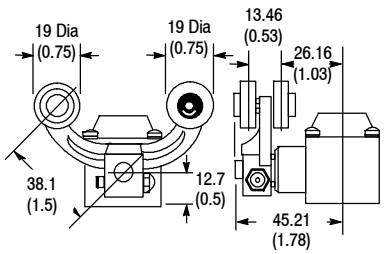

*802T-W3A and 802T-W3F*
*Shipping Wt. 57g (2oz)*




*802T-W3B and 802T-W3F*
*Shipping Wt. 43g (1.5oz)*



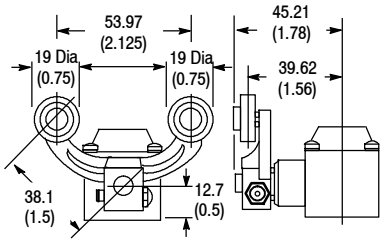

*802T-W3C*
*Shipping Wt. 57g (2oz)*



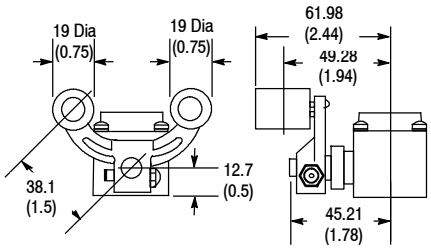

*802T-W4 and 802T-W4D*
*Shipping Wt. 43g (1.5oz) 802T-W4B*
*Shipping Wt. 57g (2oz)*

# Operating Levers

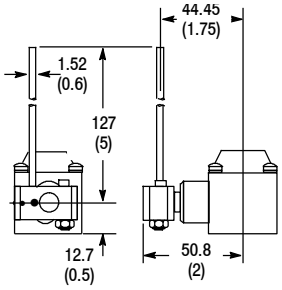
## Approximate Dimensions [mm (in.)] (continued)



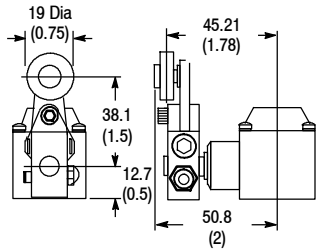

*802T-W4A and 802T-W4C*
*Shipping Wt. 57g (2oz)*



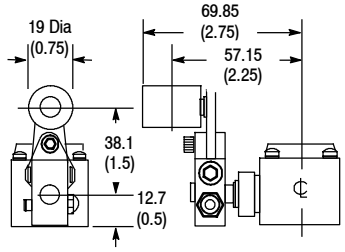

*802T-W4F*
*Shipping Wt. 57g (2oz)*



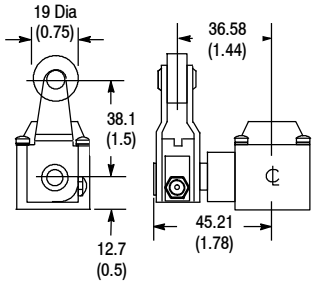

*802T-W5*
*Shipping Wt. 28g (1oz)*



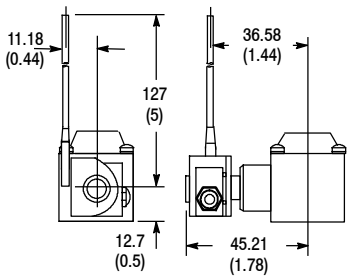

*802T-W6, 802T-W6A,*
*802T-W6B, 802T-W6E*
*Shipping Wt. 57g (2oz)*



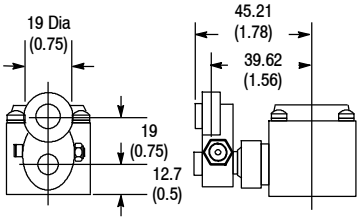

*802T-W6F*
*Shipping Wt. 57g (2oz)*



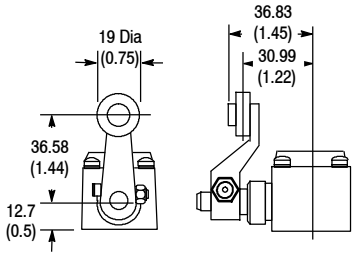

*802T-W7, 802T-W7A*
*and 802T-W7B*
*Shipping Wt. 57g (2oz)*



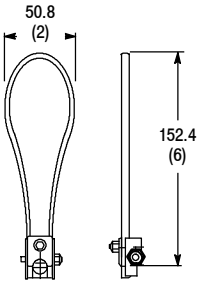

*802T-W8*
*Shipping Wt. 43g (1.5oz)*



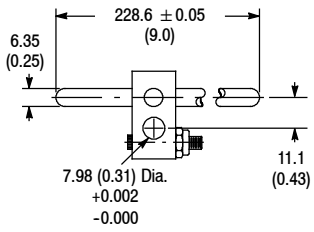

*802T-W9*
*Shipping Wt. 28g (1oz)*



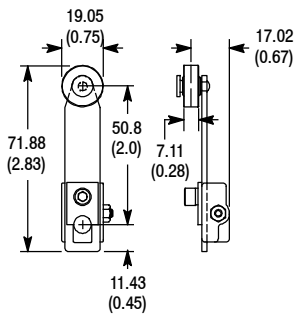

*802T-W12 Shipping Wt. 1 oz. and*
*802T-W12A 802T-W6B, 802T-W6E*
*Shipping Wt. 43g (1.5oz)*



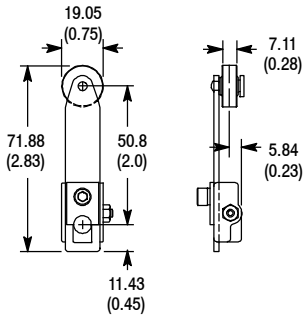

*802T-W14*
*Shipping Wt. 43g (1.5oz)*




*802T-W16*
*802T-W16A*




*802T-W20*
*Shipping Wt. 57g (2oz)*




*802T-W20J*
*Shipping Wt. 57g (2oz)*

## Replacement Parts

## Replacement Actuators for Bul. 440P Limit Switches

### Levers

| | Description | Cat. No. |
|---|---|---|
| | Short lever with nylon roller for 440P-ASL* or -AWL*<br>See page 5-115. | 440P-WA1 |
| | Short lever with metal roller for 440P-ASL* or -AWL*<br>See page 5-115. | 440P-WA1A |
| | Short lever with wide roller for 440P-ASL* or -AWL*<br>See page 5-115. | 440P-WA1B |
| | Short lever with nylon roller for 440P-CSL* or -CHM*<br>See page 5-118. | 440P-WC1 |
| | Short lever with metal roller for 440P-CSL* or -CHM*<br>See page 5-118. | 440P-WC1A |
| | Short lever with nylon roller for 440P-MSL* or -MMH*<br>See page 5-123 & 5-124. | 440P-WM1 |
| | Short lever with metal roller for 440P-MSL* or -MMH*<br>See page 5-123 & 5-124. | 440P-WM1A |
| | Adjustable lever arm with nylon roller for 440P-AAL* or -AA1L*<br>See page 5-115. | 440P-WA2A |
| | Adjustable lever arm with steel roller for 440P-AAL* or -AA1L*<br>See page 5-115. | 440P-WA2B |
| | Adjustable lever with nylon roller for 440P-CAL*, -CRR*, -MRR*<br>See page 5-119 & 5-124. | 440P-WC2 |
| | Adjustable lever with metal roller for 440P-CAL* or -CRR*<br>See page 5-119. | 440P-WC2B |
| | Adjustable lever with large rubber roller for 440P-CAL*, -CRR*, -MRR*<br>See page 5-119 & 5-124. | 440P-WC2A |
| | Adjustable lever with nylon roller for 440P-MAL* or -MRR*<br>See page 5-124. | 440P-WM2 |
| | Adjustable lever with metal roller for 440P-MAL* or -MRR*<br>See page 5-124. | 440P-WM2A |

**Note:** The actuator is included with the purchase of every Bul. 440P limit switch.

### Rods

| | Description | Cat. No. |
|---|---|---|
| | Adjustable metal rod for 440P-MAR*<br>See page 5-124. | 440P-WM3 |
| | Metal spring rod for 440P-MSR*<br>See page 5-125. | 440P-WM4 |

**Note:** The actuator is included with the purchase of every Bul. 440P limit switch.

### Telescopic Arm

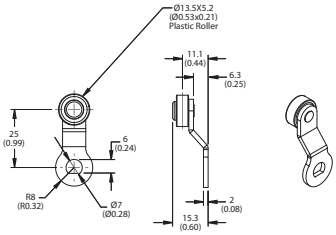
| | Description | Cat. No. |
|---|---|---|
| | Telescopic arm for 440P-MTA*<br>See page 5-125. | 440P-WM5 |

**Note:** The actuator is included with the purchase of every Bul. 440P limit switch.

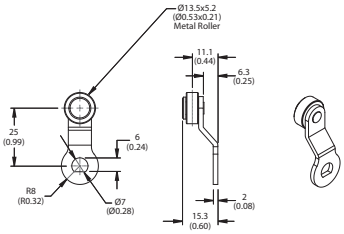
# Operating Levers

*Dimensions are not intended to be used for installation purposes.*

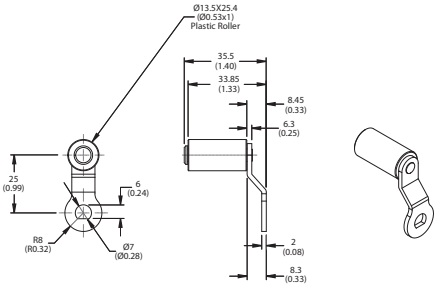
## Levers



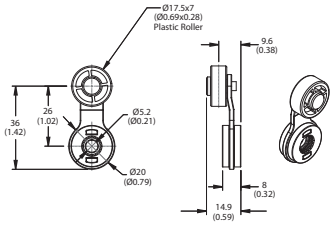

***Cat. No. 440P-ASL_ or AWL_***
***Short Lever (Plastic Roller)***



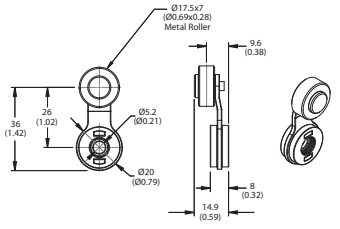

***Cat. No. 440P-ASL_ or AWL_***
***Short Lever (Metal Roller)***



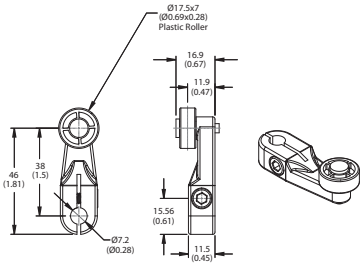

***Cat. No. 440P-ASL_ or AWL_***
***Short Lever (Wide Roller)***



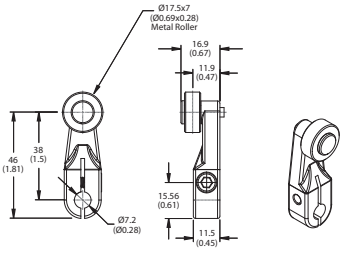

***Cat. No. 440P-CSL_ or CHM_***
***Short Lever (Plastic Roller)***



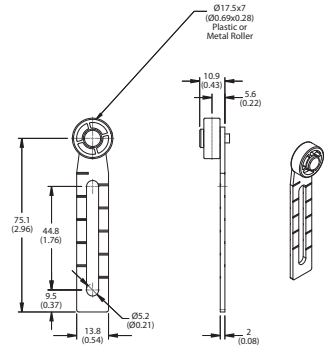

***Cat. No. 440P-CSL_ or CHM_***
***Short Lever (Metal Roller)***



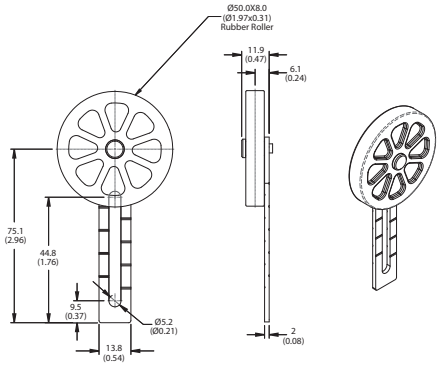

***Cat. No. 440P-MSL_ or MMH_***
***Short Lever (Plastic Roller)***



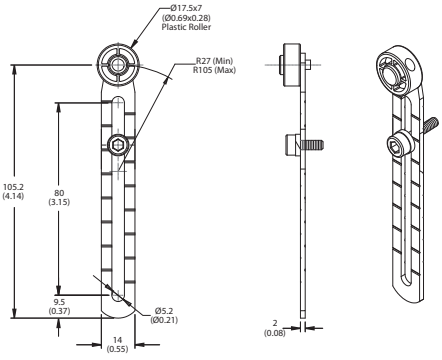

***Cat. No. 440P-MSL_ or MMH_***
***Short Lever (Metal Roller)***




***Cat. No. 440P-CAL_, -CRR_, -MAL_, and -MRR_***
***Adjustable Lever (Plastic & Metal Roller)***




***Cat. No. 440P-CAL_, -CRR_, and -MRR_***
***Adjustable Lever (Large Rubber Roller)***




***Cat. No. 440P-AAL_ or AA1L_***
***Adjustable Lever Arm (Plastic & Metal Roller)***

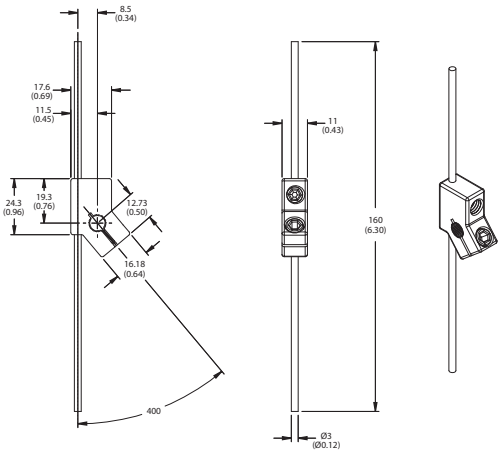


New

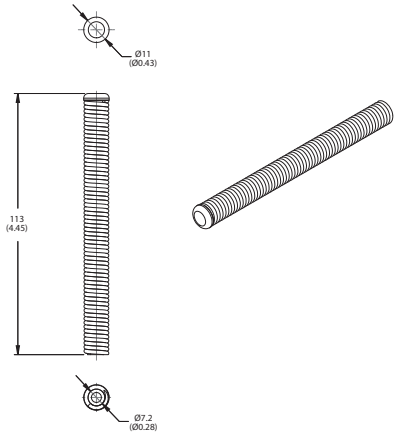


Allen-Bradley

## Rods

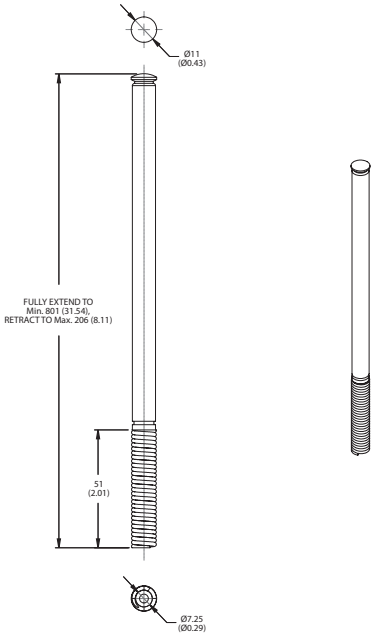



***Cat. No. 440P-MAR_***
***Adjustable Metal Rod***




***Cat. No. 440P-MSR_***
***Metal Spring Rod***

## Telescopic Arms




***Cat. No. 440P-MTA_***
***Telescopic Arm***

# Notes

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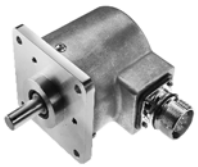
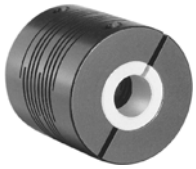
# Quick Selection Guide

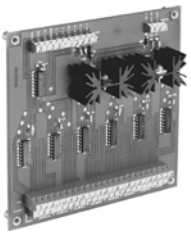
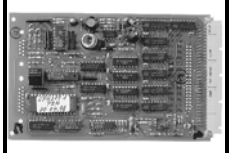
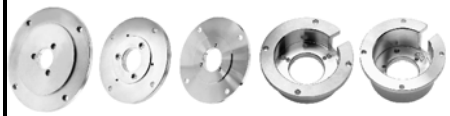
| Specifications | **842A** Multi-Turn Magnetic Absolute |  **842HR** Sine Cosine/Serial | **844A & 844B** Hollow Shaft Incremental | **844D** Hollow Shaft Incremental | **845D** Single-Turn Absolute |
|---|---|---|---|---|---|
| **Resolution** | • 24 bits (2048…8192 CPR & 256…8192 revolutions) | • 1024 PPR | • 10…2500 PPR | • 360…16,384 PPR | • 8…12 bits (256…1000 CPR) |
| **Power Supply** | • 10…30V DC | • 5-12V DC, or 7…12C DC | • 5V DC, 12V DC, or 8…24V DC | • 5V DC, 10…30V DC, or 5…26V DC | • 5V DC or 8…24V DC |
| **Outputs** | • Synchronous Serial Interface (SSI) | • Analog differential<br>• Digital RS-485<br>• Hiperface® compatible | • Differential line driver<br>• NPN open collector | • Differential line driver<br>• Push-Pull | • 5V TTL<br>• Open collector |
| **Housing Size (Dia.)** | • 60 mm (2.36 in.) | • 64 mm (2.5 in.) | • 51 mm (2.0 in.) | • 90 mm (3.5 in.) | • 64 mm (2.5 in.) |
| **Frequency Response or Data Rate** | • Up to 500 kHz | • 200 kHz | • 100 kHz | • 200, 300, or 600 kHz | • 16 K words/sec |
| **Shaft Speed** | • 6000 RPM | • 6000 RPM | • 3000 RPM | • 3000 RPM | • 5000 RPM |
| **Mounting** | • Metric servo with 36 or 50 mm pilot | • Square flange<br>• Hub Shaft | • Integral flex mount | • Three tether options & anti-rotation pin | • Square flange<br>• English servo |
| **Connections** | • Radial connector | • Radial connector | • 18in (457mm) integral cable | • Radial connector<br>• Radial cable<br>• Terminal block | • Axial connector<br>• Radial connector |
| **Protection** | • IP66 (IEC 529) | • IP66 | • IP40 (IEC 529) | • NEMA 4, 13; IP66 | • NEMA 4, 13; IP66 |
| **Additional Info** | • See page 6-7 | • See page 6-10 | • See page 6-28 | • See page 6-31 | • See page 6-14 |

| Specifications | **845F** Incremental with Integral Coupler | **845G** Single-Turn Absolute | **845GM** Single-Turn Absolute | **845H** Size 25 Incremental | **845K** Size 25 Incremental |
|---|---|---|---|---|---|
| **Resolution** | • 1…5000 PPR | • 8…15 bits (256-32,768 CPR) | • 8…15 bits (256-32,768 CPR) | • 1…5000 PPR | • Up to 5000 PPR |
| **Power Supply** | • 5V DC or 8…24V DC | • 5V DC, 10…30V DC, or 8…24V DC | • 5V DC, 10…30V DC, or 8…24V DC | • 5V DC or 8…24V DC | • 5V DC or 8…24V DC |
| **Outputs** | • Source<br>• Sink w/pullup<br>• Differential line driver<br>• Open collector | • 5V TTL<br>• Open collector<br>• Push-Pull<br>• SSI | • 5V TTL<br>• Open collector<br>• Push-Pull<br>• SSI | • Source<br>• Sink w/pullup<br>• Differential line driver<br>• Open collector | • Source<br>• Sink<br>• Differential line driver<br>• Open collector |
| **Housing Size (Dia.)** | • 64 mm (2.5 in.) | • 64 mm (2.5 in.) | • 51 mm (2.0 in.) | • 64 mm (2.5 in.) | • 64 mm (2.5 in.) |
| **Frequency Response or Data Rate** | • 200 kHz | • 16 Kwords/sec | • 16 Kwords/sec | • 200 kHz | • 210 kHz |
| **Shaft Speed** | • 6000 RPM | • 5000 RPM | • 5000 RPM | • 6000 RPM | • 6000RPM |
| **Mounting** | • Standard coupler<br>• High performance coupler | • Square flange<br>• English servo | • Square flange<br>• English servo | • Square flange<br>• English servo | • Square flange<br>• English servo |
| **Connections** | • Axial connector<br>• Radial connector<br>• Axial cable<br>• Radial cable | • Axial connector<br>• Radial connector | • Radial connector | • Axial connector<br>• Radial connector<br>• Axial cable<br>• Radial cable | • 24in pigtail cable termination |
| **Protection** | • NEMA 4, 13; IP66 | • NEMA 4, 13; IP66 | • NEMA 4, 13; IP66 | • NEMA 4, 13; IP66 | • NEMA 1 |
| **Additional Info** | • See page 6-34 | • See page 6-18 | • See page 6-23 | • See page 6-37 | • *www.ab.com/catalogs* |

# Quick Selection Guide

| Specifications | **845P** Size 15 Incremental | **845PY** Digital Tachometer (5PY Mounting) | **845S** IGBT Drive Incremental | **845T** Size 20 Incremental |
|---|---|---|---|---|
| **Resolution** | • 500 or 1000 PPR | • 1…3000 PPR | • Up to 5000 PPR | • 1…3000 PPR |
| **Power Supply** | • 5V DC | • 5V DC, 11…20V DC or 24V DC | • 5V DC and 8…24V DC | • 5V DC, 11…20V DC or 24V DC |
| **Outputs** | • Differential line driver | • Differential line driver | • Differential line driver | • Push-Pull<br>• Differential line driver |
| **Housing Size (Dia.)** | • 40 mm (1.59 in.) | • 51 mm (2.0 in.) | • 64 mm (2.5 in.) | • 51 mm (2.0 in.) |
| **Frequency Response or Data Rate** | • 100 kHz | • 100 kHz | • 100 kHz | • 100 kHz |
| **Shaft Speed** | • 5000 RPM | • 15000 RPM | • 6000RPM | • 15000 RPM |
| **Mounting** | • English servo | • 5PY | • Square flange<br>• English Servo | • Square flange<br>• English servo |
| **Connections** | • 18 in. (457 mm) integral cable | • Radial connector<br>• Radial cable | • Axial connector & cable<br>• Radial connector & cable | • Radial connector<br>• Radial cable |
| **Protection** | • NEMA 1 | • NEMA 4, 13; IP66 | • NEMA 4, 13; IP66 | • NEMA 4, 13; IP66 |
| **Additional Info** | • *www.ab.com/catalogs* | • See page 6-41 | • *www.ab.com/catalogs* | • See page 6-41 |

| Accessories |  **Flexible Couplings** | **Measuring Wheels** | **Servo Clamps** | **Cable Assemblies** | **Mating Connectors** |
|---|---|---|---|---|---|
| **Additional Info** | • See page 6-47 | • See page 6-48 | • See page 6-48 | • See page 6-49 | • See page 6-52 |

| Accessories |  **Buffer Board** |  **Serial Parallel Adaptor** | **Servo Clamps** |  **Mounting Plates** |
|---|---|---|---|---|
| **Additional Info** | • See page 6-55 | • See page 6-46 | • See page 6-46 | • See page 6-52 |

# I/O to Encoder Selection Guide

## Accessories

To use this selection guide, scan down the column of the input card or device being used, then look in the column to the right for typical encoders that could be used in the application. The asterisk ( * ) is used to represent one character in the catalog number. Complete the encoder catalog number by referring to the appropriate pages in the catalog. Some absolute encoders typically require an output module to send a latching signal.

### Incremental Encoders

| If you have one of these Input Devices: | Select one of these Encoders: |
|---|---|
| 1395 DC Drive<br>1746-HSCE<br>1746-HSTP1<br>1756-M02AE<br>1756-HSC<br>1771-IJ<br>1771-QC<br>1771-VHSC<br>8200 CNC<br>8400 CNC<br>8600 CNC<br>9 SERIES CNC<br>IMC 110, 120<br>IMC 121, 123<br>IMC S-CLASS<br>MAX CONTROL | 845F-SJ*Z*4**Y**<br>845H-SJ***4**Y**<br>845K-SA*Z*4**Y3<br>845M-***5LD*****<br><br>845P-SHC14-**3<br>845PY-**-*-*<br>845T-**13E**-*<br>845T-**43E**-*<br>845T-**53E**-*<br>844D-****1**<br>844D-****4**<br>844A-**05D****<br>844B-**05D**** |
| 1771-IK | 845F-SJ*Z26**Y** ❶<br>845H-SJ**26**Y** ❶<br>845K-SA*Z25**Y3<br>845T-**3****-C<br>844A-**12C****<br>844B-**12C****<br>844D-****5** |
| 1336 PLUS<br>1336 FORCE<br>1336 IMPACT | 845S-**** |
| MICROLOGIX<br>1000, 1200, 1500 | 845T-**33A**-*<br>845TK-*****-**<br>844D-****5**<br>844A-**12C****<br>844B-**12C**** |
| 1794-VHSC<br>1394 | 845H-SJ**24<br>845T-**53<br>844D-****4**<br>844A-**05D****<br>844B-**05D**** |
| 1794-ID2<br>1746-HSCE2<br>1756HSC<br>1397 | 845H-SJ**26<br>845T-**63<br>844D-****2**<br>844A-**24D****<br>844B-**24D**** |
| 1747-L**C<br>1747-L**D<br>1747L**E | 845T-**31** |
| 845-BB- | 845F-SJ**14<br>845H-SJ**14<br>845K-SA**14<br>845P-SHC14-**<br>845T-**13<br>844D-****1**<br>844A-**05D****<br>(5V DC Supply) |
| | 844B-**05D****<br>845F-**24<br>845H-SS**24<br>845K-SA**24<br>845T-**43<br>844D-****4**<br>(12V DC Supply) |

❶ Wire Single Ended Only (no complements)

### Absolute Encoders

| If you have one of these Input Devices: | Select one of these Encoders: | And select one of these Output Modules if necessary: |
|---|---|---|
| 1746-IG16<br>1771-IG<br>1771-IGD | 845D-SJ***4BD***<br>845D-SJ***4BN***<br>845G-*3**HT****<br>845GM-*3**HT***** | 1771-OG / OGD<br>1746-OG16 |
| 1746-IG16<br>1771-IG<br>1771-IGD | 845D-SJ***4AG***<br>845G-*3G*HT*****<br>845GM-*3G*HT*****<br>842A with 842-SPA | None Required |
| 1746-ITV16<br>1746-IV8,16,32<br>1771-IQ, IQ16<br>1771-IV, IVN<br>1756-IV16<br>1794-IV16 | 845D-SJ**25AG***<br>845G-*3G8HC*****<br>845GM-*3G8HC*****<br>842A with 842-SPA | None Required |
| 1746-ITV16<br>1746-IV8,16,32<br>1771-IQ, IQ16<br>1771-IV, IVN<br>1756-IV16<br>1794-IV16 | 845D-SJ**25BD***<br>845D-SJ**25BN***<br>845G-*3B8HC*****<br>845G-*3D8HC*****<br>845GM-*3B8HC*****<br>845GM-*3D8HC***** | 1771-OV<br>1746-OV<br>1756-OV16E<br>1794-OV16 |
| 1771-DE | 845D-SJ***4A****<br>845G-*3**HT*****<br>845GM-*3**HT***** | None Required |
| 1771-DL | 845D-SJ***5AGCW*<br>845G-*3G8HC0256*<br>845GM-*3G8HC0256* | None Required |
| 4100-AEC<br>AMCI 7561 | 842A-*****<br>845G-*3*AHS*****<br>845GM-*3*AHS***** | None Required |
| 1756-IBI16 | 845G-*3G8LC*****<br>845GM-*3G8LC******<br>845D-SJ**25AG | None Required |
| 1756-PLS | 846-SJDA1CG-R3C | None Required |
| 1746-ITB16<br>1746-IB8, IB16, IB32<br>1771-IQ, IQ16<br>1771-IB, IBN<br>1794-IB16<br>1756-IB16<br>MicroLogix 1000, 1200, 1500 | 845G-*3*8HP*****<br>845GM-*3*8HP***** | 1771-OV<br>1746-OV<br>1756-OV16E<br>1794-OV16 |

# Technical Definitions and Terminology

**5PY:** A type of analog DC tachometer with a specific bolt pattern.

**Angular Acceleration:** The rate of change of angular velocity usually expressed in radians per second squared.

**Angular Misalignment:** The maximum amount of angle between the coupled shafts.

**Axial:** The direction parallel to the encoder shaft.

**Axial Compliance:** The maximum amount of machine shaft end play.

**Axial Load:** The maximum amount of force that may be applied to an encoder shaft in a direction parallel to the shaft.

**Blind Shaft:** A hollow shaft encoder which is covered on one end so that the accepted shaft cannot exceed a maximum length. See also “Hollow Shaft” and “Through Shaft.”

**Binary:** A number system using 2 as its base (1,2,4,8,16,32,...).

**Binary Coded Decimal (BCD):** A number system where decimal numbers 0 through 9 are represented by 4 binary bits (8,4,2,1).

**Bit:** An abbreviation for binary digit.

**Channel:** An incremental encoder output signal. A dual channel encoder has two outputs.

**Counts Per Turn:** Sometimes referred to as Pulses Per Revolution (PPR), the total number of positions in 360 degrees of shaft rotation.

**Current Sinking:** An output type where signal current flows from the load into the encoder.

**Current Sourcing:** An output type where signal current flows from the encoder into the load.

**Data:** Factual measurement information transmitted by an encoder either in parallel or serial form.

**Decades:** In BCD a decade is comprised of 4 bits (1, 2, 4, 8) representing one decimal place (units, tens, hundreds, etc.).

**Differential:** In digital logic terms a pair of outputs exactly opposite 0, 1, or 180 degrees out of phase.

**Differential Line Driver:** A type of output driver using two signal lines per encoder channel. When used with a differential line receiver, longer cable lengths and higher noise immunity can be provided.

**Duty Cycle:** The ratio of the logic “1” level to the total period of one cycle.

**End Play:** The amount of axial shaft movement with a specified amount of axial load applied.

**Flange:** A square mounting configuration for rotary encoders and resolvers.

**Frequency Response:** The maximum frequency at which all parameters are still in specification.

**Gray Code:** A binary code in which only one bit of the binary word changes for each sequential number or position.

**Heavy Duty:** Encoders with higher shaft loading characteristics are considered heavy duty.

**High Performance:** Encoders with high frequency response and resolution are considered high performance.

**Hollow Shaft:** A shaftless encoder design which mounts on the shaft of a connected device such as a motor. See also “Blind Shaft” and “Through Shaft.”

**Impedances:** Impedances, expressed in ohms, are usually specified in rectangular form as R + jX where R is the sum of the DC and AC resistive components and X is the reactive component.

**Index:** An output signal, also known as a zero marker, which is produced once per revolution. It is used to identify a home position or a reset point.

**Input Current:** The current required to power the internal circuitry of the encoder.

**IP66 (IEC 529):** Provides a degree of protection against dust, and water projected in powerful jets from any direction.

**Load:** A term used to describe the device to which encoder signals are applied.

**Maximum Working Temperature:** A maximum temperature allowed for operation for most applications. Some specifications may not be met. Also see “Operating Temperature.”

**Maximum Working Speed:** A maximum speed allowed for operation for most applications. Shaft loading must be minimized. Some specifications may not be met. See also “Operating Speed.”

**Moment of Inertia:** The sum of the products formed by multiplying the mass of each element of a figure by the square of its distance from an axis.

**NEMA Type 1:** Type 1 enclosures are intended to provide protection against incidental contact with dirt, dust, lint, fibers, and other nonliquid contaminants.

**NEMA Type 4:** Type 4 enclosures are intended for indoor or outdoor use primarily to provide a degree of protection against windblown dust and rain, splashing water and hose directed water. They are not intended to provide protection against conditions such as internal condensation or internal icing.

**Nosepiece:** The housing that holds the shaft, bearings, and shaft seal.

**Null Voltage:** The residual voltage remaining when the in-phase component of the output voltage is zero.

**Operating Speed:** The maximum shaft RPM allowed at which all specifications are met. See also “Maximum Working Speed.”

**Operating Temperature:** The maximum temperature allowed at which all specifications are met.

**Parallel Misalignment:** The maximum amount of distance between the center lines of the coupled shafts.

# Technical Definitions and Terminology

**Pulses Per Revolution (PPR):** See counts per turn.

**Push-Pull:** A type of single-ended output driver capable of sinking and sourcing current. Also known as Totem-Pole.

**Quadrature:** Separation in phase by 90°. Used on incremental encoders to denote the direction of motion.

**Radial:** The direction perpendicular to the encoder shaft.

**Radial Load:** The maximum amount of force that may be applied to an encoder shaft in a perpendicular direction.

**Radial Play:** The amount of shaft radial movement with specified radial load.

**Radian:** An arc in any circle, equal in length to the radius of the same circle.

**Resolution:** The measure of the smallest change of input that the encoder can detect.

**Running Torque:** The torque required to keep a shaft rotating at constant velocity, typically measured in inch-ounces.

**Sensitivity:** The output voltage expressed as a function of the shaft angle in millivolts/degree.

**Servo:** A circular mounting configuration that allows for rotation of the encoder for purposes of alignment. Also a common term for a small electric motor.

**Shaft Loading:** The maximum amount of force that may be applied to an encoder shaft typically expressed in pounds (Newtons).

**Shaft Runout:** The amount of radial movement when spinning.

**Shock:** A transient motion which is capable of exciting mechanical resonances.

**Single-Ended:** An output referenced to common which uses only one signal line for data transmission.

**Size 15:** Encoders with a nominal diameter of 1.5 inches (1.625 inch encoders are also classified as size 15).

**Size 20:** Encoders with a nominal diameter of 2.0 inches.

**Size 25:** Encoders with a nominal diameter of 2.5 inches.

**Slew Speed:** The maximum velocity an encoder may be operated without physical damage to the unit.

**Starting Torque:** The torque required to start a shaft rotating, typically measured in inch-ounces.

**Symmetry:** The ratio of the logic “1” level to the total period of one cycle.

**Synchronous Serial Interface or SSI:** A serial communication protocol often used to translate parallel absolute encoder data. Advantages of SSI over parallel wiring include reduced wire count and better noise immunity.

**Through Shaft:** A hollow shaft encoder which is open on both ends so that the accepted shaft length is unlimited. For example, a through shaft encoder allows a motor shaft to protrude through it. See also “Blind Shaft” and “Hollow Shaft.”

**Transformation Ratio:** The ratio of the output voltage to the input voltage when the output is at maximum coupling.

**Vibration:** The periodic change in displacement with respect to a fixed reference.

**Zero Reference:** An output signal which is produced once per revolution. It is used to identify a home position or a reset point.

# Bulletin 842A Absolute Multi-Turn Magnetic Encoders

## Synchronous Serial Interface

## Description

Bulletin 842A is a 25-bit absolute multi-turn shaft encoder. It can provide up to maximum of 8192 pulses per turn or a maximum of 8192 turns. It has SSI outputs to reduce cable costs.

The 842A can be interfaced in several ways:

- 1734-SSI Synchronous Serial Interface Absolute Encoder Module
- 842-SPA and 842-CH which converts SSI to parallel data
- 4100-AEC which converts SSI to A quad B data to interface with 1394 GMC/GMC Turbo and S Class Compact motion controllers (see publication 4100-AEC-1.1)
- SLC input module AMCI 7561 which inputs SSI data directly into the module (see Encompass partner AMCI).
- PLC—AMCI 7761H

Synchronous Serial Interface or SSI provides many advantages over traditional parallel wiring. SSI provides 25 bit resolution over 5 wires rather than the usual 24 wires. The use of SSI technology in the Bulletin 842A provides the following customer benefits:

- Greatly reduced wiring cost and complexity
- Greatly improved noise immunity achieved via differential communication format
- Simplified start up
- Choice of gray code or natural binary formats

## Specifications

| | |
|---|---|
| Certifications | CE Marked for all applicable directives. |
| **Electrical** | |
| Code Format | Gray or Natural Binary |
| Code Direction | CW or CCW |
| Symmetry | 40…60% |
| Operating Voltage | 10…30V DC |
| Power Supply | 30 mA @ 24V |
| No. of Steps, Max. | 8192 |
| No. of Revolutions, Max. | 8192 |
| SSI Position Forming Time | 0.15 msec |
| Power-Up Delay | 1050 msec |
| Clock +, Clock -, Data +, Data - | Synchronous Serial Interface (SSI) |
| CW/CCW | "L" active (L = 0-1.5V, H = 3.0 - $V_s$) |
| Reset | Via covered rear button or reset pin |
| **Mechanical** | |
| Angular Acceleration | 5 x $10^5$ radians/$sec^2$ |
| Moment of Inertia | 35 $gcm^2$ (5.0 x $10^{-4}$ oz-in-$sec^2$) |
| Shaft Operating Speed, Max. (RPM) | 6000 RPM at max shaft loading |
| Starting Torque | 2.5 Ncm (3.5 oz-in) |
| Shaft Loading | Axial 11 lb (50 N)<br>Radial 67 lb (300 N) |
| **Environmental** | |
| Material | Aluminum housing |
| Operating Temperature [C (F)] | -20…85° (-4…+185°) |
| Storage Temperature [C (F)] | -40…100° (-40…+212°) |
| Relative Humidity | 98% noncondensing |
| Enclosure Type Rating | NEMA Type 4, 13; IP67 (IEC 529): Static Shaft |
| Shock | 100 g/6 msec |
| Vibration | 20 g/10…2000 Hz |
| Weight [g (oz)] | 0.5 (18) |

## Typical Applications

- Steel mills
- Overhead cranes
- Punch press
- Transfer lines
- Oil rigs
- Wind mills
- Machine Tools
- Packaging

## Accessories

| Description | Page Number |
|---|---|
| Serial Parallel Adaptor Board | 6-46 |
| Flexible Couplings | 6-47 |
| Measuring Wheels | 6-48 |
| Servo Clamps | 6-48 |
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Mounting Plates | 6-52 |

# Bulletin 842A Absolute Multi-Turn Magnetic Encoders

## Synchronous Serial Interface

### Product Selection

**842A — 31 G B**

*a b c*

***a***

| Mounting Configuration | |
|---|---|
| **Code** | **Description** |
| 31 | Servo Mount 10 mm Shaft<br>36 mm Pilot |
| 56 | Servo Mount 6 mm Shaft<br>50 mm Pilot |

***b***

| Code Type | |
|---|---|
| **Code** | **Description** |
| G | Gray Code |
| N | Natural Binary |

***c***

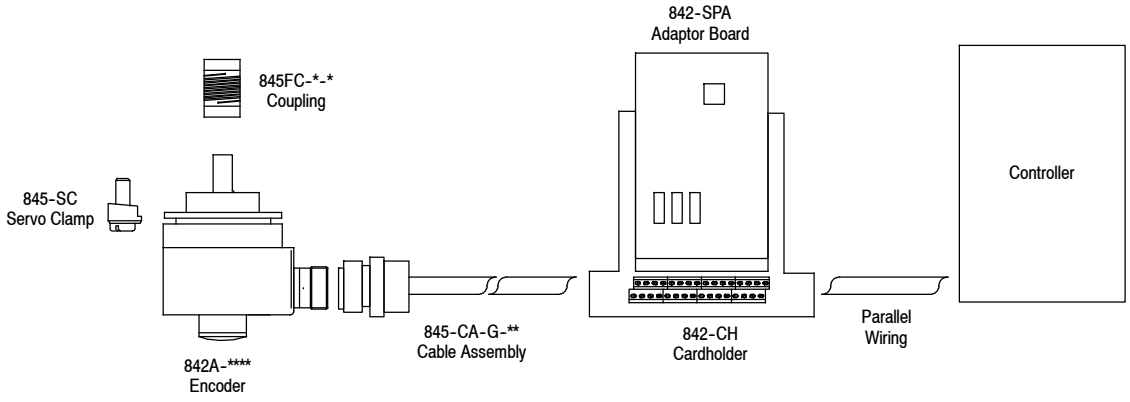
| Resolution | | |
|---|---|---|
| **Code** | **Pulses per Revolution** | **Number of Revolutions** |
| A | 8192 | 2048 |
| B | 4096 | 4096 |
| C | 2048 | 8192 |
| D | 4096 | 512 |
| E | 4096 | 256 |

### Electrical Connections

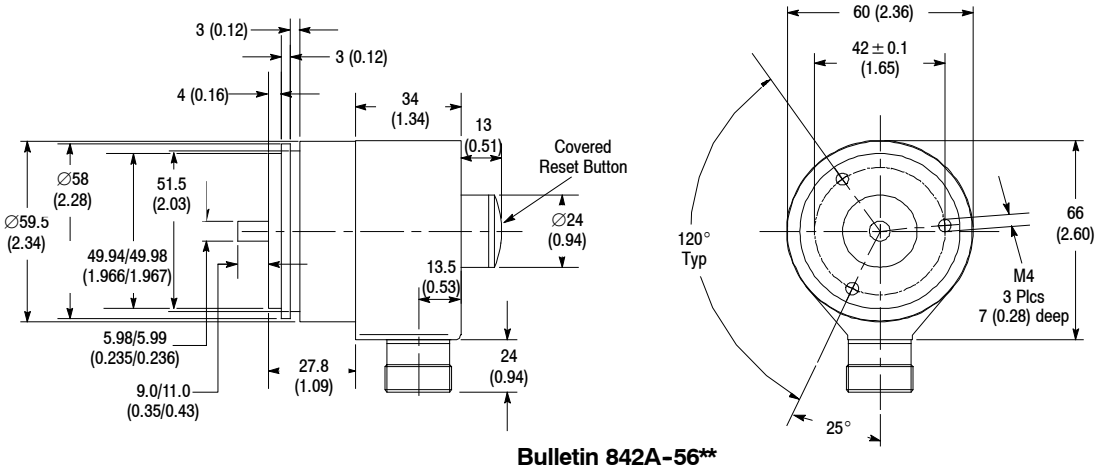
The 842A comes with an M23 connector. Order the mating connector separately.

| Function | Pin Number |
|---|---|
| DC Return | 1 |
| Data + | 2 |
| Clock + | 3 |
| DC+ Input | 8 |
| Data - | 10 |
| Clock - | 11 |
| CW/CCW | 12 |
| Reset | 9 |

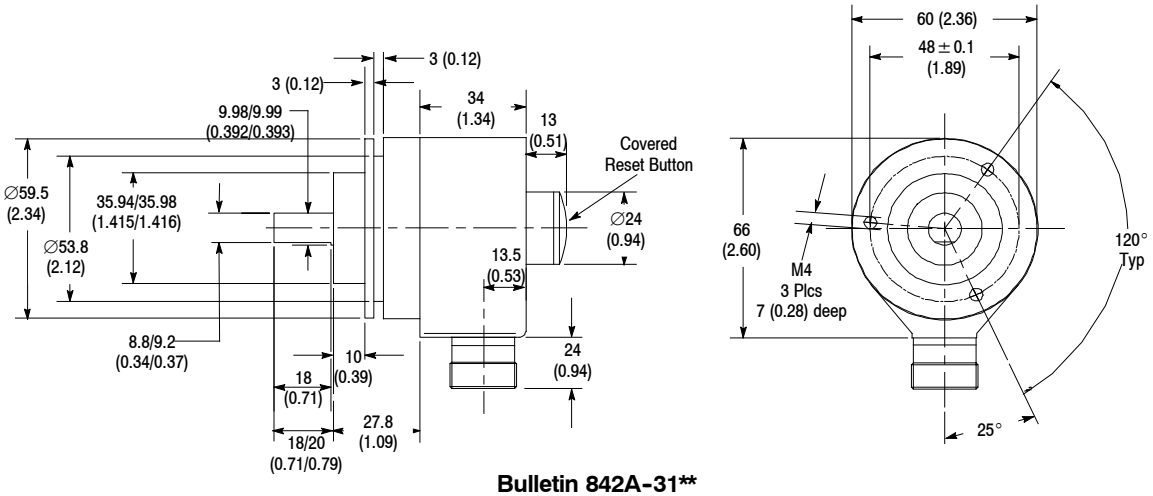
### Typical Application



## Approximate Dimensions [mm (in.)]




**Bulletin 842A-56****

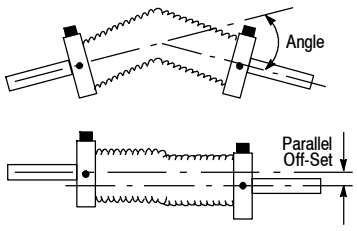



**Bulletin 842A-31****

**ATTENTION**

Activating the zero reset results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

**Flexible Shaft Couplings**

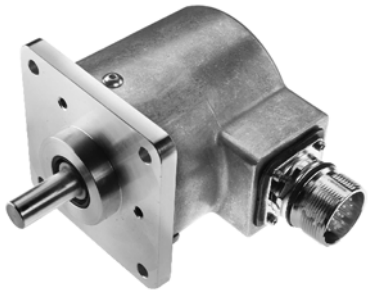



**ATTENTION**

Rigidly coupling the encoder shaft to the machine shaft will cause a failure in either the bearings of the encoder or the bearings of the machine shaft.

# Bulletin 842HR Sine Cosine/Serial Encoders

## Size 25, High Resolution Auxiliary Servo Feedback



## Description

Bulletin 842HR is a 15-bit serial/sine cosine encoder. Targeted for high performance digital servo drive systems that require absolute feedback for position control and high resolution incremental feedback for speed control.

Rockwell Automation sine cosine high performance encoders provide commutation, speed regulation and position control all in one device. Absolute position values of up to 15 bit combined with incremental resolution up to 2 million counts per turn.

## Features

- Absolute feedback for position control
- High resolution Incremental feedback for speed control
- Commutation
- Sine cosine differential interface
- Digital bidirectional RS-485 interface
- Compatible with Hiperface® interface
- Internal diagnostic functions

## Typical Applications

Compatible with a variety of motor control products including Kinetix® drives and the Allen-Bradley Guardmaster™ MSR 57 safe speed monitoring relay, the 842HR is a flexible solution for a wide range of industrial applications.

- Packing machines
- Robotics
- Printing machines
- Rotary table positioning

## Specifications

| | |
|---|---|
| Certifications | CE Marked for all applicable directives |
| **Electrical** | |
| # of sine/cosine cycles per revolution | 1,024 |
| Code format for absolute position value | Binary |
| Code direction with clockwise rotation viewed from shaft end | Increasing |
| # of steps per revolution (Single 842HR-S) | 32,768 |
| # of revolutions (Multi 842HR-M) | 4,096 |
| Error limits for the digital absolute value via RS 485 | ±90 angular seconds |
| Error limits in evaluating the 1,024 signals, integral non-linearity | ±45 singular seconds |
| Non-linearity within a sine/cosine period, differential non-linearity | ±7 angular seconds |
| Output frequency for sine/cosine signals | 0…200 kHz |
| Operating Voltage Range | 7…12V, 5…12V |
| Max. Operating Current, no load<br>5…12 V Supply ❶<br>7…12 V Supply | <br>180 mA<br>80 mA |
| Available Memory on EEPROM ❷ | 128 bytes |
| Interface Signals<br>Process data channel = SIN, REFSIN, COS, REFCOS<br>Parameter channel = RS 485 | <br>Analog, differential<br>Digital |
| **Mechanical** | |
| Angular Acceleration, Max. | 5 x $10^5$ rad/$sec^2$ |
| Shaft Operating Speed, Max. (RPM) | 6,000 |
| Torque to Operate [N•m (lb•in)] | 0.024 (0.212) max. |
| Starting Torque, Max. | 0.035 N•m (0.309 lb•in) |
| Shaft Loading | Radial 35 lb, Axial 40 lb |
| Life of Ball Bearings | 3.6 x $10^9$ rotations |
| **Environmental** | |
| Material | Aluminum housing |
| Operating Temperature [C (F)] | -20…85° (-4…+185°) |
| Storage Temperature [C (F)] | -30…+90° (-22…+194°) |
| Relative Humidity❸ | 90% |
| Shock❹ | 30 g/11 ms |
| Vibration❺ | 20 g/10…2 kHz |
| Enclosure Type Rating❻ | IP66 (IEC60529) |
| Weight [g (oz)] | 481 g (17 oz) |
| EMC | DIN EN61000-6-2<br>DIN 61000-6-3 |

❶ Inrush current with 5…12V supply can be as high as 1 Amp
❷ If applying the electronic type label, in connection with numeric controllers, attention should be paid to Patent EP 425 912 B 2. Application of the electronic type label in connection with speed regulation is exempt.
❸ Condensation not permissible
❹ To DIN EN 60068-2-27
❺ To DIN EN 60068-2-6
❻ With mating connector inserted

# Bulletin 842HR Sine Cosine/Serial Encoders

## Size 25, High Resolution Auxiliary Servo Feedback

### Product Selection

| 842HR — | S | J | DZ | 1 | 15FWY | 2 |
|---|---|---|---|---|---|---|
| | *a* | | *b* | *c* | | *d* |

***a***

| No. of Turns | |
|---|---|
| **Code** | **Description** |
| S | Single-turn (1 turn) |
| M | Multi-turn (4096 turns) |

***b***

| Mounting Configuration (Note) | |
|---|---|
| **Code** | **Description** |
| DZ | Square Flange, 3/8 in. solid shaft |
| DN | Square Flange, 3/8 in. solid shaft with flat |
| A1 | Hub shaft, 15 mm blind hollow shaft |
| A2 | Hub shaft, 1/2 in. blind hollow shaft |
| A3 | Hub shaft, 12 mm blind hollow shaft |
| A4 | Hub shaft, 10 mm blind hollow shaft |
| A5 | Hub shaft, 3/8 in. blind hollow shaft |
| A6 | Hub shaft, 8 mm blind hollow shaft |
| A7 | Hub shaft, 1/4 in. blind hollow shaft |
| A8 | Hub shaft, 6 mm blind hollow shaft |

Note: Hub shaft units are supplied with 15 mm blind hollowshaft. For shaft bores smaller than 15 mm, a shaft insert is supplied having the correct ID.

***C***

| Power Supply | |
|---|---|
| **Code** | **Description** |
| 1 | 5…12V DC |
| 2 | 7…12V DC |

***d***

| Connection Options | |
|---|---|
| **Code** | **Description** |
| 2 | MS 10-pin |
| D | M23 17-pin |

**Output Termination: M23 17-Pin**

| Pin No. | Function | Explanation | Wire Color |
|---|---|---|---|
| 1 | SINE | Process Data Channel | Black |
| 2 | REFSINE | Process Data Channel | White/Black |
| 3 | COSINE | Process Data Channel | Red |
| 4 | REFCOSINE | Process Data Channel | White/Red |
| 5 | Data + | RS-485 parameter channel | Green |
| 6 | Data - | RS-485 parameter channel | White/Green |
| 9 | DC + Input | 5V Supply Voltage | Grey |
| 10 | DC Return | Ground Connection | White/Grey ❶ |
| 11 | DC + Input | 9V Supply Voltage | Orange |
| 13 | N.C. | | |
| 14 | N.C. | | |
| 15 | N.C. | | |
| 16 | N.C. | | |
| 17 | N.C. | | |
| 7 | CASE | Case Ground | Brown |
| 8 | N.C. | | |
| 12 | DC Return | Ground Connection | ❶ |

❶ Pin 12 internally tied to pin 10

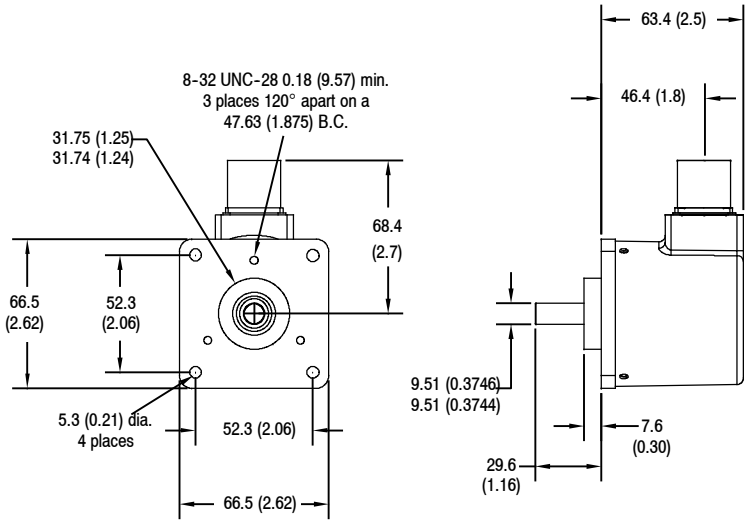
**Output Termination: MS 10-Pin**

| Pin No. | Function | Wire Color |
|---|---|---|
| A | +VS | Red |
| B | Common | Blue |
| C | Ref SIN | Brown |
| D | Ref COS | Black |
| E | Data + | Grey |
| F | Data - | Green |
| G | SIN | White |
| H | COS | Pink |
| I | Not Used | |
| J | Case | Case |

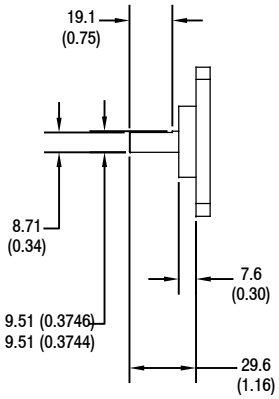
# Bulletin 842HR Sine Cosine/Serial Encoders

## Size 25, High Resolution Auxiliary Servo Feedback

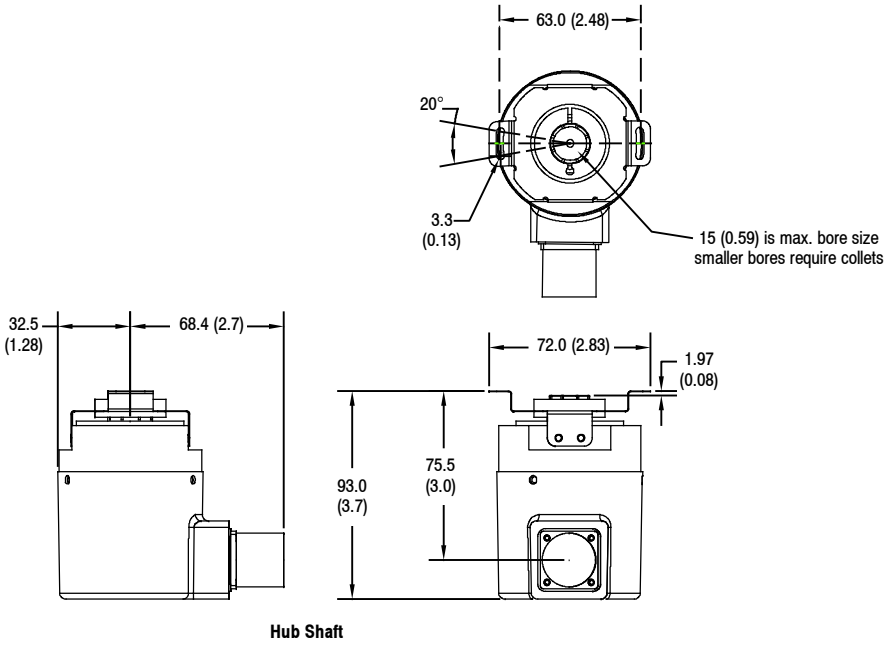
### Approximate Dimensions [mm (in.)]




**Square Flange, Solid Shaft**




**Solid Shaft with Flat**




**Hub Shaft**

## Accessories

| Description | Cat. No. |
|---|---|
| M23 17-Pin Cables | 2090-XXNFMF-Sxx |
| MS 10-Pin Cables | 842HR-CA-2-yy |
| Flexible Coupling | 845-FC-x-x |

### 2090-XXNFMF-Sxx

Pre-wired cable to a M23 DIN 17-pin connector for the encoder. The other end of the cable is flying leads.

| xx = Cable Length | |
|---|---|
| 01 | 1 m |
| 02 | 2 m |
| 03 | 3 m |
| 04 | 4 m |
| 05 | 5 m |
| 07 | 7 m |
| 09 | 9 m |
| 12 | 12 m |
| 15 | 15 m |
| 20 | 20 m |
| 25 | 25 m |
| 30 | 30 m |

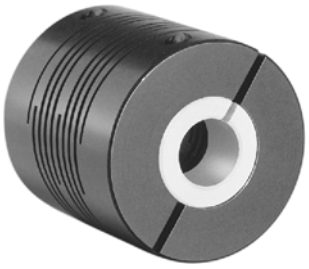
**Note**: Consult manufacturer's drive manual for maximum recommended cable length.

### 842HR-CA-2-yy

Pre-wired cable to a MS 10-pin connector for the encoder. The other end of the cable is flying leads.

| yy = Cable Length | |
|---|---|
| 01 | 1 m |
| 03 | 3 m |
| 05 | 5 m |
| 10 | 10 m |
| 20 | 20 m |
| 30 | 30 m |

### Flexible Couplings



### Description

High performance flexible couplings are used to connect two shafts, and help to reduce the effects of misalignment between the shafts. Flexible couplings are offered in the high performance version, with nonconductive inserts. They are of the flexible curved beam helical type with clamping screw at both ends.

### Specifications

| | |
|---|---|
| Parallel Offset | 0.51 mm (0.02 in.) max. |
| Angular Offset | 10° max. |
| Axial Compliance | 1.58 mm (0.06 in.) max. |
| Construction | Aluminum with a fiberglass insert |

Available cat. nos. for this encoder:

845-FC-B-B
845-FC-B-C
845-FC-B-R
845-FC-B-T
845-FC-A-B
845-FC-R-B

## Product Selection

**845 — FC — B — B**
*a* *b*

***a***

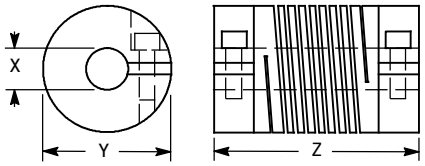
| Smallest Bore Diameter | |
|---|---|
| Code | Description |
| A | 1/4 inch |
| B | 3/8 inch |
| R | 6 mm |
| T | 10 mm |

***b***

| Largest Bore Diameter | |
|---|---|
| Code | Description |
| A | 1/4 inch |
| B | 3/8 inch |
| C | 1/2 inch |
| R | 6 mm |
| T | 10 mm |

## Approximate Dimensions [mm (in.)]

### High Performance Flexible Coupling

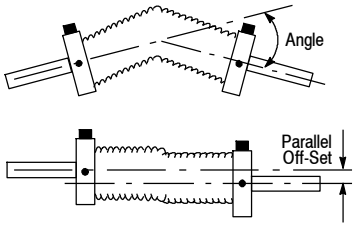



| Dimension Code | Bore Size Code Letter | | | | |
|---|---|---|---|---|---|
| | A | B | C | R | T |
| X | 6.4 (0.25) | 9.5 (0.375) | 12.7 (0.50) | 6 | 10 |
| Y | 30.56 (1.20) Dia. | | | | |
| Z | 32 (1.25) Long | | | | |

**ATTENTION**

The shielded cables, output devices, and power supplies must be properly grounded. All National Electric Code and applicable local codes and ordinances must be observed when wiring the system.

### Flexible Shaft Couplings




**ATTENTION**

Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft.

# Bulletin 845D Absolute Encoders

## Single-Turn, Size 25

*English Servo Mount*
*845D-SJHZ14BDCK2*

## Description

The Bulletin 845D is a heavy duty, NEMA Type 4 single-turn absolute position encoder that digitizes shaft angle position into one of a number of absolute code formats. The absolute encoder has a unique digital output for each shaft position. The use of absolute encoders assures that true position is always available, regardless of power interruptions to the system.

The Bulletin 845D provides improved accuracy, increased operating speed and high noise immunity over competitive units. The 845D is housed in a size 25 NEMA Type 4 enclosure to meet the demands of today's industrial environment.

## Features

- Absolute Gray Code, Natural Binary or BCD output
- Optional latch command input for discrete I/O
- Optional 5V or 8…24V DC power requirements
- 85°C (185°F) operating temperature
- Electronic zero set pin
- Field-selectable direction control
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| **Electrical** | |
| Code Format | Binary Coded Decimal (BCD)<br>Gray Code<br>Natural Binary |
| Resolution | (Gray and Natural Binary): 256 CPR (8 bit); 512 CPR (9 bit)<br>1024 CPR (10 bit)<br>(BCD): 360 CPR (10 bit); 1000 CPR (12 bit) |
| Accuracy | ±1 bit |
| Response Frequency | 16 K words/sec |
| Power Supply | Determined by Cat. No.: 5V DC ±5% @ 400 mA max.<br>8…24V DC @ 400 mA max. |
| Output Drives | NPN current sink = 16 mA |
| Output Logic | Parallel BCD, GRAY, or NAT BIN: Logic "0" = 0.0…0.6V DC<br>Logic "1" = 3.5…5.0V DC (TTL)<br>Logic "1" = 24V DC maximum (Open collector) |
| Latch Command | Optional with BCD and NAT BIN only: Logic "0" = outputs active (DC common)<br>Logic "1" = outputs latched (+DC or open) |
| Code Direction | Field selectable for increasing counts (CW or CCW) |
| Reset | Reset position value to zero (Natural Binary and BCD) or max. (Gray Code). Only with shaft stationary. |
| **Mechanical** | |
| Starting Torque | 2.5 Ncm typical [3.5 in.-oz] |
| Running Torque | 2.5 Ncm typical [3.5 in.-oz] |
| Shaft Loading | Axial 89 N [20 lbs]; Radial 178 N [40 lbs] |
| Shaft Size | 6 mm, 10 mm, 1/4 in., 3/8 in. diameter |
| Moment of Inertia | 54 g-cm$^2$ (0.3 oz-in.$^2$) |
| Slew Speed | 5000 RPM |
| **Environmental** | |
| Housing | NEMA Type 4, IP66 (IEC 529); NEMA Type 4X on selected models |
| Operating Temperature [C (F)] | 0…+85° (+32…+185° ) |
| Storage Temperature [C (F)] | -25…+90° (-13…+194°) |
| Humidity | 98%, noncondensing |
| Shock | 50 g (11 ms duration) |
| Vibration | 20 g (58…150 Hz), 1.5 mm displacement (10…58 Hz) |
| Weight [kg (lbs)] | 0.91 (2) |

## Accessories

| Description | Page Number |
|---|---|
| Flexible Couplings | 6-47 |
| Measuring Wheels | 6-48 |
| Servo Clamps | 6-48 |
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Mounting Plates | 6-52 |

## Product Selection

| 845D | — | S | J | D | Z | 1 | 4 | B | D | CK | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* | *i* |

### *a*

| NEMA Rating | |
|---|---|
| **Code** | **Description** |
| J | NEMA 4 |
| X | NEMA 4X ❶ |

### *b*

| Mounting Configuration | |
|---|---|
| **Code** | **Description** |
| D | Square Flange |
| E | 70 mm Diameter Flange |
| F | 90 mm Diameter Flange |
| G | Metric Servo 48 mm B.C. |
| H | English Servo |
| J | Metric Servo 42 mm B.C. |

### *c*

| Shaft Options | |
|---|---|
| **Code** | **Description** |
| A | 6 mm Diameter |
| B | 10 mm Diameter |
| C | 1/4 in. Diameter |
| Z | 3/8 in. Diameter |
| K | 6 mm w/Flat |
| L | 10 mm w/Flat |
| M | 1/4 in. w/Flat |
| N | 3/8 in. w/Flat |

### *d*

| Power Supply Options | |
|---|---|
| **Code** | **Description** |
| 1 | 5V DC ±5% |
| 2 | 8…24V DC Unregulated |

### *e*

| Output Configuration | |
|---|---|
| **Code** | **Description** |
| 4 | 5V DC TTL Compatible |
| 5 | NPN Open Collector 24V DC Max. |

### *f*

| Latch Options | |
|---|---|
| **Code** | **Description** |
| A | No Latch |
| B | Latch (Sink Output Module Compatible) |

### *g*

| Output Code Type | |
|---|---|
| **Code** | **Description** |
| D | Binary Coded Decimal |
| G | Gray Code ❷ |
| N | Natural Binary |

### *h*

| Resolution | | |
|---|---|---|
| **Code** | **Description** | |
| CW | 256 ❸ | Gray Code or Natural Binary |
| DW | 512 ❸ | |
| FW | 1024 ❸ | |
| CK | 360 ❹ | Binary Coded Decimal |
| CN | 1000 ❹ | |

### *i*

| Connector Options | |
|---|---|
| **Code** | **Description** |
| 1 | Axial Connector (End) without Mate |
| 2 | Radial Connector (Side) without Mate |
| 4 | Axial Connector (End) with Mate |
| 5 | Radial Connector (Side) with Mate |

❶ Available with square flange mounting configuration only.
❷ This option not available with Latch Options code: “B.”
❸ These options not available with Output Code Type code: “D.”
❹ These options not available with Output Code Type code: “G” & “N.”

# Bulletin 845D Absolute Encoders

## Single-Turn, Size 25

### Electrical Connections

| Pin | Function | | |
|---|---|---|---|
| | Gray Code | Natural Binary | BCD (8421) |
| A | G(0) | $2^0$ | 1 |
| B | G(1) | $2^1$ | 2 |
| C | G(2) | $2^2$ | 4 |
| D | G(3) | $2^3$ | 8 |
| E | G(4) | $2^4$ | 10 |
| F | G(5) | $2^5$ | 20 |
| G | G(6) | $2^6$ | 40 |
| H | G(7) | $2^7$ | 80 |
| J | G(8) | $2^8$ | 100 |
| K | G(9) | $2^9$ | 200 |
| L | MSB Complement | Not Used | 400 |
| M | Not Used | Not Used | 800 |
| N | Not Used | Not Used | Not Used |
| P | Not Used | Not Used | Not Used |
| R | Not Used | Direction Control | Direction Control |
| S | Reset | Reset | Reset |
| T | DC Return | DC Return | DC Return |
| U | Not Used | Latch Control | Latch Control |
| V | DC+ Input | DC+ Input | DC+ Input |

### Direction Pin

The Direction Pin can change function with code type. In parallel type Gray Code encoders, its function is Most significant Bit Complement or MSBC for short. In Natural Binary and Binary Coded Decimal encoders, its function is Direction Control.

### Direction Control ❶

**Natural Binary and BCD**

A logic “1” (+DC or open) on the direction control pin will produce increasing counts with a counter-clockwise rotation of the shaft. A logic “0” (DC common) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft.

**Gray Code (parallel only)**

Counterclockwise rotation of the shaft will produce increasing counts. For increasing counts with a clockwise rotation, use the Most Significant Bit Complement Pin instead of the Most Significant Bit Pin. See Electrical Connection table for pin designation.

**ATTENTION**

For parallel gray code: connecting the MSB or MSBC to +DC will result in permanent damage to the encoder.

### Reset Pin

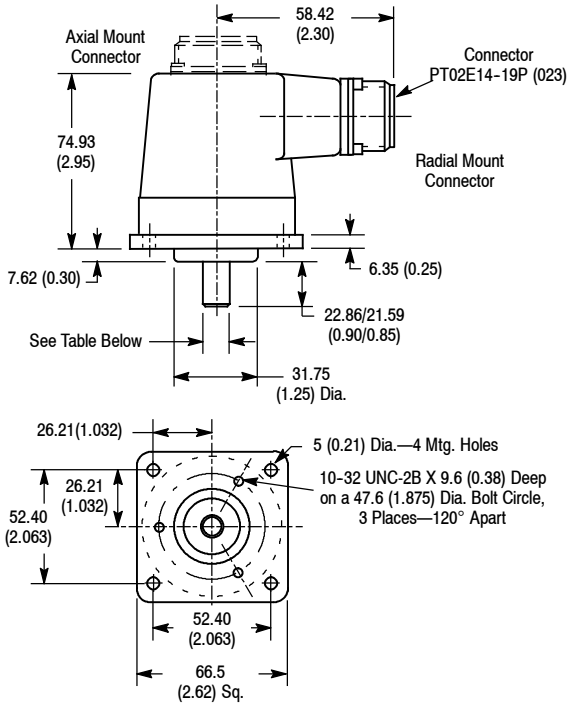
The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset Gray Code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used. The reset function requires a connection to +DC for 0.1 seconds or longer.

**ATTENTION**

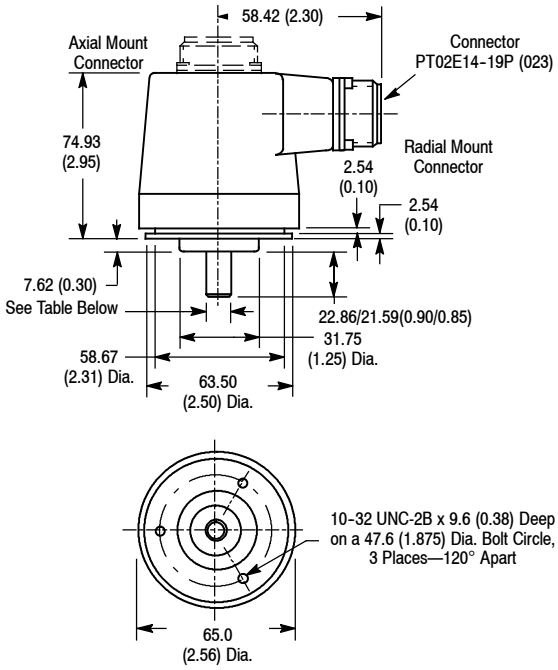
Activating the Reset Pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

❶ Rotation is viewed from the end of the encoder shaft.

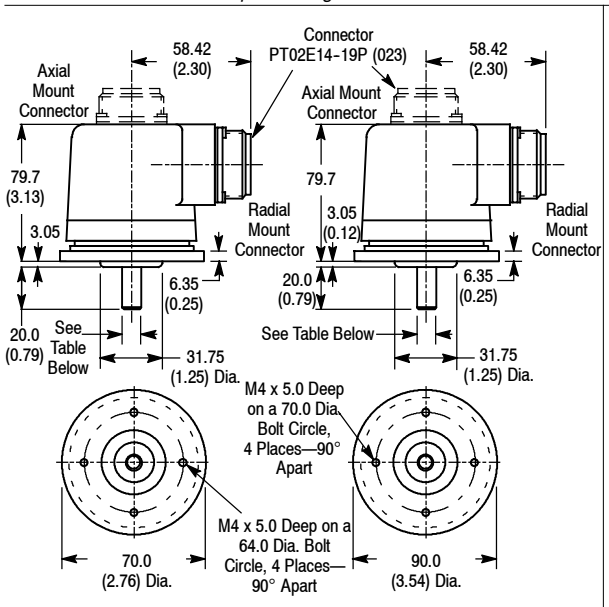
## Approximate Dimensions [mm (in.)]



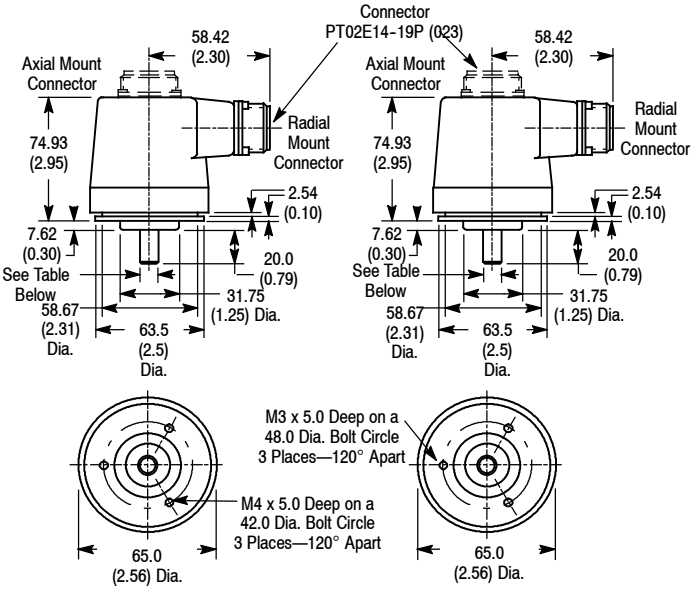

*Square Flange Mount*




*English Servo Mount*



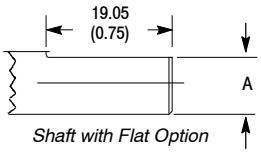

*Metric Flange Mount*




*Metric Servo Mount*

## Shaft Diameter Options

| Code | Shaft Diameter |
|---|---|
| A or K | 6 mm +0.00 mm, -0.013 mm |
| B or L | 10 mm +0.00 mm, -0.013 mm |
| C or M | 6.35(0.2499 ) +0.0000, -0.0005 |
| Z or N | 9.52 (0.3749) +0.0000, -0.0005 |




*Shaft with Flat Option*

## Flat Dimensions

| Code | Dimension "A" |
|---|---|
| K | 5.3 mm (0.21 in.) |
| L | 9.1 mm (0.36 in.) |
| M | 5.5 mm (0.22 in.) |
| N | 8.6 mm (0.34 in.) |

# Bulletin 845G Absolute Encoders

## Single-Turn, Size 25

*English Servo Mount*
*845G-S3G5HC1024R*

## Description

Bulletin 845G is a heavy duty NEMA Type 4 and 13 single-turn absolute encoder that digitizes shaft position. The absolute encoder has a unique digital output for each shaft position. The use of absolute encoders assures that true position is available, regardless of power interruptions.

## Features

- Absolute grey code, natural binary or binary coded decimal (BCD)
- 8-…15-bit resolution (256…32,768)
- Open collector, TTL, push-pull or SSI outputs
- Low or high true output optional
- NEMA Type 4 and 13
- Reverse polarity protection
- 85°C operating temperature
- CE Marked for all applicable directives

## Specifications

| | | |
|---|---|---|
| **Electrical** | | |
| Code Format | Binary Coded Decimal (parallel only)<br>Grey code or natural binary (parallel or SSI) | |
| Resolution | Counts per Rev. (CPR)<br>256 CPR (8 bit)<br>360 CPR (9 or 10 bit)<br>512 CPR (9 bit)<br>1000 CPR (12 bit BCD)<br>1024 CPR (10 bit) | <br>2048 CPR (11 bit)<br>4096 CPR (12 bit)<br>8192 CPR (13 bit)<br>16384 CPR (14 bit)<br>32768 CPR (15 bit) |
| Accuracy | ±1 bit | |
| Response Frequency | 16 K words/sec | |
| Power Supply | Determined by Cat. No: | 5V DC ±5% @ 150 mA max.<br>8…24V DC @ 150 mA max.<br>10…30V DC @ 150 mA max. |
| Output Drives | 16 mA | |
| Output Logic | Parallel Grey, natural binary or binary coded decimal (BCD)<br>Logic "0" = 0.0…0.6V DC<br>Logic "1" = 3.5…5V DC (TTL)<br>Logic "1" = 24V DC maximum (Open Collector)<br>SSI RS-422 compatible | |
| Latch Command | Standard with natural binary and BCD<br>Logic "0" = outputs active (DC common)<br>Logic "1" = outputs latched (+DC or open) | |
| Code Direction | Field selectable for increasing counts (CW or CCW) | |
| Reset | Reset position value to zero (natural binary and BCD) or max. (grey code). Only with shaft stationary. | |
| **Mechanical** | | |
| Starting Torque | 0.025 N·m [3.5 in.-oz.]Typical | |
| Running Torque | 0.025 N·m [3.5 in.-oz.]Typical | |
| Shaft Loading | Axial 89 N [20 lbs]; Radial 178 N [40 lbs] | |
| Shaft Dimensions | 9.517 mm [3/8 inch] diameter w/flat | |
| Moment of Inertia | 0.08 oz.-in.$^2$ max. | |
| Slew Speed | 5000 RPM | |
| **Environmental** | | |
| Enclosure Type Rating | NEMA Type 4, 13, IP66 (IEC 529) | |
| Operating Temperature [C (F)] | 0…+85° (+32°…+185°) | |
| Storage Temperature [C (F)] | -40…+100° (-40…+212°) | |
| Working Temperature [C (F)] | -20…+85° (-4…+185°), max. | |
| Relative Humidity | 98%, noncondensing | |
| Shock | 50 g (11 ms duration) | |
| Vibration | 20 g (58…150 Hz), 1.5 mm displacement (10…58 Hz) | |
| Weight [kg (lbs)] | 0.91 (2) | |

## Accessories

| Description | Cat. No. |
|---|---|
| High Performance Flexible Coupling | 845-FC-❶-❶ |
| Measuring Wheels | 845-MW-A-❶ |
| Servo Clamps | 845-SC |

| No. of Pins | Mating Connector | Pre-Wired Cable |
|---|---|---|
| 12 | 845-12P | 845-CA-G-❶ |
| 17 | 845-17P | 845-CA-H-❶ |
| 19 | 845-SCD | 845-CA-D-❶ |

❶ For additional information, see the Accessories section on pages 6-46...6-55.

## Product Selection

**845G — F 3 G 8 H C 1024 R**
*a b c d e f g*

### a

| Mounting Configuration | |
|---|---|
| **Code** | **Description** |
| F | Square Flange |
| S | English Servo |

### b

| Output Code Type ❶ | |
|---|---|
| **Code** | **Description** |
| B | Natural Binary |
| D | Binary Coded Decimal ❷ |
| G | Grey Code |

### c

| Power Supply | |
|---|---|
| **Code** | **Description** |
| 5 | 5V DC ±5% |
| 8 | 8…24V DC |
| A | 10…30V DC ❸ |

### d

| Output Logic | |
|---|---|
| **Code** | **Description** |
| H | High True |
| L | Low True ❹ |

### e

| Output Configuration | |
|---|---|
| **Code** | **Description** |
| C | NPN Open Collector 24V DC Max |
| P | Push-Pull (7272) ❸ |
| S | SSI Output ❸❺❽ |
| T | 5V DC TTL NPN |

### f

| Resolution | |
|---|---|
| **Code** | **Description** |
| 0256 | 8 bit/0…255 |
| 0360 | 9 or 10 bit/0…359 ❻❾ |
| 0512 | 9 bit/0…511 |
| 1000 | 12 bit/0…999 BCD only |
| 1024 | 10 bit/0…1023 |
| 2048 | 11 bit/0…2047 |
| 4096 | 12 bit/0…4095 |
| 8192 | 13 bit/0…8191 |
| 016K | 14 bit/0…16,383 |
| 032K | 15 bit/0…32,767 |

### g

| Connector Options | |
|---|---|
| **Code** | **Description** |
| A | Axial 19-Pin |
| R | Radial 19-Pin |
| S | Axial 17-pin |
| T | Axial 12-Pin ❼ |
| U | Radial 12-Pin ❼ |

❶ Latch control available with natural binary and binary coded decimal (BCD) only.
❷ BCD output available in 0360 and 1000 resolutions only. Not available with SSI output.
❸ 10…30V DC power supply may only be ordered together with either push-pull or SSI output.
❹ Not available with push-pull output. Output logic inverted.
❺ Not available with BCD. Latch not available.
❻ Excess 76 used for 9 bit grey code. BCD is 10 bit.
❼ Only available with SSI output.
❽ SSI available with grey code output only.
❾ Not available with SSI.

# Bulletin 845G Absolute Encoders

## Single-Turn, Size 25

### Electrical Connections—17 Pin Connector (All code types)

| Pin | 845-CA-H-__ Wire Color | 8192 (13 Bit) | 1000 BCD or 4096 (12 Bit) | 2048 (11 Bit) | 360 BCD or 1024 (10 Bit) | 512 (9 Bit) | 360 (9 Bit) | 0256 (8 Bit) |
|---|---|---|---|---|---|---|---|---|
| A | White/Orange | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ |
| B | White | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ |
| C | Grey | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ |
| D | Violet | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ |
| E | Blue | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ |
| F | Yellow | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ |
| G | Orange | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ |
| H | Brown | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ |
| J | White/Violet | G(8) or $2^8$ | G(8) or $2^8$ | G(8) or $2^8$ | G(8) or $2^8$ | G(8) or $2^8$ | G(8) or $2^8$ | N/C |
| K | White/Brown | G(9) or $2^9$ | G(9) or $2^9$ | G(9) or $2^9$ | G(9) or $2^9$ | N/C | N/C | N/C |
| L | White/Green | G(10) or $2^{10}$ | G(10) or $2^{10}$ | G(10) or $2^{10}$ | N/C | N/C | N/C | Reset |
| M | White/Yellow | G(11) or $2^{11}$ | G(11) or $2^{11}$ | N/C | N/C | N/C | N/C | Direction ❷ |
| N | White/Red | G(12) or $2^{12}$ | Reset | Reset | Reset | Reset | Reset | Latch Control ❶ |
| P | White/Blue | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | N/C |
| R | Black | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common |
| S | Red | +DC | +DC | +DC | +DC | +DC | +DC | +DC |
| T | Green | Direction ❷ | Direction ❷ | Direction ❷ | Direction ❷ | Direction ❷ | Direction ❷ | Case Ground |

### Electrical Connections—19 Pin Connector (Grey code or natural binary)

| Pin | 845-CA-D-__ Wire Color | 32768 (15 Bit) | 16384 (14 Bit) | 8192 (13 Bit) | 4096 (12 Bit) | 2048 (11 Bit) | 1024 (10 Bit) | 360 and 512 (9 Bit) | 0256 (8 Bit) |
|---|---|---|---|---|---|---|---|---|---|
| A | Brown | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ | N/C | N/C | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ |
| B | Orange | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ | G(0) or $2^0$ | N/C | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ |
| C | Yellow | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ | G(1) or $2^1$ | G(0) or $2^0$ | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ |
| D | Green | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ | G(2) or $2^2$ | G(1) or $2^1$ | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ |
| E | Blue | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ | G(3) or $2^3$ | G(2) or $2^2$ | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ |
| F | Violet | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ | G(4) or $2^4$ | G(3) or $2^3$ | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ |
| G | Grey | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ | G(5) or $2^5$ | G(4) or $2^4$ | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ |
| H | White | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ | G(6) or $2^6$ | G(5) or $2^5$ | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ |
| J | White/Orange | G(8) or $2^8$ | G(8) or $2^8$ | G(8) or $2^8$ | G(7) or $2^7$ | G(6) or $2^6$ | G(8) or $2^8$ | G(8) or $2^8$ | N/C |
| K | White/Brown | G(9) or $2^9$ | G(9) or $2^9$ | G(9) or $2^9$ | G(8) or $2^8$ | G(7) or $2^7$ | G(9) or $2^9$ | N/C | N/C |
| L | White/Red | G(10) or $2^{10}$ | G(10) or $2^{10}$ | G(10) or $2^{10}$ | G(9) or $2^9$ | G(8) or $2^8$ | Direction ❷ | Direction ❷ | Direction ❷ |
| M | White/Yellow | G(11) or $2^{11}$ | G(11) or $2^{11}$ | G(11) or $2^{11}$ | G(10) or $2^{10}$ | G(9) or $2^9$ | N/C | N/C | N/C |
| N | White/Green | G(12) or $2^{12}$ | G(12) or $2^{12}$ | G(12) or $2^{12}$ | G(11) or $2^{11}$ | G(10) or $2^{10}$ | N/C | N/C | N/C |
| P | White/Blue | G(13) or $2^{13}$ | G(13) or $2^{13}$ | N/C | Direction ❷ | Direction ❷ | N/C | N/C | N/C |
| R | White/Black | G(14) or $2^{14}$ | Reset | Reset | Reset | Reset | Reset | Reset | Reset |
| S | White/Violet | Direction ❷ | Direction ❷ | Direction ❷ | N/C | N/C | N/C | N/C | N/C |
| T | Black | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common |
| U | White/Grey | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ |
| V | Red | +DC | +DC | +DC | +DC | +DC | +DC | +DC | +DC |

❶ Latch control not available with grey code or SSI output. On grey code encoders this pin is not connected (N/C).
❷ The Direction pin function is either Direction Control or MSBC. See next page for further detail.

## Electrical Connections—19 Pin Connector (Binary Coded Decimal)

| Pin | 845-CA-D-___ Wire Color | 1000 BCD (12 Bit) | 360 BCD (10 Bit) |
|---|---|---|---|
| V | Red | +DC | +DC |
| A | Brown | 1 | 1 |
| B | Orange | 2 | 2 |
| C | Yellow | 4 | 4 |
| D | Green | 8 | 8 |
| E | Blue | 10 | 10 |
| F | Violet | 20 | 20 |
| G | Grey | 40 | 40 |
| H | White | 80 | 80 |
| J | White/Orange | 100 | 100 |
| K | White/Brown | 200 | 200 |
| L | White/Red | 400 | N/C |
| M | White/Yellow | 800 | N/C |
| N | White/Green | N/C | N/C |
| P | White/Blue | N/C | N/C |
| R | White/Black | Direction Control | Direction Control |
| S | White/Violet | Reset | Reset |
| T | Black | DC Common | DC Common |
| U | White/Grey | Latch Control | Latch Control |

## Electrical Connections for SSI Output—12 Pin Connector

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-G-__ (With 12 pin connector | Red/Black/Shield | Red | +DC Input | 8 |
| | | Black | DC Common | 1 |
| | White/Black/Shield | White | Clock + | 3 |
| | | Black | Clock - | 11 |
| | Blue/Black/Shield | Blue | Data + | 2 |
| | | Black | Data - | 10 |
| | Green/Black/Shield | Green | CW/CCW | 12 |
| | | Black | Reset | 9 |

## Direction Pin

The Direction Pin can change function with code type. In parallel type grey code encoders, its function is Most significant Bit Complement or MSBC for short. In Natural Binary, Binary Coded Decimal and grey code SSI encoders, its function is Direction Control.

## Direction Control ❶

### Natural Binary and BCD

A logic “1” (+DC or open) on the direction control pin will produce increasing counts with a counter-clockwise rotation of the shaft. A logic “0” (DC common) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft.

❶ Rotation is viewed from the end of the encoder shaft.

### Grey Code (SSI)

A logic “1” (+DC or open) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft. A logic “0” (DC common) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft.

### Grey Code (parallel)

Counterclockwise rotation of the shaft will produce increasing counts. For increasing counts with a clockwise rotation, use the Most Significant Bit Complement Pin instead of the Most Significant Bit Pin. See Electrical Connection table for pin designation.

**ATTENTION**

For parallel grey code: connecting the MSB or MSBC to +DC will result in permanent damage to the encoder.

### Reset Pin

The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset grey code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used. The reset function requires a connection to +DC for 0.1 seconds or longer.

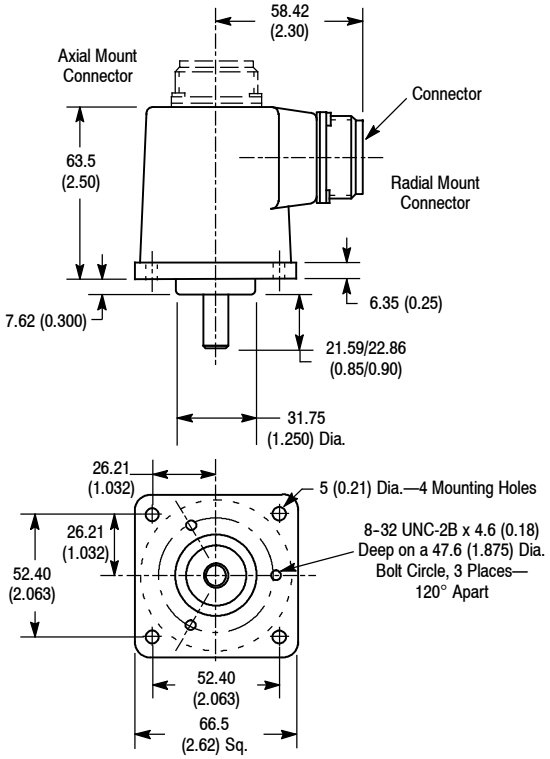
**ATTENTION**

Activating the reset pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

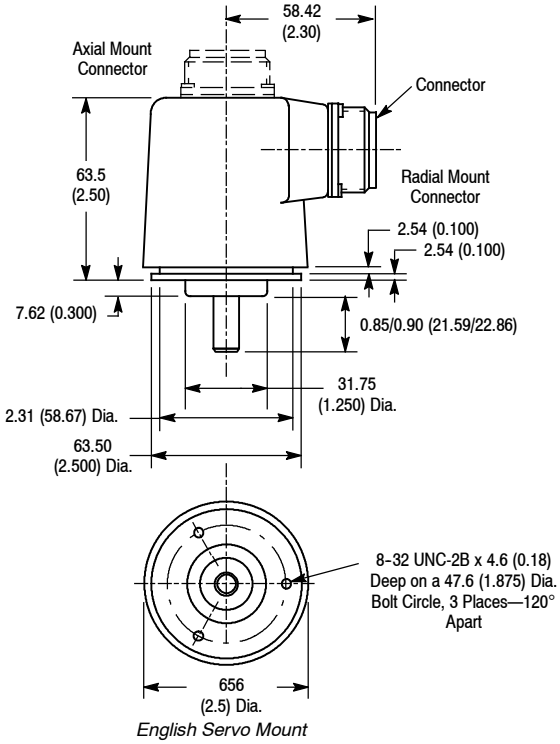
# Bulletin 845G Absolute Encoders

## Single-Turn, Size 25

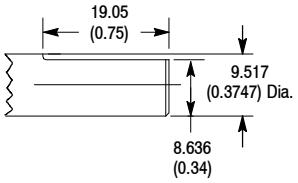
### Approximate Dimensions [mm (in.)]




*Square Flange Mount*

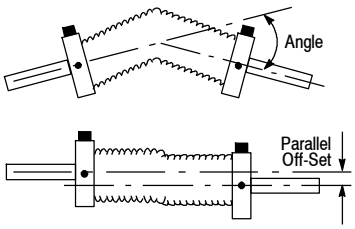



*English Servo Mount*




*Shaft Dimensions*

### Flexible Shaft Couplings




| ATTENTION | Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft. |
|---|---|

# Bulletin 845GM Absolute Encoders

## Single-Turn, Size 20

*845GM-S3G8HC0360R*

## Description

Bulletin 845GM is a single-turn absolute encoder that provides a unique digital output for each shaft position. These size 20 encoders are available with resolution ranging from 256…32,768 CPR (counts per revolution). The electronic zero-set feature facilitates synchronization of electrical and mechanical zero positions.

## Features

- Absolute grey code, natural binary or binary coded decimal (BCD)
- 8-…15-bit resolution (256…32,768)
- Open collector, TTL, push-pull or SSI outputs
- Electronic zero-set pin
- Low or high true output optional
- NEMA Type 4 and 13
- Reverse polarity protection
- 85°C operating temperature
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| **Electrical** | |
| Code Format | Parallel: grey code, natural binary, binary coded decimal (BCD)<br>SSI: grey code |
| Resolution | Counts per Rev. (CPR)<br>256 CPR (8 bit) — 2048 CPR (11 bit)<br>360 CPR (9 or 10 bit) — 4096 CPR (12 bit)<br>512 CPR (9 bit) — 8192 CPR (13 bit)<br>1000 CPR (12 bit BCD) — 16384 CPR (14 bit)<br>1024 CPR (10 bit) — 32768 CPR (15 bit) |
| Accuracy | ±1 bit |
| Response Frequency | 16 K words/sec |
| Power Supply. | Determined by Cat. No.: 5V DC ±5% @ 150 mA max.<br>8…24V DC @ 150 mA max.<br>10…30V DC @ 150 mA max. |
| Output Drives | 16 mA |
| Output Logic | Parallel: grey, natural binary or (BCD)<br>Logic "0" = 0.0…0.6V DC<br>Logic "1" = 3.5…5V DC (TTL)<br>Logic "1" = 24V DC maximum (Open Collector)<br>Logic "1" = 0.7 x Vs (Push-Pull)<br>SSI RS-422 compatible |
| Latch Command | Standard with natural binary and BCD<br>Logic "0" = outputs active (DC common)<br>Logic "1" = outputs latched (+DC or open) |
| Code Direction | Field selectable for increasing counts (CW or CCW) |
| Reset | Reset position value to zero (see the Reset Pin section on page 6-26).<br>Only with shaft stationary. |
| **Mechanical** | |
| Starting Torque | 0.025 N·m (3.5 in-oz) typical |
| Running Torque | 0.025 N·m (3.5 in-oz) typical |
| Shaft Loading | Axial 178 N (40 lbs); radial 178 N (40 lbs) |
| Shaft Dimensions | 6 mm, 10 mm, 9.517 mm (3/8 in.), 9.517 mm (3/8 in.) w/flat |
| Moment of Inertia | 54 gcm$^2$ (0.30 oz-in$^2$) max. |
| Slew Speed | 5000 RPM |
| **Environmental** | |
| Enclosure Type Rating | NEMA Type 4, 13; IP65 |
| Operating Temperature [C (F)] | 0…+85° (+32…+185°) |
| Storage Temperature [C (F)] | -40…+100° (-40…+212°) |
| Working Temperature [C (F)] | -20…+85° (-4…+185°), max. |
| Relative Humidity | 90%, noncondensing |
| Shock | 50 g (11 ms duration) |
| Vibration | 20 g (58…150 Hz), 1.5 mm displacement (10…58Hz) |
| Weight [kg (lbs)] | 0.45 (1) |

## Accessories

| Description | Cat. No. |
|---|---|
| High Performance Flexible Coupling | 845-FC-❶-❶ |
| Measuring Wheels | 845-MW-A-❶ |
| Servo Clamps | 845-SC |

| No. of Pins | Mating Connector | Pre-Wired Cable |
|---|---|---|
| 12 | 845-12P | 845-CA-G-❶ |
| 19 | 845-SCD | 845-CA-D-❶ |

❶ For additional information, see the Accessories section on pages 6-46...6-55.

# Bulletin 845GM Absolute Encoders

## Single-Turn, Size 20

### Product Selection

| 845GM — | F | 3 | G | 8 | H | C | 1024 | R |
|---|---|---|---|---|---|---|---|---|
| | *a* | *b* | *c* | *d* | *e* | *f* | *g* | *h* |

***a***

| Mounting Configuration | |
|---|---|
| **Code** | **Description** |
| F | Square Flange |
| S | English Servo |

***b***

| Shaft Options | |
|---|---|
| **Code** | **Description** |
| 1 | 6 mm |
| 2 | 10 mm |
| 3 | 3/8 in. w/flat |
| 4 | 3/8 in. |

***c***

| Output Code Type ❶ | |
|---|---|
| **Code** | **Description** |
| B | Natural Binary |
| D | Binary Coded Decimal |
| G | Grey Code |

***d***

| Power Supply | |
|---|---|
| **Code** | **Description** |
| 5 | 5V DC ±5% |
| 8 | 8…24V DC |
| A | 10…30V DC ❶ |

***e***

| Output Logic | |
|---|---|
| **Code** | **Description** |
| H | High True |
| L | Low True ❷ |

***f***

| Output Configuration | |
|---|---|
| **Code** | **Description** |
| C | NPN Open Collector 24V DC Max |
| P | Push-Pull (7272) ❶ |
| S | SSI Output ❶❸❹ |
| T | 5V DC TTL NPN |

***g***

| Resolution | |
|---|---|
| **Code** | **Description** |
| 0256 | 8 bit/0…255 |
| 0360 | 9 or 10 bit/0…359 ❺❻ |
| 0512 | 9 bit/0…511 |
| 1000 | 12 bit/0…999 BCD only |
| 1024 | 10 bit/0…1023 |
| 2048 | 11 bit/0…2047 |
| 4096 | 12 bit/0…4095 |
| 8192 | 13 bit/0…8191 |
| 016K | 14 bit/0…16,383 |
| 032K | 15 bit/0…32,767 |

***h***

| Connector Options | |
|---|---|
| **Code** | **Description** |
| R | Radial 19-Pin |
| U | Radial 12-Pin ❹ |

❶ Push-Pull or SSI output can only be ordered with 10…30V DC power supply.
❷ Not available with push-pull and SSI output. Output logic inverted.
❸ SSI available with grey code output only.
❹ SSI only available with 12-pin connector.
❺ Excess 76 used for 9 bit 360 grey code. BCD is 10 bit.
❻ Not available with SSI.

## Electrical Connections—19 Pin Connector (Grey code or natural binary)

| Pin | 845-CA-D-__ Wire Color | 32768 (15 Bit) | 16384 (14 Bit) | 8192 (13 Bit) | 4096 (12 Bit) | 2048 (11 Bit) | 1024 (10 Bit) | 360 and 512 (9 Bit) | 0256 (8 Bit) |
|---|---|---|---|---|---|---|---|---|---|
| A | Brown | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ | N/C | N/C | G(0) or $2^0$ | G(0) or $2^0$ | G(0) or $2^0$ |
| B | Orange | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ | G(0) or $2^0$ | N/C | G(1) or $2^1$ | G(1) or $2^1$ | G(1) or $2^1$ |
| C | Yellow | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ | G(1) or $2^1$ | G(0) or $2^0$ | G(2) or $2^2$ | G(2) or $2^2$ | G(2) or $2^2$ |
| D | Green | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ | G(2) or $2^2$ | G(1) or $2^1$ | G(3) or $2^3$ | G(3) or $2^3$ | G(3) or $2^3$ |
| E | Blue | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ | G(3) or $2^3$ | G(2) or $2^2$ | G(4) or $2^4$ | G(4) or $2^4$ | G(4) or $2^4$ |
| F | Violet | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ | G(4) or $2^4$ | G(3) or $2^3$ | G(5) or $2^5$ | G(5) or $2^5$ | G(5) or $2^5$ |
| G | Grey | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ | G(5) or $2^5$ | G(4) or $2^4$ | G(6) or $2^6$ | G(6) or $2^6$ | G(6) or $2^6$ |
| H | White | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ | G(6) or $2^6$ | G(5) or $2^5$ | G(7) or $2^7$ | G(7) or $2^7$ | G(7) or $2^7$ |
| J | White/Orange | G(8) or $2^8$ | G(8) or $2^8$ | G(8) or $2^8$ | G(7) or $2^7$ | G(6) or $2^6$ | G(8) or $2^8$ | G(8) or $2^8$ | N/C |
| K | White/Brown | G(9) or $2^9$ | G(9) or $2^9$ | G(9) or $2^9$ | G(8) or $2^8$ | G(7) or $2^7$ | G(9) or $2^9$ | N/C | N/C |
| L | White/Red | G(10) or $2^{10}$ | G(10) or $2^{10}$ | G(10) or $2^{10}$ | G(9) or $2^9$ | G(8) or $2^8$ | Direction ❷ | Direction ❷ | Direction ❷ |
| M | White/Yellow | G(11) or $2^{11}$ | G(11) or $2^{11}$ | G(11) or $2^{11}$ | G(10) or $2^{10}$ | G(9) or $2^9$ | N/C | N/C | N/C |
| N | White/Green | G(12) or $2^{12}$ | G(12) or $2^{12}$ | G(12) or $2^{12}$ | G(11) or $2^{11}$ | G(10) or $2^{10}$ | N/C | N/C | N/C |
| P | White/Blue | G(13) or $2^{13}$ | G(13) or $2^{13}$ | N/C | Direction ❷ | Direction ❷ | N/C | N/C | N/C |
| R | White/Black | G(14) or $2^{14}$ | Reset | Reset | Reset | Reset | Reset | Reset | Reset |
| S | White/Violet | Direction ❷ | Direction ❷ | Direction ❷ | N/C | N/C | N/C | N/C | N/C |
| T | Black | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common | DC Common |
| U | White/Grey | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ | Latch Control ❶ |
| V | Red | +DC | +DC | +DC | +DC | +DC | +DC | +DC | +DC |

❶ Latch control not available with grey code or SSI output. On grey code encoders this pin is not connected (N/C).
❷ **Important**—The Direction pin function provides Direction Control for Binary Coded Decimal and Natural Binary or MSBC for parallel grey code. See next page for further detail.

# Bulletin 845GM Absolute Encoders

## Single-Turn, Size 20

### Electrical Connections—19 Pin Connector (Binary Coded Decimal)

| Pin | 845-CA-D-___ Wire Color | 1000 BCD (12 Bit) | 360 BCD (10 Bit) |
|---|---|---|---|
| V | Red | +DC | +DC |
| A | Brown | 1 | 1 |
| B | Orange | 2 | 2 |
| C | Yellow | 4 | 4 |
| D | Green | 8 | 8 |
| E | Blue | 10 | 10 |
| F | Violet | 20 | 20 |
| G | Grey | 40 | 40 |
| H | White | 80 | 80 |
| J | White/Orange | 100 | 100 |
| K | White/Brown | 200 | 200 |
| L | White/Red | 400 | N/C |
| M | White/Yellow | 800 | N/C |
| N | White/Green | N/C | N/C |
| P | White/Blue | N/C | N/C |
| R | White/Black | Direction Control | Direction Control |
| S | White/Violet | Reset | Reset |
| T | Black | DC Common | DC Common |
| U | White/Grey | Latch Control | Latch Control |

### Electrical Connections for SSI Output—12 Pin Connector

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-G-__ (With 12 pin connector | Red/Black/Shield | Red | +DC Input | 8 |
| | | Black | DC Common | 1 |
| | White/Black/Shield | White | Clock + | 3 |
| | | Black | Clock - | 11 |
| | Blue/Black/Shield | Blue | Data + | 2 |
| | | Black | Data - | 10 |
| | Green/Black/Shield | Green | Direction Control | 12 |
| | | Black | Reset | 9 |

### Direction Pin

The Direction Pin can change function with code type. In parallel type grey code encoders, its function is Most significant Bit Complement or MSBC for short. In Natural Binary, Binary Coded Decimal and grey code SSI encoders, its function is Direction Control.

### Direction Control ❶

**Natural Binary and BCD**

A logic “1” (+DC or open) on the direction control pin will produce increasing counts with a counter-clockwise rotation of the shaft. A logic “0” (DC common) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft.

❶ Rotation is viewed from the end of the encoder shaft.

**Grey Code (SSI)**

A logic “1” (+DC or open) on the direction control pin will produce increasing counts with a clockwise rotation of the shaft. A logic “0” (DC common) on the direction control pin will produce increasing counts with a counterclockwise rotation of the shaft.

**Grey Code (parallel)**

Counterclockwise rotation of the shaft will produce increasing counts. For increasing counts with a clockwise rotation, use the Most Significant Bit Complement Pin instead of the Most Significant Bit Pin. See Electrical Connection table for pin designation.

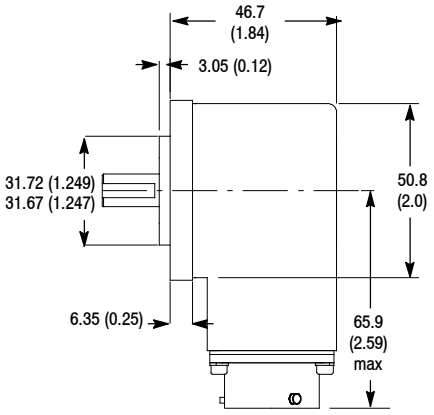
| ATTENTION | |
|---|---|
| | For parallel grey code: connecting the MSB or MSBC to +DC will result in permanent damage to the encoder. |

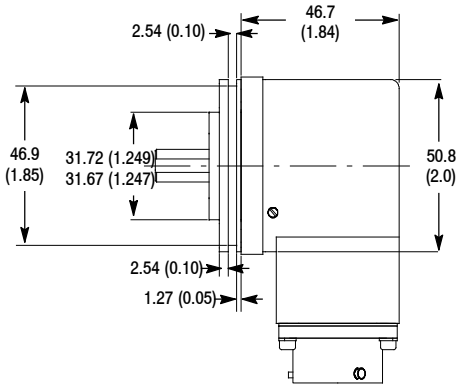
**Reset Pin**

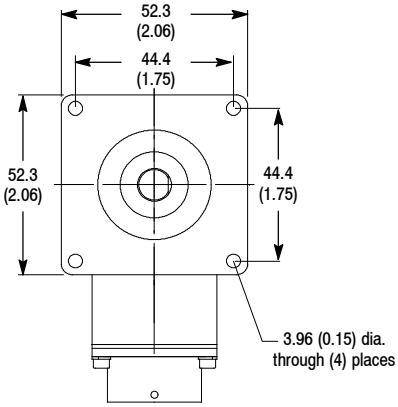
The shaft must be stationary before using the reset function. Connecting the Reset Pin to +DC will reset Natural Binary and BCD position value to zero. Connecting the Reset Pin to +DC will reset grey code position value to maximum (e.g., 255, 511, 1023, etc.) if MSBC is used, to zero if MSB is used. The reset function requires a connection to +DC for 0.1 seconds or longer.

| ATTENTION | |
|---|---|
| | Activating the Reset Pin results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury. |

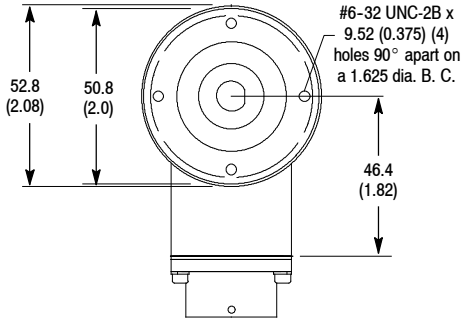
## Approximate Dimensions [mm (in.)]



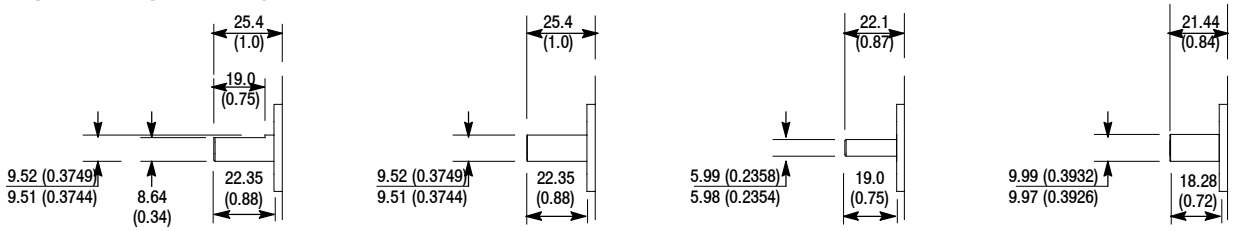




*Square Flange Mount*



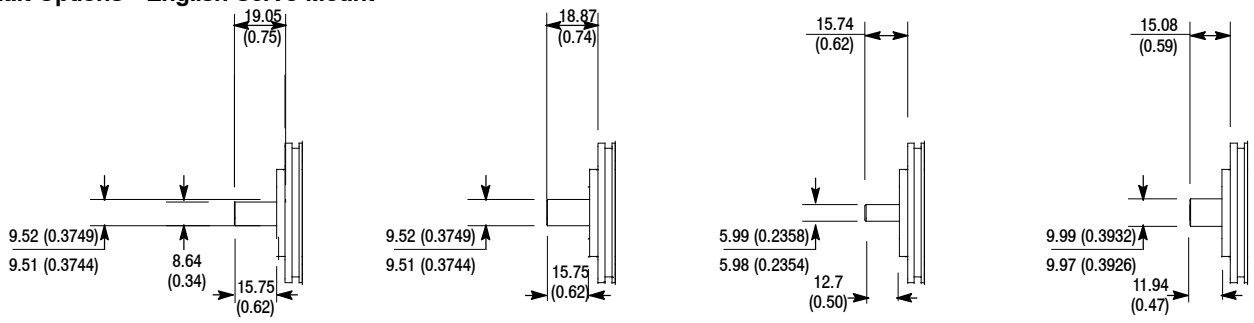

*English Servo Mount*

### Shaft Options—Square Flange Mount



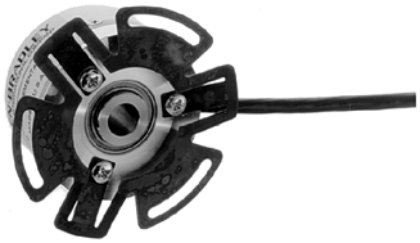

*3/8 in. w/flat* *3/8 in.* *6 mm* *10 mm*

### Shaft Options—English Servo Mount




*3/8 in. w/flat* *3/8 in.* *6 mm* *10 mm*

# Bulletin 844A & 844B Hollow Shaft Incremental Encoders



## Description

Bulletin 844A blind-shaft and 844B through-shaft incremental encoders are used to electronically monitor the position or speed of a rotating shaft. Shaft position is converted to digital pulses in an A quad B format.

- Blind or through-shaft designs
- Integral flex mount
- 10…2500 PPR
- 2 inch diameter housing

Bulletin 844A and 844B encoders offer a built-in flexible coupling which reduces installation cost and mounting space requirements. Additionally, the Bulletin 844B Encoder is a through-shaft design allowing additional accessories to be mounted to the same shaft. Both families come standard with channels A, B and Z and differential line driver (DLD) outputs. Single-ended outputs are also supported at no additional charge. All support shaft sizes up to 1/2 inch in diameter. Bulletin 844A and 844B Encoders offer 42 resolution options.

## Specifications

| **Electrical** | |
|---|---|
| Code Format | 2 channels with zero index |
| Quadrature | 90° ±22° channel A leads B CW |
| Symmetry | 40…60% |
| Power Supply | 120 mA (no load) |
| Output Frequency, Max. | 100 kHz |
| Resolution | Up to 2500 pulses per revolution |
| Cable Diameter [mm (in.)] | 457 (18) |
| Output Drivers | RS422 Line driver—3487<br>Open collector—7406<br>8-24V Line driver—7272 |

| **Mechanical** | |
|---|---|
| Angular Acceleration | 50,000 radians/sec$^2$ |
| Moment of Inertia | 19.4 gcm$^2$ (2.75 x 10$^{-4}$ oz-in-sec$^2$) |
| Operating Speed, Max. (RPM) | 3000 at max shaft loading |
| Permissible Shaft Movement | Radial 0.13 mm (0.005 in.); Axial ±0.76 mm ⟨±0.030 in.) |
| Shaft Loading | Axial 0.45 kg (1 lb); Radial 1.36 kg (3 lb) |
| Shaft Dimensions | 3/8 inch or 1/2 inch |

| **Environmental** | |
|---|---|
| Material | Aluminum Housing |
| Operating Temperature [C (F)] | 0…70° (+32…+158°) |
| Storage Temperature [C (F)] | -20…85° (-4…+185°) |
| Relative Humidity | 95% noncondensing |
| Enclosure Type Rating | IP40 (IEC529) |
| Shock | 20 g/11 ms |
| Vibration | 5 g/10…150 Hz |
| Weight [kg (oz)] | 0.12 (4) |

# Bulletin 844A & 844B Hollow Shaft Incremental Encoders

## Product Selection

**844 A — Z3 05C 2500**

*a* *b* *c* *d*

### *a*

| Coupling Options | |
|---|---|
| **Code** | **Description** |
| A | Front (Blind-Shaft) |
| B | Rear (Through-Shaft) |

### *b*

| Shaft Options | |
|---|---|
| **Code** | **Description** |
| Z3 | 3/8 inch |
| Z4 | 1/2 inch |

### *c*

| Power Supply & Output❶ | |
|---|---|
| **Code** | **Description** |
| 05D | 5V DC In,<br>5V DC DLD RS-422 Out |
| 05C | 5V DC In,<br>NPN Open Collector Out |
| 12C | 12V DC In,<br>NPN Open Collector Out |
| 24D | 8…24V DC In,<br>8…24V DC DLD Out |

❶ DLD = Differential Line Driver

### *d*

| Resolution (PPR) | |
|---|---|
| **Code** | **Description** |
| 0010 | 10 |
| 0020 | 20 |
| 0030 | 30 |
| 0050 | 50 |
| 0060 | 60 |
| 0100 | 100 |
| 0128 | 128 |
| 0150 | 150 |
| 0180 | 180 |
| 0200 | 200 |
| 0240 | 240 |
| 0250 | 250 |
| 0256 | 256 |
| 0300 | 300 |
| 0336 | 336 |
| 0360 | 360 |
| 0400 | 400 |
| 0500 | 500 |
| 0512 | 512 |
| 0600 | 600 |
| 0720 | 720 |
| 0800 | 800 |
| 0900 | 900 |
| 0960 | 960 |
| 1000 | 1000 |
| 1024 | 1024 |
| 1140 | 1140 |
| 1152 | 1152 |
| 1200 | 1200 |
| 1230 | 1230 |
| 1250 | 1250 |
| 1260 | 1260 |
| 1270 | 1270 |
| 1386 | 1386 |
| 1500 | 1500 |
| 1512 | 1512 |
| 1800 | 1800 |
| 1888 | 1888 |
| 2000 | 2000 |
| 2048 | 2048 |
| 2400 | 2400 |
| 2500 | 2500 |

## Accessories

| Description | Page Number |
|---|---|
| Differential Encoder Buffer Board | 6-55 |

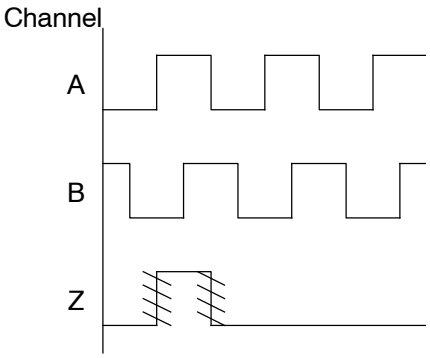
# Bulletin 844A & 844B Hollow Shaft Incremental Encoders

## Electrical Connections

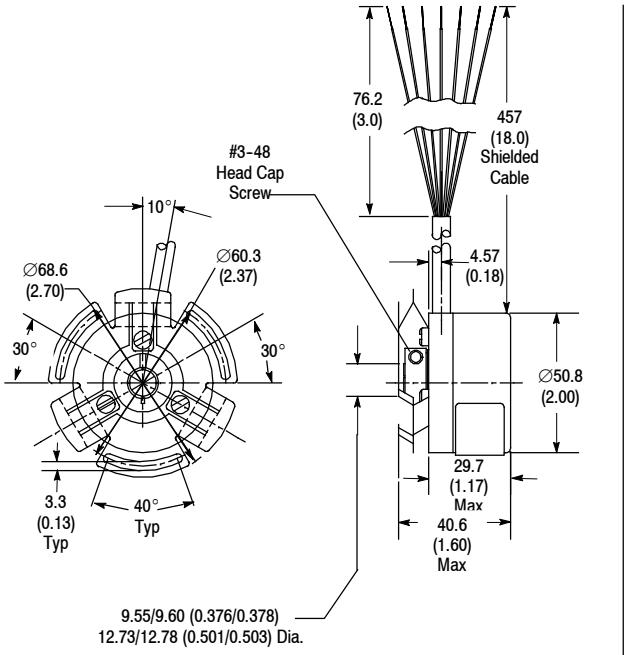
| Function | Line Driver Wire Color | Open Collector Wire Color |
|---|---|---|
| V DC | Red | Red |
| Common | Black | Black |
| A Output | White | White |
| B Output | Green | Green |
| Z Output | White/Black | White/Black |
| $\overline{A}$ Output | Blue | NC |
| $\overline{B}$ Output | Orange | NC |
| $\overline{Z}$ Output | Red/Black | NC |
| Shield | Drain Wire | Drain Wire |

## Output Waveforms

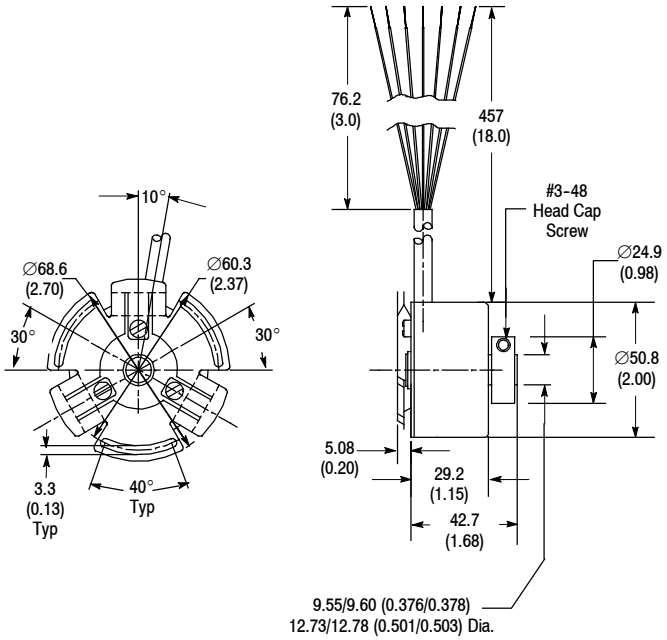
1. Channel A leads Channel B for clockwise rotation when viewed from face of the encoder.
2. Complementary signals (A, B, and Z) are supplied only on units with line drivers.
3. Marker Pulse is nongated and is approximately centered on the positive-going edge of Channel B for clockwise rotation and is 180° ± 90° wide.




## Approximate Dimensions [mm (in.)]




**Bulletin 844A**




**Bulletin 844B**

## 844A Mating Shaft Tolerance [mm (in.)]

| Bore | Diameter | Length |
|---|---|---|
| 3/8 in. | 9.50/9.55 (0.374/0.376) | 10.7/31 (0.42/1.22) |
| 1/2 in. | 12.67/12.73 (0.499/0.501) | 10.7/31 (0.42/1.22) |

## 844B Mating Shaft Tolerance [mm (in.)]

| Bore | Diameter | Length (minimum) |
|---|---|---|
| 3/8 in. | 9.50/9.55 (0.374/0.376) | 41 (1.6) |
| 1/2 in. | 12.67/12.73 (0.499/0.501) | |

# Bulletin 844D Hollow Shaft Incremental Encoders

## HS35 Style

## Description

Bulletin 844D blind-shaft and through-shaft incremental encoders are used to electronically monitor the position or speed of a rotating shaft. Shaft position is converted to digital pulses in an A quad B format. A Zero Index Channel is also included with all models.

## Features

- Blind-shaft and through-shaft front coupled models
- Flexible coupler not required
- Adaptor plate not required
- 120…16,384 PPR
- 3.5 in. diameter housing
- Supports 1/2…1 1/8 inch shafts
- Cable, connector or terminal block connection options
- CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| **Electrical** | |
| Code Format | 2 channels with zero index |
| Power Supply | 120 mA (no load) |
| Output Frequency, Max. | 200 kHz Push-Pull (120…8192 PPR)<br>300 kHz all other drivers (120…8192 PPR)<br>600 kHz (above 8192 PPR) |
| Resolution | Up to 16,384 pulses per revolution |
| Output Drives | 3487 Line driver = ±40 mA<br>4469 Line driver = ±200 mA<br>7272 Line driver = ±40 mA<br>Push-Pull Single Ended Driver = ±70 mA |
| **Mechanical** | |
| Angular Acceleration | 100,000 radians/sec$^2$ |
| Starting Torque | 9.3 Ncm (13 in-oz) @ @ 25°C (77°F) |
| Running Torque | 5 Ncm (7 in-oz) @ 25°C (77°F) |
| Moment of Inertia | 490 gcm$^2$ (6.9 x x 10$^{-3}$ oz-in-sec$^2$) |
| Slew Speed | 3000 rpm maximum |
| Shaft Loading | 120…2500 PPR: Axial 67 N (15 lbs); Radial 133 N (30 lbs)<br>4096…16,384 PPR: Axial 44 N (10 lbs); Radial 67 N (15 lbs) |
| Permissible Shaft | Radial Movement: Static ±0.5 mm (0.02 in.); Dynamic ±0.1 mm (0.004 in.<br>Axial Movement: Static ±0.5 mm (0.02 in.); Dynamic ±0.5 mm (0.02 in.) |
| Bore Size | Supports 1/2…1 1/8 in. and 30 mm shafts |
| **Environmental** | |
| Enclosure Type Rating | NEMA Type 4, 13; IP66 (IEC 529) except terminal block connection type rated IP40 (IEC 529) only |
| Material | Aluminum Housing |
| Operating Temperature [C (F)] | -20…85° (-4…+185°) |
| Storage Temperature [C (F)] | -30…85° (-22…+185°) |
| Relative Humidity | 90% noncondensing |
| Shock | 50 g for 11 ms |
| Vibration | 20 g from 5…2000 Hz |
| Weight [kg (lbs)] | 0.91 (2) |

## Accessories

| Description | Page Number |
|---|---|
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Differential Encoder Buffer Board | 6-55 |

# Bulletin 844D Hollow Shaft Incremental Encoders

## HS35 Style

## Product Selection

| 844D — | A | 5 | A | C | 1 | CR |
|---|---|---|---|---|---|---|
| | *a* | *b* | *c* | *d* | *e* | *f* |

### *a*

| Shaft Design | |
|---|---|
| **Code** | **Description** |
| A | Blind-Shaft |
| B | Through-Shaft |

### *b*

| Shaft Size ❶ | |
|---|---|
| **Code** | **Description** |
| 4 | 1/2 inch |
| 5 | 5/8 inch |
| 6 | 3/4 inch |
| 7 | 7/8 inch |
| 8 | 1.0 inch |
| 9 | 1 1/8 inch |
| M | 30 mm |

❶ Shaft sizes below 1 inch include an insulating insert.

❷ Terminal block unit is not rated for fluid ingress protection (IP40 (IEC 529) only).

❸ DLD = Differential Line Driver

❹ 7272 line driver has a voltage drop of 1.9V.

❺ Available with power supply and output options 1, 2, 3, and 4.

### *c*

| Mounting Configuration | |
|---|---|
| **Code** | **Description** |
| A | Tether, 1/2 inch bolt on a 7.25 inch dia. B.C. (to fit 8 1/2 inch NEMA C face) |
| B | Tether, 3/8 inch bolt on a 5.88 inch dia. B.C. (to fit 4 1/2 inch NEMA C face) |
| C | Tether, 3/8 inch bolt on a 2.5…4.0 inch dia. radius |
| D | Anti-rotation pin |

### *d*

| Connection Type | |
|---|---|
| **Code** | **Description** |
| C | 10 pin connector |
| T | Terminal block ❷ |
| 1 | 1 m (3.28 ft) cable |

### *e*

| Power Supply & Output❸ | |
|---|---|
| **Code** | **Description** |
| 1 | 5V DC in, 5V DC DLD out (3487) |
| 2 | 5…26V DC in, 5…26V DC DLD out (7272) ❹ |
| 3 | 5…15V DC in, 5…15V DC DLD out (4469) |
| 4 | 8…26V DC in, 5V DC DLD out (3487) |
| 5 | 10…30V DC in, 10…30V DC Push-Pull out |

### *f*

| Resolution | |
|---|---|
| **Code** | **Description (PPR)** |
| DB | 120 |
| CK | 360 |
| FW | 1024 |
| CS | 2048 |
| CR | 2500 |
| DS | 4096 |
| DR | 5000 |
| FS | 8192 |
| CV | 10000 ❺ |
| LS | 16384 ❺ |

## Electrical Connections

### Table A: Differential Line Driver Outputs

| Function | 10-Pin Connector | Shielded Cable | Terminal |
|---|---|---|---|
| Channel A Output | A | White | 1 |
| Channel B Output | B | Pink | 2 |
| Channel Z Output | C | Violet | 7 |
| DC+ Input | D | Red | 3 |
| DC Return | F | Blue | 4 |
| Case Ground | G | Green | — |
| Channel $\overline{A}$ Output | H | Brown | 5 |
| Channel $\overline{B}$ Output | I | Black | 6 |
| Channel $\overline{Z}$ Output | J | Yellow | 8 |

### Table B: Push-Pull Outputs

| Function | 10-Pin Connector | Shielded Cable | Terminal |
|---|---|---|---|
| Channel A Output | A | White | 1 |
| Channel B Output | B | Pink | 2 |
| Channel Z Output | C | Violet | 7 |
| DC+ Input | D | Red | 3 |
| DC Return | F | Blue | 4 |
| Case Ground | G | Green | — |
| Not connected | — | Brown | — |
| Not connected | — | Black | — |
| Not connected | — | Yellow | — |

**Note**: 10-pin connector type MS3102R18-1P

**844D**
**Blind-Shaft Tolerance**

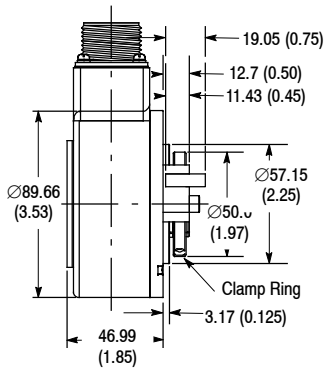
| Shaft Size | Bore | Mating Shaft | Length |
|---|---|---|---|
| 1/2 inch | 0.500/0.501 inch | 0.500/0.499 inch | 0.70/2.00 inch |
| 5/8 inch | 0.625/0.626 inch | 0.625/0.624 inch | 0.70/2.00 inch |
| 3/4 inch | 0.750/0.751 inch | 0.750/0.749 inch | 0.70/2.00 inch |
| 7/8 inch | 0.875/0.876 inch | 0.875/0.874 inch | 0.70/2.00 inch |
| 1.0 inch | 1.000/1.001 inch | 1.000/0.999 inch | 0.70/2.00 inch |
| 1 1/8 inch | 1.125/1.126 inch | 1.125/1.124 inch | 0.70/2.00 inch |
| 30 mm | 30.000/30.025 mm | 30.000/29.975 mm | 18/50 mm |

**844D**
**Through-Shaft Tolerance**

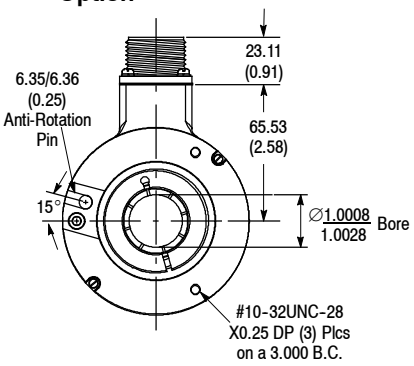
| Shaft Size | Bore | Mating Shaft | Length—min. |
|---|---|---|---|
| 1/2 inch | 0.500/0.501 inch | 0.500/0.499 inch | 0.70 inch |
| 5/8 inch | 0.625/0.626 inch | 0.625/0.624 inch | 0.70 inch |
| 3/4 inch | 0.750/0.751 inch | 0.750/0.749 inch | 0.70 inch |
| 7/8 inch | 0.875/0.876 inch | 0.875/0.874 inch | 0.70 inch |
| 1.0 inch | 1.000/1.001 inch | 1.000/0.999 inch | 0.70 inch |
| 1 1/8 inch | 1.125/1.126 inch | 1.125/1.124 inch | 0.70 inch |
| 30 mm | 29.980/29.959 mm | 30.000/29.975 mm | 18 mm |

## Approximate Dimensions [mm (in.)]

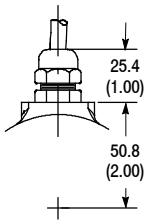
**Blind-Shaft ❶**



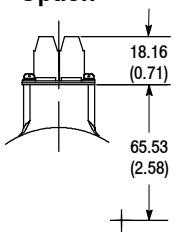

**Connector Option**



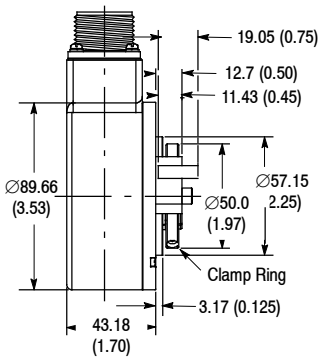

**Cable Option**



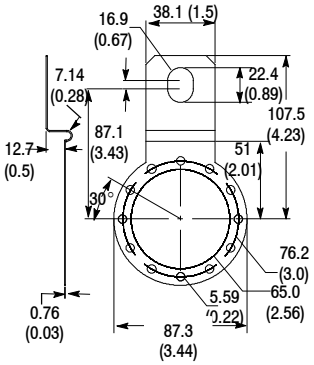

**Terminal Option**



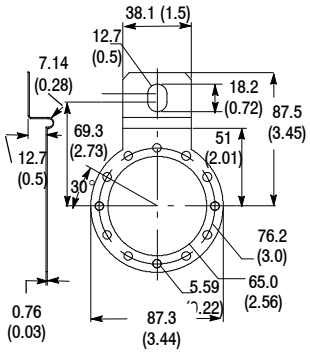

**Through-Shaft ❶**



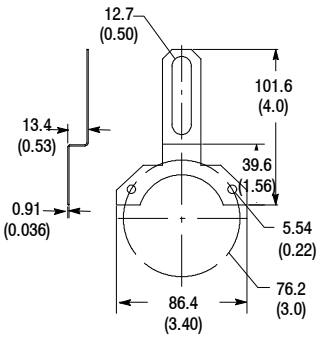

**Tether Option "A"**




**Tether Option "B"**




**Tether Option "C"**




❶ Shown with optional anti-rotation pin.

# Bulletin 845F Incremental Encoders

## Size 25, High Performance with Integral Shaft Coupling

*High Performance Coupling*
*845F-SJGZ14FWY2*

## Description

The Bulletin 845F is an optical incremental encoder that provides digital feedback corresponding to the position of a rotating shaft. This feedback is compatible with Programmable Controllers, Numerical Controllers, Motion Controllers, and other positioning systems.

The 845F provides code disk resolution up to 5000 pulses per revolution, frequency response of 210 kHz, and high immunity to electromagnetic interference. Housed in a rugged, size 25, NEMA Type 4 and 13, IP66 (IEC 529), aluminum enclosure, the 845F has a flange mount with integral coupling for ease of installation in harsh industrial environments.

## Features

- Code disk resolution up to 5000 PPR
- Optional sink, source, open collector or differential line driver output configurations
- 210 kHz operating frequency
- Input reverse polarity protection
- CE Marked for all applicable directives

## Specifications

| | | |
|---|---|---|
| **Electrical** | | |
| Code Format | Incremental, 2 channels with zero index | |
| Quadrature | 90° ±22°; Channel A leads B CCW | |
| Symmetry | 50% ±10% | |
| Zero Index Channel | 1/2 cycle, gated to channel $\overline{B}$ | |
| Power Supply | Determined by cat. no.: | 5V DC ±5% @ 150 mA max.<br>8…24V DC @ 150 mA max. |
| Response Frequency | Data: 210 kHz | Zero index: 125 kHz |
| Operating Speed (Data) | (210 kHz x 60)/pulses per rev. = RPM or 6000 RPM, whichever is lower | |
| Resolution | Up to 5000 PPR on code disk | |
| Output Drives | PNP current source = 20 mA; NPN current sink = 20 mA;<br>Differential line driver = ±20 mA; NPN open collector = 20 mA | |
| **Mechanical** | | |
| Starting Torque | 2.5 Ncm typical [3.5 in-oz] | |
| Running Torque | 2.5 Ncm typical [3.5 in-oz] | |
| Moment of Inertia | 27 $gcm^2$ (3.9 x $10^{-4}$ oz-in-$sec^2$) | |
| Slew Speed | 6000 RPM | |
| Shaft Misalignment | Angular: 5° standard, 10° high performance;<br>Parallel: 0.010 in. standard, 0.020 in. high performance | |
| Coupling Axial Compliance | ±0.030 in. standard, ±0.060 in. high performance | |
| Bore Size | 9.517 mm (3/8 in.) or 6.4 mm (1/4 in.) dia. | |
| **Environmental** | | |
| Enclosure Type Rating | NEMA Type 4,13; IP66 (IEC 529) | |
| Operating Temperature [C (F)] | 0…+60° (+32…+140°) | |
| Storage Temperature [C (F)] | -25…+90° (-13…+194°) | |
| Relative Humidity | 98%, noncondensing | |
| Shock | 50 g (11 ms duration) | |
| Vibration | 20 g (5…2000 Hz) | |
| Weight [kg (lbs)] | 0.91 (2) | |

## Accessories

| Description | Page Number |
|---|---|
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Differential Encoder Buffer Board | 6-55 |

# Bulletin 845F Incremental Encoders

## Size 25, High Performance with Integral Shaft Coupling

### Product Selection

| 845F | — | S | J | G | Z | 1 | 4 | FW | Y | 2 | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *a* | | *b* | *c* | *d* | | *e* | *f* |

***a***

| Coupling Version | |
|---|---|
| **Code** | **Description** |
| B | Standard 1/4 in. Bore |
| E | Standard 3/8 in. Bore |
| F | High Performance 1/4 in. Bore |
| G | High Performance 3/8 in. Bore |

***b***

| Power Supply | |
|---|---|
| **Code** | **Description** |
| 1 | 5V DC ±5% |
| 2 | 8…24V DC Unregulated |

***c***

| Output Configuration ❶ | |
|---|---|
| **Code** | **Description** |
| 2 | PNP Current Source |
| 3 | NPN Current Sink |
| 4 | DLD 5V DC RS-422 |
| 5 | NPN Open Collector 24V DC Max ❷ |
| 6 | DLD 8…24V DC ❸ |

❶ DLD = Differential Line Driver
❷ External pull-up resistor required
❸ Can not be ordered with 5V DC power supply (code 1 above)

***d***

| Resolution | |
|---|---|
| **Code** | **Description (PPR)** |
| AG | 1 |
| AM | 5 |
| BG | 10 |
| CA | 50 |
| CB | 60 |
| CE | 64 |
| CF | 80 |
| CG | 100 |
| DB | 120 |
| DF | 150 |
| EB | 180 |
| CH | 200 |
| CJ | 250 |
| CC | 254 |
| CW | 256 |
| EG | 300 |
| CK | 360 |
| CL | 400 |
| CM | 500 |
| DW | 512 |
| EH | 600 |
| DG | 720 |
| DL | 800 |
| LG | 900 |
| CN | 1000 |
| FW | 1024 |
| EL | 1200 |
| CD | 1250 |
| RF | 1280 |
| CU | 1472 |
| EM | 1500 |
| FL | 1600 |
| CP | 1800 |
| DN | 2000 |
| CS | 2048 |
| HL | 2400 |
| CR | 2500 |
| CY | 2540 |
| LJ | 2750 |
| EN | 3000 |
| CT | 3600 |
| DR | 5000 |

***e***

| Connection Options | |
|---|---|
| **Code** | **Description** |
| 1 | Axial Connector (End) |
| 2 | Radial Connector (Side) |
| A | Axial Cable (End) |
| R | Radial Cable (Side) |

***f***

| Connection Options | |
|---|---|
| **Code** | **Description** |
| Blank | Without Mating Connector ❹ |
| C | With Mating Connector ❹ |
| 1 | 1 m (3.28 ft) Cable Length ❺ |
| 5 | 5 m (16.4 ft) Cable Length ❺ |
| 9 | 9 m (29.52 ft) Cable Length ❺ |

❹ These options not available with Connection Options code: "A" and "R."
❺ These options not available with Connection Options code: "1" and "2."

# Bulletin 845F Incremental Encoders

## Size 25, High Performance with Integral Shaft Coupling

## Electrical Connections

### 7-Pin Connector (ACS02E16S-1P (023))

**Current Source, Current Sink, Open Collector Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | E❶ | — |
| B | Channel B Output | F | DC Return |
| C | Channel Z Output | G | Case Ground |
| D❶ | DC+ Input | — | — |

### 10-Pin Connector (ACS02E18-1P (023))

**Differential Line-Driver Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | F | DC Return |
| B | Channel B Output | G | Case Ground |
| C | Channel Z Output | H | Channel $\overline{A}$ Output |
| D❶ | DC+ Input | I | Channel $\overline{B}$ Output |
| E❶ | — | J | Channel $\overline{Z}$ Output |

❶ Pins D and E internally connected

## Cable

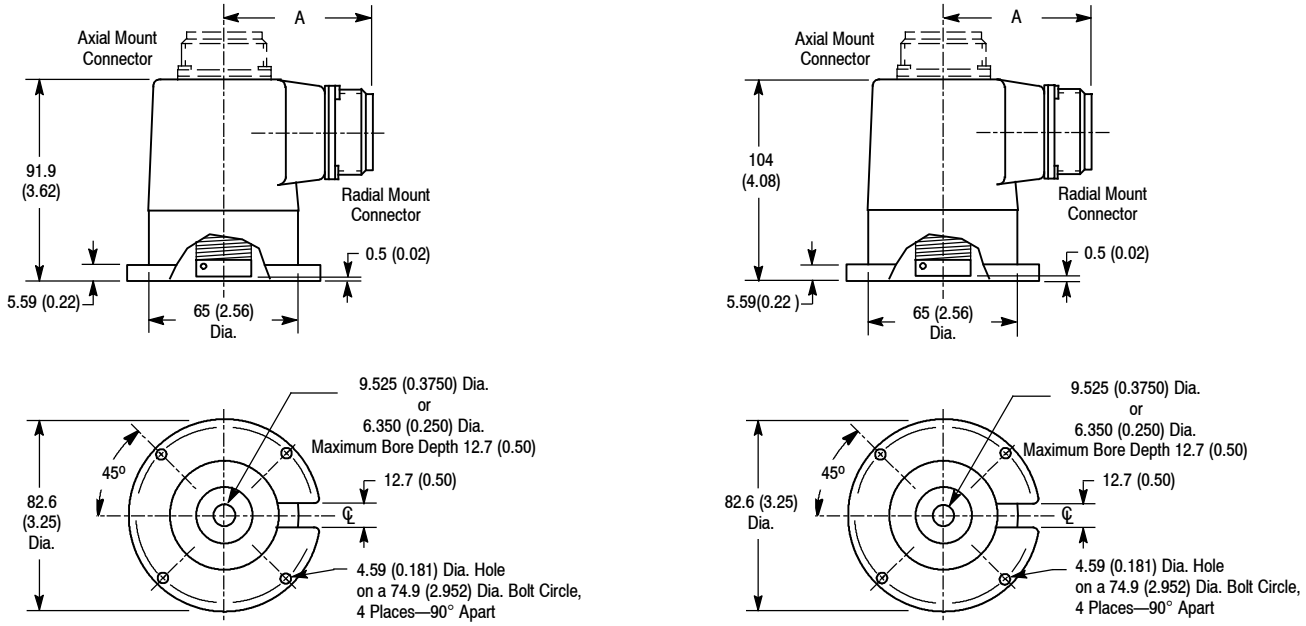
**Current Source, Current Sink, Open Collector Outputs**

| Wire Pair | Wire Color | Function |
|---|---|---|
| Red/Black | Red | DC+ Input |
| | Black | DC Return |
| White/Black | White | Channel A Output |
| | Black | Not Connected |
| Blue/Black | Blue | Channel B Output |
| | Black | Not Connected |
| Green/Black | Green | Channel Z Output |
| | Black | Not Connected |

**Differential Line Driver Outputs**

| Wire Pair | Wire Color | Function |
|---|---|---|
| Red/Black | Red | DC+ Input |
| | Black | DC Return |
| White/Black | White | Channel A Output |
| | Black | Channel $\overline{A}$ Output |
| Blue/Black | Blue | Channel B Output |
| | Black | Channel $\overline{B}$ Output |
| Green/Black | Green | Channel Z Output |
| | Black | Channel $\overline{Z}$ Output |

## Approximate Dimensions [mm (in.)]




*Standard Coupling* *High Performance Coupling*

**Connector Type [mm (in.)]**

| Output Code | Output Type | Connector Type | Number of Pins | Dimension "A" |
|---|---|---|---|---|
| 2 | Current Source | ACS02E16S-1P (023) | 7 | 63 (2.48) |
| 3 | Current Sink | ACS02E16S-1P (023) | 7 | 63 (2.48) |
| 4 | Diff. Line Driver | ACS02E18-1P (023) | 10 | 73.9 (2.91) |
| 5 | Open Collector | ACS02E16S-1P (023) | 7 | 63 (2.48) |

# Bulletin 845H Incremental Encoders

## Size 25, High Performance

*Square Flange Mount*
*845H-SJDZ14CRY2*

## Description

The Bulletin 845H optical incremental encoders electronically digitize shaft motion of a rotating element by converting mechanical motion to an electronic digital format. Incremental square waves are accumulated in a counter as position feedback. The encoder provides code disk resolutions up to 5000 pulses per revolution at a signal frequency response of 210 kHz.

The Bulletin 845H encoder is housed in a size 25, NEMA Type 4 and 13, IP66 (IEC 529), enclosure making it suitable for many of today's industrial environments.

## Features

- Code disk resolution up to 5000 PPR
- Optional sink, source, open collector or differential line driver output configurations
- English and metric options
- Input reverse polarity protection
- CE Marked for all applicable directives

## Specifications

| | | |
|---|---|---|
| **Electrical** | | |
| Code Format | Incremental, 2 channels with zero index | |
| Quadrature | 90° ±22°; Channel A leads B CCW | |
| Symmetry | 50% ±10% | |
| Zero Index Channel | 1/2 cycle, gated to channel $\overline{B}$ | |
| Power Supply | Determined by cat. no.: | 5V DC ±5% @ 150 mA max.<br>8…24V DC @ 150mA max. |
| Response Frequency | Data: 210 kHz | Zero index: 125 kHz |
| Shaft Operating Speed, Max. (RPM) | (210 kHz x 60)/pulses per rev. = RPM or 6000 RPM, whichever is lower | |
| Resolution | Up to 5000 PPR on code disk | |
| Output Drives | PNP current source = 20 mA; NPN current sink = 20 mA;<br>Differential line driver = ±20 mA; NPN open collector = 20 mA | |
| **Mechanical** | | |
| Starting Torque | 2.5 Ncm typical [3.5 in-oz] | |
| Running Torque | 2.5 Ncm typical [3.5 in-oz] | |
| Moment of Inertia | 15 gcm (2.1 x $10^{-4}$ oz-in-$sec^2$) | |
| Slew Speed | 6000 RPM | |
| Shaft Loading | 3/8 in. and 10 mm Dia.: | Axial 89 N (20 lbs) (10 lbs 5000 PPR);<br>Radial 178 N (40 lbs) (20 lbs 5000 PPR) |
| Shaft Diameter | 6 mm, 10 mm, 6.4 mm (1/4 in.) 9.517 mm (3/8 in.) diameter | |
| **Environmental** | | |
| Enclosure Type Rating | NEMA Type 4, 13; IP66 (IEC 529) | |
| Operating Temperature [C (F)] | 0…+60° (+32…+140°) | |
| Storage Temperature [C (F)] | -25…+90° (-13…+194°) | |
| Relative Humidity | 98%, noncondensing | |
| Shock | 50 g (11 ms duration) | |
| Vibration | 20 g (4…2000 Hz) | |
| Weight [kg (lbs)] | 0.91 (2) | |

## Accessories

| Description | Page Number |
|---|---|
| Flexible Couplings | 6-47 |
| Measuring Wheels | 6-48 |
| Servo Clamps | 6-48 |
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Mounting Plates | 6-52 |
| Differential Encoder Buffer Board | 6-55 |

# Bulletin 845H Incremental Encoders

**Size 25, High Performance**

## Selection Guide

| 845H | — | S | J | H | Z | 1 | 4 | CR | Y | 2 | C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *a* | *b* | *c* | *d* | *e* | | *f* | *g* |

### *a*

| Mounting Configuration ❶ | |
|---|---|
| **Code** | **Description** |
| D | Square Flange |
| E | 70 mm Diameter Flange |
| F | 90 mm Diameter Flange |
| G | Metric Servo 48 mm B.C. |
| H | English Servo |
| J | Metric Servo 42 mm B.C. |

### *b*

| Shaft Options ❶ | |
|---|---|
| **Code** | **Description** |
| A | 6 mm Diameter |
| B | 10 mm Diameter |
| C | 1/4 in. Diameter |
| Z | 3/8 in. Diameter |
| K | 6 mm w/Flat |
| L | 10 mm w/Flat |
| M | 1/4 in. w/Flat |
| N | 3/8 in. w/Flat |
| P | 3/8 in. w/Double Flat |

❶ Standard cat. nos. consist of either English Mounting Configurations with English Shaft Options or Metric Mounting Configurations with Metric Shaft Options.

### *c*

| Power Supply | |
|---|---|
| **Code** | **Description** |
| 1 | 5V DC ±5% |
| 2 | 8…24V DC Unregulated |

### *d*

| Output Configuration ❷ | |
|---|---|
| **Code** | **Description** |
| 2 | PNP Current Source |
| 3 | NPN Current Sink |
| 4 | DLD 5V DC RS-422 |
| 5 | NPN Open Collector 24V DC Max ❸ |
| 6 | DLD 8…24V DC ❹ |

❷ DLD = Differential Line Driver

❸ External pull-up resistor required

❹ Can not be ordered with 5V DC power supply (code 1 above)

### *e*

| Resolution | Resolution |
|---|---|
| **Code** | **Description (PPR)** |
| AG | 1 |
| AM | 5 |
| BG | 10 |
| CA | 50 |
| CB | 60 |
| CE | 64 |
| CF | 80 |
| CG | 100 |
| DB | 120 |
| DF | 150 |
| EB | 180 |
| CH | 200 |
| CJ | 250 |
| CC | 254 |
| CW | 256 |
| EG | 300 |
| CK | 360 |
| CL | 400 |
| CM | 500 |
| DW | 512 |
| EH | 600 |
| DG | 720 |
| DL | 800 |
| LG | 900 |
| CN | 1000 |
| FW | 1024 |
| EL | 1200 |
| CD | 1250 |
| RF | 1280 |
| CU | 1472 |
| EM | 1500 |
| FL | 1600 |
| CP | 1800 |
| DN | 2000 |
| CS | 2048 |
| HL | 2400 |
| CR | 2500 |
| CY | 2540 |
| LJ | 2750 |
| EN | 3000 |
| CT | 3600 |
| DR | 5000 |

### *f*

| Connection Type | |
|---|---|
| **Code** | **Description** |
| 1 | Axial Connector (End) |
| 2 | Radial Connector (Side) |
| A | Axial Cable (End) |
| R | Radial Cable (Side) |

### *g*

| Connection Options | |
|---|---|
| **Code** | **Description** |
| Blank | Without Mating Connector ❺ |
| C | With Mating Connector ❺ |
| 1 | 1 m (3.28 ft) Cable Length ❻ |
| 5 | 5 m (16.4 ft) Cable Length ❻ |
| 9 | 9 m (29.52 ft) Cable Length ❻ |

❺ These options not available with Connection Options code: “A” & “R.”

❻ These options not available with Connection Options code: “1” & “2.”

## Electrical Connections

### 7-Pin Connector (ACS02E16S-1P (023))

**Current Source, Current Sink, Open Collector Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | E❶ | — |
| B | Channel B Output | F | DC Return |
| C | Channel Z Output | G | Case Ground |
| D❶ | DC+ Input | — | — |

### Cable

**Current Source, Current Sink, Open Collector Outputs**

| Wire Pair | Wire Color | Function |
|---|---|---|
| Red/Black | Red | DC+ Input |
| | Black | DC Return |
| White/Black | White | Channel A Output |
| | Black | Not Connected |
| Blue/Black | Blue | Channel B Output |
| | Black | Not Connected |
| Green/Black | Green | Channel Z Output |
| | Black | Not Connected |

### Cable

**Differential Line Driver Outputs**

| Wire Pair | Wire Color | Function |
|---|---|---|
| Red/Black | Red | DC+ Input |
| | Black | DC Return |
| White/Black | White | Channel A Output |
| | Black | Channel $\overline{A}$ Output |
| Blue/Black | Blue | Channel B Output |
| | Black | Channel $\overline{B}$ Output |
| Green/Black | Green | Channel Z Output |
| | Black | Channel $\overline{Z}$ Output |

### 10-Pin Connector (ACS02E18-1P (023))

**Differential Line-Driver Outputs**

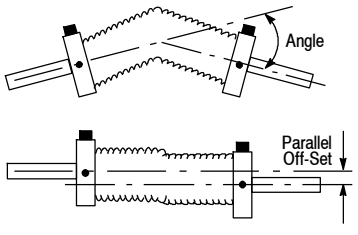
| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | F | DC Return |
| B | Channel B Output | G | Case Ground |
| C | Channel Z Output | H | Channel $\overline{A}$ Output |
| D❶ | DC+ Input | I | Channel $\overline{B}$ Output |
| E❶ | — | J | Channel $\overline{Z}$ Output |

❶ Pins D and E internally connected

**Connector Type**

| Output Code | Output Type | Connector Type | Number of Pins | Dimension "B" |
|---|---|---|---|---|
| 2 | Current Source | ACS02E16S-1P (023) | 7 | 63 (2.48) |
| 3 | Current Sink | ACS02E16S-1P (023) | 7 | 63 (2.48) |
| 4.6 | Diff. Line Driver | ACS02E18-1P (023) | 10 | 73.9 (2.91) |
| 5 | Open Collector | ACS02E16S-1P (023) | 7 | 63 (2.48) |

### Flexible Shaft Couplings



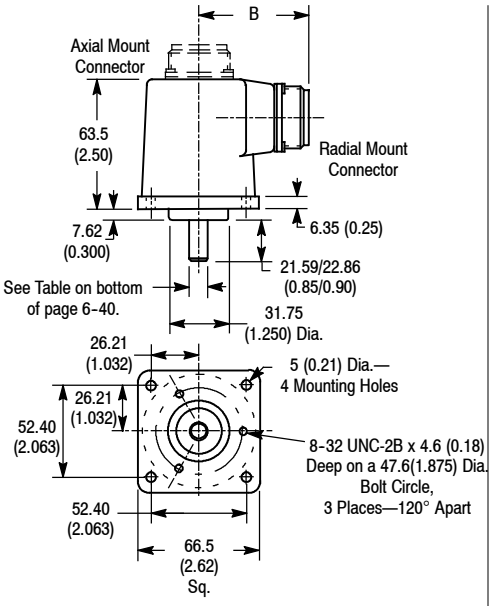

**ATTENTION**

Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft.

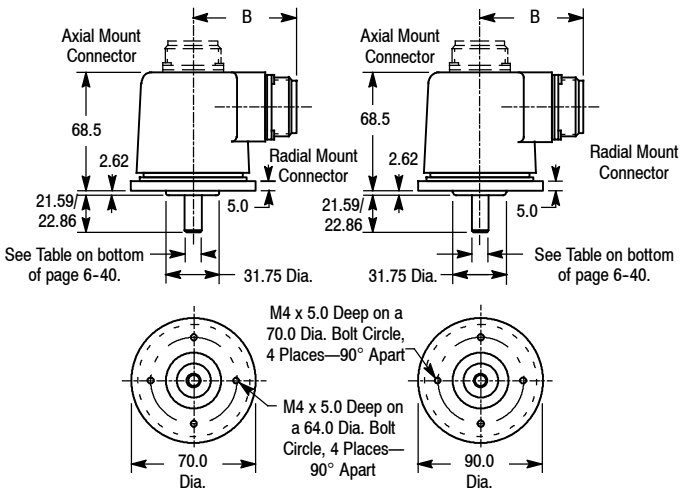
# Bulletin 845H Incremental Encoders

## Size 25, High Performance

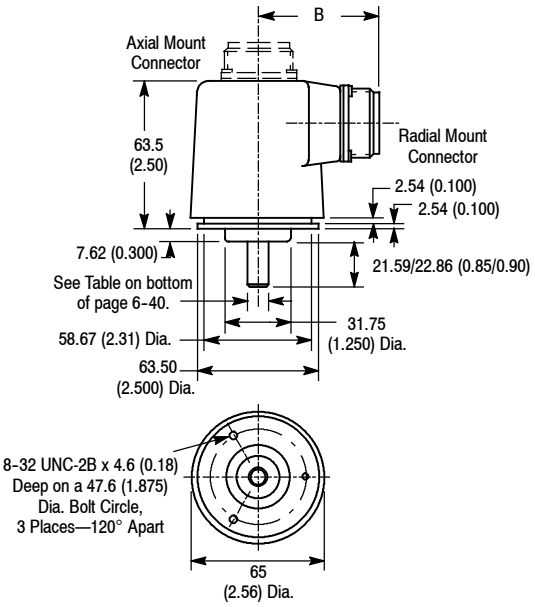
### Approximate Dimensions [mm (in.)]



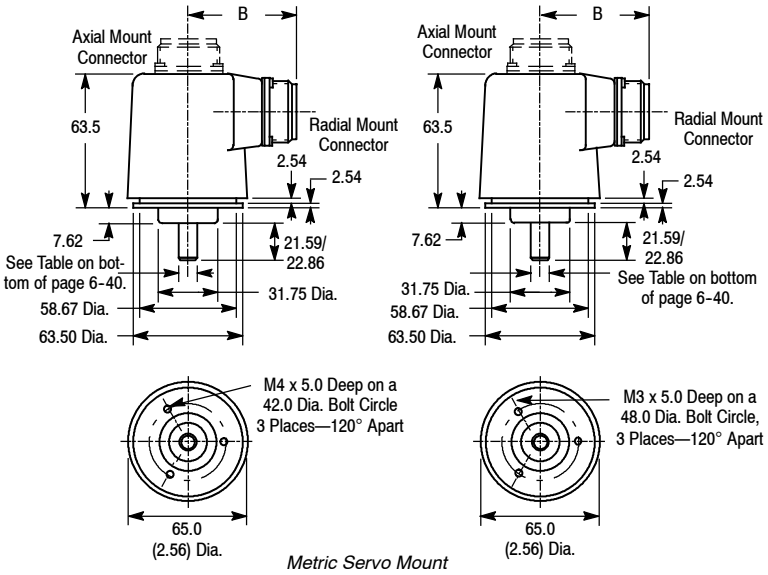

*Square Flange Mount*




*Metric Flange Mount*



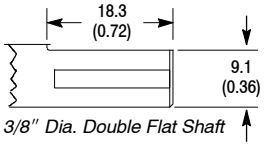

*English Servo Mount*



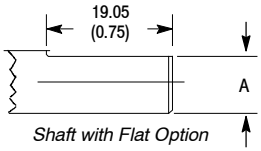

*Metric Servo Mount*

### Shaft Diameter Options

| Code | Shaft Diameter [mm (in.)] |
|---|---|
| A or K | 6 +0.00, -0.013 |
| B or L | 10 +0.00, -0.013 |
| C or M | 6.35 (0.2499) +0.0000, -0.0005 |
| Z or N | 9.52 (0.3749) +0.0000, -0.0005 |




*3/8″ Dia. Double Flat Shaft*




*Shaft with Flat Option*

### Flat Dimensions

| Code | Dimension "A" [mm (in.)] |
|---|---|
| K | 5.3 (0.21) |
| L | 9.1 (0.36) |
| M | 5.5 (0.22) |
| N | 8.6 (0.34) |

# Bulletin 845T Incremental Encoders

## Size 20, Heavy Duty

*Square Flange Mount*
*845T-DZ13ECR*

## Description

Bulletin 845T optical incremental encoders are used to electronically monitor the position of a rotating shaft. Shaft motion is converted to digital pulses which are accumulated and evaluated by various electronic controllers. The 845T provides code disk resolutions of up to 3000 pulses per revolution, and a frequency response of up to 100 kHz.

The Bulletin 845T encoder is a heavy duty, NEMA Type 4, and IP66 (IEC 529) rated optical incremental shaft encoder that is housed in a two inch diameter enclosure. Typical applications for the 845T include machine tools, packaging machinery, motion controls, and robotics. The heavy duty bearing assembly, rugged construction and high shaft loading capabilities make the 845T suitable for many of today's harsh industrial environments.

## Features

- Code disk resolution up to 3000 PPR
- Input reverse polarity protection
- CE Marked for all applicable directives

## Specifications

| | | |
|---|---|---|
| **Electrical** | | |
| Code Format | Incremental (A, AB or ABZ channels) | |
| Quadrature | 90° ±22°; Channel A leads B CCW | |
| Symmetry | 50% ±10% | |
| Zero Index Channel | 1/2 cycle, gated to channel $\overline{B}$ | |
| Power Supply | Determined by cat. no.: | 5V DC ±5% @ 150 mA max.<br>11…20V DC @ 150 mA max.<br>24V DC @ 150 mA max. |
| Response Frequency | Data: 100 kHz | Zero index: 100 kHz |
| Operating Speed | 100 kHz x 60)/pulses per revolution = RPM or 15,000 RPM, whichever is lower | |
| Resolution | Up to 3000 PPR on code disk | |
| Output Drives | Push-Pull Single Ended Driver = ±20 mA<br>Differential line driver = ±20 mA | |
| **Mechanical** | | |
| Starting Torque | 2.5 Ncm (3.5 in-oz) typical | |
| Running Torque | 2.5 Ncm (3.5 in-oz) typical | |
| Slew Speed | 15,000 RPM | |
| Shaft Loading | Axial: 359 N (80lbs); Radial: | 359 N (80 lbs) (10 mm, 3/8 in. shafts)<br>180 N (40 lbs) (6 mm, 1/4 in. shafts) |
| Shaft Dimensions | 6 mm, 10 mm, 6.4 mm (1/4 in.), 9.517 mm (3/8 in.) diameter | |
| **Environmental** | | |
| Enclosure Type Rating | NEMA Type 4; IP66 (IEC 529) | |
| Operating Temperature [C (F)] | 0…+60° (+32…+140°) | |
| Storage Temperature [C (F)] | -25…+90° (-13…+194°) | |
| Relative Humidity | 98%, noncondensing | |
| Shock | 50 g (11 ms duration) | |
| Vibration | 20 g (5…2000 Hz) | |
| Weight [kg (oz)] | 0.44 (14) | |

## Accessories

| Description | Page Number |
|---|---|
| Flexible Couplings | 6-47 |
| Measuring Wheels | 6-48 |
| Servo Clamps | 6-48 |
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Mounting Plates | 6-52 |
| Differential Encoder Buffer Board | 6-55 |

# Bulletin 845T Incremental Encoders

**Size 20, Heavy Duty**

## Product Selection

**845T — D Z 1 3 E CR — C**

***a b c d e f g***

### *a*

| Mounting Configuration | |
|---|---|
| **Code** | **Description** |
| D | Square Flange |
| H | Servo with Face Mount Holes |
| L | Servo without Face Mount Holes |

### *b*

| Shaft Options | |
|---|---|
| **Code** | **Description** |
| A | 6 mm Diameter |
| B | 10 mm Diameter |
| C | 1/4 in. Diameter |
| Z | 3/8 in. Diameter |
| K | 6 mm w/Flat |
| L | 10 mm w/Flat |
| M | 1/4 in. w/Flat |
| N | 3/8 in. w/Flat |

### *c*

| Electrical Options ❶ | |
|---|---|
| **Code** | **Description** |
| 1 | 5V DC in, 5V DC DLD Out |
| 2 | 5V DC in, 5V DC P-P Out |
| 3 | 11…24V DC in, 11…24V DC P-P Out |
| 4 | 11…20V DC in, 5V DC DLD Out |
| 5 | 24V DC in, 5V DC DLD Out |
| 6 | 11…24V DC in, 11…24V DC DLD out |

❶ DLD = Differential Line Driver
P-P = Push-Pull Single Ended Driver

### *d*

| Signal Options | |
|---|---|
| **Code** | **Description** |
| 1 | Channel A Only |
| 2 | Channel A and B |
| 3 | Channel A, B, and Z |

### *e*

| Connection Options | |
|---|---|
| **Code** | **Description** |
| A | 6 Pin Connector ❷ |
| B | 7 Pin Connector ❷ |
| E | 10 Pin Connector |
| P | Pigtail Cable |

❷ This option not available with Electrical Option codes: “1,” “4,” “5” or “6.”

### *f*

| Resolution | |
|---|---|
| **Code** | **Description (PPR)** |
| AG | 1 |
| AM | 5 |
| BG | 10 |
| CA | 50 |
| CB | 60 |
| CE | 64 |
| CF | 80 |
| CG | 100 |
| DB | 120 |
| DF | 150 |
| EB | 180 |
| CH | 200 |
| CJ | 250 |
| CC | 254 |
| CW | 256 |
| EG | 300 |
| CK | 360 |
| CL | 400 |
| CM | 500 |
| DW | 512 |
| EH | 600 |
| DG | 720 |
| DL | 800 |
| LG | 900 |
| CN | 1000 |
| FW | 1024 |
| EL | 1200 |
| CD | 1250 |
| RF | 1280 |
| CU | 1472 |
| EM | 1500 |
| FL | 1600 |
| CP | 1800 |
| DN | 2000 |
| CS | 2048 |
| HL | 2400 |
| CR | 2500 |
| CY | 2540 |
| LJ | 2750 |
| EN | 3000 |

### *g*

| Mating Connector/Cable Length | |
|---|---|
| **Code** | **Description** |
| Blank | Without Mating Connector ❸ |
| C | With Mating Connector ❸ |
| 1 | 1 m (3.28 ft) Cable Length ❹ |
| 5 | 5 m (16.4 ft) Cable Length ❹ |
| 9 | 9 m (29.52 ft) Cable Length ❹ |

❸ These options not available with Connection Options code: “P.”

❹ These options not available with Connection Options code: “A,” “B,” & “E.”

## Cable

**Push-Pull Outputs**

| Wire Pair | Wire Color | Function |
|---|---|---|
| Red/Black | Red | DC+ Input |
| | Black | DC Return |
| White/Black | White | Channel A Output |
| | Black | Not Connected |
| Blue/Black | Blue | Channel B Output |
| | Black | Not Connected |
| Green/Black | Green | Channel Z Output |
| | Black | Not Connected |

**Differential Line Driver Outputs**

| Wire Pair | Wire Color | Function |
|---|---|---|
| Red/Black | Red | DC+ Input |
| | Black | DC Return |
| White/Black | White | Channel A Output |
| | Black | Channel $\overline{A}$ Output |
| Blue/Black | Blue | Channel B Output |
| | Black | Channel $\overline{B}$ Output |
| Green/Black | Green | Channel Z Output |
| | Black | Channel $\overline{Z}$ Output |

## Electrical Connections

### 6-Pin Connector (ACS02E14S-6P (023))

**Push-Pull Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | DC Return | D | Channel B Output |
| B | DC+ Input | E | Channel A Output |
| C | Channel Z Output | F | No Connection |

### 7-Pin Connector (ACS02E16S-1P (023))

**Push-Pull Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | E | No Connection |
| B | Channel B Output | F | DC Return |
| C | Channel Z Output | G | No Connection |
| D | DC+ Input | — | No Connection |

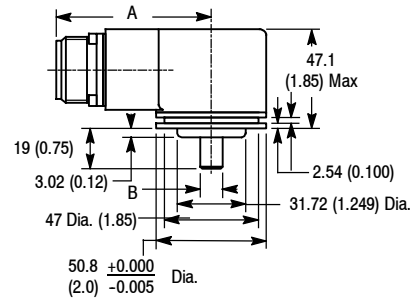
### 10-Pin Connector (ACS02E18-1P (023))

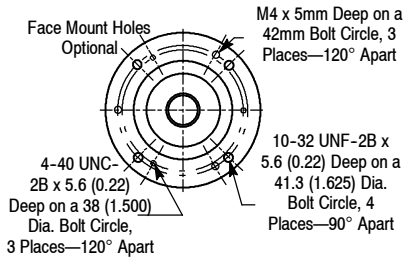
**Push-Pull, Differential Line Driver Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | F | DC Return |
| B | Channel B Output | G | No Connection |
| C | Channel Z Output | H | Channel $\overline{A}$ Output❶ |
| D | DC+ Input | I | Channel $\overline{B}$ Output❶ |
| E | No Connection | J | Channel $\overline{Z}$ Output❶ |

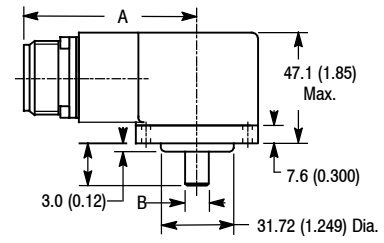
❶ Not included with push-pull outputs

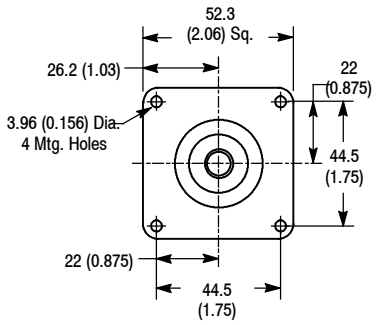
## Approximate Dimensions [mm (in.)]




*Servo Mount*




*Square Flange Mount*

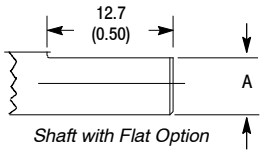
### Connector Dimensions

| Dimension Code | Radial Connector Options | Length mm (inches) |
|---|---|---|
| A | ACS02E14S-6P (023) | 57.7 (2.272) |
| | ACS02E16S-1P (023) | 62.5 (2.460) |
| | ACS02E18-1P (023) | 68.9 (2.691) |

## Shaft Diameter Options Dimension "B"

| Code | Shaft Diameter [mm (in.)] |
|---|---|
| A or K | 6 +0.00, -0.013 |
| B or L | 10 +0.00, -0.013 |
| C or M | 6.35 (0.2499) +0.0000, -0.0005 |
| Z or N | 9.52 (0.3749) +0.0000, -0.0005 |

Option H Mounting Configuration includes all 3 sets of mounting holes.




*Shaft with Flat Option*

## Flat Dimensions

| Code | Dimension "A" [mm (in.)] |
|---|---|
| K | 5.3 (0.21) |
| L | 9.1 (0.36) |
| M | 5.5 (0.22) |
| N | 8.6 (0.34) |

# Bulletin 845PY Digital Tachometer

## Size 20, 5PY Mounting

*5PY Mount*
*845PY-FW-2*

## Description

Bulletin 845PY digital tachometer is an optical encoder that determines the angular velocity of a rotating shaft and is a direct digital replacement for the standard 5PY analog tachometer. The Bulletin 845PY will mount on the same bolt hole pattern and use the same flexible coupling.

The Bulletin 845PY digital tachometer is a heavy duty, NEMA Type 4, and IP66 (IEC 529) rated optical incremental shaft encoder that is housed in a two-inch diameter enclosure. Typical applications for the 845PY include velocity feedback to a variety of DC drives, and machine tools.

## Features

- Digital replacement for the 5PY Analog Tachometer
- Direct 1395 digital DC drive interface
- Code disk resolution up to 3000 PPR
- Input reverse polarity protection
- CE Marked for all applicable directives

## Specifications

| | | |
|---|---|---|
| **Electrical** | | |
| Code Format | Incremental, 2 channels | |
| Quadrature | 90° ±22°; Channel A leads B CCW | |
| Symmetry | 50% ±10% | |
| Power Supply | Determined by cat. no.: | 5V DC ±5% @ 150 mA max.<br>11…20V DC @ 150 mA max.<br>24V DC @ 150 mA max. |
| Response Frequency | 100 kHz | |
| Operating Speed | (100 kHz x 60)/pulses per revolution = RPM or 15,000 RPM, whichever is lower | |
| Resolution | Up to 3000 PPR on code disk | |
| Output Drives | Differential line driver = ±20 mA @ 5V DC | |
| **Mechanical** | | |
| Starting Torque | 2.5 Ncm (3.5 in-oz) typical | |
| Running Torque | 2.5 Ncm (3.5 in-oz) typical | |
| Slew Speed | 15,000 RPM | |
| Shaft Loading | Axial: 359 N (80 lbs); Radial: 222 N (50 lbs) | |
| Shaft Dimensions | 7.94 mm (5/16 in.) diameter | |
| **Environmental** | | |
| Enclosure Type Rating | NEMA Type 4; IP66 (IEC 529) | |
| Operating Temperature [C (F)] | 0…+60° (+32…+140°) | |
| Storage Temperature [C (F)] | -25…+90° (-13…+194°) | |
| Relative Humidity | 98%, noncondensing | |
| Shock | 50 g (11 ms duration) | |
| Vibration | 20 g (5…2000 Hz) | |
| Weight [kg (oz)] | 0.56 (20) | |

## Accessories

| Description | Page Number |
|---|---|
| Pre-Wired Cables | 6-49 |
| Mating Connectors | 6-52 |
| Differential Encoder Buffer Board | 6-55 |

## Product Selection

**845PY — FW — 2 — C**

*a* *b* *c*

### *a*

| Resolution | |
|---|---|
| **Code** | **Description (PPR)** |
| AG | 1 |
| AM | 5 |
| BG | 10 |
| CA | 50 |
| CB | 60 |
| CE | 64 |
| CF | 80 |
| CG | 100 |
| DB | 120 |
| DF | 150 |
| EB | 180 |
| CH | 200 |
| CJ | 250 |
| CC | 254 |
| CW | 256 |
| EG | 300 |
| CK | 360 |
| CL | 400 |
| CM | 500 |
| DW | 512 |
| EH | 600 |
| DG | 720 |
| DL | 800 |
| LG | 900 |
| CN | 1000 |
| FW | 1024 |
| EL | 1200 |
| CD | 1250 |
| RF | 1280 |
| CU | 1472 |
| EM | 1500 |
| FL | 1600 |
| CP | 1800 |
| DN | 2000 |
| CS | 2048 |
| HL | 2400 |
| CR | 2500 |
| CY | 2540 |
| LJ | 2750 |
| EN | 3000 |

### *b*

| Power Supply Option | |
|---|---|
| **Code** | **Description** |
| 1 | 5V DC ±5% |
| 2 | 11…20V DC |
| 3 | 24V DC ±10% |

### *c*

| Mating Connector | |
|---|---|
| **Code** | **Description** |
| Blank | Without Mating Connector |
| C | With Mating Connector |

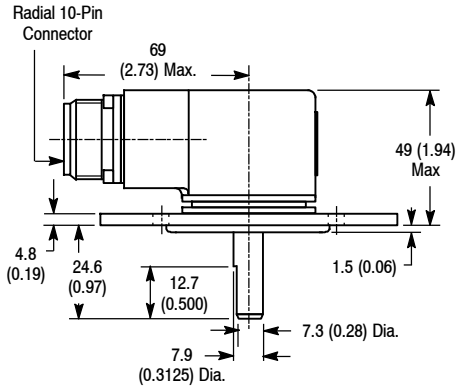
## Electrical Connections

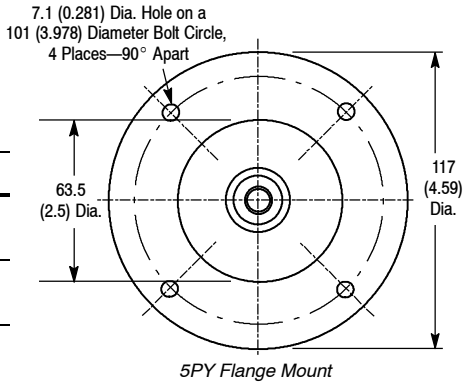
**10-Pin Connector (ACS02E18-1P (023))**

**Differential Line Driver Outputs**

| Pin | Function | Pin | Function |
|---|---|---|---|
| A | Channel A Output | F | DC Return |
| B | Channel B Output | G | No Connection |
| C | No Connection | H | Channel $\overline{A}$ Output |
| D | DC+ Input | I | Channel $\overline{B}$ Output |
| E | No Connection | J | No Connection |

## Approximate Dimensions [mm (in.)]

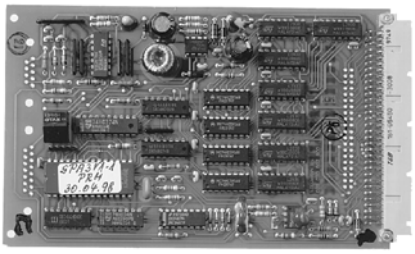



*5PY Flange Mount*

# Bulletin 842 Encoder Accessories

## Serial Parallel Adaptor/SPA Card Holder



*Serial Parallel Adaptor*
*842-SPA*

### Description

The 842-SPA, Serial Parallel Adaptor, converts Synchronous Serial Interface (SSI) signals to parallel data format. The 842-SPA is used with 842A, 845G, and 845GM absolute encoders.

Typically, one each of the 842-SPA and 842-CH are ordered for each application.

### Product Selection

**842 — SPA**

| | |
|---|---|
| **Size** | 10.3 x 165 mm (4 x 6.5 in.) |
| **Voltage Supply** | 11…32V DC |
| **Power Requirements** | 250 mA |
| **Operating Temperature [C (F)]** | 0…50° (32…122°) |
| **Output Driver (parallel)** | Push-pull, 5…32V, 20 mA (max) |
| **Input** | RS422 (SSI) |

*SPA Card Holder*
*842-CH*

### Description

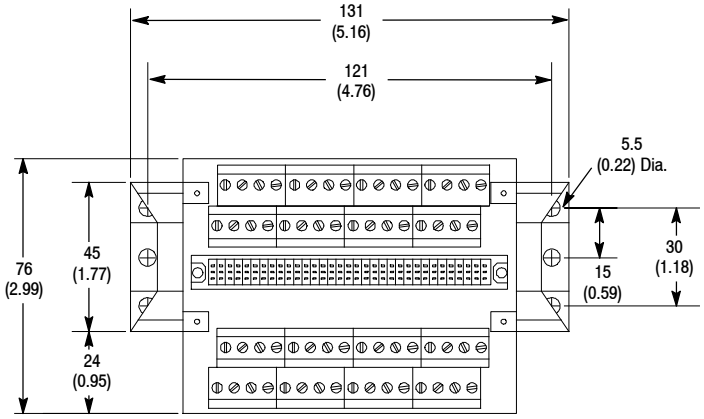
The 842-CH is the card holder for the 842-SPA. It is designed to be mounted in an enclosure provided by the user. The card holder should be mounted as close as possible to the controller or input card.

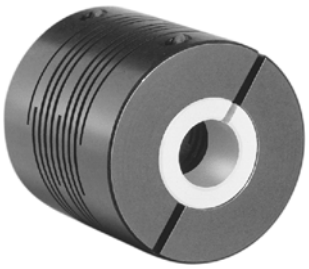
Typically, one each of the 842-SPA and 842-CH are ordered for each application.

The 842-CH can accommodate wire sizes from #26…16 AWG.

### Product Selection

**842 — CH**





*High Performance Flexible Coupling*
*845-FC-B-B*

## Description

High performance flexible couplings are used to connect two shafts, and help to reduce the effects of misalignment between the shafts. Flexible couplings are offered in the high performance version, with nonconductive inserts. They are of the flexible curved beam helical type with clamping screw at both ends.

## Specifications

| | |
|---|---|
| **Parallel Offset** | 0.51 mm (0.020 in.) max. |
| **Angular Offset** | 10.0° max. |
| **Axial Compliance** | 1.58 mm (0.060 in.) max. |
| **Construction** | Aluminum with a fiberglass insert |

## Product Selection—High Performance

**845 — FC — B — B**
*a* *b*

***a***

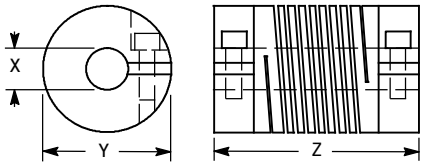
| Smallest Bore Diameter | |
|---|---|
| **Code** | **Description** |
| A | 1/4 in. |
| B | 3/8 in. |
| R | 6 mm |
| T | 10 mm |

***b***

| Largest Bore Diameter | |
|---|---|
| **Code** | **Description** |
| A | 1/4 in. |
| B | 3/8 in. |
| C | 1/2 in. |
| R | 6 mm |
| T | 10 mm |

## Approximate Dimensions [mm (in.)]

**High Performance Flexible Coupling**




| Dimension Code | Bore Size Code Letter | | | | |
|---|---|---|---|---|---|
| | **A** | **B** | **C** | **R** | **T** |
| X | 6.4 (0.25) | 9.5 (0.375) | 12.7 (0.50) | 6 | 10 |
| Y | 30.56 (1.20) Dia. | | | | |
| Z | 32 (1.25) Long | | | | |

*Miniature Style*
*Flexible Coupling*
*845-FC-1*

## Specifications

| | |
|---|---|
| **Parallel Offset** | 0.25 mm (0.010 in.) max |
| **Angular Offset** | 5.0° max |
| **Axial Compliance** | 0.76 mm (0.030 in.) max |
| **Construction** | Aluminum with a fiberglass insert |

## Product Selection—Miniature Style

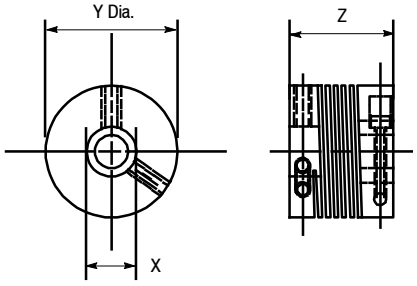
**845 — FC — 1**
*a*

***a***

| Bore Diameter | |
|---|---|
| **Code** | **Description** |
| 1 | 3/8…3/8 in. |
| 2 | 1/4…3/8 in. |

## Approximate Dimensions [mm (in.)]

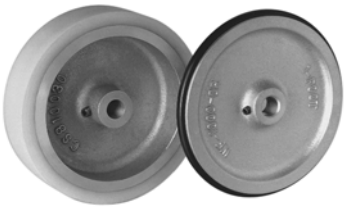
**Miniature Style Flexible Coupling**




| Dimension Code | Bore Size Code Letter | |
|---|---|---|
| | **1** | **2** |
| X | 9.5 (0.375) | 6.4 (0.25) |
| Y | 25.40 (1.0) Dia. | |
| Z | 19 (0.750) Long | |

# Bulletin 845 Encoder Accessories

## Measuring Wheels/Servo Clamps



*Polyurethane 845-MW-A-2* *Rubber O-Ring 845-MW-A-1*

### Description

Measuring wheels are used to convert a fixed amount of linear motion to a corresponding amount of rotary motion. Rubber O-Ring type contact material is used on metal, paper, foil, film and hard plastics. Polyurethane type contact material is used on soft smooth materials, such as soft paper, cardboard and fine weave textiles.

### Product Selection

**845 —M W— A — 1**
***a***

***a***

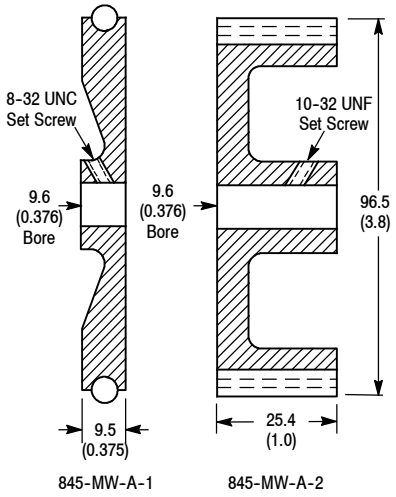
| Contact Material | |
|---|---|
| **Code** | **Description** |
| 1 | Rubber O-Ring |
| 2 | Polyurethane |

### Specifications

| | |
|---|---|
| **Circumference** | 304.8 mm (12.00 in.) |
| **Bore Hole Diameter** | 9.6 mm (0.376 in.) |
| **Durometer** | 70 Shore D |
| **Material** | Cast Aluminum |

### Approximate Dimensions [mm (in.)]

**Measuring Wheels**



*Servo Clamps 845-SC*

### Description

Servo clamps are used for the mounting of all encoders with the servo type mounting option. For the size 15 device, 3 clamps are arrayed on a 48.1 mm (1.895 in.) diameter bolt circle. For the size 20 device, 3 or 4 clamps are arrayed on a 57.7 mm (2.27 in.) diameter bolt circle. For 60 mm encoders (i.e., the 842A), 3 or 4 clamps are arrayed on a 66.3 mm (2.61 in.) diameter bolt circle. For the size 25 device, 3 or 4 clamps are arrayed on a 70.4 mm (2.77 in.) diameter bolt circle. Servo clamps are sold as a kit (set of 4 clamps).

### Product Selection

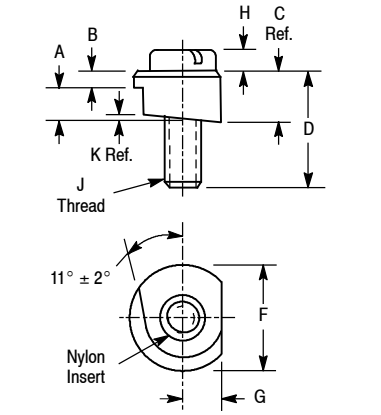
**845 — SC**

| Dimension Code | Approximate Dimension |
|---|---|
| A | 2.38 ±0.003 (0.093) |
| B | 1.02±0.003 (0.040) |
| C | 3.38 (0.133) |
| D | 9.5+0.000, -0.032 (0.375) |
| E | 3.43 (0.135) |
| F | 9.90 (0.390) |
| G | 3.18 (0.125) |
| H | 1.73 (0.068) max. |
| J | #4…40 |
| K | 0.25 (0.010) |

Material: Stainless Steel 316

### Approximate Dimensions [mm (in.)]

**Servo Clamps**



*6 Pin Connector*
*845-CA-A-50*

## Description

The following pre-wired cable assemblies are available for use with Allen-Bradley encoder products. The cables are wired to the appropriate mating connector for the encoder with which they will be used. The other end of the cable will be a stripped and tinned pigtail. Connector catalog numbers shown below from Amphenol Corporation.

## Product Selection

**845 — CA — C — 25**
*a* *b*

***a***

| Connector | | |
|---|---|---|
| **Code** | **Description** | **Cable Type** |
| A | 6 Pin (845T) | Alpha 6054C or equivalent |
| B | 7 Pin (845F, H, T) | |
| C | 10 Pin (845F, H, T, 844D) | |
| D | 19 Pin (845D, G, GM) | Alpha 5199/20C or equivalent |
| G | 12 Pin (842A, 845G, GM) | Alpha 6054C or equivalent |
| H | 17 Pin (845G) | Alpha 5199/20C or equivalent |
| K | 10 Pin (845F, H, T) | Alpha 6318 or equivalent ❸ |
| PY | 10 Pin (845PY) | Alpha 6054C or equivalent |

***b***

| Cable Length ❶ | |
|---|---|
| **Code** | **Description** |
| 10 | 10 ft |
| 25 | 25 ft |
| 50 | 50 ft ❷ |
| 100 | 100 ft ❷ |

❶ See table on page 6-51 for other available lengths.
❷ Not recommended for 5V DC powered encoders.
❸ Low capacitance cable for long cable runs.

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-A-__ (With 6 pin ACS06E14S-6S (023) connector) | Red/Black/Shield | Red | +DC Input | B |
| | | Black | DC Common | A |
| | White/Black/Shield | White | CH A | E |
| | | Black | N/C | — |
| | Blue/Black/Shield | Blue | CH B | D |
| | | Black | N/C | — |
| | Green/Black/Shield | Green | CH Z | C |
| | | Black | N/C | — |

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-B-__ (With 7 pin ACS06E16S-1S (023) connector) | Red/Black/Shield | Red | +DC Input | D |
| | | Black | DC Common | F |
| | White/Black/Shield | White | CH A | A |
| | | Black | N/C | — |
| | Blue/Black/Shield | Blue | CH B | B |
| | | Black | N/C | — |
| | Green/Black/Shield | Green | CH Z | C |
| | | Black | N/C | — |

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-C-__ (With 10 pin ACS06E18-1S (023) connector) | Red/Black/Shield | Red | +DC Input | D |
| | | Black | DC Common | F |
| | White/Black/Shield | White | CH A | A |
| | | Black | CH $\overline{A}$ | H |
| | Blue/Black/Shield | Blue | CH B | B |
| | | Black | CH $\overline{B}$ | I |
| | Green/Black/Shield | Green | CH Z | C |
| | | Black | CH $\overline{Z}$ | J |

# Bulletin 845 Encoder Accessories

## Pre-Wired Cable Assemblies

| Cat. No. | Wire Color | Pin | Wire Color | Pin |
|---|---|---|---|---|
| 845-CA-D-__ (With 19 pin PT06E14-19S connector) | Brown | A | White/Red | L |
| | Orange | B | White/Yellow | M |
| | Yellow | C | White/Green | N |
| | Green | D | White/Blue | P |
| | Blue | E | White/Black | R |
| | Violet | F | White/Violet | S |
| | Grey | G | Black | T |
| | White | H | White/Grey | U |
| | White/Orange | J | Red | V |
| | White/Brown | K | White/Black/Brown | — |
| | | | Shield | Shield |

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-G-__ (With 12 pin connector) | Red/Black/Shield | Red | +DC Input | 8 |
| | | Black | DC Common | 1 |
| | White/Black/Shield | White | Clock + | 3 |
| | | Black | Clock - | 11 |
| | Blue/Black/Shield | Blue | Data + | 2 |
| | | Black | Data - | 10 |
| | Green/Black/Shield | Green | CW/CCW | 12 |
| | | Black | Reset | 9 |

| Cat. No. | Wire Color | Pin | Wire Pair | Pin |
|---|---|---|---|---|
| 845-CA-H-__ (With 17 pin MS3106E20-29S connector) | White/Orange | A | White/Green | L |
| | White | B | White/Yellow | M |
| | Grey | C | White/Red | N |
| | Violet | D | White/Blue | P |
| | Blue | E | Black | R |
| | Yellow | F | Red | S |
| | Orange | G | Green | T |
| | Brown | H | | |
| | White/Violet | J | | |
| | White/Brown | K | | |
| | | | Shield | Shield |

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-K-__ (With 10 pin ACS06E18-1S (023) connector) | Red/Black/Shield | Red | +DC Input | D |
| | | Black | DC Common | F |
| | White/Black/Shield | White | CH A | A |
| | | Black | CH $\overline{A}$ | H |
| | Blue/Black/Shield | Blue | CH B | B |
| | | Black | CH $\overline{B}$ | I |
| | Green/Black/Shield | Green | CH Z | C |
| | | Black | CH $\overline{Z}$ | J |
| | All Shields | — | Shield | G |

| Cat. No. | Wire Pair | Wire Color | Function | Pin |
|---|---|---|---|---|
| 845-CA-PY-__ (With 10 pin ACS06E18-1S (023) connector) | Red/Black/Shield | Red | +DC Input | D |
| | | Black | DC Common | F |
| | White/Black/Shield | White | CH A | A |
| | | Black | CH $\overline{A}$ | H |
| | Green/Black/Shield | Green | CH B | B |
| | | Black | CH $\overline{B}$ | I |

| Cat. No. | Description | Cat. No. | Description |
|---|---|---|---|
| 845-CA-A-10 | 6 Pin Connector for 845T—3 m (10 ft) | | |
| 845-CA-A-25 | 6 Pin Connector for 845T—7.6 m (25 ft) | | |
| 845-CA-A-50 | 6 Pin Connector for 845T—15.2 m (50 ft) | | |
| 845-CA-A-100 | 6 Pin Connector for 845T—30.4 m (100 ft) | | |
| 845-CA-B-10 | 7 Pin Connector for 845F, H, T—3 m (10 ft) | 845-CA-G-10 | 12 Pin Connector for 842A, 845G❶, GM❶—3 m (10 ft) |
| 845-CA-B-25 | 7 Pin Connector for 845F, H, T—7.6 m (25 ft) | 845-CA-G-25 | 12 Pin Connector for 842A, 845G❶, GM❶—7.6 m (25 ft) |
| 845-CA-B-50 | 7 Pin Connector for 845F, H, T—15.2 m (50 ft) | 845-CA-G-50 | 12 Pin Connector for 842A, 845G❶, GM❶—15.2 m (50 ft) |
| 845-CA-B-100 | 7 Pin Connector for 845F, H, T—30.4 m (100 ft) | 845-CA-G-100 | 12 Pin Connector for 842A, 845G❶, GM❶—30.4 m (100 ft) |
| 845-CA-C-10 | 10 Pin Connector for 845F, H, T, 844D—3 m (10 ft) | 845-CA-H-10 | 17 Pin Connector for 845G—3 m (10 ft) |
| 845-CA-C-25 | 10 Pin Connector for 845F, H, T, 844D—7.6 m (25 ft) | 845-CA-H-25 | 17 Pin Connector for 845G—7.6 m (25 ft) |
| 845-CA-C-50 | 10 Pin Connector for 845F, H, T, 844D—15.2 m (50 ft) | 845-CA-H-50 | 17 Pin Connector for 845G—15.2 m (50 ft) |
| 845-CA-C-100 | 10 Pin Connector for 845F, H, T, 844D—30.4 m (100 ft) | 845-CA-H-100 | 17 Pin Connector for 845G—30.4 m (100 ft) |
| 845-CA-C-200 | 10 Pin Connector for 845F, H, T, 844D—60.9 m (200 ft) | 845-CA-K-10 | 10 Pin Connector ❷—3 m (10 ft) |
| 845-CA-C-330 | 10 Pin Connector for 845F, H, T, 844D—100.5 m (330 ft) | 845-CA-K-25 | 10 Pin Connector ❷—7.6 m (25 ft) |
| 845-CA-D-10 | 19 Pin Connector for 845D, G, GM—3 m (10 ft) | 845-CA-K-50 | 10 Pin Connector ❷—15.2 m (50 ft) |
| 845-CA-D-25 | 19 Pin Connector for 845D, G, GM—7.6 m (25 ft) | 845-CA-K-100 | 10 Pin Connector ❷—30.4 m (100 ft) |
| 845-CA-D-50 | 19 Pin Connector for 845D, G, GM—15.2 m (50 ft) | 845-CA-K-200 | 10 Pin Connector ❷—60.9 m (200 ft) |
| 845-CA-D-100 | 19 Pin Connector for 845D, G,GM—30.4 m (100 ft) | 845-CA-K-300 | 10 Pin Connector ❷—91.4 m (300 ft) |
| 845-CA-D-150 | 19 Pin Connector for 845D, G, GM—45.7 m (150 ft) | 845-CA-K-400 | 10 Pin Connector ❷—121.9 m (400 ft) |
| 845-CA-D-200 | 19 Pin Connector for 845D, G, GM—60.9 m (200 ft) | 845-CA-PY-10 | 10 Pin Connector for 845PY—3 m (10 ft) |
| | | 845-CA-PY-25 | 10 Pin Connector for 845PY—7.6 m (25 ft) |
| | | 845-CA-PY-50 | 10 Pin Connector for 845PY—15.2 m (50 ft) |
| | | 845-CA-PY-100 | 10 Pin Connector for 845PY—30.4 m (100 ft) |

Cables 50 ft and longer not recommended for 5V DC powered encoders.

❶ 845-CA-G-** for 845G and 845GM SSI models.

❷ Low capacitance cable.

# Bulletin 845 Encoder Accessories

## Mating Connectors/Mounting Plates

*Mating Connectors*

### Product Selection

**845 — 10P**
***a***

***a***

| Connector | |
|---|---|
| **Code** | **Description** |
| 6P | 6 Pin (845T) |
| 7P | 7 Pin (845F, H, T) |
| 7P-RT | 7 Pin, Right Angle (845F, H, T) |
| 10P | 10 Pin (845F, H, T, PY, 844D) |
| 10P-RT | 10 Pin, Right Angle (845F, H, T, PY, 844D) |
| 12P | 12 Pin (842A, G, GM) |
| SCD | 19 Pin, KPT06F-14-19S (845D, G, GM) |
| 17P | 17 Pin, MS3106E20-29S (845G) |

### Description

Mating connectors listed are either included with, or available as standard options for all encoder products.

### Description

Mounting plates are used to physically mount the encoder or resolver to the rotating member that is to be monitored.

### Product Selection

**845 — MB — 1**
***a***

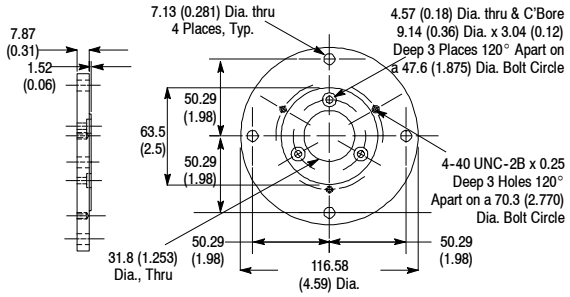
***a***

| Plate | |
|---|---|
| **Code** | **Description** |
| 1 | 5PY Mounting Plate for Size 25 Face or Servo Mount (845H, K, G, D) |
| 2 | BC42 Mounting Plate for Size 25 Face Mount (845H, K, G, D) |
| 3 | 5PY Mounting Plate for Size 20 Face Mount (845T) |
| 4 | Integral Coupling Flange, Miniature Style (845D, G, H, K, T) ❶ |
| 5 | Integral Coupling Flange, High Performance (845D, G, H, K, T) ❶ |
| 6 | BC48 Servo to Square (842A) ❷ |
| 7 | 0.1875 Servo to Square (845H, K) ❷ |
| 8 | NEMA 180 C-Face Mount (845H, K) ❸ |
| 9 | Low Profile Coupling Flange Miniature Style (845D, G, H, K, T) |

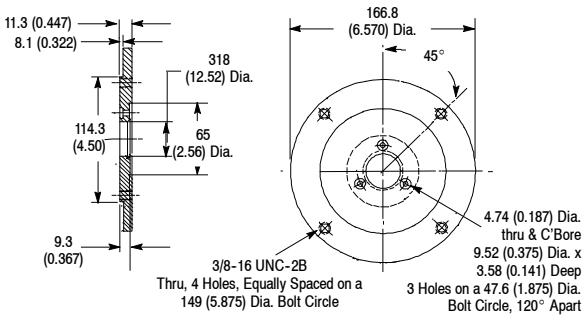
❶ For size 20/25 face mount
❷ Square flange adaptor
❸ Face or servo mount

### Approximate Dimensions [mm (in.)]

*845-MB-1*

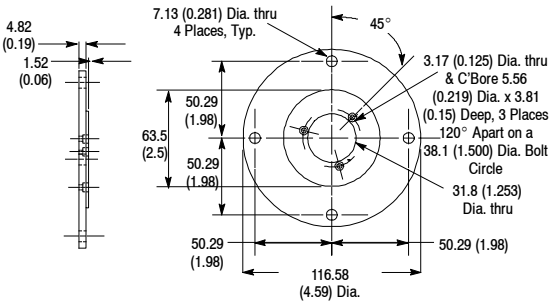


*845-MB-2*

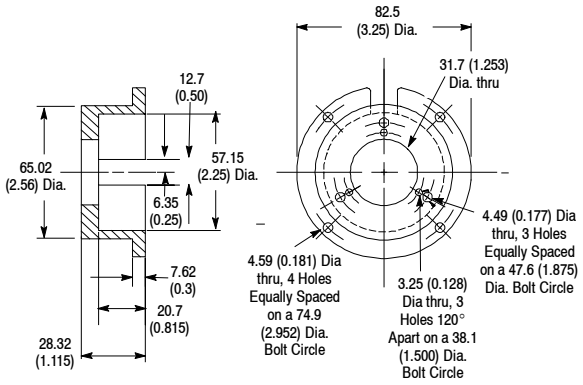


## Approximate Dimensions [mm (in.)] (continued)

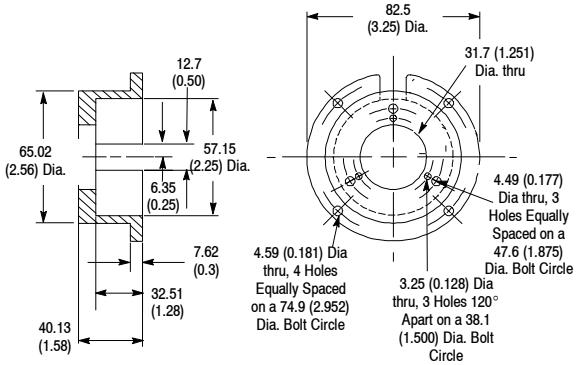
*845-MB-3*



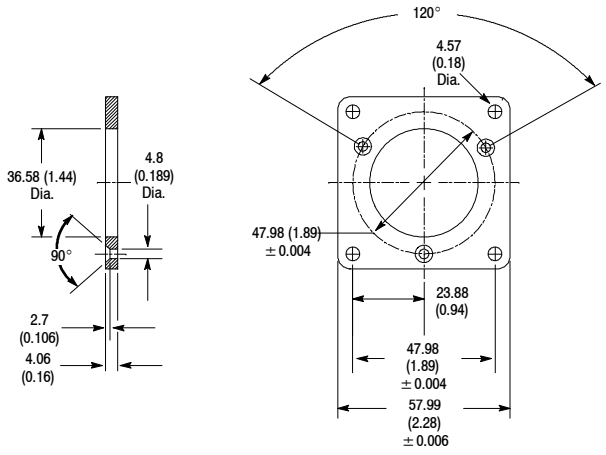
*845-MB-4*



*845-MB-5*




*845-MB-6*

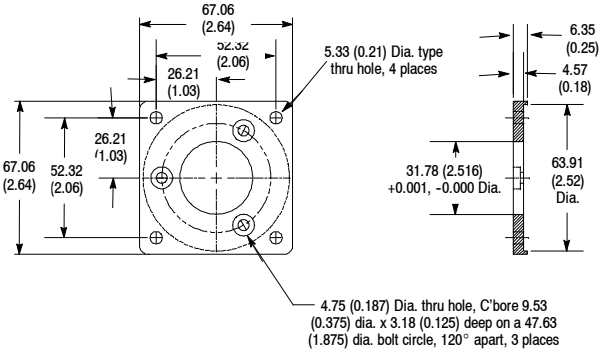


# Bulletin 845 Encoder Accessories

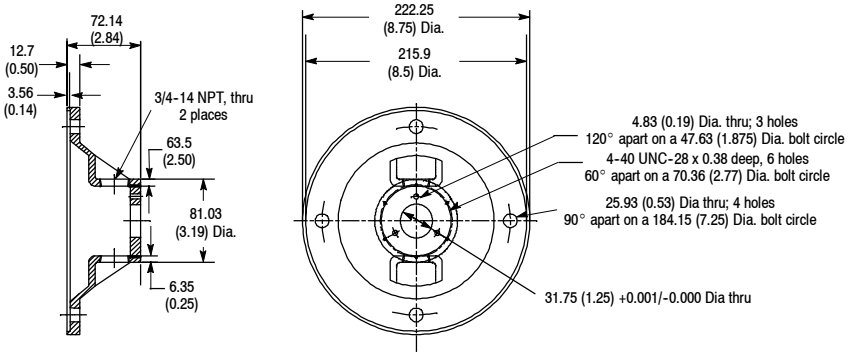
## Mounting Plates

### Approximate Dimensions [mm (in.)] (continued)

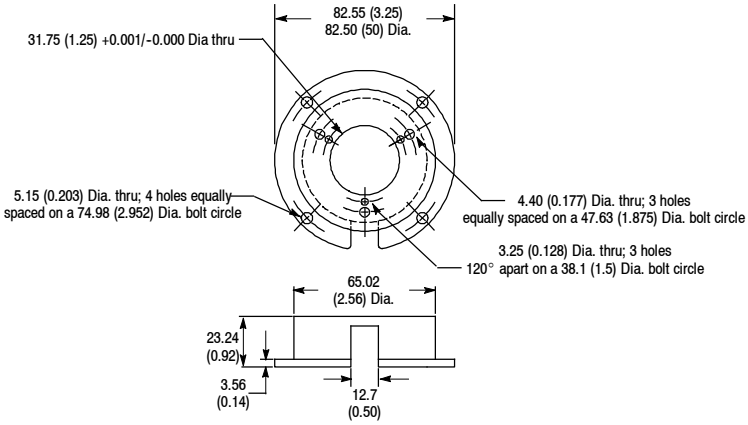
845-MB-7



845-MB-8



845-MB-9

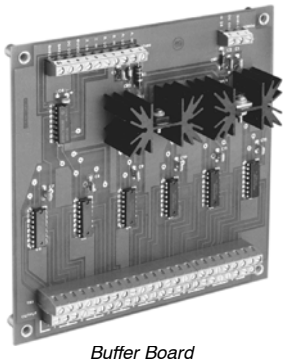



### Encoder Mounting Plate Options

| Mounting Plate | Option 1 | Option 2 | 845D #1 | 845D #2 | 845G | 845K | 845T |
|---|---|---|---|---|---|---|---|
| 845-MB-1 | 845H-SJD* | 845H-SJH* | 845D-S*D* | 845-S*H* | 845G-* | 845K-* | |
| 845-MB-2 | | | | | | | |
| 845-MB-3 | | | | | | | 845T-H* |
| 845-MB-4 | 845H-SJD* | 845H-SJH* | 845D-S*D* | 845D-S*H* | 845G-* | 845K-* | |
| 845-MB-5 | | | | | | | |
| 845-MB-6 | 842A-31* | | | | | | |
| 845-MB-7 | 845H-SJH* | | | 845D-S*H* | 845G-S* | 845K-SAH* | |
| 845-MB-8 | 845H-SJD* | 845H-SJH* | | | | 845K-* | |
| 845-MB-9 | | | 845D-S*D* | 845D-S*H* | 845G-* | | 845T-H* |

# Bulletin 845 Encoder Accessories

## Differential Encoder Buffer Board



*Buffer Board*
*845-BB*

## Selection Guide

**845 — BB**

## Specifications

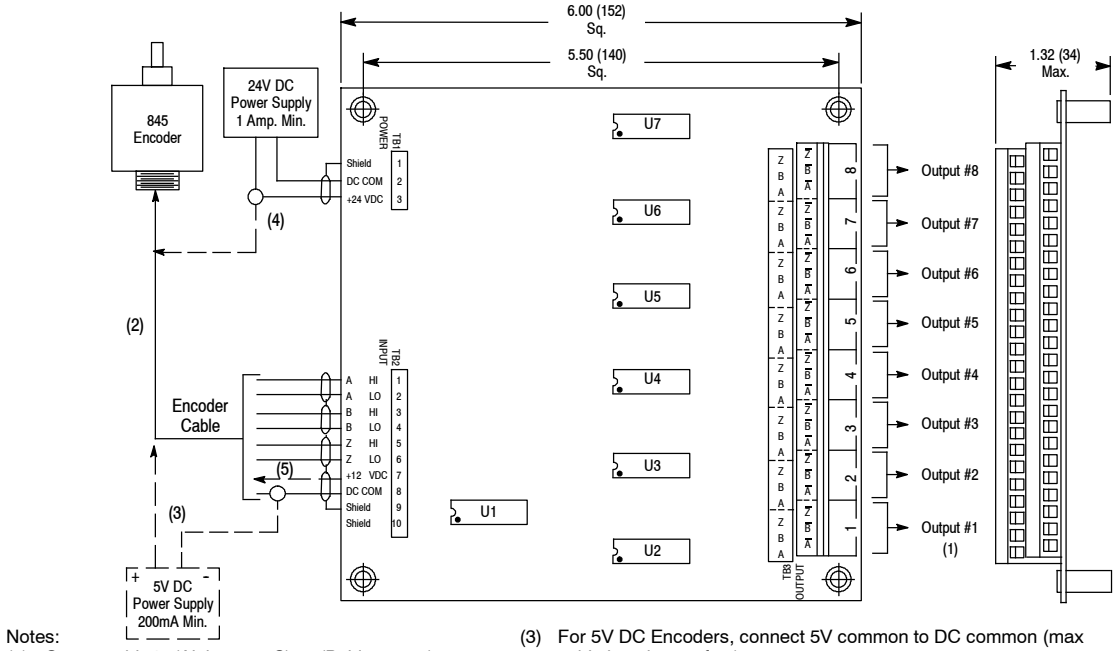
| | |
|---|---|
| **Electrical** | |
| **Power Requirements** | 24V DC ±10% filtered @ 1 A maximum |
| **Input Code Format** | Incremental differential line driver dual channel with zero index |
| **Input Signal** | 5V DC RS-422 differential line driver |
| **Available Encoder Power** | 12V DC ±10% @ 220 mA maximum |
| **Frequency Response** | 250 kHz maximum |
| **Outputs** | Eight (8) sets of ABZ channel 5V DC RS-422 differential line driver signals |
| **Output Drive Capability** | ±20 mA per channel |
| **Mechanical** | |
| **Dimensions** | 152 mm (6 in.) x 152 mm (6 in.) x 34 mm (1.32 in.) maximum |
| **Mounting** | Thru-hole standoffs on circuit board four (4) holes on a 140 mm (5.5 in.) square |
| **Enclosure** | None (non-enclosed circuit board) |
| **Environmental** | |
| **Operating Temperature** | 0…+50°C (+32…+122°F) |
| **Storage Temperature** | -25…+90°C (-13…+194°F |
| **Humidity** | 98%, Noncondensing |
| **Approximate Ship Weight** | 0.23kg (0.5lbs) |

## Description

The 845-BB buffer board is an encoder interface designed to allow a single differential line driver type encoder to be wired to eight sets of differential inputs. The inputs may be programmable controllers, numerical controllers, motion controllers, and other positioning systems that require differential encoder input signals.

The 845-BB buffer board should be mounted in the I/O cabinet and will provide a degree of immunity to electrical noise. The buffer board is powered with 24V DC, 1 A maximum. Internal voltage regulator circuits make available 12V DC as encoder power. All connections are made via terminal strips mounted on the buffer board.

## Approximate Dimensions [mm (in.)]




Notes:
(1) Output cable is (Alpha 6053C) or (Belden 9329) or equivalent.
(2) Encoder cable is (Alpha 6054C) or (Belden 9330) or equivalent.
(3) For 5V DC Encoders, connect 5V common to DC common (max cable length = 30 feet).
(4) Connect for 24V DC Encoders.
(5) Connect for 12V DC Encoders.

## Notes

# Contents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**Products**

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837E Temperature Switches . . . . . page 7–10
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Adaptors . . . . . page 7–6

# Quick Selection Guide

| | 836E Pressure Switches | 836E Nondisplay Pressure Switches | 840E Level Switches |
|---|---|---|---|
| **Features** | • Microprocessor based with no moving parts for longer life and reduced downtime<br>• Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions<br>• Operating pressures from -15…6000 psi (gauge)<br>• Industry-leading four-digit 14-segment digital display<br>• Independently programmable dual PNP N.O./N.C. outputs or 4…20 mA analog output<br>• Stainless steel sensing element | • Microprocessor based with no moving parts for longer life and reduced downtime<br>• Rugged, corrosion-resistant 304L stainless steel housing features an IP65 enclosure rating to withstand harsh industrial conditions<br>• Operating pressures from 0…6000 psi (gauge)<br>• 4…20 mA analog output<br>• Stainless steel sensing element | • Liquid level switch used in tanks, containers and pipelines<br>• On-site control using external LED display<br>• Easy-to-install<br>• Microprocessor based with no moving parts for longer life and reduced downtime<br>• Rugged, corrosion-resistant 316L stainless steel housing features an IP67 enclosure rating to withstand harsh industrial conditions<br>• DC PNP version with M12 connector<br>• AC version with NPT 1/2 valve connector<br>• 316L stainless steel sensing element |
| **Applications** | • Automotive industry<br>• Machine tool<br>• Injection molding machines<br>• Hydraulics<br>• Pneumatics | • Automotive industry<br>• Machine tool<br>• Injection molding machines<br>• Hydraulics<br>• Pneumatics | • Liquid level monitoring<br>• Tanks, containers and pipelines<br>• Filtering systems<br>• Coolant and lubricant tanks<br>• Pump protector |
| **Supply Voltage** | • 12…30V DC | • 12…30V DC | • DC PNP 10...35 V DC<br>• AC 19...253 V AC |
| **Output** | • Dual PNP N.O./N.C. or 4…20 mA analog with single PNP N.O./N.C. programmable outputs | • 4…20 mA analog | • DC PNP<br>• AC |
| **Supply Current** | • <60 mA | • <30 mA | • DC PNP <15 mA<br>• AC <3.8 mA |
| **Load Current** | • 250 mA (each output) | • 250 mA (each output) | • 250 mA |
| **Certifications** | • cULus<br>• CE Marked for all applicable directives | • CE Marked for all applicable directives | • CE Marked for all applicable directives<br>• CSA C US |
| **Additional Info** | • See page 7-4 | • See page 7-7 | • See page 7-7 |

| | | |
|---|---|---|
| **837E Temperature Switches** | **837E Nondisplay Temperature Switches** | **839E Flow Switches** |
| • Microprocessor based with no moving parts for longer life and reduced downtime<br>• Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions<br>• Media temperature range from -50…150°C (-58…302°F)<br>• Industry-leading four-digit 14-segment digital display<br>• Independently programmable dual PNP N.O./N.C. outputs or 4…20 mA analog output<br>• 316L stainless steel probe | • Microprocessor based with no moving parts for longer life and reduced downtime<br>• Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions<br>• Media temperature range from -50…150°C (-58…302°F)<br>• 4…20 mA analog output PC programmable via the M12 connector<br>• 316L stainless steel probe | • Microprocessor based with no moving parts for longer life and reduced downtime<br>• Rugged, corrosion-resistant 316 stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions<br>• Flow range from 0.03…3 m/s (0.1…9.84 ft/s)<br>• Industry-leading four-digit 14-segment digital display<br>• Independently programmable dual PNP N.O./N.C. outputs or 4…20 mA analog output<br>• 316L stainless steel probe |
| • Automotive industry<br>• Machine tool<br>• Hydraulics<br>• Batch temperature control | • Automotive industry<br>• Machine tool<br>• Hydraulics<br>• Batch temperature control | • Food and beverage<br>• Pharmaceuticals<br>• Water/wastewater<br>• Hydraulics |
| • 12…30V DC | • 10…35V DC | • 18…30V DC |
| • Dual PNP N.O./N.C. or 4…20 mA analog with single PNP N.O./N.C. programmable outputs | • 4…20 mA analog | • Dual PNP N.O./N.C. or 4…20 mA analog with single PNP N.O./N.C. programmable outputs |
| • <60 mA | • <23 mA | • <100 mA |
| • 250 mA (each output) | • 250 mA (each output) | • 250 mA (each output) |
| • cULus<br>• CE Marked for all applicable directives | • cULus<br>• CE Marked for all applicable directives | • cULus<br>• CE Marked for all applicable directives |
| • See page 7-10 | • See page 7-13 | • See page 7-15 |

# 836E Pressure Switches

## Features

- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions
- Operating pressures from –15…6000 psi (gauge)
- Industry-leading four-digit 14-segment digital display
- Independently programmable dual PNP NO/NC outputs or 4…20 mA analog output with single PNP NO/NC output
- Stainless steel sensing element

## Applications

- Automotive industry
- Machine tool
- Injection molding machines
- Hydraulics
- Pneumatics
- Food and beverage
- Pharmaceuticals

## Specifications

| | |
|---|---|
| Certifications | cULus, CE Marked for all applicable directives, and 3 A authorized only with sanitary adaptor |
| Supply Voltage | 12…30V DC |
| Output | Dual PNP N.O./N.C. or 4…20 mA analog with single PNP N.O./N.C. |
| Supply Current | <60 mA (no load) |
| Load Current, Max. | 250 mA (per PNP output) |
| Analog Output Impedance | Max (Vsupply - 6.5V)/0.22 A |
| Accuracy | <0.5% of upper pressure range limit Analog Nonlinearity: <0.2% (as per limit point method) |
| Repeatability | <0.2% of upper pressure range limit |
| Long Term Drift | <0.15% per year |
| Media Temperature [C (F)] | -40…100° (-40…212°) |
| Operating Temperature [C (F)] | -40…85° (-40…185°) |
| Housing Material | 316L stainless steel |
| Wetted Parts | 316L stainless steel |
| Enclosure Type Rating | IP66 ❶ |
| Switch Cycles, Min. | >10,000,000 |
| Over Pressure Limit (psi) ❷ | 1.5 times MWP |
| Burst Pressure Limit | 3 times MWP |
| Response Time | Switch Output: ≤20 ms;<br>Analog Output: Rise Time: $T_{90}$ ≤200 ms;<br>Analog Output: Settling Time: $T_{99}$ ≤500 ms |

❶ Pressure sensors up to 60 psi are rated IP60.

❷ Maximum working pressure (MWP) is the maximum pressure that switches can tolerate for an indefinite period of time. Over pressure limit is the maximum pressure that switches can tolerate for a short period of time without sustaining permanent damage. Burst pressure limit is the maximum pressure that switches can tolerate without sustaining permanent damage or leakage.

## Product Selection

| Process Connection | Pressure Range [psi] | Set Point Range [psi] | Reset Point Range [psi] | Max. Working Pressure [psi]❶ | Cat. No. | |
|---|---|---|---|---|---|---|
| | | | | | Dual PNP Output | 420 mA Analog Output w/Single PNP Output❷ |
| 1/4 inch NPT (female) | -15…15 | -14.92+15 | -15.00…14.92 | 40.5 | 836E-DA1CC1D4 | 836E-DC1CC1D4 |
| | 0…60 | 0.30…60 | 0…59.70 | 160.5 | 836E-DA1EL1D4 | 836E-DC1EL1D4 |
| | 0…150 | 0.75…150 | 0…149.25 | 400.5 | 836E-DA1EN1D4 | 836E-DC1EN1D4 |
| | 0…600 | 3.00…600 | 0…597.00 | 1600.5 | 836E-DA1EQ1D4 | 836E-DC1EQ1D4 |
| | 0…1,500 | 7.50…1,500 | 0…1,492.50 | 1600.5 | 836E-DA1ER1D4 | 836E-DC1ER1D4 |
| | 0…6,000 | 0.30…6000 | 0…5,970.00 | 6,000 | 836E-DA1EU1D4 | 836E-DC1EU1D4 |
| SAE 7/16-20 UNF (female) | -15…15 | -14.92…+15 | -15.00…14.92 | 40.5 | 836E-DA1CC2D4 | 836E-DC1CC2D4 |
| | 0…60 | 0.30…60 | 0…59.70 | 160.5 | 836E-DA1EL2D4 | 836E-DC1EL2D4 |
| | 0…150 | 0.75…150 | 0…149.25 | 400.5 | 836E-DA1EN2D4 | 836E-DC1EN2D4 |
| | 0…600 | 3.00…600 | 0…597.00 | 1600.5 | 836E-DA1EQ2D4 | 836E-DC1EQ2D4 |
| | 0…1,500 | 7.50…1,500 | 0…1,492.50 | 1600.5 | 836E-DA1ER2D4 | 836E-DC1ER2D4 |
| | 0…6,000 | 0.30…6000 | 0…5,970.00 | 6,000 | 836E-DA1EU2D4 | 836E-DC1EU2D4 |
| G1/4 BSPP (female) | -1…1 (bar) | -1.0…+1.03 (bar) | -1.03…1 (bar) | 2.7 (bar) | 836E-DA1CC3D4 | 836E-DC1CC3D4 |
| | 0…4 (bar) | 0.02…4.14 (bar) | 0…4 (bar) | 10.7 (bar) | 836E-DA1EL3D4 | 836E-DC1EL3D4 |
| | 0…10 (bar) | 0.05…10.30 (bar) | 0…10 (bar) | 26.7 (bar) | 836E-DA1EN3D4 | 836E-DC1EN3D4 |
| | 0…40 (bar) | 0.21…41.38 (bar) | 0…40 (bar) | 106.7 (bar) | 836E-DA1EQ3D4 | 836E-DC1EQ3D4 |
| | 0…100 (bar) | 0.52…103.45 (bar) | 0…100 (bar) | 106.7 (bar) | 836E-DA1ER3D4 | 836E-DC1ER3D4 |
| | 0…400 (bar) | 2.07…413.79 (bar) | 0…400 (bar) | 400 (bar) | 836E-DA1EU3D4 | 836E-DC1EU3D4 |
| **Sanitary Connection** | | | | | | |
| 1…1.5 inch Clamp | 0…150 | 0.75…150 | 0…149.25 | 400.5 | 836E-DA1ENBD4 | 836E-DC1ENBD4 |
| | 0…600 | 3.00…600 | 0…597.00 | 600 | 836E-DA1EQBD4 | 836E-DC1EQBD4 |
| 2 inch Clamp | 0…150 | 0.75…150 | 0…149.25 | 400.5 | 836E-DA1ENCD4 | 836E-DC1ENCD4 |
| | 0…600 | 3.00…600 | 0…597.00 | 600 | 836E-DA1EQCD4 | 836E-DC1EQCD4 |
| Base Switch (No Adaptor) | 0…150 | 0.75…150 | 0…149.25 | 400.5 | 836E-DA1EN7D4 | 836E-DC1EN7D4 |
| | 0…600 | 3.00…600 | 0…597.00 | 600 | 836E-DA1EQ7D4 | 836E-DC1EQ7D4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight) ❸ | | | | | | 889D-F4AC-2 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (right angle) ❸ | | | | | | 889D-R4AC-2 |

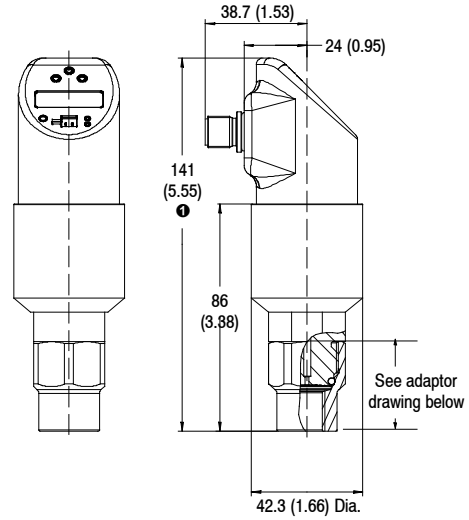
❶ Maximum working pressure (MWP) is the maximum pressure that switches can tolerate for an indefinite period of time. Over pressure limit is the maximum pressure that switches can tolerate for a short period of time without sustaining permanent damage. Burst pressure limit is the maximum pressure that switches can tolerate without sustaining permanent damage or leakage.

❷ Analog output version may be set up to output dual PNP NO/NC.

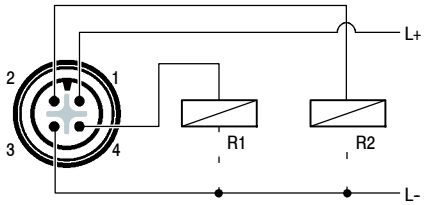
❸ Additional cable lengths are available. Shielded cables may be used to protect analog signal quality in an electrically noisy environment—refer to the *On-Machine Connectivity* catalog for options.

# 836E Pressure Switches

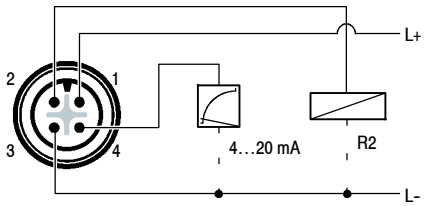
## Approximate Dimensions [mm (in.)]




## Wiring Diagram




**Dual PNP**




**4…20 mA Analog with Single PNP**

**Note**: Output 2 operates as diagnostic/break contact in DESINA mode.

❶ 145.2 (5.71) for 6000psi switch.

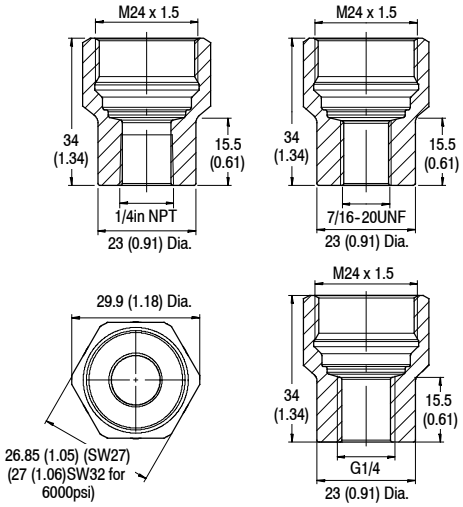
## Accessories

| Description | Cat. No. |
|---|---|
| Configuation kit (includes converter cable and ReadWin 2000 software) | 836E-NSR |
| 1/4 in. NPT (female) adaptor | 836E-NP71 |
| 7/16-20 UNF (female) adaptor | 836E-NP72 |
| G1/4 BSPP (female) adaptor | 836E-NP73 |
| 1/4 in. NPT (male) adaptor | 836E-NP74 |

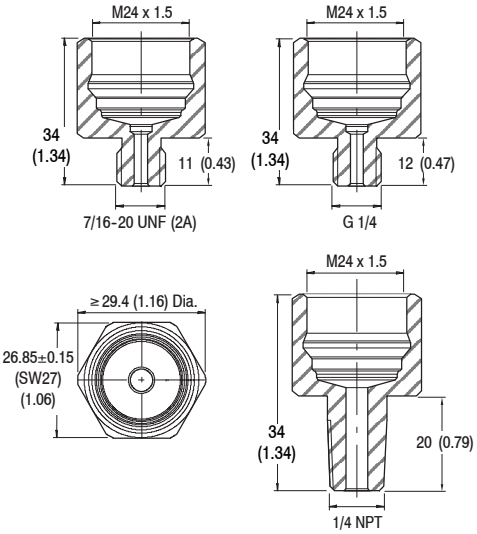
| Description | Cat. No. |
|---|---|
| 7/16-20 UNF (male) adaptor | 836E-NP75 |
| G1/4 BSPP (male) adaptor | 836E-NP76 |
| 1…1.5 inch sanitary clamp | 836E-NH7B |
| 2 inch sanitary clamp | 836E-NH7C |
| O-ring (EPDM) | 836E-NV1 |
| O-ring (fluorinated elastomer seal) | 836E-NV2 |

**Note**: Maximum female adaptor pressure range = 1,450psi (100 bar).
Maximum male adaptor pressure range = 580psi (40 bar).

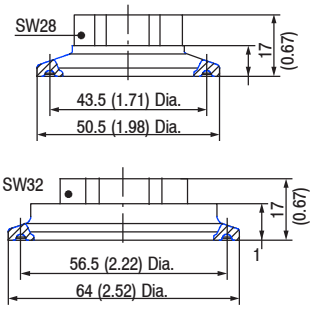
### Female Adaptors




### Male Adaptors




### Sanitary Connectors



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Allen-Bradley

# 836E Nondisplay Pressure Switches

## Features

- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 304 stainless steel housing features an IP65 enclosure rating to withstand harsh industrial conditions
- Operating pressures from 0...6000 psi (gauge)
- 4...20 mA analog output
- 316L stainless steel sensing element

## Applications

- Automotive industry
- Machine tool
- Injection molding machines
- Hydraulics
- Pneumatics

## Specifications

| | |
|---|---|
| Certifications | CE Marked for all applicable directives |
| Supply Voltage | 12…30V DC |
| Output | 4…20 mA analog |
| Supply Current | <30 mA |
| Analog Output Impedance | Max. (Vsupply - 12V)/0.02 A |
| Accuracy | <0.5% of upper pressure range limit analog nonlinearity |
| Repeatability | < 0.2% of upper pressure range limit |
| Long Term Drift | <0.15% per year |
| Media Temperature [C (F)] | -25…70° (-13…158°) |
| Operating Temperature [C (F)] | -25…70° (-13…158°) [ambient] |
| Storage Temperature [C (F)] | -40…85° (-40…185°) |
| Housing Material | 304 stainless steel |
| Sensor Diaphragm | 316L stainless steel |
| Enclosure Type Rating | IP65/NEMA 4 |
| Over Pressure Limit (psi) ❶ | 1.5 times MWP |
| Response Time | 2…5 ms |

❶ Maximum working pressure (MWP) is the maximum pressure that switches can tolerate for an indefinite period of time. Over pressure limit is the maximum pressure that switches can tolerate for a short period of time without permanent damage.

# 836E Nondisplay Pressure Switches

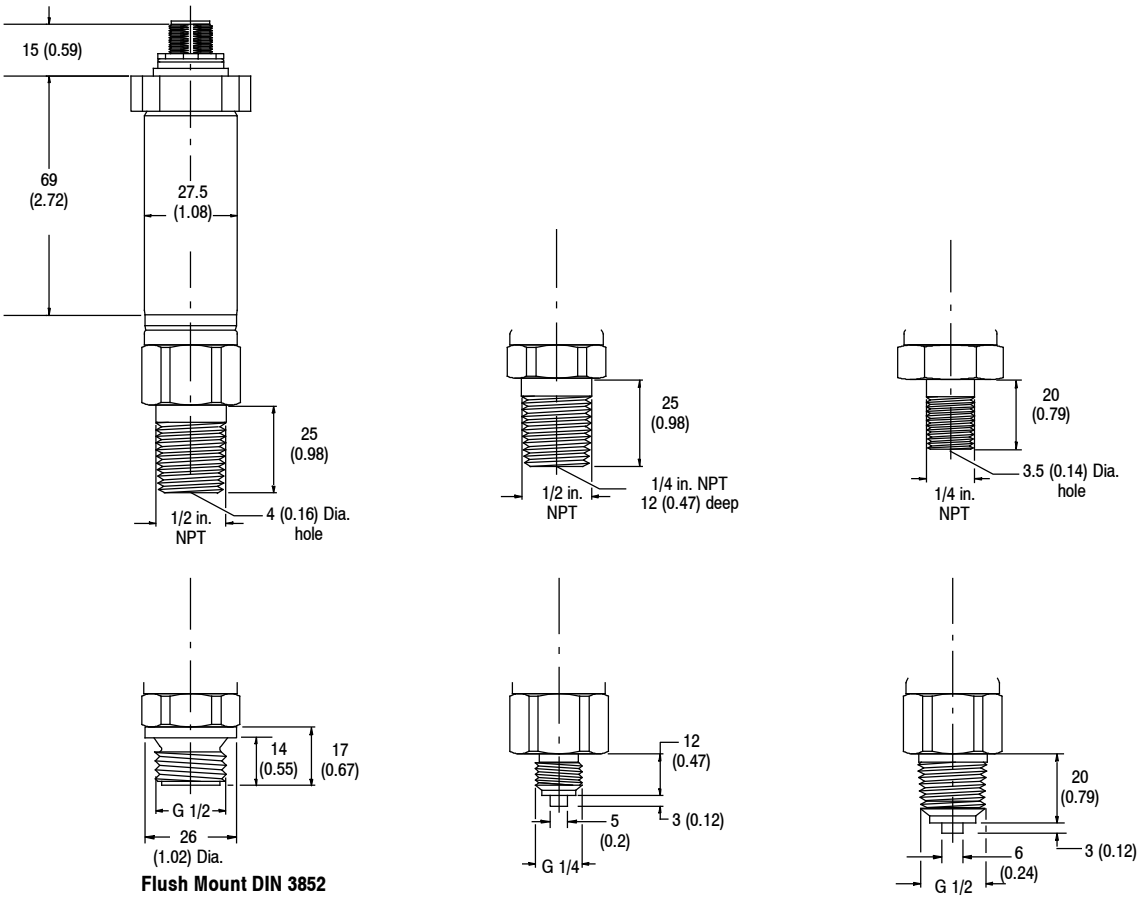
## Product Selection

| Process Connection | Pressure Range [psi] | Max. Working Pressure [psi] ❶ | Cat. No. |
|---|---|---|---|
| 1/2 inch NPT (male) | 0…500 | 1,000 | 836E-TD1EQ8-D4 |
| | 0…1,500 | 1,500 | 836E-TD1ER8-D4 |
| | 0…6,000 | 6,000 | 836E-TD1EU8-D4 |
| 1/4 inch NPT (male) | 0…15 | 40 | 836E-TD1CC4-D4 |
| | 0…50 | 160 | 836E-TD1EL4-D4 |
| | 0…150 | 400 | 836E-TD1EN4-D4 |
| | 0…500 | 1,000 | 836E-TD1EQ4-D4 |
| | 0…1,500 | 1,500 | 836E-TD1ER4-D4 |
| | 0…6,000 | 6,000 | 836E-TD1EU4-D4 |
| 1/2 inch NPT (male)<br>1/4 inch NPT (female) | 0…15 | 40 | 836E-TD1CC9-D4 |
| | 0…50 | 160 | 836E-TD1EL9-D4 |
| | 0…150 | 400 | 836E-TD1EN9-D4 |
| | 0…500 | 1,000 | 836E-TD1EQ9-D4 |
| | 0…1,500 | 1,500 | 836E-TD1ER9-D4 |
| G1/2 (flush mount) | 0…15 | 40 | 836E-TD1CC62-D4 |
| | 0…50 | 160 | 836E-TD1EL62-D4 |
| | 0…150 | 400 | 836E-TD1EN62-D4 |
| | 0…500 | 1,000 | 836E-TD1EQ62-D4 |
| | 0…1,500 | 1,500 | 836E-TD1ER62-D4 |
| | 0…6,000 | 6,000 | 836E-TD1EU62-D4 |
| G1/4 (male) | 0…15 | 40 | 836E-TD1CC6-D4 |
| | 0…50 | 160 | 836E-TD1EL6-D4 |
| | 0…150 | 400 | 836E-TD1EN6-D4 |
| | 0…500 | 1,000 | 836E-TD1EQ6-D4 |
| | 0…1,500 | 1,500 | 836E-TD1ER6-D4 |
| | 0…6,000 | 6,000 | 836E-TD1EU6-D4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight) ❷ | | | 889D-F4AC-2 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (right angle) ❷ | | | 889D-R4AC-2 |

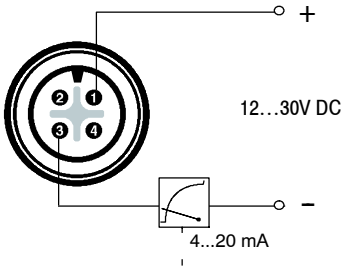
❶ Maximum working pressure (MWP) is the maximum pressure that switches can tolerate for an indefinite period of time. Over pressure limit is the maximum pressure that switches can tolerate for a short period of time without sustaining permanent damage.

❷ Additional cable lengths are available. Shielded cables may be used to protect analog signal quality in an electrically noisy environment—refer to the *On-Machine Connectivity* catalog for options.

## Approximate Dimensions [mm (in.)]




## Wiring Diagram



# 837E Temperature Switches

## Features

- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 316L stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions
- Media temperature range from –50…150°C (–58…302°F)
- Operating temperatures from –40…85°C (–40…185°F)
- Industry-leading four-digit 14-segment digital display
- Independently programmable dual PNP N.O./N.C. outputs or 4…20 mA analog output with single PNP N.O./N.C. output
- Stainless steel probe

## Specifications

| | |
|---|---|
| Certifications | cULus, CE Marked for all applicable directives, and 3 A authorized only with sanitary adaptor |
| Supply Voltage | 12…30V DC |
| Output | Dual PNP N.O./N.C. or 4…20 mA analog output with single PNP N.O./N.C. |
| Supply Current | <60 mA (no load) |
| Load Current, Max. | 250 mA (per PNP output) |
| Analog Output Impedance | Max. ($V_{supply}$ - 6.5V)/0.22 A |
| Accuracy | <0.2°C |
| Repeatability | <0.1°C |
| Temperature Drift | <0.1°C per year |
| Media Temperature [C (F)] | -50…150° (-58…302°) |
| Operating Temperature [C (F)] | -40…85° (-40…185°) |
| Housing Material | 316 stainless steel |
| Wetted Parts | 316L stainless steel |
| Enclosure Type Rating | IP66 |
| Switch Cycles, Min. | >10,000,000 |
| Response Time | Switch Output: ≤20 ms<br>Analog Output: Rise Time: $T_{90}$ ≤200 ms<br>Analog Output: Settling Time: $T_{99}$ ≤500 ms |

## Applications

- Automotive industry
- Machine tool
- Hydraulics
- Batch temperature control
- Food and beverage
- Pharmaceuticals

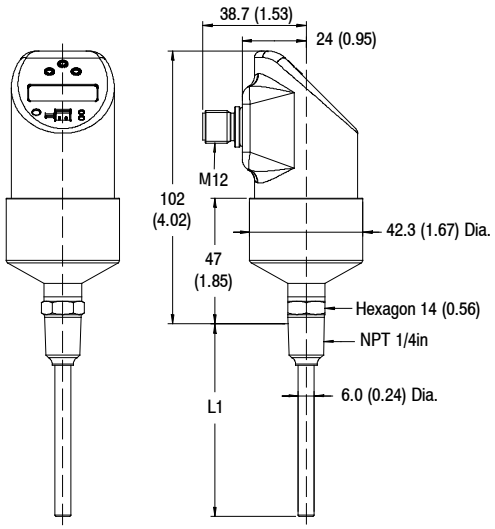
## Product Selection

| Process Connection | Set Point Range [C (F)] | Reset Point Range [C (F)] | Probe Length | Cat. No. | |
|---|---|---|---|---|---|
| | | | | Dual PNP Output | 4…20 mA Analog Output w/Single PNP Output❶ |
| 1/4 inch NPT (Male) | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 50 (1.96 in.) | 837E-DA1BN1A1D4 | 837E-DC1BN1A1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 100 (3.93 in.) | 837E-DA1BN1A2D4 | 837E-DC1BN1A2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 (7.87 in.) | 837E-DA1BN1A4D4 | 837E-DC1BN1A4D4 |
| 1/2 inch NPT (Male) | -49…150° (-56.2…302°) | -50…149.5° (-58…301.1°) | 50 (1.96 in.) | 837E-DA1BN2A1D4 | 837E-DC1BN2A1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301.1°) | 100 (3.93 in.) | 837E-DA1BN2A2D4 | 837E-DC1BN2A2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 (7.87 in.) | 837E-DA1BN2A4D4 | 837E-DC1BN2A4D4 |
| G1/4 BSPP | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 50 (1.96 in.) | 837E-DA1BN3A1D4 | 837E-DC1BN3A1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 100 (3.93 in.) | 837E-DA1BN3A2D4 | 837E-DC1BN3A2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 (7.87 in.) | 837E-DA1BN3A4D4 | 837E-DC1BN3A4D4 |
| G1/2 BSPP | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 50 (1.96 in.) | 837E-DA1BN4A1D4 | 837E-DC1BN4A1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 100 (3.93 in.) | 837E-DA1BN4A2D4 | 837E-DC1BN4A2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 (7.87 in.) | 837E-DA1BN4A4D4 | 837E-DC1BN4A4D4 |
| **Sanitary Connection** | | | | | |
| 1…1.5 inch Clamp | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 50 mm (1.96 in.) | 837E-DA1BNBA1D4 | 837E-DC1BNBA1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 100 mm (3.93 in.) | 837E-DA1BNBA2D4 | 837E-DC1BNBA2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 mm (7.87 in.) | 837E-DA1BNBA4D4 | 837E-DC1BNBA4D4 |
| 2 inch Clamp | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 50 mm (1.96 in.) | 837E-DA1BNCA1D4 | 837E-DC1BNCA1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 100 mm (3.93 in.) | 837E-DA1BNCA2D4 | 837E-DC1BNCA2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 mm (7.87 in.) | 837E-DA1BNCA4D4 | 837E-DC1BNCA4D4 |
| Base Switch | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 50 mm (1.96 in.) | 837E-DA1BN7A1D4 | 837E-DC1BN7A1D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 100 mm (3.93 in.) | 837E-DA1BN7A2D4 | 837E-DC1BN7A2D4 |
| | -49…150° (-57…302°) | -50…149.5° (-58…301°) | 200 mm (7.87 in.) | 837E-DA1BN7A4D4 | 837E-DC1BN7A4D4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight) ❷ | | | | | 889D-F4AC-2 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (right angle) ❷ | | | | | 889D-R4AC-2 |

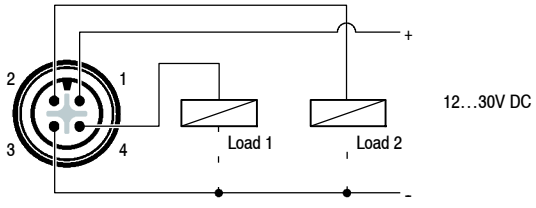
❶ Analog output version may be set up to output dual PNP N.O./N.C.

❷ Additional cable lengths are available. Shielded cables may be used to protect analog signal quality in an electrically noisy environment—refer to the *On-Machine ™ Connectivity* catalog for options.

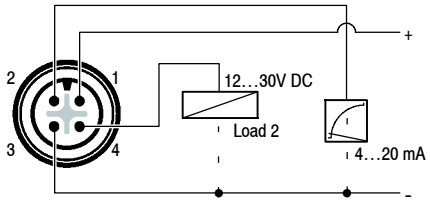
## Approximate Dimensions [mm (in.)]




## Wiring Diagram




**Dual PNP**




**4…20 mA Analog with Single PNP**

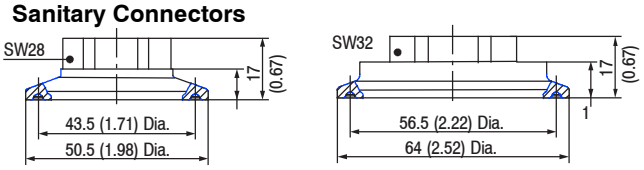
**Note**: Output 2 operates as diagnostic/break contact in DESINA mode.

# 837E Temperature Switches

## Accessories

| Description | Cat. No. |
|---|---|
| Configuration kit (includes converter cable and ReadWin 2000 software) | 836E-NSR |
| 1…1.5 inch sanitary clamp | 836E-NH7B |
| 2 inch sanitary clamp | 836E-NH7C |

### Sanitary Connectors



# 837E Nondisplay Temperature Switches

## Features

- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 316L stainless steel housing features an IP67 enclosure rating to withstand harsh industrial conditions
- Media temperature range from –50…150°C (–58…302°F)
- Operating temperatures from –40…85°C (–40…185°F)
- 4…20 mA analog output PC programmable via the M12 connector
- Stainless steel probe

### Applications

- Automotive industry
- Machine tool
- Hydraulics
- Batch temperature control
- Food and beverage
- Pharmaceuticals

## Specifications

| | |
|---|---|
| Certifications | cULus, CE Marked for all applicable directives, and 3 A authorized only with sanitary adaptor |
| Supply Voltage | 10…35V DC |
| Output | 4…20 mA analog |
| Supply Current | <23 mA (no load) |
| Analog Output Impedance | Max. ($V_{supply}$ - 10V)/0.23 A |
| Accuracy | <0.2°C |
| Repeatability | <0.1°C |
| Temperature Drift | <0.1°C per year |
| Media Temperature [C (F)] | -50…150° (-58…302°) |
| Operating Temperature [C (F)] | -40…85° (-40…185°) |
| Housing Material | 316 stainless steel |
| Wetted Parts | 316L stainless steel |
| Enclosure Type Rating | IP67 |
| Switch Cycles, Min. | >10,000,000 |
| Response Time | < 3 s |

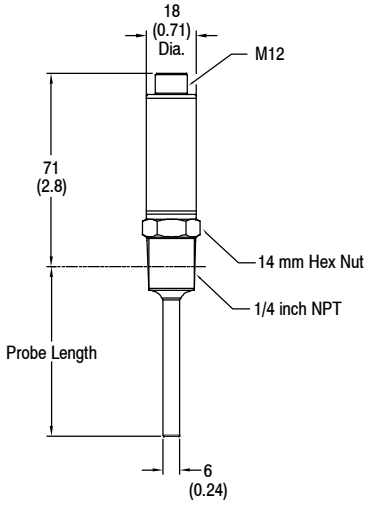
# 837E Nondisplay Temperature Switches

## Product Selection

| Process Connection | Media Temperature [C (F)] | Probe Length | Cat. No. 4…20 mA Analog Output |
|---|---|---|---|
| 1/4 inch NPT (Male) | -50…150° (-58…302°) | 50 mm (1.96 in.) | 837E-TD1BN1A1-D4 |
| | -50…150° (-58…302°) | 100 mm (3.93 in.) | 837E-TD1BN1A2-D4 |
| | -50…150° (-58…302°) | 200 mm (7.87 in.) | 837E-TD1BN1A4-D4 |
| 1/2 inch NPT (Male) | -50…150° (-58…302°) | 50 mm (1.96 in.) | 837E-TD1BN2A1-D4 |
| | -50…150° (-58…302°) | 100 mm (3.93 in.) | 837E-TD1BN2A2-D4 |
| | -50…150° (-58…302°) | 200 mm (7.87 in.) | 837E-TD1BN2A4-D4 |
| G1/4 BSPP | -50…150° (-58…302°) | 50 mm (1.96 in.) | 837E-TD1BN3A1-D4 |
| | -50…150° (-58…302°) | 100 mm (3.93 in.) | 837E-TD1BN3A2-D4 |
| | -50…150° (-58…302°) | 200 mm (7.87 in.) | 837E-TD1BN3A4-D4 |
| **Sanitary Connection** | | | |
| 1…1.5 inch Clamp | -50…150° (-58…302°) | 50 mm (1.96 in.) | 837E-TD1BNBA1-D4 |
| | -50…150° (-58…302°) | 100 mm (3.93 in.) | 837E-TD1BNBA2-D4 |
| | -50…150° (-58…302°) | 200 mm (7.87 in.) | 837E-TD1BNBA4-D4 |
| 2 inch Clamp | -50…150° (-58…302°) | 50 mm (1.96 in.) | 837E-TD1BNCA1-D4 |
| | -50…150° (-58…302°) | 100 mm (3.93 in.) | 837E-TD1BNCA2-D4 |
| | -50…150° (-58…302°) | 200 mm (7.87 in.) | 837E-TD1BNCA4-D4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC Micro (straight) ❶ | | | 889D-F4AC-2 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC Micro (right angle) ❶ | | | 889D-R4AC-2 |

❶ Additional cable lengths are available. Shielded cables may be used to protect analog signal quality in an electrically noisy environment—refer to the *On-Machine Connectivity* catalog for options.

## Approximate Dimensions [mm (in.)]



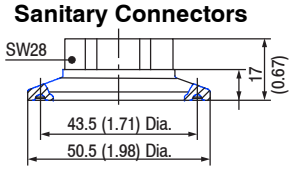

## Wiring Diagram

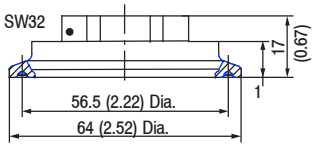
| Pin No. | Description | Wire Color |
|---|---|---|
| 1 | Power supply 10…35V DC, current output 4…20 mA | Brown |
| 2 | Connection of PC configuration cable, shortened pin | White |
| 3 | Power supply 0V DC, current output 4…20 mA | Blue |
| 4 | Connection of PC configuration cable, shortened pin | Black |

## Accessories

| Description | Cat. No. |
|---|---|
| Configuration kit (includes converter cable and ReadWin 2000 software) | 836E-NSR |
| Cable adaptor, PC programming | 836E-NSRT |
| 1…1.5 inch sanitary clamp | 836E-NH7B |
| 2 inch sanitary clamp | 836E-NH7C |

### Sanitary Connectors



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Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

# 839E Flow Switches

## Features

- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 316 stainless steel housing features an IP66 enclosure rating to withstand harsh industrial conditions
- Flow rates of liquid media (calorimetric measuring principle) in the range from 0.03…3 m/s (0.1…9.84 ft/s)
- Industry leading four-digit 14-segment digital display
- Dual N.O./N.C. programmable PNP outputs or 4…20 mA analog output with single PNP output
- Stainless steel probe

### Applications

- Food and beverage
- Pharmaceuticals
- Water/Wastewater
- Hydraulics

## Specifications

| | | | | |
|---|---|---|---|---|
| Certifications | cULus, CE Marked for all applicable directives, and 3 A authorized only with sanitary adaptor | | | |
| Supply Voltage | 18…30V DC | | | |
| Output | Dual PNP N.O./N.C. or 4…20 mA analog output with single PNP N.O./N.C. | | | |
| Supply Current | <100 mA | | | |
| Load Current, Min. | 250 mA | | | |
| Temperature Accuracy | 2 K (3.6 F) | | | |
| Temperature Repeatability | 1 K ( 1.8 F) | | | |
| Operating Range | Liquids from 0.03…3 m/s (0.1… 9.84 ft/s)<br>Mass flow as a relative value between 0 and 100% | | | |
| Media Temperature [C (F)] | -20…85° (-4…185°) | | | |
| Housing Material | 316 stainless steel | | | |
| Enclosure Type Rating | IP66 | | | |
| Switch Cycles, Min. | >10,000,000 | | | |
| Flow Accuracy | Measuring Range— m/s (f/s) | Repeatability | Influence of Medium Temperature❶ | Influence of Ambient Temperature |
| | 0.03…0.5 (0.1…1.6) | 2% | 0.05%/K | 0.04%/K |
| | 0.03…1 (0.1…3.28) | 3% | 0.10%/K | 0.05%/K |
| | 0.03…2 (0.1…6.56) | 5% | 0.15%/K | 0.10%/K |
| | 0.03…3 (0.1…9.84) | 10% | 0.25%/K | 0.30%/K |

❶ The values indicated only apply to the device itself without taking the temperature-dependent change of the thermo-physical properties of the medium into account. For this reason, we recommend you commission the device at the process temperature and set the switch points (learn function).

**Note**: The temperature should be within ±10 degrees of the calibration temperature for reliable results.

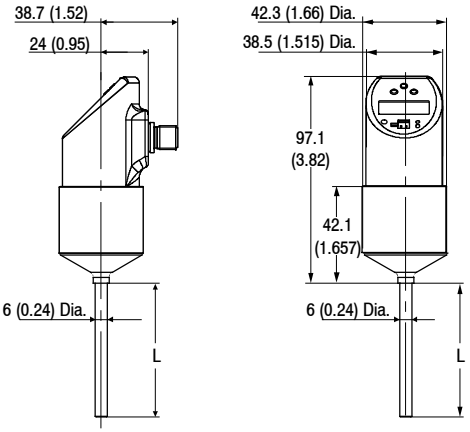
# 839E Flow Switches

## Product Selection

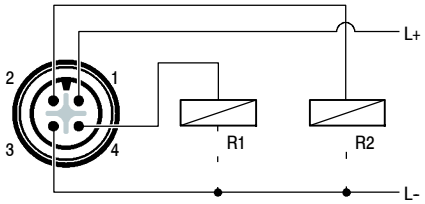
| Process Connection | Measuring Range | Response Time | Probe Length | Cat. No. | |
|---|---|---|---|---|---|
| | | | | Dual PNP Output | 4…20 mA Analog Output with Single PNP Output❶ |
| 1/4 inch NPT (Male) | Liquids from 0.03…3 m/s (0.1… 9.84 ft/s) Mass flow as a relative value between 0 and 100% | 6…12 seconds | 30 mm (1.18 in) | 839E-DA1BA1A3-D4 | 839E-DC1BA1A3D4 |
| | | | 100 mm (3.93 in) | 839E-DA1BA1A2-D4 | 839E-DC1BA1A2D4 |
| 1/2 inch NPT (Male) | | | 30 mm (1.18 in) | 839E-DA1BA2A3D4 | 839E-DC1BA2A3D4 |
| | | | 100 mm (3.96 in) | 839E-DA1BA2A2D4 | 839E-DC1BA2A2D4 |
| G1/4 BSPP | | | 30 mm (1.18 in) | 839E-DA1BA3A3D4 | 839E-DC1BA3A3D4 |
| | | | 100 mm (3.96 in) | 839E-DA1BA3A2D4 | 839E-DC1BA3A2D4 |
| G1/2 BSPP | | | 30 mm (1.18 in) | 839E-DA1BA4A3D4 | 839E-DC1BA4A3D4 |
| | | | 100 mm (3.96 in) | 839E-DA1BA4A2D4 | 839E-DC1BA4A2D4 |
| **Sanitary Connection** | | | | | |
| 1…1.5 inch Clamp | Liquids from 0.03…3 m/s (0.1… 9.84 ft/s) Mass flow as a relative value between 0 and 100% | 6…12 seconds | 30 mm (1.18 in) | 839E-DA1BABA3D4 | 839E-DC1BABA3D4 |
| | | | 100 mm (3.96 in) | 839E-DA1BABA2D4 | 839E-DC1BABA2D4 |
| 2 inch Clamp | | | 30 mm (1.18 in) | 839E-DA1BACA3D4 | 839E-DC1BACA3D4 |
| | | | 100 mm (3.96 in) | 839E-DA1BACA2D4 | 839E-DC1BACA2D4 |
| Base Switch | | | 30 mm (1.18 in) | 839E-DA1BA7A3D4 | 839E-DC1BA7A3D4 |
| | | | 100 mm (3.96 in) | 839E-DA1BA7A2D4 | 839E-DC1BA7A2D4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight) | | | | | 889D-F4AC-2 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (right angle) | | | | | 889D-R4AC-2 |

❶ Analog output version may be set up to output dual PNP N.O./N.C.

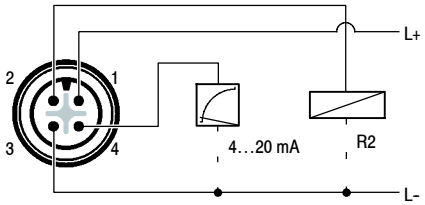
## Approximate Dimensions [mm (in.)]




## Wiring Diagram




**Dual PNP**

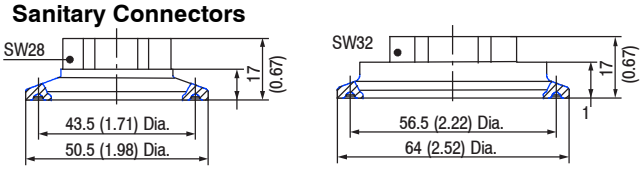



**4…20 mA Analog with Single PNP**

## Accessories

| Description | Cat. No. |
|---|---|
| Configuation kit (includes converter cable and ReadWin 2000 software) | 836E-NSR |
| 1…1.5 in. sanitary clamp | 836E-NH7B |
| 2 in. sanitary clamp | 836E-NH7C |

**Sanitary Connectors**



# 840E Level Switches

## Features

- Liquid level switch used in tanks, containers and pipelines
- On-site control using external LED display
- Easy-to-install
- Microprocessor based with no moving parts for longer life and reduced downtime
- Rugged, corrosion-resistant 316L stainless steel housing features IP66/67 rating for DC type and IP65 for AC type enclosure for various industrial conditions
- DC PNP version with M12 connector
- AC version with NPT 1/2 valve connector
- 316L stainless steel sensing element

## Applications

- Liquid level monitoring
- Tanks, containers and pipelines
- Filtering systems
- Coolant and lubricant tanks
- Pump protector

## Specifications

| | | |
|---|---|---|
| Certifications | CE Marked for all applicable directives, CSA C US | |
| Housing Material | 316L stainless steel | |
| **Power Supply** | | |
| DC-PNP with M12 connector | 10…35 V DC<br>< 825 mW<br>< 15 mA | Supply voltage<br>Power consumption<br>Current consumption |
| AC with NPT 1/2 valve connector | 19…253 V AC<br>< 819 mW<br>< 3.8 mA | Supply voltage<br>Power consumption<br>Current consumption |
| **Performance Characteristics** | | |
| Switching Delay | 0.5 s when covering<br>1.0 s when free | |
| Resolution [mm (in.)] | < 0.5 (0.02) | |
| Maximum Error [mm (in.)] | 13.0 +/-1 (0.51 +/- 0.04) | |
| Repeatability [mm (in.)] | +/-0.5 (+/-0.02) | |
| Hysteresis [mm (in.)] | 3.0 +/-0.5 (0.12 +/- 0.02) | |
| Settling Time | < 2 s | |
| Ambient Temperature Range [C (F)] | -40…70° (-40…+158°) | |
| StorageTemperature Range [C (F)] | -40…85° (-40…+185°) | |
| Process Temperature Range [C (F)] | -40…100° (-40…+212°) | |
| Process Pressure | -14.5…580 psi | |
| Degree of Protection | NEMA 4X (IP66/67)<br>NEMA 4 (IP65) | DC-M12 Connector<br>AC-Valve Connector |
| Media | Liquid | |
| Density | > 0.7 SGU | |
| Viscosity | 1…10000 cSt | |
| Gas Content | Stagnant Mineral Water | |
| Solids Content [mm (in.)] | 5 Dia. (<0.20) | |

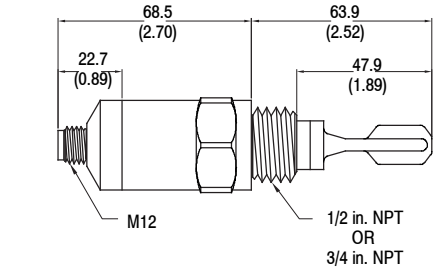
# 840E Level Switches

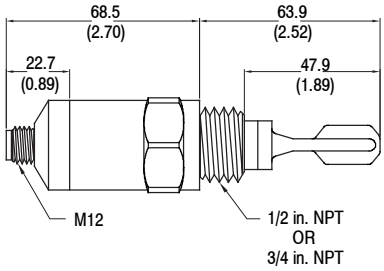
## Product Selection

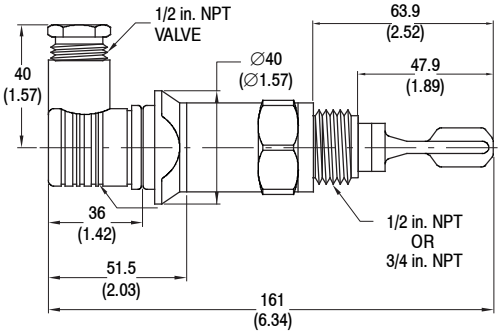
| Process Connection | Cat. No. | |
|---|---|---|
| | DC-PNP | AC |
| 1/2 inch NPT (male) | 840E-TB1B1A1D4 | 840E-TB2B1A1E4 |
| 3/4 inch NPT (male) | 840E-TB1B2A1D4 | 840E-TB2B2A1E4 |
| G 1/2 inch (male) | 840E-TB1B3A1D4 | 840E-TB2B3A1E4 |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight) ❶ | 889D-F4AC-2 | |
| Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (right angle) ❶ | 889D-R4AC-2 | |
| Optional cordset 2 m (6.5 ft) DIN valve ❶ | | 889V-RZ3ABE-2 |

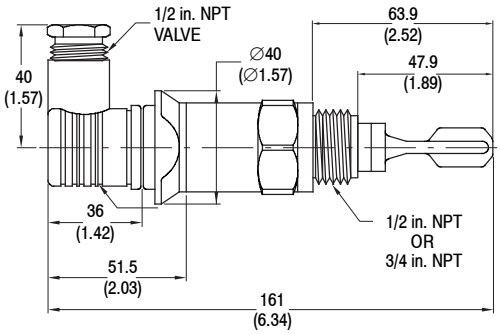
❶ Additional cable lengths are available. Shielded cables may be used to protect analog signal quality in an electrically noisy environment—refer to the *On-Machine Connectivity* catalog for options.

## Approximate Dimensions [mm (in.)]



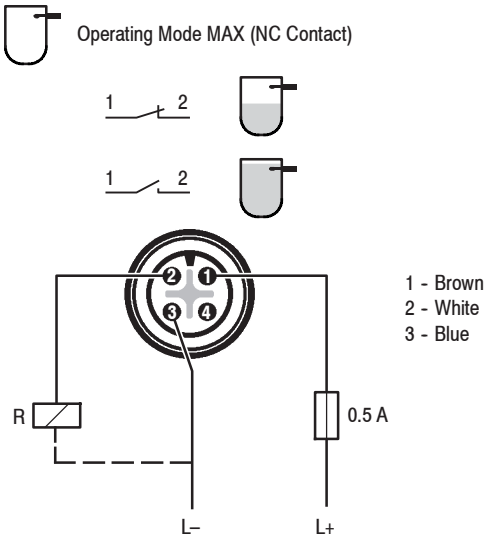



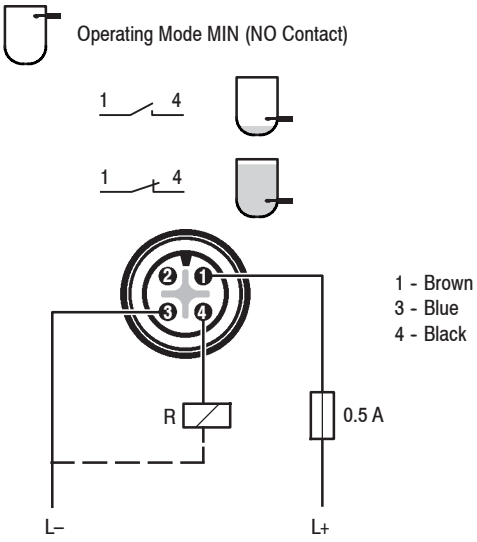



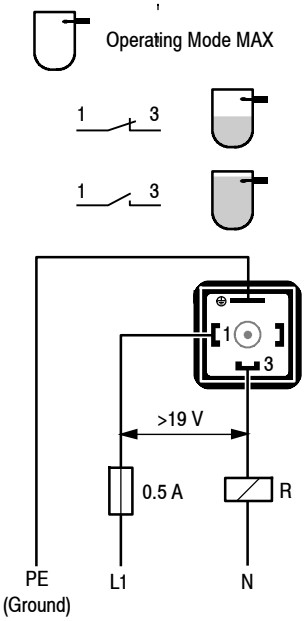
## Wiring Diagram

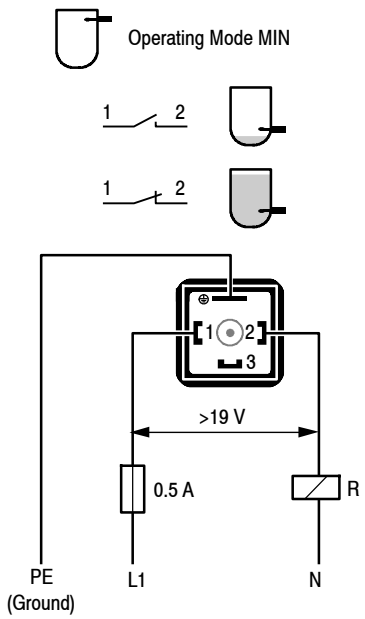
DC PNP with M12 Connector



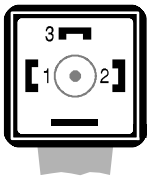




AC with Valve Connector NPT 1/2 inch




## Optional Cordset DIN Valve




| | |
|---|---|
| 1 | Brown |
| 2 | Blue |
| 3 | Black |
| GND | Yellow/Green |

## Notes

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# Quick Selection Guide

| | Female Cordsets | Male Cordsets | Patchcords |
|---|---|---|---|
| | | | |
| **Description** | • Cable with integral female connector on one end | • Cable with integral male connector on one end | • Cable with integral connector on each end |
| **Features** | • Straight or right angle<br>• Multiple standard lengths<br>• Braided and unbraided<br>• Standard and LED versions<br>• Female connector provides direct interface to sensors and other field devices | • Straight or right angle<br>• Multiple standard lengths<br>• Male connector provides interface to distribution boxes or DC micro ArmorBlock DeviceNet I/O | • Straight or right angle<br>• Multiple standard lengths<br>• Direct connection between field devices and distribution boxes or Allen-Bradley ArmorBlock DeviceNet I/O |
| **Available Models** | • Mini . . . . . 8-4<br>• Mini-Plus . . . . . 8-14<br>• DC Micro . . . . . 8-16<br>• AC Micro . . . . . 8-28<br>• Pico . . . . . 8-34 | • Mini . . . . . 8-4<br>• DC Micro . . . . . 8-16<br>• AC Micro . . . . . 8-28 | • Mini to Mini . . . . . 8-4<br>• Mini-Plus . . . . . 8-14<br>• DC Micro . . . . . 8-16<br>• AC Micro . . . . . 8-28<br>• Pico . . . . . 8-34<br>• M23 . . . . . 8-44 |

| | Field Attachable Connectors | Accessories |
|---|---|---|
| | | |
| **Description** | • Terminal Chambers and Insulation Displacement Connectors (IDC) | • Sealing caps, coupling adaptors, and other connection systems accessories |
| **Features** | • Screw, solder or insulation displacement connector styles<br>• Straight or right angle<br>• Multiple sizes for varying cable jacket diameters | • Rugged durable construction<br>• Versions to interface with male or female connectors<br>• Multiple sizes for various connector types |
| **Available Models** | • Mini . . . . . 8-12<br>• DC Micro . . . . . 8-24<br>• AC Micro . . . . . 8-32<br>• Pico . . . . . 8-36<br>• M23 . . . . . 8-44 | • Sealing caps . . . . . 12-1 |

**For information on additional On-Machine™ Connectivity Products, see the *On-Machine Connectivity* catalog or visit *www.ab.com/catalogs*.**

# Connection Systems

## Overview

## Description

Rockwell Automation offers a wide variety of connection products for interfacing field devices to I/O, junction boxes, PLCs, etc. Connection systems products are made of durable materials and are designed to handle rough industrial environments.

Featuring industry standard 2-, 3-, 4-, 5-, or 6-pin overmolded connectors, Rockwell Automation quick-disconnect cables provide secure connection for proximity sensors, limit switches and photoelectric sensors. Connectors can be straight or right-angled and are physically keyed to reduce wiring mishaps. Rockwell Automation cabling options include:

- Cordsets: Cable with integral male or female connector at one end and flying leads at the other
- Patchcords: Cable with integral connector at each end (one male, one female)

Available in a variety of cable jackets, lengths, and connector styles, Rockwell Automation cordsets can be configured to fit the needed application.

## Cordsets & Patchcords:

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Mini-Plus Style . . . . . page 8-14
DC Micro Style . . . . . page 8-16
AC Micro Style . . . . . page 8-28
Pico Style . . . . . page 8-34
M23 Style . . . . . page 8-44

## Terminal Chambers

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## Combination Connectors

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## Accessories

Sealing Caps . . . . . page 12-10

# Cordsets & Patchcords, Mini Style

**16 AWG, STOOW PVC**

## Mini Style

4-Pin Straight Mini Cordset

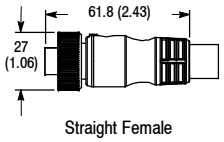
### Features

- Heavy duty STOOW-A 16 AWG cable
- PVC jacket offers good oil and chemical resistance
- 2-, 3-, 4-, 5-, and 6-pin configurations
- Ratcheting coupling nut for vibration resistance

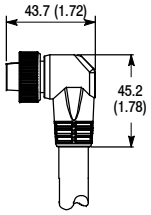
### Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Housing | Molded oil-resistant TPE |
| Contacts | Gold-plated brass |
| Cable | Oil-resistant yellow PVC jacket, 16 AWG stranded copper, 600V; UL Recognized and CSA Certified, STOOW-A |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 2/c = 10 mm (0.40 in.)<br>3/c = 10 mm (0.40 in.)<br>4/c = 11 mm (0.43 in.)<br>5/c = 13 mm (0.51 in.)<br>6/c = 14 mm (0.55 in.) |
| **Electrical** | |
| Cable Rating | UL STOOW VW-1 105C 600V, CSA ST 105C 600V FT2, UV oil and water resistant |
| Assembly Rating | 2-pin = 600V, 13 A<br>3-pin = 600V, 13 A<br>4-pin = 600V, 10 A<br>5-pin = 600V, 8 A<br>6-pin = 600V, 8 A |
| **Environmental** | |
| Enclosure Type Rating | NEMA 4, 6P, 12, 13; IP67 |
| Operating Temperature [C (F)] | -20…+105° (-4…+221°) |

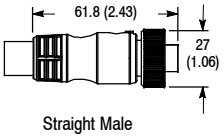
### Approximate Dimensions [mm (in.)]



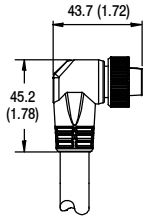

Straight Female




Right Angle Female

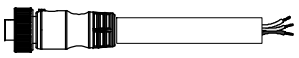



Straight Male




Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.



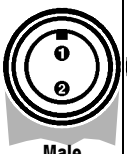
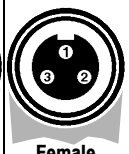
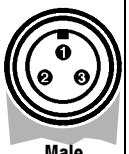
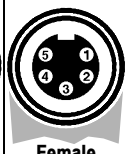
*Example of Cordset*

*Example of Patchcord*

### Mating Components & Accessories

| Description | Cat. No. | Page |
|---|---|---|
| Coupling Adaptors | 889A-NADPT | 12-11 |

## Pinout and Color Code

| Color Code | Face View Pinout | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2-Pin | | 3-Pin | | 4-Pin | | 5-Pin | | 6-Pin | |
| | Female |  Male |  Female |  Male | Female | Male |  Female | Male | Female | Male |
| A (US) | 1 White<br>2 Black | | 1 Green<br>2 Black<br>3 White | | 1 Black<br>2 White | 3 Red<br>4 Green | 1 White<br>2 Red<br>3 Green | 4 Orange<br>5 Black | 1 White<br>2 Red<br>3 Green | 4 Orange<br>5 Black<br>6 Blue |
| B (Auto) | — | | 1 Green<br>2 Red/Black Tr<br>3 Red/White Tr | | 1 Red/Black Tr<br>2 Red/White Tr | 3 Red<br>4 Green | 1 Red/White Tr<br>2 Red<br>3 Green<br>4 Red/Yellow Tr<br>5 Red/Black Tr | | — | |
| C (IEC) | — | | — | | 1 Black<br>2 Blue | 3 Brown<br>4 White | 1 Black<br>2 Blue<br>3 Orange | 4 Brown<br>5 White | 1 Blue<br>2 Orange<br>3 Red | 4 White<br>5 Brown<br>6 Black |

## Product Selection

### Cordsets

| Pin Count | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 2-Pin | 600V 13 A | A | 889N-F2AFC-❶F | 889N-R2AFC-❶F | 889N-U2AFC-❶F | 889N-V2AFC-❶F |
| 3-Pin | | A | **889N-F3AFC-❶F** | **889N-R3AFC-❶F** | **889N-U3AFC-❶F** | 889N-V3AFC-❶F |
| | | B | 889N-F3AFA-❶F | 889N-R3AFA-❶F | 889N-U3AFA-F | 889N-V3AFA-❶F |
| 4-Pin | 600V 10 A | A | **889N-F4AFC-❶F** | **889N-R4AFC-❶F** | 889N-U4AFC-❶F | 889N-V4AFC-❶F |
| | | B | 889N-F4AFA-❶F | 889N-R4AFA-❶F | 889N-U4AFA-❶F | 889N-V4AFA-❶F |
| | | C | **889N-F4AF-❶F** | **889N-R4AF-❶F** | 889N-U4AF-❶F | 889N-V4AF-❶F |
| 5-Pin | 600V 8 A | A | **889N-F5AFC-❶F** | 889N-R5AFC-❶F | 889N-U5AFC-❶F | 889N-V5AFC-❶F |
| | | B | 889N-F5AFA-❶F | 889N-R5AFA-❶F | 889N-U5AFA-❶F | 889N-V5AFA-❶F |
| | | C | **889N-F5AF-❶F** | **889N-R5AF-❶F** | 889N-U5AF-❶F | 889N-V5AF-❶F |
| 6-Pin | | C | 889N-F6AFC-❶F | 889N-R6AFC-❶F | 889N-U6AFC-❶F | 889N-V6AFC-❶F |
| | | A | 889N-F6AF-❶F | 889N-R6AF-❶F | 889N-U6AF-❶F | 889N-V6AF-❶F |

### Patchcords

| Pin Count | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|
| | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 2-Pin | 16 AWG 600V 13 A | 889N-F2AFNU-❷F | 889N-F2AFNV-❷F | 889N-R2AFNU-❷F | 889N-R2AFNV-❷F |
| 3-Pin | | **889N-F3AFNU-❷F** | 889N-F3AFNV-❷F | 889N-R3AFNU-❷F | 889N-R3AFNV-❷F |
| 4-Pin | 16 AWG 600V 10 A | **889N-F4AFNU-❷F** | 889N-F4AFNV-❷F | 889N-R4AFNU-❷F | 889N-R4AFNV-❷F |
| 5-Pin | 16 AWG 600V 8 A | **889N-F5AFNU-❷F** | 889N-F5AFNV-❷F | 889N-R5AFNU-❷F | 889N-R5AFNV-❷F |
| 6-Pin | | 889N-F6AFNU-❷F | 889N-F6AFNV-❷F | 889N-R6AFNU-❷F | 889N-R6AFNV-❷F |

❶ Replace symbol with 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.
❷ Replace symbol with 3 (3 ft), 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.

**Note**: Stainless steel connector versions may be ordered by adding an "S" to the cat. no., e.g., 889N**S**-F3AFC-❶F.

# Cordsets & Patchcords, Mini Style

**18 AWG, PVC**

## Mini Style

4-Pin Straight Mini Cordset

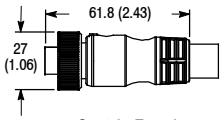
### Features

- General purpose 18 AWG cable
- Highly visible yellow PVC jacket offers good oil and chemical resistance
- 2-, 3-, 4-, 5-, and 6-pin configurations
- Ratcheting coupling nut for vibration resistance

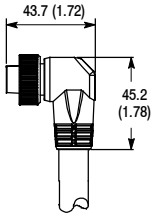
### Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Housing | Molded oil-resistant TPE |
| Contacts | Gold-plated brass |
| Cable | Oil-resistant yellow PVC jacket, 18 AWG stranded copper, 300V; UL Recognized and CSA Certified, STOOW-A |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 2/c = 6 mm (0.24 in.)<br>3/c = 6 mm (0.25 in.);<br>4/c = 7 mm (0.27 in.);<br>5/c = 8 mm (0.31 in.);<br>6/c = 8 mm (0.32 in.) |
| **Electrical** | |
| Cable Rating | UL AWM style 2661 VW-1 105C 300V, CSA AWM A/B I/II 80C 300V FT1, UV oil and water resistant |
| Assembly Rating | 2-pin = 300V, 10 A<br>3-pin = 300V, 10 A<br>4-pin = 300V, 7 A<br>5-pin = 300V, 5.6 A<br>6-pin = 300V, 5.6 A |
| **Environmental** | |
| Enclosure Type Rating | NEMA 4, 6P, 12, 13; IP67; 1200 psi washdown |
| Operating Temperature [C (F)] | -20…+105° (-4…+221°) |

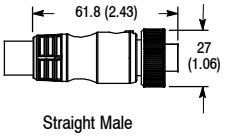
### Approximate Dimensions [mm (in.)]



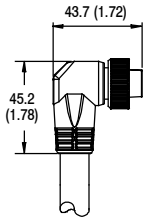

Straight Female




Right Angle Female

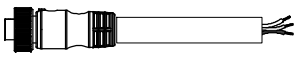



Straight Male

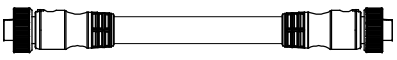



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*

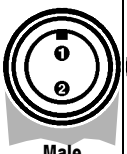
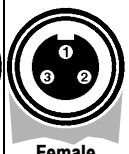
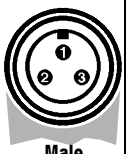
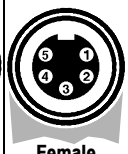


*Example of Patchcord*

### Mating Components & Accessories

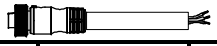
| Description | Cat. No. | Page |
|---|---|---|
| Coupling Adaptor | 889A-NADPT | 12-11 |

## Pinout and Color Code

| Color Code | Face View Pinout | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2-Pin | | 3-Pin | | 4-Pin | | 5-Pin | | 6-Pin | |
| | Female |  Male |  Female |  Male | Female | Male |  Female | Male | Female | Male |
| A (US) | 1 White<br>2 Black | | 1 Green<br>2 Black<br>3 White | | 1 Black<br>2 White | 3 Red<br>4 Green | 1 White<br>2 Red<br>3 Green | 4 Orange<br>5 Black | 1 White<br>2 Red<br>3 Green | 4 Orange<br>5 Black<br>6 Blue |
| B (Auto) | — | | 1 Green<br>2 Red/Black Tr<br>3 Red/White Tr | | 1 Red/Black Tr<br>2 Red/White Tr | 3 Red<br>4 Green | 1 Red/White Tr<br>2 Red<br>3 Green<br>4 Red/Yellow Tr<br>5 Red/Black Tr | | — | |
| C (IEC) | — | | — | | 1 Black<br>2 Blue | 3 Brown<br>4 White | 1 Black<br>2 Blue<br>3 Grey | 4 Brown<br>5 White | — | |

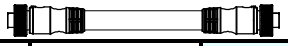
## Product Selection

### Cordsets



| Pin Count | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 2-Pin | 300V, 10 A | A | 889N-F2AEC-❶F | 889N-R2AEC-❶F | 889N-U2AEC-❶F | 889N-V2AEC-❶F |
| 3-Pin | | A | 889N-F3AEC-❶F | 889N-R3AEC-❶F | 889N-U3AEC-❶F | 889N-V3AEC-❶F |
| | | B | **889N-F3AEA-❶F** | 889N-R3AEA-❶F | 889N-U3AEA-❶F | 889N-V3AEA-❶F |
| 4-Pin | 300V, 7 A | A | 889N-F4AEC-❶F | 889N-R4AEC-❶F | 889N-U4AEC-❶F | 889N-V4AEC-❶F |
| | | B | 889N-F4AEA-❶F | 889N-R4AEA-❶F | 889N-U4AEA-❶F | 889N-V4AEA-❶F |
| | | C | **889N-F4AE-❶F** | **889N-R4AE-❶F** | 889N-U4AE-❶F | 889N-V4AE-❶F |
| 5-Pin | 300V, 5.6 A | A | **889N-F5AEC-❶F** | 889N-R5AEC-❶F | 889N-U5AEC-❶F | 889N-V5AEC-❶F |
| | | B | 889N-F5AEA-❶F | 889N-R5AEA-❶F | 889N-U5AEA-❶F | 889N-V5AEA-❶F |
| | | C | **889N-F5AE-❶F** | **889N-R5AE-❶F** | 889N-U5AE-❶F | 889N-V5AE-❶F |
| 6-Pin | | A | 889N-F6AE-❶F | 889N-R6AE-❶F | 889N-U6AE-❶F | 889N-V6AE-❶F |

### Patchcords



| Pin Count | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|
| | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 2-Pin | 300V, 10 A | 889N-F2AENU-❷F | 889N-F2AENV-❷F | 889N-R2AENU-❷F | 889N-R2AENV-❷F |
| 3-Pin | | 889N-F3AENU-❷F | 889N-F3AENV-❷F | 889N-R3AENU-❷F | 889N-R3AENV-❷F |
| 4-Pin | 300V, 7 A | 889N-F4AENU-❷F | 889N-F4AENV-❷F | 889N-R4AENU-❷F | 889N-R4AENV-❷F |
| 5-Pin | 300V, 5.6 A | 889N-F5AENU-❷F | 889N-F5AENV-❷F | 889N-R5AENU-❷F | 889N-R5AENV-❷F |
| 6-Pin | | 889N-F6AENU-❷F | 889N-F6AENV-❷F | 889N-R6AENU-❷F | 889N-R6AENV-❷F |

❶ Replace symbol with 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.
❷ Replace symbol with 3 (3 ft), 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.

**Note**: Stainless steel connector versions may be ordered by adding an "S" to the cat. no., e.g., 889N**S**-F3AEC-❶F.

# Cordsets & Patchcords, Mini Style

**16 AWG, ToughLink™ and ToughWeld™**

## Mini Style

4-Pin Straight Mini Cordset

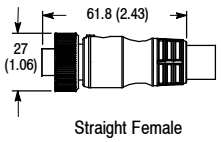
### Features

- Heavy duty 16 AWG cable
- Highly visible yellow ToughLink jacket offers excellent oil and chemical resistance
- ToughWeld jacket offers good oil and chemical resistance and excellent resistance to weld slag
- 3-, 4-, and 5-pin configurations
- Ratcheting coupling nut for vibration resistance

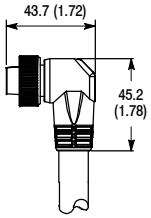
### Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Housing | Molded oil-resistant TPE |
| Contacts | Gold-plated brass |
| Cable | ToughLink: Oil-resistant yellow TPE jacket, 16 AWG stranded copper, 600V; UL Recognized and CSA Certified, SEOOW<br>ToughWeld: Oil-resistant yellow CPE thermoset jacket, 16 AWG stranded copper, 600V; UL Recognized and CSA Certified, SOOW |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 3/c = 10 mm (0.41 in.);<br>4/c = 11 mm (0.44 in.);<br>5/c = 13 mm (0.52 in.) |
| **Electrical** | |
| Cable Rating | ToughLink: UL SEOOW VW-1 105C -50C 600V water resistant, CSA STOO FT-1 600V;<br>ToughWeld: UL SOOW 105C 600V water resistant, CSA -50C FT-1 600V |
| Assembly Rating | 3-pin = 600V, 13A; 4-pin = 600V, 10 A; 5-pin = 600V, 8 A |
| **Environmental** | |
| Enclosure Type Rating | NEMA 4, 6P, 12, 13; IP67; 1200 psi washdown |
| Operating Temperature [C (F)] | ToughLink: -20…+105° (-4…+221°);<br>ToughWeld: -20…+90° (-4…+194°) |

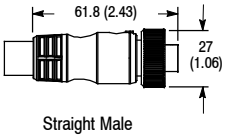
### Approximate Dimensions [mm (in.)]



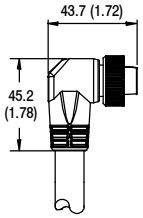

Straight Female




Right Angle Female

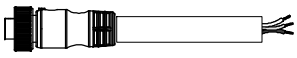



Straight Male

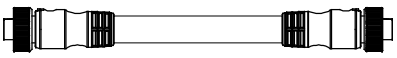



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*

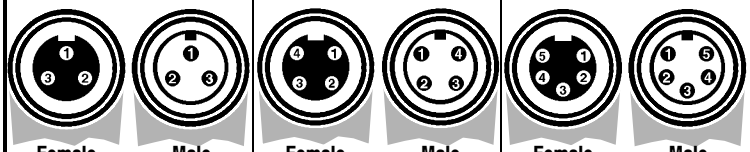


*Example of Patchcord*

### Mating Components & Accessories

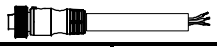
| Description | Cat. No. | Page |
|---|---|---|
| Coupling Adaptor | 889A-NADPT | 12-11 |

## Pinout and Color Code

| Color Code | Face View Pinout | | | | | |
|---|---|---|---|---|---|---|
| | 3-Pin | | 4-Pin | | 5-Pin | |
| |  | | | | | |
| | Female | Male | Female | Male | Female | Male |
| A (US) | 1 Green<br>2 Black<br>3 White | | 1 Black<br>2 White | 3 Red<br>4 Green | 1 White<br>2 Red<br>3 Green | 4 Orange<br>5 Black |

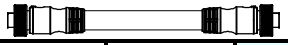
## Product Selection

### Cordsets



| Pin Count | Material | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 3-Pin | ToughLink (TPE) | 600V 13 A | A | 889N-F3HFC-❶F | 889N-R3HFC-❶F | 889N-U3HFC-❶F | 889N-V3HFC-❶F |
| 4-Pin | | 600V 10 A | | 889N-F4HFC-❶F | 889N-R4HFC-❶F | 889N-U4HFC-❶F | 889N-V4HFC-❶F |
| 5-Pin | | 600V 8 A | | 889N-F5HFC-❶F | 889N-R5HFC-❶F | 889N-U5HFC-❶F | 889N-V5HFC-❶F |
| 3-Pin | Tough-Weld (CPE) | 600V 13 A | | 889N-F3WFC-❶F | 889N-R3WFC-❶F | 889N-U3WFC-❶F | 889N-V3WFC-❶F |
| 4-Pin | | 600V 10 A | | 889N-F4WFC-❶F | 889N-R4WFC-❶F | 889N-U4WFC-❶F | 889N-V4WFC-❶F |
| 5-Pin | | 600V 8 A | | 889N-F5WFC-❶F | 889N-R5WFC-❶F | 889N-U5WFC-❶F | 889N-V5WFC-❶F |

### Patchcords



| Pin Count | Material | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 3-Pin | ToughLink (TPE) | 600V 13A | 889N-F3HFNU-❶F | 889N-F3HFNV-❶F | 889N-R3HFNU-❶F | 889N-R3HFNV-❶F |
| 4-Pin | | 600V 10 A | 889N-F4HFNU-❶F | 889N-F4HFNV-❶F | 889N-R4HFNU-❶F | 889N-R4HFNV-❶F |
| 5-Pin | | 600V 8 A | 889N-F5HFNU-❶F | 889N-F5HFNV-❶F | 889N-R5HFNU-❶F | 889N-R5HFNV-❶F |
| 3-Pin | ToughWeld (CPE) | 600V 13 A | 889N-F3WFNU-❶F | 889N-F3WFNV-❶F | 889N-R3WFNU-❶F | 889N-R3WFNV-❶F |
| 4-Pin | | 600V 10 A | 889N-F4WFNU-❶F | 889N-F4WFNV-❶F | 889N-R4WFNU-❶F | 889N-R4WFNV-❶F |
| 5-Pin | | 600V 8 A | 889N-F5WFNU-❶F | 889N-F5WFNV-❶F | 889N-R5WFNU-❶F | 889N-R5WFNV-❶F |

❶ Replace symbol with 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.
❷ Replace symbol with 3 (3 ft), 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.

**Note**: Stainless steel connector versions may be ordered by adding an “S” to the cat. no., e.g., 889N**S**-F3HFC-❶F.

# Cordsets & Patchcords, Mini Style

**18 AWG, TPE and ToughWeld™**

## Mini Style

4-Pin Straight Mini Cordset

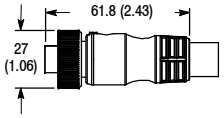
### Features

- General purpose 18 AWG cable
- Highly visible yellow ToughLink jacket offers excellent oil and chemical resistance
- ToughWeld jacket offers good oil and chemical resistance and excellent resistance to weld slag
- 3-, 4-, and 5-pin configurations
- Ratcheting coupling nut for vibration resistance

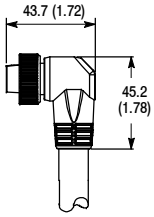
### Specifications

| | | |
|---|---|---|
| Certifications | UL Recognized and CSA Certified | |
| **Mechanical** | | |
| Coupling Nut | Epoxy-coated zinc | |
| Housing | Molded oil-resistant TPE | |
| Contacts | Gold-plated brass | |
| Cable | Oil-resistant yellow TPE or CPE jacket, 18 AWG stranded copper, 300V; UL Recognized and CSA Certified, STOOW-A | |
| Bend Radius | 10x diameter, min. | |
| Cable Diameter | TPE<br>3/c = 6 mm (0.25 in.);<br>4/c = 7 mm (0.27 in.);<br>5/c = 8 mm (0.32 in.); | ToughWeld<br>3/c = 8 mm (0.32 in.)<br>4/c = 9 mm (0.36 in.)<br>5/c = 10 mm (0.38 in.) |
| **Electrical** | | |
| Cable Rating | TPE: UL AWM style 20327 VW-1 105C 300V, CSA AWM A/B I/II 105C 300V FT1, UV oil and water resistant<br>ToughWeld: UL SJOOW 105C 300V water resistant, CSA -50C FT-1 300V | |
| Assembly Rating | 3-pin = 300V, 10 A<br>4-pin = 300V, 7 A<br>5-pin = 300V, 5.6 A | |
| **Environmental** | | |
| Enclosure Type Rating | NEMA 4, 6P, 12, 13; IP67; 1200 psi washdown | |
| Operating Temperature [C (F)] | -20…+105° (-4…+221°) | |

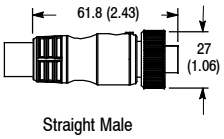
### Approximate Dimensions [mm (in.)]



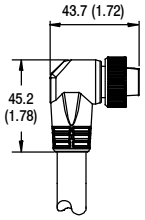

Straight Female




Right Angle Female

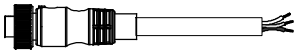



Straight Male

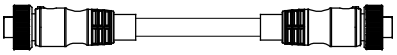



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*

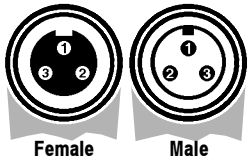
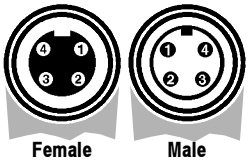
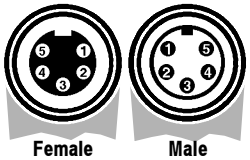


*Example of Patchcord*

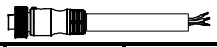
### Mating Components & Accessories

| Description | Cat. No. | Page |
|---|---|---|
| Coupling Adaptor | 889A-NADPT | 12-11 |

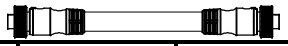
## Pinout and Color Code

| Color Code | Face View Pinout | | | | | |
|---|---|---|---|---|---|---|
| | 3-Pin | | 4-Pin | | 5-Pin | |
| |  Female | Male |  Female | Male |  Female | Male |
| A (US) | 1 Green<br>2 Black<br>3 White | | 1 Black<br>2 White | 3 Red<br>4 Green | 1 White<br>2 Red<br>3 Green | 4 Orange<br>5 Black |
| B (Auto) | 1 Green<br>2 Red/Black Tr<br>3 Red/White Tr | | 1 Red/Black Tr<br>2 Red/White Tr | 3 Red<br>4 Green | 1 Red/White Tr<br>2 Red<br>3 Green | 4 Red/Yellow Tr<br>5 Red/Black Tr |

## Product Selection

### Cordsets 

| Pin Count | Material | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 3-Pin | TPE | 300V, 10 A | B | 889N-F3HJA-❶F | 889N-R3HJA-❶F | 889N-U3HJA-❶F | 889N-V3HJA-❶F |
| 4-Pin | | 300V, 7 A | | 889N-F4HJA-❶F | 889N-R4HJA-❶F | 889N-U4HJA-❶F | 889N-V4HJA-❶F |
| 5-Pin | | 300V, 5.6 A | | 889N-F5HJA-❶F | 889N-R5HJA-❶F | 889N-U5HJA-❶F | 889N-V5HJA-❶F |
| 3-Pin | Tough-Weld (CPE) | 300V, 10 A | A | 889N-F3WEC-❶F | 889N-R3WEC-❶F | 889N-U3WEC-❶F | 889N-V3WEC-❶F |
| 4-Pin | | 300V, 7 A | | 889N-F4WEC-❶F | 889N-R4WEC-❶F | 889N-U4WEC-❶F | 889N-V4WEC-❶F |
| 5-Pin | | 300V, 5.6 A | | 889N-F5WEC-❶F | 889N-R5WEC-❶F | 889N-U5WEC-❶F | 889N-V5WEC-❶F |

### Patchcords 

| Pin Count | Material | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 3-Pin | TPE | 300V, 10 A | 889N-F3HJNU-❶F | 889N-F3HJNV-❶F | 889N-R3HJNU-❶F | 889N-R3HJNV-❶F |
| 4-Pin | | 300V, 7 A | 889N-F4HJNU-❶F | 889N-F4HJNV-❶F | 889N-R4HJNU-❶F | 889N-R4HJNV-❶F |
| 5-Pin | | 300V, 5.6 A | 889N-F5HJNU-❶F | 889N-F5HJNV-❶F | 889N-R5HJNU-❶F | 889N-R5HJNV-❶F |
| 3-Pin | ToughWeld (CPE) | 300V, 10 A | 889N-F3WENU-❶F | 889N-F3WENV-❶F | 889N-R3WENU-❶F | 889N-R3WENV-❶F |
| 4-Pin | | 300V, 7 A | 889N-F4WENU-❶F | 889N-F4WENV-❶F | 889N-R4WENU-❶F | 889N-R4WENV-❶F |
| 5-Pin | | 300V, 5.6 A | 889N-F5WENU-❶F | 889N-F5WENV-❶F | 889N-R5WENU-❶F | 889N-R5WENV-❶F |

❶ Replace symbol with 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.
❷ Replace symbol with 3 (3 ft), 6 (6 ft), 12 (12 ft), or 20 (20 ft) for standard cable lengths.

**Note**: Stainless steel connector versions may be ordered by adding an "S" to the cat. no., e.g., 889N**S**-F3HJA-❶F.

# Terminal Chambers, Mini Style

## Screw Type, Field Attachable Connector

## Mini Style

3-Pin Mini Female Terminal Chamber

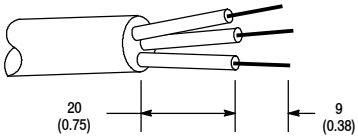
## Specifications

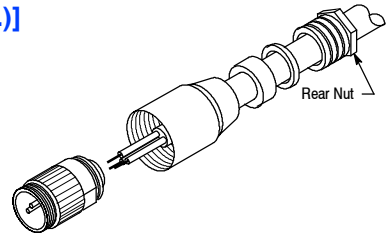
| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Black anodized aluminum |
| Connector Shell Material | PBT |
| Contacts | Gold-plated brass |
| Wire Size, Max. | 16 AWG (1.5 $mm^2$) |
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -40…+85° (-40…+185°) |

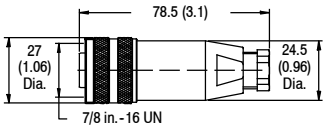
## Features

- Field installable
- Screw terminals provide simple and secure installation
- Allows easy modification of existing cable installations

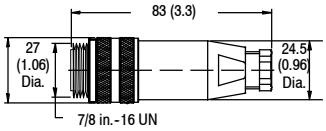
## Approximate Dimensions [mm (in.)]



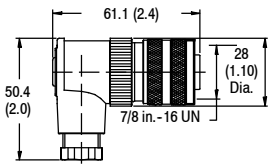



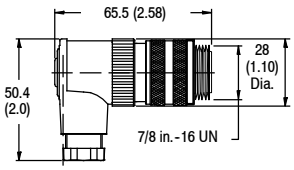

Straight
Internal Thread




Straight
External Thread




Right Angle Internal
Thread




Right Angle External
Thread

Dimensions are approximate. Illustrations are not drawn to scale.

## Pinout

| Face View Pinout | | | | | |
|---|---|---|---|---|---|
| 3-Pin | | 4-Pin | | 5-Pin | |
| | | | | | |
| Female | Male | Female | Male | Female | Male |

## Product Selection

### Terminal Chambers

| Pin Count | Cable Jacket Diameter [mm (in.)] | Assembly Raiting | Rear Nut Thread Size | Cat. No. | | |
|---|---|---|---|---|---|---|
| | | | | Straight Female Internal Threads | Straight Male Internal Threads | Straight Male External Threads |
| 3-Pin | 6.0…8.0 (0.24…0.32) | 250V, 12 A | PG9 | **871A-TS3-N2 ❶** | **871A-TS3-NU2 ❶** | **871A-TS3-NM2 ❶** |
| | 10.0…12.0 (0.39…0.47) | | PG13.5 | **871A-TS3-N1** | **871A-TS3-NU1** | 871A-TS3-NM1 |
| 4-Pin | 6.0…8.0 (0.24…0.32) | 250V, 9 A | PG9 | **871A-TS4-N1❶** | 871A-TS4-NU1 ❶ | **871A-TS4-NM1 ❶** |
| | 10.0…12.0 (0.39…0.47) | | PG13.5 | **871A-TS4-N2** | 871A-TS4-NU2 | **871A-TS4-NM2** |
| | 12.0…14.0 (0.47…0.55) | | PG16 | **871A-TS4-N3** | 871A-TS4-NU3 | **871A-TS4-NM3** |
| 5-Pin | 6.0…8.0 (0.24…0.32) | | PG9 | **871A-TS5-N1 ❶** | 871A-TS5-NU1 ❶ | **871A-TS5-NM1 ❶** |
| | 10.0…12.0 (0.39…0.47) | | PG13.5 | 871A-TS5-N2 | 871A-TS5-NU2 | 871A-TS5-NM2 |
| | 12.0…14.0 (0.47…0.55) | | PG16 | **871A-TS5-N3** | 871A-TS5-NU3 | **871A-TS5-NM3** |

❶ Available in Right Angle. Replace “S” with “R” (i.e. 871A-T**R**3-N2).

**Note**: Stainless steel coupling nuts available. Add “S” to cat. no. (i.e. 871A**S**-TS3-N2).

# Mini-Plus Style

10-Pin Mini-Plus Cordset

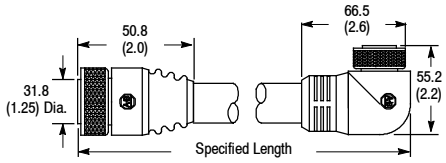
## Features

- Heavy duty STOOW 16 AWG cable
- Highly visible yellow PVC jacket offers good oil and chemical resistance
- One-piece molded body design

## Specifications

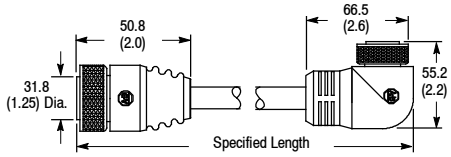
| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Anodized aluminum with clear sealant |
| Material | Molded oil-resistant PVC |
| Contacts | Gold-plated machined brass |
| Cable | Oil-resistant yellow PVC jacket, 16 AWG stranded copper, 600V; UL Recognized and CSA Certified, STOOW |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 16 AWG 9/c = 17 mm (0.67 in.)<br>16 AWG 10/c = 17 mm (0.67 in.)<br>16 AWG 12/c = 18 mm (0.71 in.)<br>18/22 AWG 12/c = 9 mm (0.36 in.) |
| **Electrical** | |
| Cable Rating | 16 AWG: UL STOOW 105C 600V, CSA ST 105C FT2<br>18/22 AWG: UL AWM style 2661 VW-1 105C 300V, CSA AWM A/B I/II 105C 300V FT4 |
| Assembly Rating | 16 AWG: 600V, 7 A; 18/22 AWG: 300V, 3 A |
| **Environmental** | |
| Enclosure Type Rating | NEMA 4, 6P, 12, 13; IP67; 1200 psi washdown |
| Operating Temperature [C (F)] | -40…+105° (-40…+221°) |

## Approximate Dimensions [mm (in.)]




16 AWG Straight Internal Thread

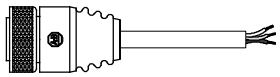
16 AWG Right Angle Internal Thread



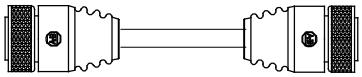

18 AWG Straight Internal Thread

18 AWG Right Angle Internal Thread

Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*

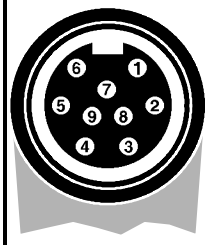
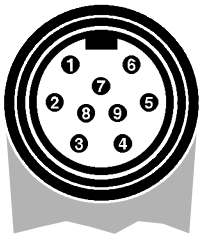
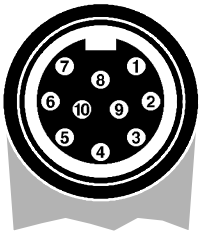
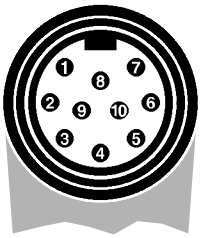
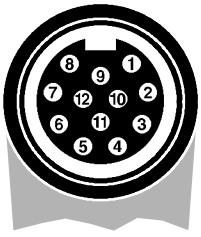
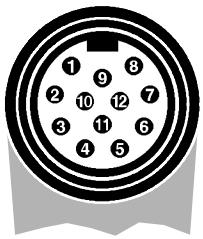


*Example of Patchcord*

## Mating Components & Accessories

| Description | Cat. No. | Page |
|---|---|---|
| Coupling Adaptor | 889A-N3ADPT | 12-11 |

## Pinout and Color Code

| Color Code | Face View Pinout | | | | | |
|---|---|---|---|---|---|---|
| | 9-Pin | | 10-Pin | | 12-Pin | |
| |  |  |  |  |  |  |
| | Female | Male | Female | Male | Female | Male |
| A | 1 Orange<br>2 Blue<br>3 Red/Black Tr<br>4 Green/Black Tr<br>5 White | 6 Red<br>7 Green<br>8 White/Black Tr<br>9 Black | 1 Orange<br>2 Blue<br>3 White/Black Tr<br>4 Red/Black Tr<br>5 Green/Black Tr | 6 Orange/Black Tr<br>7 Red<br>8 Green<br>9 Black<br>10 White | 1 Orange<br>2 Blue<br>3 WhiteBlack Tr<br>4 Red/Black Tr<br>5 Green/Black Tr<br>6 Orange/Black Tr | 7 Blue/Black Tr<br>8 Black/White Tr<br>9 Green<br>10 Red<br>11 White<br>12 Black |
| B | — | | — | | 1 White<br>2 Green<br>3 Yellow<br>4 Grey<br>5 Rose<br>6 Red | 7 Black<br>8 Violet<br>9 Green/Yellow ❶<br>10 Orange<br>11 Blue ❶<br>12 Brown ❶ |

## Product Selection

### Cordsets

| Pin Count | Assembly Rating | Color Code | Cat. No. | |
|---|---|---|---|---|
| | | | Straight Female | Straight Male |
| 9-Pin | 16 AWG, 600V, 7 A | A | **889N-F9AF-❷** | 889N-U9AF-❷ |
| 10-Pin | 16 AWG, 600V, 7 A | | **889N-F10AF-❷** | 889N-U10AF-❷ |
| 12-Pin | 16 AWG, 600V, 7 A | | **889N-F12AF-❷** | 889N-U12AF-❷ |
| | (3) 18 AWG/(9) 22 AWG, 300V, 3 A | B | **889N-F12AC-❷** | — |

### Patchcords

| Pin Count | Assembly Rating | Cat. No. | |
|---|---|---|---|
| | | Straight Female Straight Male | Straight Female Right Angle Male |
| 9-Pin | 16 AWG, 600V, 7 A | 889N-F9AFNU-❸ | — |
| 10-Pin | 16 AWG, 600V, 7 A | 889N-F10AFNU-❸ | 889N-F10AFNV-❸ |
| 10-Pin | (3) 18 AWG/(9) 22 AWG, 300V, 3 A | 889N-F10ACNU-❸ | 889N-F10ACNV-❸ |
| 12-Pin | 16 AWG, 600V, 7 A | 889N-F12AFNU-❸ | 889N-F12AFNV-❸ |
| 12-Pin | (3) 18 AWG/(9) 22 AWG, 300V, 3 A | 889N-F12ACNU-❸ | 889N-F12ACNV-❸ |
| Thread adaptor to couple standard internally threaded ends. | | 889A-N3ADPT | 889A-N3ADPT |

❶ 18 AWG conductors
❷ Replace symbol with 2 (2 m (6.5 ft)), 5 (5 m (16.4 ft)), or 10 (10 m (32.8 ft)) for standard cable lengths.
❸ Replace symbol with 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard cable lengths.

# Cordsets & Patchcords, DC Micro Style

**18 and 22 AWG, Yellow, Black, or Blue PVC**

## DC Micro Style

4-Pin DC Micro Cordset

### Features

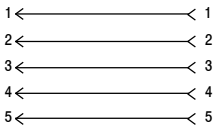
- Ratcheting coupling nut
- Subtle black or highly visible yellow PVC jacket offers good oil and chemical resistance
- Blue jacket models for intrinsically safe applications
- "-V" models allow wiring of devices using pin 2 for output into standard single-point distribution boxes and IP 67 I/O

### Specifications

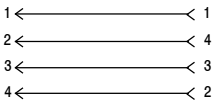
| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Material | Molded oil-resistant PUR |
| Contacts | Gold-plated brass |
| Cable | Oil-resistant PVC jacket, 18 AWG or 22 AWG conductors, 300V, UL Recognized and CSA Certified |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 2/c = 5 mm (0.21 in.)<br>3/c = 5 mm (0.21 in.)<br>4/c = 5 mm (0.21 in.)<br>5/c = 6.5 mm (0.25 in.)<br>4/c (18AWG) = 6.5 mm (0.25 in.) |
| **Electrical** | |
| Cable Rating | UL AWM style 2661 VW-1 105C 300V, CSA AWM A/B I/II 80C 300V FT1, UV oil and water resistant |
| Assembly Rating | 250V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP 67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+105 ° (-4…+221 °) |

### Wiring Diagrams

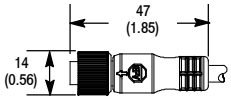
**Standard Models**



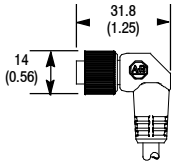

**889D-*4ACD*-V* Models**



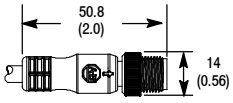

### Approximate Dimensions [mm (in.)]



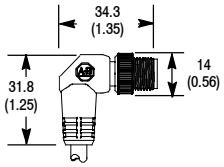

Straight Female




Right Angle Female

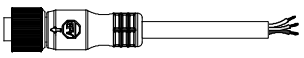



Straight Male

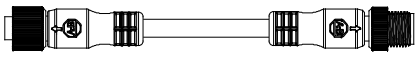



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.

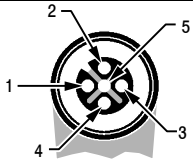
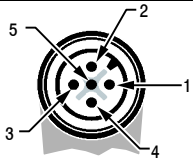


*Example of Cordset*



*Example of Patchcord*

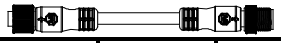
## Pinout and Color Code

| Color Code | Face View Pinout | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2-Pin | | 3-Pin | | 4-Pin | | 5-Pin | |
| | | |  Female | |  Male | | | |
| A | 1 NA<br>2 NA<br>3 Brown | 4 Blue<br>5 NA | 1 Brown<br>2 NA<br>3 Blue | 4 Black<br>5 NA | 1 Brown<br>2 White<br>3 Blue | 4 Black<br>5 NA | 1 Brown<br>2 White<br>3 Blue | 4 Black<br>5 Grey |

## Product Selection

### Cordsets

| Pin Count | Color Code | Jacket Color | Wire Gauge | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 2-Pin | A | Yellow | 22 AWG | 889D-F2AC-❶ | 889D-R2AC-❶ | 889D-M2AC-❶ | 889D-E2AC-❶ |
| 3-Pin | A | Yellow | 22 AWG | 889D-F3AC-❶ | 889D-R3AC-❶ | 889D-M3AC-❶ | 889D-E3AC-❶ |
| 4-Pin | A | Yellow | 22 AWG | **889D-F4AC-❶** | **889D-R4AC-❶** | **889D-M4AC-❶** | **889D-E4AC-❶** |
| | A | Yellow | 18 AWG | **889D-F4AE-❶** | **889D-R4AE-❶** | 889D-M4AE-❶ | 889D-E4AE-❶ |
| | A | Black | 22 AWG | **889D-F4BC-❶** | **889D-R4BC-❶** | 889D-M4BC-❶ | 889D-E4BC-❶ |
| | A | Blue | 22 AWG | 889D-F4LC-❶ | 889D-R4LC-❶ | 889D-M4LC-❶ | 889D-E4LC-❶ |
| 5-Pin | A | Yellow | 22 AWG | **889D-F5AC-❶** | **889D-R5AC-❶** | **889D-M5AC-❶** | 889D-E5AC-❶ |
| | A | Black | 22 AWG | 889D-F5BC-❶ | 889D-R5BC-❶ | 889D-M5BC-❶ | 889D-E5BC-❶ |

### Patchcords 

| Pin Count | Color Code | Jacket Color | Wire Gauge | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 2-Pin | A | Yellow | 22 AWG | 889D-F2ACDM-❷ | 889D-F2ACDE-❷ | 889D-R2ACDM-❷ | 889D-R2ACDE-❷ |
| 3-Pin | A | Yellow | 22 AWG | 889D-F3ACDM-❷ | 889D-F3ACDE-❷ | 889D-R3ACDM-❷ | 889D-R3ACDE-❷ |
| 4-Pin | A | Yellow | 22 AWG | **889D-F4ACDM-❷** | **889D-F4ACDE-❷** | **889D-R4ACDM-❷** | 889D-R4ACDE-❷ |
| | A❸ | Yellow | 22 AWG | 889D-F4ACDM-V❷ | 889D-F4ACDE-V❷ | 889D-R4ACDM-V❷ | 889D-R4ACDE-V❷ |
| | A | Yellow | 18 AWG | 889D-F4AEDM-❷ | 889D-F4AEDE-❷ | 889D-R4AEDM-❷ | 889D-R4AEDE-❷ |
| | A | Black | 22 AWG | 889D-F4BCDM-❷ | 889D-F4BCDE-❷ | 889D-R4BCDM-❷ | 889D-R4BCDE-❷ |
| | A | Blue | 22 AWG | 889D-F4LCDM-❷ | 889D-F4LCDE-❷ | 889D-R4LCDM-❷ | 889D-R4LCDE-❷ |
| 5-Pin | A | Yellow | 22 AWG | **889D-F5ACDM-❷** | 889D-F5ACDE-❷ | 889D-R5ACDM-❷ | 889D-R5ACDE-❷ |
| | A | Yellow | 22 AWG | 889D-F5BCDM-❷ | 889D-F5BCDE-❷ | 889D-R5BCDM-❷ | 889D-R5BCDE-❷ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.
❷ Replace symbol with 0M3 (1 ft), 1 (1 m), 2 (2 m), 5 (5 m) or 10 (10 m) for standard lengths.
❸ See Wiring Diagrams.

**Note**: Stainless steel connectors may be ordered by adding an "S" to the cat. no. (e.g. 889D**S**-F4AC-2).

# DC Micro Style

4-Pin DC Micro Cordset

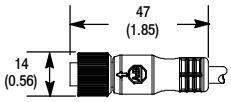
## Features

- Ratcheting coupling nut
- Q models specifically wired for QuadroPlex applications
- N models specifically wired for NAMUR applications
- E models specifically wired for Photo Emitter applications
- K models specifically wired for KwikLink Auxiliary Power applications
- Blue Jacket models for intrisically safe applications

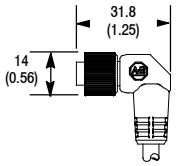
## Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Material | Molded oil-resistant PUR |
| Contacts | Gold-plated brass |
| Cable | Unshielded, oil-, water- and UV-resistant, UL Recognized and CSA Certified |
| Cable Diameter | 2/c = 5 mm (0.21 in.)<br>3/c = 5 mm (0.21 in.)<br>4/c = 5 mm (0.21 in.)<br>5/c = 6.5 mm (0.25 in.)<br>4/c (18 AWG) = 6.5 mm (0.25 in.) |
| Bend Radius | 10x diameter, min. |
| **Electrical** | |
| Cable Rating | UL AWM style 2661 VW-1 105C 300V, CSA AWM A/B I/II 80C 300V FT1, UV oil and water resistant |
| Assembly Rating | 250V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+105 ° (-4…+221 °) |

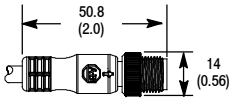
## Approximate Dimensions [mm (in.)]



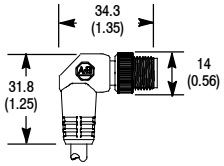

Straight Female




Right Angle Female

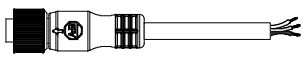



Straight Male

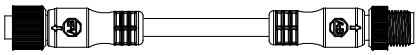



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.

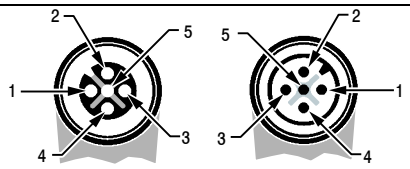


*Example of Cordset*



*Example of Patchcord*

## Pinout and Color Code

| | Face View Pinout<br>4-Pin/2 Conductor |
|---|---|
| |  <br> |

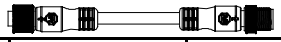
| Color Code | A | B | C | D | F |
|---|---|---|---|---|---|
| | Photo Emitter | NAMUR | QuadroPlex | KwikLink Aux Power | 2-Wire |
| | 1 Brown<br>2 NA<br>3 Blue<br>4 NA | 1 Brown<br>2 Blue<br>3 NA<br>4 NA | 1 Brown<br>2 NA<br>3 NA<br>4 Blue | 1 NA<br>2 Brown<br>3 Blue<br>4 NA | 1 NA<br>2 NA<br>3 Brown<br>4 Blue |

## Product Selection

### Cordsets

| No. of Pins | Color Code | Wire Type | Jacket Material | Wire Size, AWG | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 2-Pin | B | NAMUR | Blue PVC | 22 AWG | 889D-F2LC-N❶ | 889D-R2LC-N❶ | 889D-M2LC-N❶ | 889D-E2LC-N❶ |
| | F | Intrinsically Safe | Blue PVC | 22 AWG | 889D-F2LC-❶ | 889D-R2LC-❶ | 889D-M2LC-❶ | 889D-E2LC-❶ |
| | C | QuadroPlex | Yellow PVC | 22 AWG | 889D-F2AC-Q❶ | 889D-R2AC-Q❶ | 889D-M2AC-Q❶ | 889D-E2AC-Q❶ |
| | A | Photo Emitter | Yellow PVC | 22 AWG | 889D-F2AC-E❶ | 889D-R2AC-E❶ | 889D-M2AC-E❶ | 889D-E2AC-E❶ |
| | D | KwikLink Aux Pwr | Yellow PVC | 18 AWG | 889D-F2AE-K❶ | 889D-R2AE-K❶ | 889D-M2AE-K❶ | 889D-E2AE-K❶ |

### Patchcords



| No. of Pins | Color Code | Wire Type | Jacket Material | Wire Size AWG | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Straight Female… Straight Male | Straight Female… Right Angle Male | Right Angle Female…Straight Male | Right Angle Female…Right Angle Male |
| 2-Pin | B | NAMUR | Blue PVC | 22 | 889D-F2LCDM-N❶ | 889D-R2LCDE-N❶ | 889D-F2LCDM-N❶ | 889D-R2LCDE-N❶ |
| | F | Intrinsically Safe | Blue PVC | 22 | 889D-F2LCDM-❶ | 889D-R2LCDE-❶ | 889D-F2LCDM-❶ | 889D-R2LCDE-❶ |
| | C | QuadroPlex | Yellow PVC | 22 | 889D-F2ACDM-Q❶ | 889D-R2ACDE-Q | 889D-F2ACDM-Q❶ | 889D-R2ACDE-Q❶ |
| | A | Photo Emitter | Yellow PVC | 22 | 889D-F2ACDM-E❶ | 889D-R2ACDE-E | 889D-F2ACDM-E❶ | 889D-R2ACDE-E❶ |
| | D | KwikLink Aux Pwr | Yellow PVC | 18 | 889D-F2AEDM-K❶ | 889D-R2AEDE-K | 889D-F2AEDM-K❶ | 889D-R2AEDE-K❶ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

**Note**: Stainless steel connectors may be ordered by adding an "**S**" to the cat. no. (e.g. 889D**S**-F2LN-N2).

**Notes**: QuadroPlex models are used with 872C Proximity products.
NAMUR models are used with 871C Proximity products.
Photo Emitter models are used with Photoelectric light source/emitter/models.

# DC Micro Style

4-Pin DC Micro Cordset

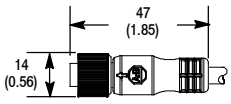
## Features

- PUR jacket provides good oil and chemical resistance
- TPE jacket material for good oil, chemical, and weld slag resistance
- 8-pin/7-wire configuration for Sipha safety switches and other applications
- Ratcheting coupling nuts for vibration resistance

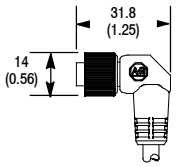
## Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-Coated Zinc |
| Material | Molded oil-resistant PUR |
| Contacts | Gold-plated brass |
| Cable | PUR or TPE jacket, 18 & 22 AWG or 24 AWG conductors, 300V; UL Recognized and CSA Certified |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 4/c (PUR): 5 mm (0.21 in.)<br>4/c (18 AWG TPE): 7 mm (0.28 in.)<br>4/c (22 AWG TPE): 4.9 mm (0.19 in.)<br>5/c: 6.5 mm (0.25 in.)<br>7/c: 7.4 mm (0.29 in.)<br>8/c: 7.4 mm (0.29 in.) |
| **Electrical** | |
| Cable Rating | 4 & 5/c (PUR): UL AWM style 20866 VW-1 80C 300V, CSA AWM A/B I/II 80C 300V FT1, UV oil and water resistant<br>8/c (PUR): UL AWM style 20866 90C 300V, CSA II A 90C 300V<br>TPE: UL AWM style 20327 VW-1 105C 300V, CSA AWM A/B I/II 105C 300V FT1, UV oil and water resistant |
| Assembly Rating | 4- or 5-pin: 250V, 4 A; 8-pin: 300V AC/36V DC, 1.5 A |
| **Environmental** | |
| Enclosure Type Rating | IP 67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature—C (F) | PUR models: -20…+80 ° (-4…+176 °)<br>TPE models: -20…+105 ° (-4…+221 °)<br>TPR models: -25…+125 ° (-13…+256 °) |

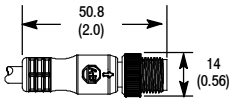
## Approximate Dimensions [mm (in.)]



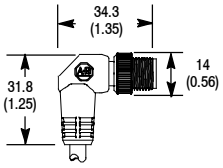

Straight Female




Right Angle Female

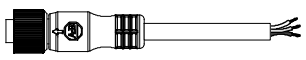



Straight Male

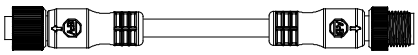



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.

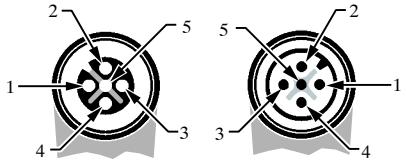
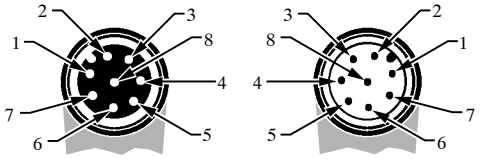


*Example of Cordset*



*Example of Patchcord*

## Pinout and Color Code

| Color Code | Face View Pinout | | | |
|---|---|---|---|---|
| | 3-Pin | 4-Pin | 5-Pin | 8-Pin |
| | |  Female Male | |  Female Male |
| A | 1 Brown<br>2 NA<br>3 Blue<br>4 Black<br>5 NA | 1 Brown<br>2 White<br>3 Blue<br>4 Black<br>5 NA | 1 Brown<br>2 White<br>3 Blue<br>4 Black<br>5 Grey | 1 Red<br>2 Blue<br>3 Green<br>4 Yellow<br>5 Black<br>6 White<br>7 N.C.<br>8 Grey |
| B | — | — | — | 1 White<br>2 Brown<br>3 Green<br>4 Yellow<br>5 Grey<br>6 Pink<br>7 Blue<br>8 Red |

## Product Selection

### Cordsets

| Pin Count | Cable Type | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 3-Pin | PUR | 18 AWG, 300V, 4 A | A | 889D-F3UE-❶ | 889D-R3UE-❶ | 889D-M3UE-❶ | 889D-E3UE-❶ |
| 4-Pin | TPE | 18 AWG, 250V, 4 A | A | **889D-F4HJ-❶** | 889D-R4HJ-❶ | 889D-M4HJ-❶ | 889D-E4HJ-❶ |
| 4-Pin | TPE | 22 AWG, 250V, 4 A | A | **889D-F4HL-❶** | 889D-R4HL-❶ | 889D-M4HL-❶ | 889D-E4HL-❶ |
| | PUR | | A | **889D-F4UC-❶** | **889D-R4UC-❶** | 889D-M4UC-❶ | 889D-E4UC-❶ |
| 4-Pin | PUR | 18 AWG, 300V, 4 A | A | 889D-F4UE-❶ | 889D-R4UE-❶ | 889D-M4UE-❶ | 889D-E4UE-❶ |
| 5-Pin | PUR | 22 AWG, 250V, 4 A | A | 889D-F5UC-❶ | 889D-R5UC-❶ | 889D-M5UC-❶ | 889D-E5UC-❶ |
| 8-Pin | TPR | 24 AWG 30V AC/ 36V DC 1.5 A | A | **889D-F8AC-❶** | — | — | — |
| | PUR | | B | **889D-F8AB-❶** | **889D-R8AB-❶** | 889D-M8AB-❶ | — |

### Patchcords

| Pin Count | Cable Type | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right-Angle Male |
| 3-Pin | PUR | 18 AWG, 300V, 4 A | A | 889D-F3UEDM-❷ | 889D-F3UEDE-❷ | 889D-R3UEDM-❷ | 889D-R3UEDE-❷ |
| 4-Pin | TPE | 18 AWG, 250V, 4 A | A | 889D-F4HJDM-❷ | 889D-F4HJDE-❷ | 889D-R4HJDM-❷ | 889D-R4HJDE-❷ |
| 4-Pin | TPE | 22 AWG, 250V, 4 A | A | **889D-F4HLDM-❷** | 889D-F4HLDE-❷ | 889D-R4HLDM-❷ | 889D-R4HLDE-❷ |
| | PUR | | A | 889D-F4UCDM-❷ | 889D-F4UCDE-❷ | 889D-R4UCDM-❷ | 889D-R4UCDE-❷ |
| 4-Pin | PUR | 18 AWG, 300V, 4 A | A | 889D-F4UEDM-❷ | 889D-F4UEDE-❷ | 889D-R4UEDM-❷ | 889D-R4UEDE-❷ |
| 5-Pin | PUR | 22 AWG, 250V, 4 A | A | 889D-F5UCDM-❷ | 889D-F5UCDE-❷ | 889D-R5UCDM-❷ | 889D-R5UCDE-❷ |
| 8-Pin | PUR | 24 AWG, 30V AC/ 36V DC 1.5 A | A | 889D-F8ABDM-❷ | — | — | — |

❶ Replace symbol with 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❷ Replace symbol with 0M3 (1 ft), 1 (1 m), 2 (2 m), 5 (5 m) or 10 (10 m) for standard lengths.

**Note**: Stainless steel connectors may be ordered by adding an "S" to the cat. no. (e.g. 889D**S**-F4HJ-2).

# DC Micro Style

4-Pin DC Micro Cordset

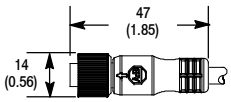
## Features

- Ratcheting coupling nut for vibrating resistance
- ToughLink TPE yellow jacket offers excellent oil and chemical resistance
- ToughWeld CPE yellow jacket provides excellent resistance to weld slag
- Heavy duty construction for rugged environments

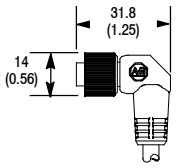
## Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Material | Molded oil-resistant PUR |
| Contacts | Gold-plated brass |
| Cable | Allen-Bradley ToughLink TPE or ToughWeld CPE yellow jacket, 18 AWG or 22 AWG conductors, 300V; UL Recognized and CSA Certified |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | ToughLink: 9 mm (0.35 in.); ToughWeld: 9 mm (0.35 in.) |
| **Electrical** | |
| Cable Rating | ToughLink: UL AWM style 20328 600V VW-1 -50…105°C water resistant, CSA AWM I/II A/B 105C 600V FT1<br>ToughWeld: UL -50°C SJOOW 90°C dry and 60°C water resistant, CSA -50°C SJOOW 90°C FT1, P-123-103, MSHA 300V |
| Assembly Rating | 250V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | ToughLink: -50…+105° (-58…+221°)<br>ToughWeld: -50…90° (-58…+194°) |

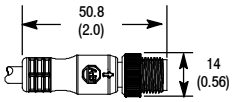
## Approximate Dimensions [mm (in.)]



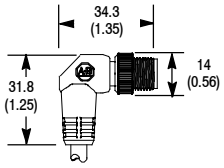

Straight Female




Right Angle Female

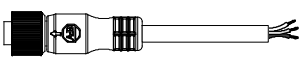



Straight Male

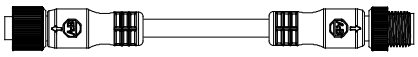



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.



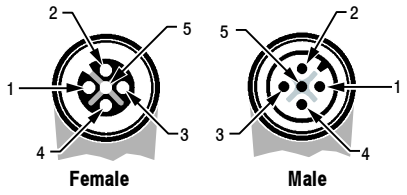
*Example of Cordset*



*Example of Patchcord*

## Pinout and Color Code

| Color Code | Face View Pinout 4-Pin Female | Face View Pinout 4-Pin Male |
|---|---|---|
| A | 1 Brown<br>2 White | 3 Blue<br>4 Black |

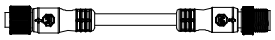



## Product Selection

### Cordsets

| Pin Count | Material | Assembly Rating | Color Code | Cat. No. Straight Female | Cat. No. Right Angle Female | Cat. No. Straight Male | Cat. No. Right Angle Male |
|---|---|---|---|---|---|---|---|
| 4-Pin | ToughLink (TPE) | 22 AWG 250V 4 A | A | **889D-F4HC-❶** | **889D-R4HC-❶** | 889D-M4HC-❶ | 889D-E4HC-❶ |
| | ToughWeld (CPE) | 18 AWG 250V 4 A | A | **889D-F4WE-❶** | 889D-R4WE-❶ | 889D-M4WE-❶ | 889D-E4WE-❶ |
| | ToughLink (TPE) | 18 AWG 250V 4 A | A | 889D-F4HE-❶ | 889D-R4HE-❶ | 889D-M4HE-❶ | 889D-E4HE-❶ |

### Patchcords



| Pin Count | Material | Assembly Rating | Cat. No. Straight Female Straight Male | Cat. No. Straight Female Right Angle Male | Cat. No. Right Angle Female Straight Male | Cat. No. Right Angle Female Right Angle Male |
|---|---|---|---|---|---|---|
| 4-Pin | ToughLink (TPE) | 22 AWG 250V 4 A | 889D-F4HCDM-❷ | 889D-F4HCDE-❷ | 889D-R4HCDM-❷ | 889D-R4HCDE-❷ |
| | ToughWeld (CPE) | 18 AWG 250V 4 A | **889D-F4WEDM-❷** | 889D-F4WEDE-❷ | 889D-R4WEDM-❷ | 889D-R4WEDE-❷ |
| | ToughLink (TPE) | 18 AWG 250V 4 A | 889D-F4HEDM-❷ | 889D-F4HEDE-❷ | 889D-R4HEDM-❷ | 889D-R4HEDE-❷ |

❶ Replace symbol with 1 (1 m), 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❷ Replace symbol with 1 (1 m), 2 (2 m), 3 (3 m), 4 (4 m), 5 (5 m) or 6 (6 m) for standard lengths.

**Note**: Stainless steel connectors may be ordered by adding an "S" to the cat. no. (e.g. 889D**S**-F4HC-2).

# DC Micro Style

DC Micro Female

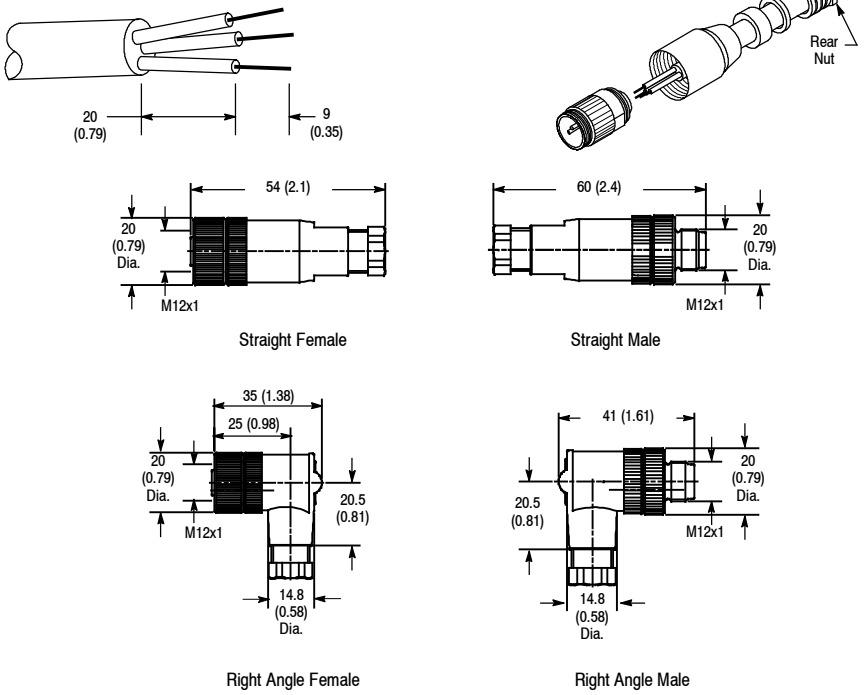
## Specifications

| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Nickel-plated brass |
| Connector Shell Material | PBT, except embedded thermistor models: Nylon |
| Contacts | Gold-plated palladium nickel |
| Cable | 18 AWG (0.75 $mm^2$) max. |
| **Electrical** | |
| Assembly Rating | 4- or 5-pin: 250V, 4 A; 8-pin: 60V, 2 A |
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -40…+88° (-40…+185°) |

## Features

- Field installable
- 4- or 5-pin DC micro style
- Straight or right angle
- Single cable or dual cable models
- Screw terminals provide simple and secure installation
- Allows easy modification of existing cable installations

## Approximate Dimensions [mm (in.)]




Straight Female

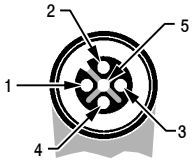
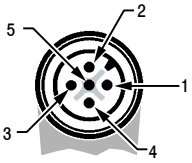
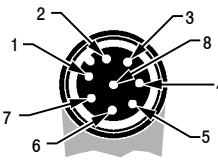
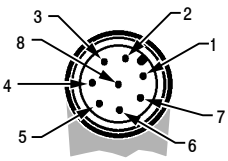
Straight Male

Right Angle Female

Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.

## Pinout

| Face View Pinout | | |
|---|---|---|
| 4-Pin | 5-Pin | 8-Pin |
|  Female |  Male |  Female  Male |

## Product Selection

### Single-Cable Model Terminal Chambers

| Pin Count | Cable Jacket Diameter [mm (in.)] | Assembly Rating | Rear Nut Thread Size | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 4-Pin | 4.0…6.0 (0.16…0.24) | 250V, 4 A | PG 7 | **871A-TS4-D** | **871A-TR4-D** | **871A-TS4-DM** | **871A-TR4-DM** |
| | 6.0…8.0 (0.24…0.32) | | PG 9 | **871A-TS4-D1** | 871A-TR4-D1 | **871A-TS4-DM1** | 871A-TR4-DM1 |
| 5-Pin | 4.0…6.0 (0.16…0.24) | | PG 7 | **871A-TS5-D** | 871A-TR5-D | **871A-TS5-DM** | 871A-TR5-DM |
| | 6.0…8.0 (0.24…0.32) | | PG 9 | **871A-TS5-D1** | **871A-TR5-D1** | **871A-TS5-DM1** | **871A-TR5-DM1** |
| 8-Pin | 6.0…8.0 (0.24…0.32) | 60V, 2 A | PG 9 | 871A-TS8-D1 | — | 871A-TS8-DM1 | — |

### Dual-Cable Model Terminal Chambers

| Pin Count | Cable Jacket Diameter [mm (in.)] | Assembly Rating | Rear Nut Thread Size | Cat. No. | |
|---|---|---|---|---|---|
| | | | | Straight Male | Right Angle Male |
| 4-Pin | Two cables 2.1…3.0 (0.08…0.12) or 3.5…5.2 (0.14…0.21) | 250V, 4 A | PG 9 | 871A-VS4-DM | 871A-VR4-DM |
| 5-Pin | | | | 871A-VS5-DM | 871A-VR5-DM |

**Note**: Stainless steel coupling nuts available, add an “S” to the cat. no. (e.g. 871A**S**-TS4-DM).

# DC Micro Style

DC Micro Male

## Features

- Field installable with no hand tools needed
- 4-pin DC micro style
- Straight or right angle, male or female
- Allows easy modification of existing cable installations
- Insulation displacement technology for secure and reliable installation
- Metal body unit excellent in shielding applications

## Specifications

| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Zinc die-cast |
| Connector Shell Material | Zinc die-cast or polyamide |
| Contacts | Gold-plated palladium nickel |
| Maximum IDC Installations | 10 |
| Conductor Outside Diameter | 26-22 AWG-20 AWG: 1.0…1.6 mm (0.039…0.063 in.)<br>24-22 AWG, 22-18 AWG: 1.6…2.0 mm (0.063…0.079 in.) |
| **Electrical** | |
| Assembly Rating | 32V, 4 A; 50V, 6 A |
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -25…85° (-13…185°) |
| Installation Temperature [C (F)] | -5…50° (23…185°) |

## Approximate Dimensions [mm (in.)]

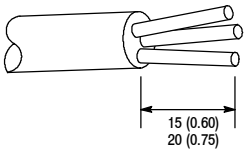



*Figure A*

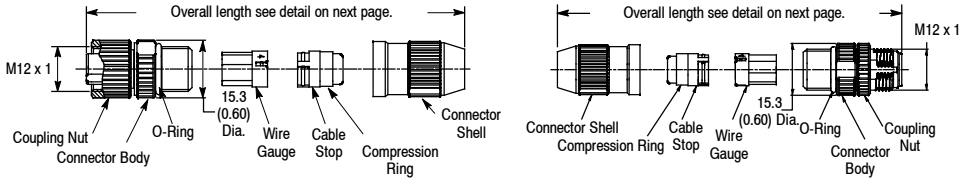



*Figure B*

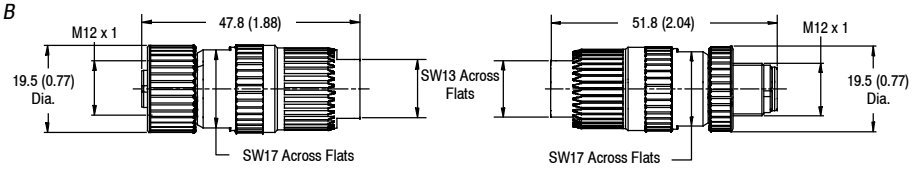



*Figure C*

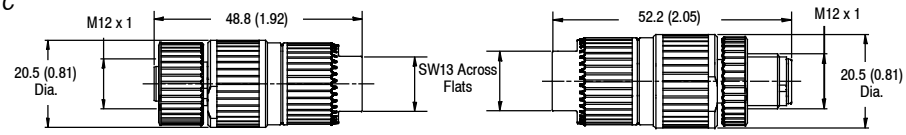
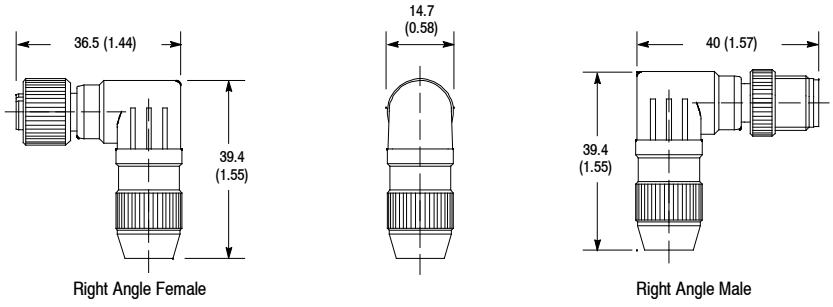
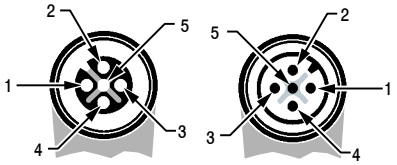



*Figure D*




Dimensions are approximate. Illustrations are not drawn to scale.

## Pinout

| | Face View Pinout |
|---|---|
| | 4- Pin |
| |  |



## Product Selection

### IDC Field Attachables

| Pin Count | Connector Body | Dimen-sions | Cable Jacket Diameter [mm (in.)] | Wire Size | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Straight Female | Straight Male | Right Angle Female | Right Angle Male |
| 4-Pin | Polyamide Small body unshielded | Figure A & D | 4.0…5.1 (0.16…0.20) | 26…22 AWG | 32V 4 A | **889D-F4DC-H** | **889D-M4DC-H** | **889D-R4DC-H** | **889D-E4DC-H** |
| | Zinc die-cast Large body shielded | Figure B | 7.0…8.8 (0.28…0.35) | 24…22 AWG | 32V 4 A | 889D-F4DC-SH | 889D-M4DC-SH | — | — |
| | Polyamide Large body unshielded | Figure C | 5.5…8.0 (0.22…0.31) | 22…18 AWG | 50V 6 A | 889D-F4CE-H | 889D-M4CE-H | — | — |

# Cordsets & Patchcords, AC Micro Style

**18 or 22 AWG, PVC**

## AC Micro Style

3-Pin AC Micro Cordset

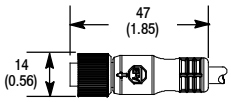
### Features

- Highly visible yellow PVC jacket offers good oil and chemical resistance
- Heavy-duty re-inforcing braiding can be used as a grounded shield to reduce noise
- Ratcheting coupling nut for vibration resistance

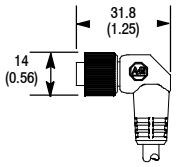
### Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Connector | Molded oil-resistant polyurethane |
| Contacts | Gold-plated brass |
| Cable | Oil-resistant yellow PVC jacket, 18 or 22 AWG conductors, 300V; UL Recognized and CSA Certified |
| Bend Radius | 10 x diameter, min. |
| Cable Diameter | 3/c (22 AWG) = 6.7 mm (0.26 in.)<br>3/c (18 AWG) = 6.7 mm (0.26 in.)<br>4/c (18 AWG) = 6.7 mm (0.26 in.)<br>5/c (18 AWG) = 6.7 mm (0.26 in.)<br>6/c (22 AWG) = 6.7 mm (0.26 in.) |
| Braiding | Shield aluminum mylar stranding 26 x #36 (AWG) (Braided cable models only) |
| Cable Rating | UL AWM style 2661 VW-1 105C 300V, CSA AWM A/B I/II 80C 300V FT1, UV oil and water resistant |
| Assembly Rating | 250V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+105 ° (-4…+221 °) |

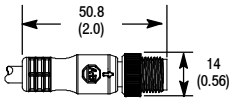
### Approximate Dimensions [mm (in.)]



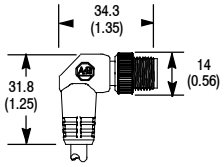

Straight Female




Right Angle Female

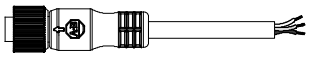



Straight Male

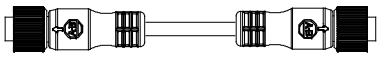



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*

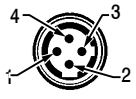
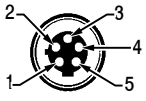
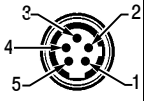
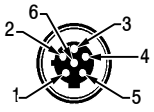
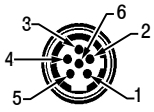


*Example of Patchcord*

# Cordsets & Patchcords, AC Micro Style

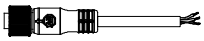
**18 or 22 AWG, PVC**

## Pinout and Color Code

| Color Code | Face View Pinout | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3-Pin | | 4-Pin | | 5-Pin | | 6-Pin | | | | | |
| | Female | Male | Female |  Male |  Female |  Male |  Female |  Male | | | | |
| A | 1 Green (GND)<br>2 Red/Black Tr.<br>3 Red/White Tr. | | 1 Red/Black Tr. 3 Red<br>2 Red/White Tr. 4 Green (GND) | | 1 Red/White Tr. 4 Red/Yellow Tr.<br>2 Red 5 Red/Black Tr.<br>3 Green | | 1 Red/White Tr. 4 Red/Yellow Tr.<br>2 Red 5 Red/Black Tr.<br>3 Green 6 Red/Blue Tr. | | | | | |

## Product Selection

### Cordsets



| Pin Count | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 3-Pin | Braided 22 AWG, 250V, 4 A | A | **889R-F3ECA-❶** | **889R-R3ECA-❶** | 889R-M3ECA-❶ | 889R-E3ECA-❶ |
| | 18 AWG, 250V, 4 A | | **889R-F3AEA-❶** | **889R-R3AEA-❶** | **889R-M3AEA-❶** | 889R-E3AEA-❶ |
| 4-Pin | Braided 22 AWG, 250V, 4 A | | 889R-F4ECA-❶ | 889R-R4ECA-❶ | 889R-M4ECA-❶ | 889R-E4ECA-❶ |
| | 18 AWG, 250V, 4 A | | **889R-F4AEA-❶** | **889R-R4AEA-❶** | 889R-M4AEA-❶ | 889R-E4AEA-❶ |
| 5-Pin | Braided 22 AWG, 250V, 4 A | | 889R-F5ECA-❶ | 889R-R5ECA-❶ | 889R-M5ECA-❶ | 889R-E5ECA-❶ |
| | 18 AWG, 250V, 4 A | | **889R-F5AEA-❶** | 889R-R5AEA-❶ | 889R-M5AEA-❶ | 889R-E5AEA-❶ |
| 6-Pin | Braided 22 AWG, 250V, 4 A | | **889R-F6ECA-❶** | **889R-R6ECA-❶** | 889R-M6ECA-❶ | 889R-E6ECA-❶ |

### Patchcords

| Pin Count | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 3-Pin | Braided 22 AWG, 250V, 4 A | A | 889R-F3ECRM-❷ | 889R-F3ECRE-❷ | 889R-R3ECRM-❷ | 889R-R3ECRE-❷ |
| | 18 AWG, 250V, 4 A | | **889R-F3AERM-❷** | 889R-F3AERE-❷ | 889R-R3AERM-❷ | 889R-R3AERE-❷ |
| 4-Pin | Braided 22 AWG, 250V, 4 A | | 889R-F4ECRM-❷ | 889R-F4ECRE-❷ | 889R-R4ECRM-❷ | 889R-R4ECRE-❷ |
| | 18 AWG, 250V, 4 A | | 889R-F4AERM-❷ | 889R-F4AERE-❷ | 889R-R4AERM-❷ | 889R-R4AERE-❷ |
| 5-Pin | Braided 22 AWG, 250V, 4 A | | 889R-F5ECRM-❷ | 889R-F5ECRE-❷ | 889R-R5ECRM-❷ | 889R-R5ECRE-❷ |
| | 18 AWG, 300V, 4 A | | 889R-F5AERM-❷ | 889R-F5AERE-❷ | 889R-R5AERM-❷ | 889R-R5AERE-❷ |
| 6-Pin | Braided 22 AWG, 250V, 4 A | | **889R-F6ECRM-❷** | 889R-F6ECRE-❷ | 889R-R6ECRM-❷ | 889R-R6ECRE-❷ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

❷ Replace symbol with 0M3 (0.3 m), 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m) or 10 (10 m) for standard lengths.

**Note**: Stainless steel connectors may be ordered by adding an "S" to the cat. no. (e.g. 889R**S**-F6ECA-2).

# Cordsets & Patchcords, AC Micro Style

**18 AWG, ToughLink™ or ToughWeld™**

## AC Micro Style

3-Pin AC Micro Cordset

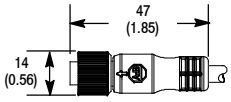
### Features

- ToughLink TPE jacket offers excellent oil, chemical, and abrasion resistance
- ToughWeld neoprene rubber jacket offers excellent weld slag resistance
- Ratcheting coupling nuts for vibration resistance

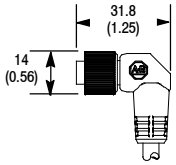
### Specifications

| | ToughLink | ToughWeld |
|---|---|---|
| Certifications | UL Recognized and CSA Certified | |
| **Mechanical** | | |
| Coupling Nut | Epoxy-coated zinc | |
| Connector | Molded oil-resistant polyurethane | |
| Contacts | Gold-plated brass | |
| Cable | Yellow TPE jacket, 18 AWG stranded copper, 300V | Yellow CPE jacket, 18 AWG stranded copper, 300V |
| Bend Radius | 10 x diameter, min. | |
| Cable Diameter | 3-pin: 8.64 mm (0.34 in.)<br>4-pin: 9.40 mm (0.37 in.)<br>5-pin: 10.16 mm (0.40 in.) | 7.87 mm (0.31 in.)<br>8.64 mm (0.34 in.)<br>9.14 mm (0.36 in.) |
| **Electrical** | | |
| Cable Rating | UL AWM style 20328, 600V, VW-1, CSA AWM A/B I/II 600V FT1 | UL SJOOW style CSA FT1, P-123-103, MSHA-300V |
| Assembly Rating | 250V, 4 A | |
| **Environmental** | | |
| Enclosure Type Rating | IP67, NEMA 6P, 1200 psi (8270 kPa) washdown | |
| Operating Temperature [C (F)] | -50…+105 ° (-58…+221 °) | |

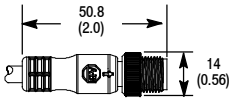
### Approximate Dimensions [mm (in.)]



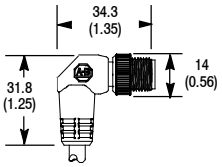

Straight Female




Right Angle Female

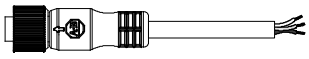



Straight Male

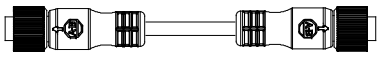



Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.

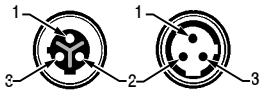
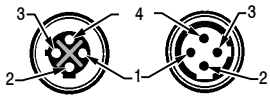
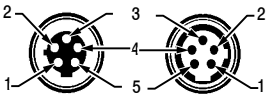


*Example of Cordset*

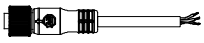


*Example of Patchcord*

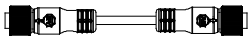
## Pinout and Color Code

| Color Code | Face View Pinout | | |
|---|---|---|---|
| | 3-Pin | 4-Pin | 5-Pin |
| |  Female Male |  Female Male |  Female Male |
| A | 1 Green<br>2 Red/Black Tr<br>3 Red/White Tr | 1 Red/Black Tr<br>2 Red/White Tr<br>3 Red<br>4 Green | 1 Red/White Tr<br>2 Red<br>3 Green<br>4 Red/Yellow Tr<br>5 Red/Black Tr |
| B | 1 Green<br>2 Black<br>3 White | 1 Black<br>2 White<br>3 Red<br>4 Green | 1 White<br>2 Red<br>3 Green<br>4 Orange<br>5 Black |

## Product Selection

### Cordsets 

| Pin Count | Material | Assembly Rating | Color Code | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 3-Pin | ToughWeld | 18 AWG, 300V, 4 A | B | **889R-F3WEC-❶** | 889R-R3WEC-❶ | 889R-M3WEC-❶ | 889R-E3WEC-❶ |
| 4-Pin | ToughWeld | 18 AWG, 300V, 4 A | B | 889R-F4WEC-❶ | 889R-R4WEC-❶ | 889R-M4WEC-❶ | 889R-E4WEC-❶ |
| 5-Pin | ToughWeld | 18 AWG, 300V, 4 A | B | 889R-F5WEC-❶ | 889R-R5WEC-❶ | 889R-M5WEC-❶ | 889R-E5WEC-❶ |
| 3-Pin | ToughLink | 18 AWG, 300V, 4 A | A | 889R-F3HEA-❶ | 889R-R3HEA-❶ | 889R-M3HEA-❶ | 889R-E3HEA-❶ |
| 4-Pin | ToughLink | 18 AWG, 300V, 4 A | A | 889R-F4HEA-❶ | 889R-R4HEA-❶ | 889R-M4HEA-❶ | 889R-E4HEA-❶ |
| 5-Pin | ToughLink | 18 AWG, 300V, 4 A | A | 889R-F5HEA-❶ | 889R-R5HEA-❶ | 889R-M5HEA-❶ | 889R-E5HEA-❶ |

### Patchcords 

| Pin Count | Material | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female... Straight Male | Straight Female... Right Angle Male | Right Angle Female... Straight Male | Right Angle Female... Right Angle Male |
| 3-Pin | ToughWeld | 18 AWG, 300V, 4 A | 889R-F3WERM-❷ | 889R-F3WERE-❷ | 889R-R3WERM-❷ | 889R-R3WERE-❷ |
| 4-Pin | ToughWeld | 18 AWG, 300V, 4 A | 889R-F4WERM-❷ | 889R-F4WERE-❷ | 889R-R4WERM-❷ | 889R-R4WERE-❷ |
| 5-Pin | ToughWeld | 18 AWG, 300V, 4 A | 889R-F5WERM-❷ | 889R-F5WERE-❷ | 889R-R5WERM-❷ | 889R-R5WERE-❷ |
| 3-Pin | ToughLink | 18 AWG, 300V, 4 A | 889R-F3HERM-❷ | 889R-F3HERE-❷ | 889R-F3HERM-❷ | 889R-R3HERE-❷ |
| 4-Pin | ToughLink | 18 AWG, 300V, 4 A | 889R-F4HERM-❷ | 889R-F4HERE-❷ | 889R-R4HERM-❷ | 889R-R4HERE-❷ |
| 5-Pin | ToughLink | 18 AWG, 300V, 4 A | 889R-F5HERM-❷ | 889R-F5HERE-❷ | 889R-R5HERM-❷ | 889R-R5HERE-❷ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

❷ Replace symbol with 0M3 (0.3 m), 1 (1 m), 2 (2 m), 3 (3 m), 5 (5 m), or 10 (10 m) for standard lengths.

# Terminal Chambers, AC Micro Style

## Screw Type, Field Attachable Connector

## AC Micro Style

AC Micro Male Receptacle

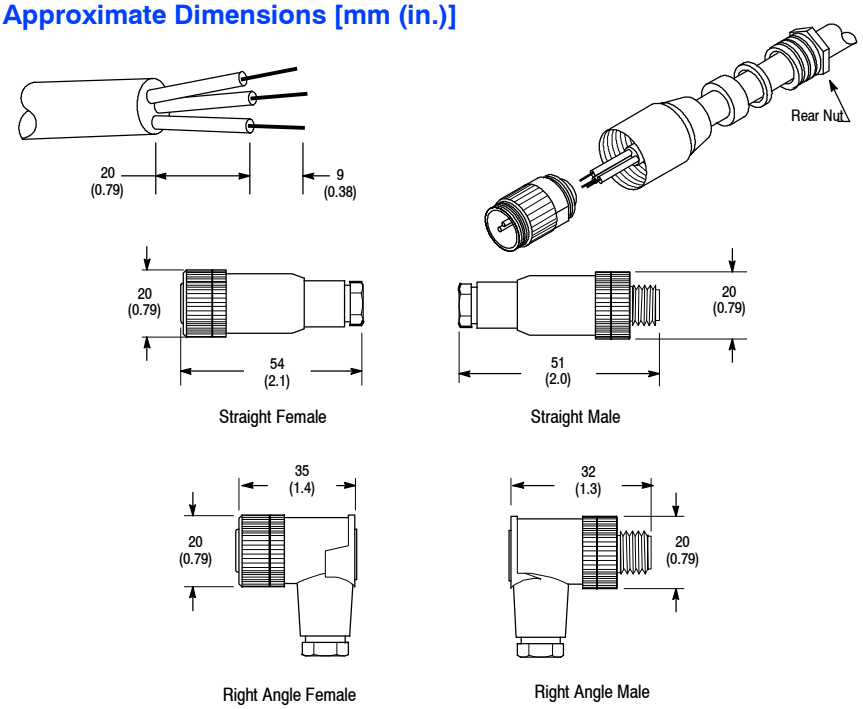
### Specifications

| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Nickel-plated brass |
| Connector Insert Material | Nylon |
| Contacts | Gold-plated palladium/nickel |
| Wire Size, Max. | 18 AWG (0.75 $mm^2$) |
| **Environmental** | |
| Enclosure Type Rating | IP67 (IEC 529); NEMA 6P |
| Operating Temperature [C (F)] | -40…+90° (-40…+194°) |

### Features

- Field installable
- 3-pin AC micro style
- Straight or right angle
- Screw terminals provide simple and secure installation
- Allows easy modification of existing cable installations

### Approximate Dimensions [mm (in.)]




Dimensions are approximate. Illustrations are not drawn to scale.

## Pinout and Color Code

| Color Code | Face View Pinout<br>3-Pin<br>Female | Face View Pinout<br>3-Pin<br>Male |
|---|---|---|
| A | 1 Green<br>2 Red/Black Tr<br>3 Red/White Tr | |

## Product Selection

**Terminal Chambers**

| Style | Cable Jacket Diameter [mm (in.)] | Wire Size, Max. | Cat. No. | |
|---|---|---|---|---|
| | | | Female | Male |
| Straight | 4.0…6.0 (0.16…0.24) | 18 AWG (0.75 $mm^2$) | **871A-TS3-R** | **871A-TS3-RM** |
| Right Angle | | | 871A-TR3-R | 871A-TR3-RM |
| Straight | 6.0…8.0 (0.24…0.32) | 18 AWG (0.75 $mm^2$) | **871A-TS3-R1** | **871A-TS3-RM1** |
| Right Angle | | | 871A-TR3-R1 | 871A-TR3-RM1 |

**Note**: Stainless steel coupling nuts available, add “S” to cat. no. (e.g., 871A**S**-TS3-R).

# Cordsets & Patchcords, Pico Style

## 24 AWG, PVC, PUR, TPE, or Shielded, Screw-On and Snap-On

## Pico Style

*Pico Screw-On Style*

### Features

- Highly visible yellow PVC jacket offers good oil and chemical resistance
- LED versions provide power and output indication for either PNP or NPN devices
- Snap-on coupling style for quick and simple connection

### Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut Material | Nickel-plated brass |
| Connector Material | Molded, oil-resistant, PUR |
| Contacts | Gold-plated brass |
| Cable | Oil-, water-, and UV-resistant, 24 AWG conductors, 300V, 4 A, AWM |
| Cable Diameter | 3/c PVC = 4.6 mm (0.18 in.)<br>3/c Foil Shield = 4.8 mm (0.189 in.)<br>3/c TPE or PUR = 4.3 mm (0.17 in.)<br>4/c PVC = 4.75 mm (0.18 in.)<br>4/c Foil Shield = 5.0 mm (0.197 in.)<br>4/c PUR or TPE = 4.6 mm (0.18 in.) |
| Bend Radius | 10x diameter, min. |
| **Electrical** | |
| Cable Rating | PVC: UL AWM style 2661 VW-1 105°C 300V, CSA AWM A/B I/II 105°C 300V FT1<br>PUR: UL AWM style 20233, 21198 or 10493 80°C 300V FT2<br>TPE: UL AWM style 20327 VW-1 105°C 300V FT1 |
| Assembly Rating | 60V AC/75V DC, 4 A |
| **Environmental** | |
| Enclosure Type Rating | Screw-type: IP67, 1200 psi (8270 kPa) washdown<br>Snap-on type: IP65 |
| Operating Temperature [C (F)] | -20…+105° (-4…+221°) |

### Approximate Dimensions [mm (in.)]

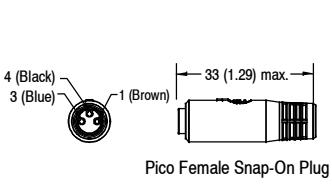



*Figure A*

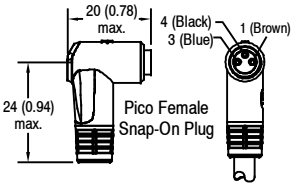



*Figure B*

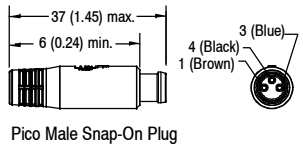



*Figure C*

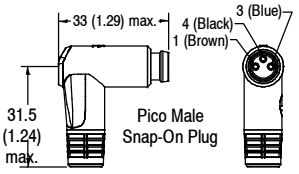



*Figure D*

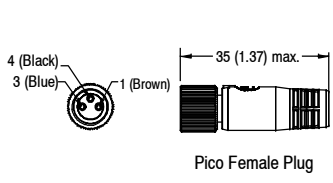



*Figure E*

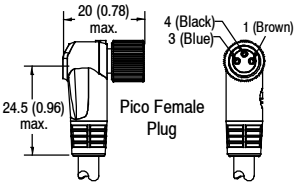



*Figure F*

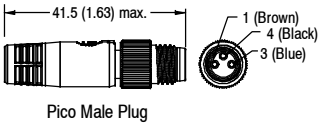



*Figure G*

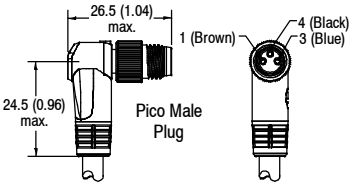



*Figure H*

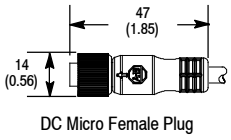



*Figure I*

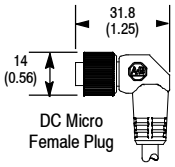



*Figure J*

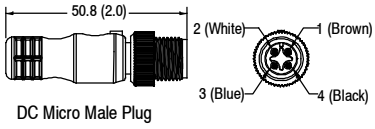



*Figure K*

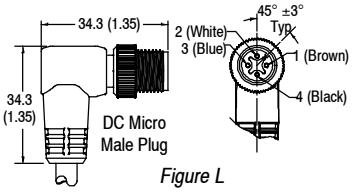
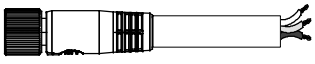
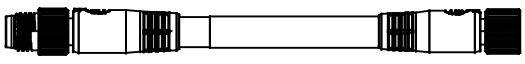



*Figure L*

Dimensions are approximate. Illustrations are not drawn to scale.

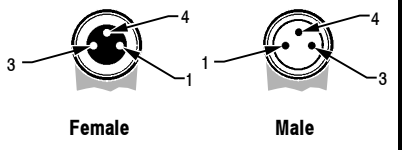
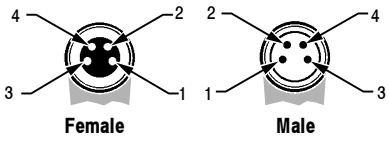


*Example of Cordset*



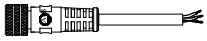
*Example of Patchcord*

## Pinout and Color Code

| Face View Pinout | |
|---|---|
| **3-Pin** | **4-Pin** |
|  |  |
| 1 Brown<br>2 NA<br>3 Blue<br>4 Black | 1 Brown<br>2 White<br>3 Blue<br>4 Black |

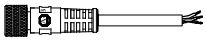
## Product Selection

### Snap-On Cordsets



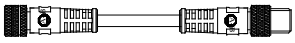
| Pin Count | Jacket Material❶ | Cat. No. | | Cat. No. | |
|---|---|---|---|---|---|
| | | Straight Female❶ | Right Angle Female❶ | Straight Male❶ | Right Angle Male❶ |
| 3-Pin | Yellow PUR Flex❶ | 889P-S3UB-❹ | 889P-Z3UB-❹ | 889P-G3UB-❹ | 889P-H3UB-❹ |
| 4-Pin | | 889P-S4UB-❹ | 889P-Z4UB-❹ | 889P-G4UB-❹ | 889P-H4UB-❹ |

### Screw-On Cordsets



| Pin Count | Jacket Material❷ | Cat. No. | | Cat. No. | |
|---|---|---|---|---|---|
| | | Straight Female❷ | Right Angle Female❷ | Straight Male❷ | Right Angle Male❷ |
| 3-Pin | Yellow PVC❷ | **889P-F3AB-❹** | **889P-R3AB-❹** | **889P-M3AB-❹** | 889P-E3AB-❹ |
| 4-Pin | | **889P-F4AB-❹** | **889P-R4AB-❹** | 889P-M4AB-❹ | 889P-E4AB-❹ |

### Screw-On Patchcords



| Pin Count | Jacket Material | Cat. No. | | Cat. No. | |
|---|---|---|---|---|---|
| | | Straight Female… Straight Male❸ | Straight Female… Right Angle Male❸ | Right Angle Female… Straight Male❸ | Right Angle Female… Right Angle Male❸ |
| Male: Pico 3-Pin<br>Female: Pico 3-Pin | Yellow AB PVC❸ | **889P-F3ABPM-❺** | **889P-F3ABPE-❺** | 889P-R3ABPM-❺ | 889P-R3ABPE-❺ |
| Male: Pico 3-Pin<br>Female: Pico 4-Pin | | 889P-F4ABP3M-❺ | 889P-F4ABP3E-❺ | 889P-R4ABP3M-❺ | 889P-R4ABP3E-❺ |
| Male: Pico 4-Pin<br>Female: Pico 4-Pin | | 889P-F4ABPM-❺ | 889P-F4ABPE-❺ | 889P-R4ABPM-❺ | 889P-R4ABPE-❺ |

❶ Replace **UB** with **JB** for black Halogen free PUR.
❷ Replace **AB** with **BB** for black PVC, **FB** for yellow PVC/foil shield and drain; **UB** for yellow PUR, flex cable, **JB** for black Halogen-free PUR, **HB** for yellow TPE flex.
❸ Replace **AB** with **BB** for black PVC, **UB** for yellow PUR, flex cable, **JB** for black Halogen-free PUR, **HB** for yellow TPE flex cable.
❹ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.
❺ Replace symbol with 0M3 (0.3 m), 1 (1 m ), 2 (2 m), 3 (3 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

# Pico Style

*3-Pin Pico Female*

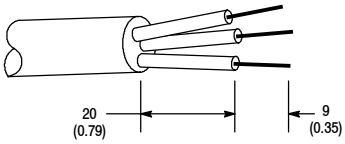
## Features

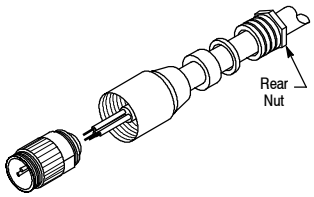
- Field installable
- 3- or 4-pin DC micro style
- Straight connectors
- Screw terminals provide simple and secure installation
- Allows easy modification of existing cable installations

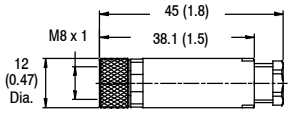
## Specifications

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Nickel-plated brass |
| Connector Shell Material | PBT |
| Contacts | Gold-plated palladium nickel |
| Cable | 20 AWG (0.5 $mm^2$) max. |
| **Electrical** | |
| Assembly Rating | 3- or 4-pin: 60V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -40…+88° (-40…+185°) |

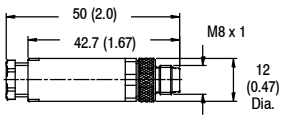
## Approximate Dimensions [mm (in.)]




Right Angle Female



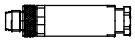

*Right Angle Male*

Dimensions are approximate. Illustrations are not drawn to scale.

## Pinout and Color Code

| Color Code | Face View Pinout | | | |
|---|---|---|---|---|
| | 4-Pin | | 5-Pin | |
| | Female | Male | Female | Male |
| A | 1 Brown<br>3 Blue | 4 Black | 1 Brown<br>2 White | 3 Blue<br>4 Black |

## Product Selection

### Terminal Chambers 

| Pin Count | Cable Jacket Diameter [mm (in.)] | Assembly Rating | Rear Nut Thread Size | Cat. No. | |
|---|---|---|---|---|---|
| | | | | Straight Female | Straight Male |
| 3-Pin | 3.5…5.0 (0.14…0.20) | 60V, 4 A | PG 7 | **871A-TS3-P** | **871A-TS3-PM** |
| 4-Pin | | | | **871A-TS4-P** | **871A-TS4-PM** |

# Pico Style

*Pico Style Male*

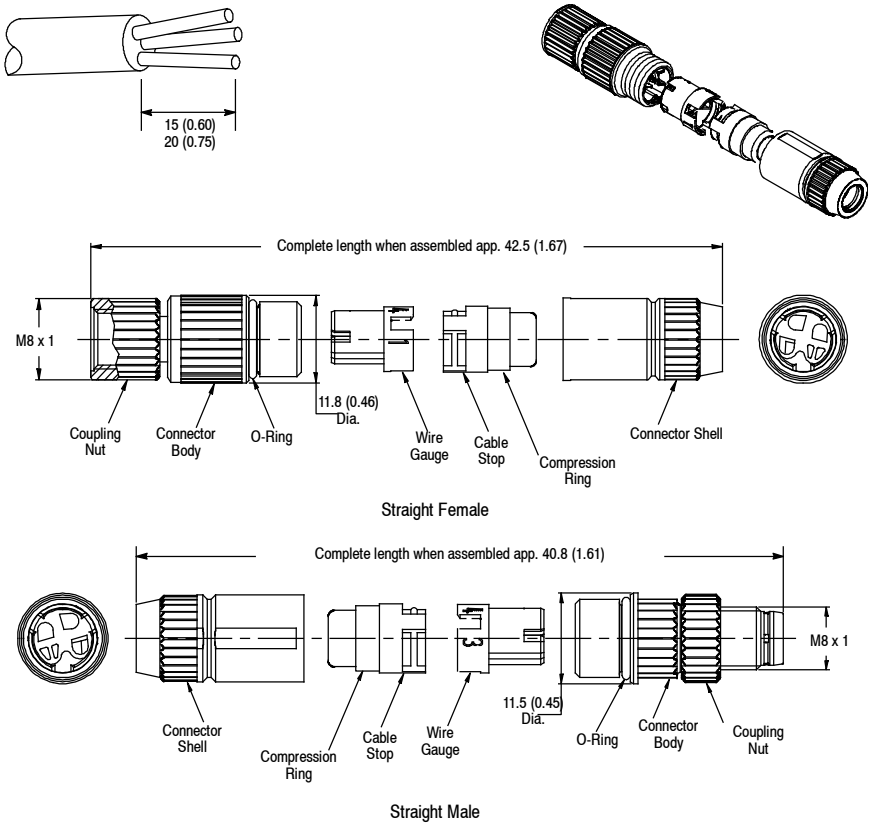
## Features

- Field installable with no hand tools needed
- 3- or 4-pin pico style
- Straight, male or female
- Allows easy modification of existing cable installations
- Insulation displacement technology for secure and reliable installation

## Specifications

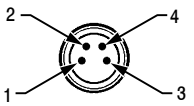
| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Nickel-plated brass |
| Connector Shell Material | Nickel-plated brass |
| Connector Body Material | Hytrel Htr 8068 |
| Field Contacts | Gold-plated palladium nickel |
| IDC Installations, Max. | 10 |
| Outside Diameter Conductor | 1.0…1.6 mm (0.04…0.063 in.) |
| Wire Size | 22 AWG…26 AWG (min. individual strand size = 38 AWG) |
| **Environmental** | |
| Enclosure Type Rating | IP67; NEMA 6P |
| Operating Temperature [C (F)] | -25…+85° (-13…+185°) |
| Installation Temperature [C (F)] | -5…+50° (23…+122°) |

## Approximate Dimensions [mm (in.)]




Dimensions are approximate. Illustrations are not drawn to scale.

## Pinout and Color Code

| Color Code | Face View Pinout | | | |
|---|---|---|---|---|
| | 3-Pin | | 4-Pin | |
| | Female | Male | Female |  Male |
| A | 1 Brown<br>3 Blue | 4 Black | 1 Brown<br>2 White | 3 Blue<br>4 Black |

## Product Selection

### Terminal Chambers

| Style | Cable Jacket Diameter [mm (in.)] | Rating | Cat. No. | |
|---|---|---|---|---|
| | | | Female | Male |
| Straight | 4.0…5.1 (0.16…0.20) | 32V<br>3 A | **889P-F3DC-H** | **889P-M3DC-H** |
| | | | 889P-F4DC-H | 889P-M4DC-H |

# Patchcords, Combination Cables

## 18…22 AWG, Yellow PVC, Micro to Mini

## Patchcords

Patchcords, Multiple Style Connectors

### Features

- Convenient connection from AC micro to mini and AC micro to DC micro
- Highly visible yellow PVC jacket offers good oil- and chemical-resistance

### Specifications759

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut | Epoxy-coated zinc |
| Material | Molded oil-resistant<br>Micro end: PUR<br>Mini end: TPE |
| Contacts | Gold-plated brass |
| Cable | Oil resistant PVC jacket, 18 AWG or 22 AWG conductors, 300V<br>UL Recognized and CSA Certified |
| Bend Radius | 10x diameter, min. |
| Cable Diameter | 6.7 mm (0.26 in.) |
| **Electrical** | |
| Cable Rating | UL AWM style 2661 VW-1 105°C 300V, CSA AWM A/B I/II 80°C 300V<br>FT1, UV oil and water resistant |
| Assembly Rating | 250V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+105° (-4…+221°) |

### Wiring Diagrams

**AC Micro Male ⟵ Mini Female**

| | |
|---|---|
| Pin 1 | Pin 1 |
| Pin 2 | Pin 2 |
| Pin 3 | Pin 3 |

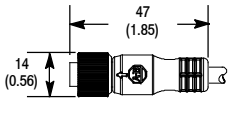
**DC Micro Male ⟵ AC Micro Female**

| | |
|---|---|
| Pin 1 | Pin 2 |
| Pin 4 | Pin 3 |
| Pin 2 (N/C) | Pin 1 (N/C) |
| Pin 3 (N/C) | |

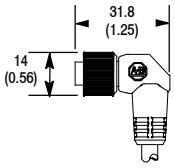
**Mini Male ⟵ AC Micro Female**

| | |
|---|---|
| Pin 1 | Pin 1 |
| Pin 2 | Pin 2 |
| Pin 3 | Pin 3 |

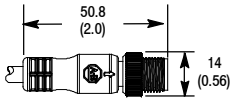
### Approximate Dimensions [mm (in.)]



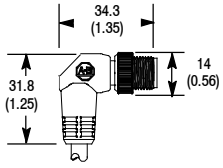

Micro Straight Female



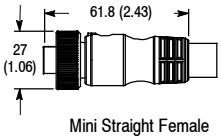

Micro Right Angle Female



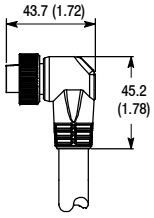

Micro Straight Male



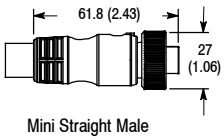

Micro Right Angle Male



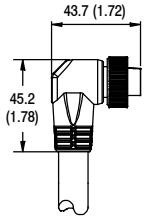

Mini Straight Female




Mini Right Angle Female

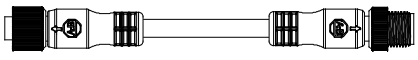



Mini Straight Male



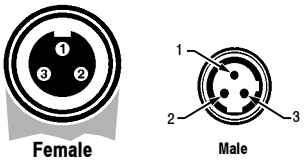

Mini Right Angle Male

Dimensions are approximate. Illustrations are not drawn to scale.

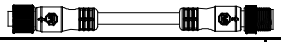


*Example of Patchcord*

## Pinout and Color Code

| No. of Pins | Face View Pinout | | |
|---|---|---|---|
| | 3-Pin Mini Female to 3-Pin AC Micro Male | 3-Pin AC Micro Female to 3-Pin Mini Male | 3-Pin AC Micro Female to 4-Pin DC Micro Male |
| |  | | |
| Pinout | A | B | C |

## Product Selection

**Patchcords** 

| Pinout | Connector Style | Wire Size, AWG | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female… Straight Male | Straight Female… Right Angle Male | Right Angle Female… Straight Male | Right Angle Female… Right Angle Male |
| A | 3-Pin Mini Female to 3-Pin AC Micro Male | 18 | 889N-F3AERM-❶ | 889N-F3ARE-❶ | 889N-R3AERM-❶ | 889N-R3ARE-❶ |
| B | 3-Pin AC Micro Female to 3-Pin Mini Male | 18 | 889R-F3AENM-❶ | 889R-F3AENE-❶ | 889R-R3AENM-❶ | 889R-R3AENE-❶ |
| C | 3-Pin AC Micro Female to 4-Pin DC Micro Male | 18 | 889R-F3AEDM-❶ | 889R-F3AEDE-❶ | 889R-R3AEDM-❶ | 889R-R3AEDE-❶ |
| C | 3-Pin AC Micro Female to 4-Pin DC Micro Male | 22 | 889R-F3ACDM-❶ | 889R-F3ACDE-❶ | 889R-R3ACDM-❶ | 889R-R3ACDE-❶ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

# Cordsets & Patchcords, Combination Connectors

## 24 AWG, PVC, PUR, or TPE, Screw-On and Snap-On, Pico to Micro

## Pico Style

*Pico to Micro Screw-On Style*

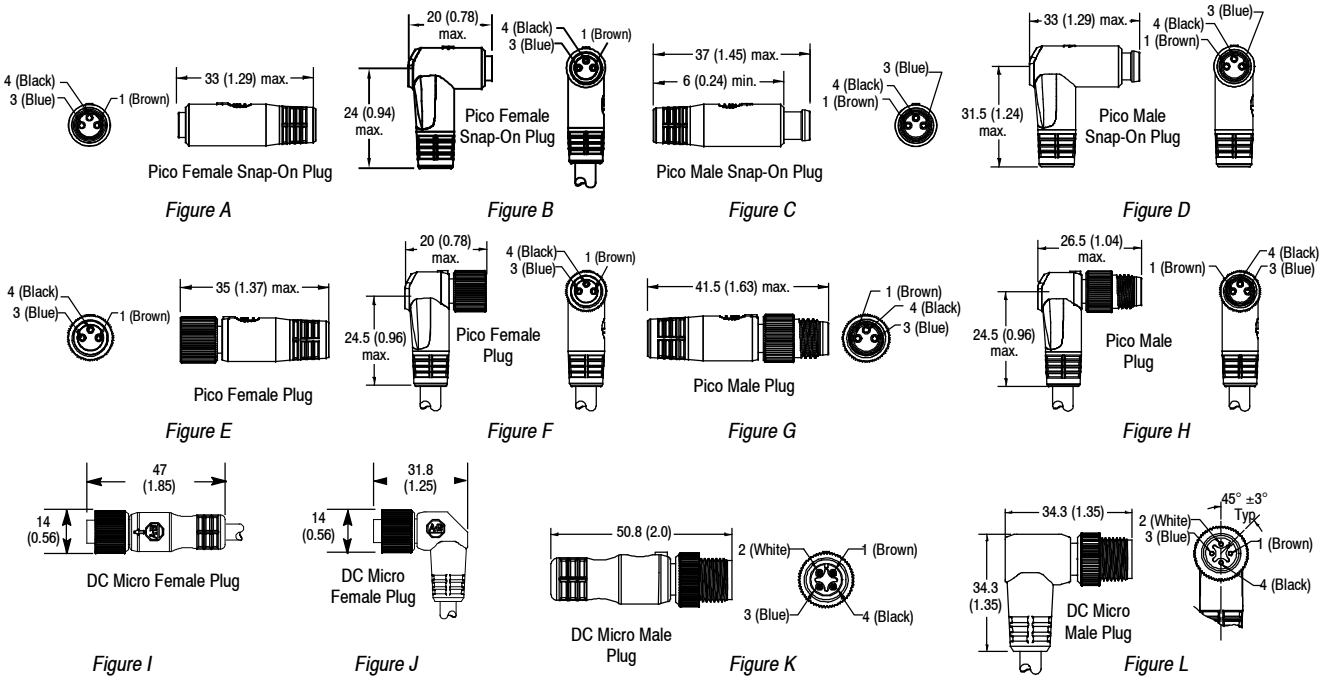
### Features

- Highly visible yellow PVC jacket offers good oil and chemical resistance
- LED versions provide power and output indication for either PNP or NPN devices
- Snap-on coupling style for quick and simple connection
- "-V" models allow wiring of devices using pin 2 for output into standard single-point distribution boxes and IP67 I/O

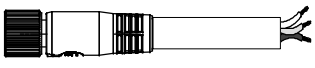
### Specifications760

| | |
|---|---|
| Certifications | UL Recognized and CSA Certified |
| **Mechanical** | |
| Coupling Nut Material | Nickel-plated brass |
| Connector Material | Molded, oil-resistant, PUR |
| Contacts | Gold-plated brass |
| Cable | Oil-, water-, and UV-resistant, 24 AWG conductors, 300V, 4 A, AWM |
| Cable Diameter | 3/c PVC = 4.6 mm (0.18 in.)<br>3/c Foil Shield = 4.8 mm (0.189 in.)<br>3/c TPE or PUR = 4.3 mm (0.17 in.)<br>4/c PVC = 5.0 mm (0.197 in.)<br>4/c PUR or TPE = 4.6 mm (0.18 in.) |
| Bend Radius | 10x diameter, min. |
| **Electrical** | |
| Cable Rating | PVC: UL AWM style 2661 VW-1 105°C 300V, CSA AWM A/B I/II 105°C 300V FT1<br>PUR: UL AWM style 20233, 21198 or 10493 80°C 300V FT2<br>TPE: UL AWM style 20327 VW-1 105°C 300V FT1 |
| Assembly Rating | 60V AC/75V DC, 4 A |
| **Environmental** | |
| Enclosure Type Rating | Screw-type: IP67, 1200 psi (8270 kPa) washdown<br>Snap-on type: IP65 |
| Operating Temperature [C (F)] | -20…+105° (-4…+221°) |

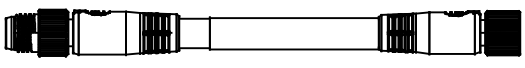
### Approximate Dimensions [mm (in.)]




Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*



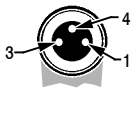
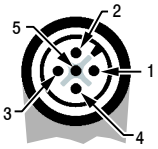
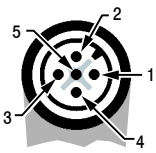
*Example of Patchcord*

# Cordsets & Patchcords, Combination Connectors

## 24 AWG, Yellow PVC, PUR, or TPE, Screw-On and Snap-On, Pico to Micro

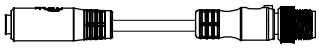
## Pinout and Color Code

**Face View Pinout**

| 3-Pin Female Pico to 4-Pin Male DC Micro | | 4-Pin Female Pico to 4-Pin Male DC Micro | | 4-Pin Female DC Micro to 3-Pin Male Pico | | 4-Pin Female DC Micro to 4-Pin Male Pico | |
|---|---|---|---|---|---|---|---|
|  |  | |  | | | | |
| Female | Male | Female | Male | Female | Male | Female | Male |

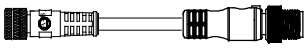
## Product Selection

### Snap-On Pico to Threaded Micro Cordsets



| Pin Count | Jacket Material | Cat. No. | | Cat. No. | |
|---|---|---|---|---|---|
| | | Straight Female to Straight Male❶ | Straight Female to Right Angle Male❶ | Right Angle Female to Straight Male❶ | Right Angle Female to Right Angle Male❶ |
| Male: Micro 4-Pin<br>Female: Pico 3-Pin | Yellow PUR Flex❶ | 889P-S3UBD4M-❸ | 889P-S3UBD4E-❸ | 889P-Z3UBD4M-❸ | 889P-Z3UBD4E-❸ |
| Male: Micro 4-Pin<br>Female: Pico 4-Pin | | 889P-S4UBDM-❸ | 889P-S4UBDE-❸ | 889P-Z4UBDM-❸ | 889P-Z4UBDE-❸ |
| Male: Micro 4-Pin<br>Female: Pico 4-Pin | | 889P-S4UBDM-V❸ | 889P-S4UBDE-V❸ | 889P-Z4UBDM-V❸ | 889P-Z4UBDE-V❸ |
| Male: Pico 3-Pin<br>Female: Micro 4-Pin | | 889D-F4UBP3G-❸ | 889D-F4UBP3H-❸ | 889D-R4UBP3G-❸ | 889D-R4UBP3H-❸ |
| Male: Pico 3-Pin<br>Female: Micro 4-Pin | | 889D-F4UBP3G-V❸ | 889D-F4UBP3H-V❸ | 889D-R4UBP3G-V❸ | 889D-R4UBP3G-V❸ |
| Male: Micro 4-Pin<br>Female: Pico 4-Pin | | 889D-F4UBPG-❸ | 889D-F4UBPH-❸ | 889D-R4UBPG-❸ | 889D-R4UBPH-❸ |

### Threaded Pico to Threaded Micro Patchcords



| Pin Count | Jacket Material | Cat. No. | | Cat. No. | |
|---|---|---|---|---|---|
| | | Straight Female to Straight Male❷ | Straight Female to Right Angle Male❷ | Right Angle Female to Straight Male❷ | Right Angle Female to Right Angle Male❷ |
| Male: Micro 4-Pin<br>Female: Pico 3-Pin | Yellow PVC❷ | **889P-F3ABD4M-❹** | 889P-F3ABD4E-❹ | 889P-R3D4M-❹ | 889P-R3ABD4E-❹ |
| Male: Micro 4-Pin<br>Female: Pico 4-Pin | | 889P-F4ABDM-❹ | 889P-F4ABDE-❹ | 889P-R4ABDM-❹ | 889P-R4ABDE-❹ |
| Male: Micro 4-Pin<br>Female: Pico 4-Pin | | 889P-F4ABDM-V❹ | 889P-F4ABDE-V❹ | 889P-R4ABDM-V❹ | 889P-R4ABDE-V❹ |
| Male: Pico 3-Pin<br>Female: Micro 4-Pin | | 889D-F4ABP3M-❹ | 889D-F4ABP3E-❹ | 889D-R4ABP3M-❹ | 889D-R4ABP3E-❹ |
| Male: Pico 3-Pin<br>Female: Micro 4-Pin | | 889D-F4ABP3M-V❹ | 889D-F4ABP3E-V❹ | 889D-R4ABP3M-V❹ | 889D-R4ABP3E-V❹ |
| Male: Pico 4-Pin<br>Female: Micro 4-Pin | | 889D-F4ABPM-❹ | 889D-F4ABPE-❹ | 889D-R4ABPM-❹ | 889D-R4ABPE-❹ |

❶ Replace **UB** with **JB** for black Halogen free PUR.
❷ Replace **AB** with **BB** for black PVC, **UB** for yellow PUR, flex cable, **JB** for black Halogen-free PUR, **HB** for yellow TPE flex cable.
❸ Replace symbol with 2 (2 m), (5 m) or 10 (10 m) for standard cable lengths.
❹ Replace symbol with 0M3 (0.3 m), 1 (1 m ), 2 (2 m), 3 (3 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

# Cordsets & Patchcords, M23 Style

**18 or 18/22 AWG, Black or Yellow PVC**

## M23 Style

12-Pin M23 Cordset

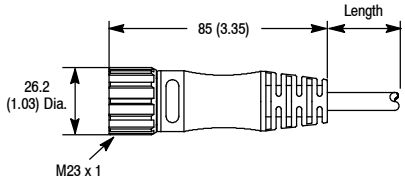
### Features

- 12-pin configuration for SafeShield light curtains and other applications
- 12-pin/11-conductor on 19-pin for passive distribution and other box applications
- Subtle black or highly visible yellow PVC jacket offers good oil and chemical resistance

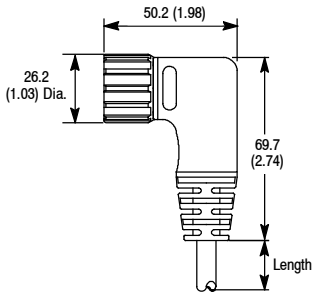
### Specifications

| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Nickel-plated brass |
| Connector | Molded oil-resistant PUR |
| Contacts | Gold over nickel-plated brass |
| Cable | Oil resistant yellow PVC jacket, 18 AWG conductors, 60V<br>UL Recognized and CSA Certified |
| Bend Radius | 10 x diameter, min. |
| Cable Diameter | 10 mm (0.41 in.) |
| **Electrical** | |
| Cable Rating | 300V |
| Assembly Rating | 9- & 12-pin: 300V, 4 A<br>11-pin: 63V, 6 A;<br>19-pin: 63V, 12 A |
| **Environmental** | |
| Enclosure Type Rating | IP67, NEMA 6P, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+80° (-4…+176°) |

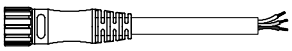
### Approximate Dimensions [mm (in.)]



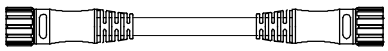

Straight Internal Threads




Right Angle Internal Threads



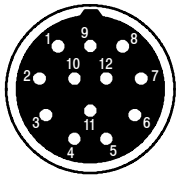
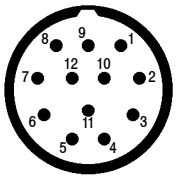
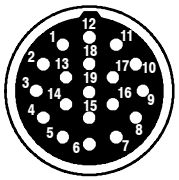
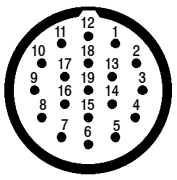
*Example of Cordset*



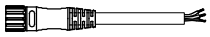
*Example of Patchcord*

Dimensions are approximate. Illustrations are not drawn to scale.

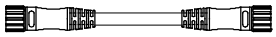
## Pinout and Color Code

| Color Code | Face View Pinout | | |
|---|---|---|---|
| | 9-, 11-, or 12-Pin | | 19-Pin |
| |  Female |  Male |  Female  Male |
| A | **9-Pin**<br>1 Brown<br>2 NA<br>3 Blue<br>4 White<br>5 NA<br>6 Green<br>7 Yellow<br>8 Grey<br>9 Pink<br>10 Red<br>11 NA<br>12 Green/Yellow | | 1 Violet<br>2 Red<br>3 Grey<br>4 Red/Blue<br>5 Green<br>6 Blue<br>7 Grey/Pink<br>8 White/Green<br>9 White/Yellow<br>10 White/Grey<br>11 Black<br>12 Green/Yellow<br>13 Yellow/Brown<br>14 Brown/Green<br>15 White<br>16 Yellow<br>17 Pink<br>18 Grey/Brown<br>19 Brown |
| B | **11-Pin**<br>1 White<br>2 Green<br>3 Yellow<br>4 Grey<br>5 Pink<br>6 Red<br>7 Black<br>8 Violet<br>9 Blue<br>10 Blue<br>11 Brown<br>12 Green/Yellow | | — |
| C | **12-Pin**<br>1 Brown<br>2 Blue<br>3 Grey<br>4 Pink<br>5 Red<br>6 Yellow<br>7 White<br>8 Red/Blue<br>9 Black<br>10 Violet<br>11 Grey/Pink<br>12 Green | | — |

## Product Selection

### Cordsets 

| Pin Count | Color Code | Jacket Color | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 9-Pin | A | Yellow | 18 AWG | **889M-F12X9AE-❶** | 889M-R12X9AE-❶ | — | — |
| 11-Pin | B | Black | 3/18 & 8/22 AWG | 889M-F11RM-❶ | 889M-R11RM-❶ | 889M-U11RM-❶ | 889M-V11RM-❶ |
| 12-Pin | C | Yellow | 18 AWG | **889M-F12AH-❶** | 889M-R12AH-❶ | — | — |
| 19-Pin | A | Black | 3/18 & 16/22 AWG | 889M-F19RM-❶ | 889M-R19RM-❶ | 889M-U19RM-❶ | 889M-V19RM-❶ |

### Patchcords 

| Pin Count | Jacket Color | Assembly Rating | Cat. No. | | | |
|---|---|---|---|---|---|---|
| | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 11-Pin | Black | 3/18 & 8/22 AWG | 889M-F11RMMU-❷ | 889M-F11RMMV-❷ | 889M-R11RMMU-❷ | 889M-R11RMMV-❷ |
| 12-Pin | Yellow | 18 AWG | 889M-F12AHMU-❸ | — | — | — |
| 19-Pin | Black | 3/18 & 16/22 AWG | 889M-F19RMMU-❷ | 889M-F19RMMV-❷ | 889M-R19RMMU-❷ | 889M-R19RMMV-❷ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.
❷ Replace symbol with 0M3 (0.3 m), 1 (1 m), 2 (2 m), 5 (5 m), or 10 (10 m) for standard cable lengths.
❸ Replace symbol with 0M3 (0.3 m), 0M6 (0.6 m), 1 (1 m), 2 (2 m) or 3 (3 m) for standard cable lengths.

# Notes

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# Quick Selection Guide

| | Cable Spools | Cordsets & Patchcords | Field Attachable RJ45 Connectors | IDC M12 D-Code Connectors | M12 to RJ45 Bulkhead Connector |
|---|---|---|---|---|---|
| **Description** | • Unshielded raw ethernet cable spools | • Cable with connector on one end or both ends | • Insulation Displacement Connectors (IDC) | • Insulation Displacement Connector (IDC) | • M12 to RJ45 bulkhead adaptor |
| **Features** | • Cable spools for custom applications | • 2 pair and 4 pair cables<br>• Riser PVC, high flex, Plenum PVC | • Easy to assemble | • Easy to assemble | • Easy transition from inside the cabinet (IP20) to On-Machine (IP67) |
| **Available Models** | • Riser PVC, 4 pair<br>• High Flex, 2 pair<br>• High Flex, 4 pair<br>• Plenum PVC, 4 pair | • M12 D-code to M12 D code<br>• M12 D-code to flying leads<br>• RJ45 to RJ45<br>• RJ45 to flying leads<br>• M12 to RJ45 | • RJ45 IDC connector<br>• RJ45 crimp connector with boot<br>• Crimp tool kit | • M12 IDC female shielded<br>• M12 IDC male shielded and unshielded | • M12 to RJ45 bulkhead adaptor, female M12 to female RJ45 |
| **Additional Info** | • See page 9-4 | • See page 9-5 | • See page 9-9 | • See page 9-11 | • See page 9-13 |

# Network Media

## Description

As ethernet becomes increasingly utilized in industrial control, survival of physical media in rugged or harsh environments is becoming a necessity. The high speed of network protocol allows it to be used in applications where other networks fall short. EtherNet/IP™ uses both standard ethernet and TCP/IP technologies and an open application layer protocol called the Control and Information Protocol (CIP). This is the same application layer used in DeviceNet™ and ControlNet™ networks.

Rockwell Automation Cat5e ethernet cables are designed to supply a reliable network connection in harsh surroundings. By optimizing the balance of twisted pair conductors inside a robust Thermoplastic Elastomer (TPE) jacket, data is protected from noise, chemicals and mechanical issues to $M_3I_3C_3E_3$ environmental protection levels. The cable is available in RJ45 patchcords for IP20 applications or in four-pin D-coded M12 patchcords for IP67 applications where high vibration, fluids and other contaminants can threaten the reliability of a network.

M12 D-code field attachable insulation displacement connectors (IDC) are available in both shielded and unshielded housings with male or female connectors. Male eight-pin RJ45 connectors are available in both a crimp termination and a toolless IDC connector for custom cabling.

Rockwell Automation M12 to RJ45 bulkhead connectors provide an elegant transition for network architecture from an IP20 setting to an IP67 environment. The adaptor can be used to connect remote junction boxes or implement an On-Machine™ solution with Armor™ I/O products.

The Rockwell Automation ethernet media portfolio provides reliable connectivity to maintain network integrity and prevent costly downtime from troubleshooting.

M12 patchcords can be used with the following sensing products:

- 48 MS MultiSight™ vision sensors
- 54RF, 55RF, and 56RF RFID ethernet control interfaces

# Ethernet Media

## Cable Spools

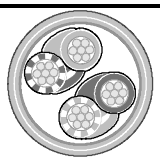
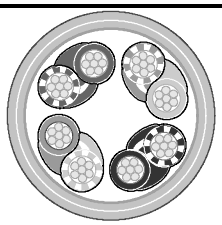
## Specifications

| | |
|---|---|
| Certifications | UL Listed and CEC |
| Cable Type | Unshielded 2- and 4-pair, Cat 5e |
| Operating Temperature [C (F)] | -40…+75° (-40…+167°) |
| Conductor Material | Tinned copper stranded |
| Bend Radius | Ten million cycles at 20 x dia., min. (TPE cable) |
| Data Rate | Up to 1 Gb/s |

## Description

Rockwell Automation Cat5e unshielded cables are designed to supply a reliable network connection in harsh surroundings. The high speed data rate provides more data to be transferred within a shorter period of time. By optimizing balance of twisted pair conductors inside a robust thermoplastic elastomer (TPE) jacket, data is protected from noise, chemicals, and mechanical issues to $M_3I_3C_3E_3$ environmental protection levels. Two and four pair TPE robotic flex cable is available for flex applications, reaching 10 million cycles, as well as a riser PVC cable for standard applications and a plenum PVC cable for air duct applications. All ethernet media components are designed to perform at TIA 568-B.2 and ODVA ethernet standards. Bulletin 1585 ethernet cables are optimized UTP cables, which can be used in place of STP for many applications. Therefore, ground potential differences, which may cause problems in shielded cabling systems, are eliminated.

## Cable and Color Code

| Two-Pair | Four-Pair |
|---|---|
|  |  |
| White/Orange<br>White/Green<br>Orange<br>Green | White/Orange<br>Orange<br>White/Green<br>Blue<br>White/Blue<br>Green<br>White/Brown<br>Brown |

## Features

- Four- and eight-conductor styles
- Unshielded cable types, Cat 5e
- 24 AWG conductors
- Twisted pairs maintain signal balance through cable to provide high noise immunity
- Designed to ODVA EtherNet/IP specifications and ISO IEC 24702
- Suitable for high noise environments $M_3I_3C_3E_3$
- Riser PVC cables used for general purpose environments
- TPE robotic cable used for flex applications, transmission-tested to 10 million cycles
- Plenum PVC cable used for air duct applications
- TPE cable meets channel transmission performance to 10 million flexes

## Product Selection

| Jacket Material | No. of Conductors | Nominal Outer Diameter [mm (in.)] | Jacket Color | Color Code | Cable Rating | Cat. No. |
|---|---|---|---|---|---|---|
| Robotic TPE | 4 | 5.6 (0.22) | Teal | White/Orange, Orange, White/Green, Green | Weld splatter, sunlight and oil resistant; UL CM; cUL CM; Standard TIA 568-B, high flex rated | **1585-C4TB-S❶** |
| Robotic TPE | 8 | 5.84 (0.23) | Teal | White/Orange, Orange, White/Green, Green, White/Blue, Blue, White/Brown, Brown | Weld splatter, sunlight and oil resistant; UL CM; cUL CM; Standard TIA 568-B, high flex rated | 1585-C8TB-S❶ |
| Robotic TPE | 8 | 5.84 (0.23) | Red | White/Orange, Orange, White/Green, Green, White/Blue, Blue, White/Brown, Brown | Weld splatter, sunlight and oil resistant; UL CM; cUL CM; Standard TIA 568-B, high flex rated | 1585-C8VB-S❶ |
| Plenum | 8 | 5.84 (0.23) | Red | White/Orange, Orange, White/Green, Green, White/Blue, Blue, White/Brown, Brown | UL CMP; cUL CMP; Standard TIA 568-B | 1585-C8MB-S❶ |
| Riser PVC | 8 | 5.84 (0.23) | Teal | White/Orange, Orange, White/Green, Green, White/Blue, Blue, White/Brown, Brown | UL CMR; CMG; cUL CMG; Standard TIA 568-B | **1585-C8PB-S❶** |

❶ Replace symbol with 100 (100 m), 300 (300 m), or 600 (600 m) for standard cable lengths.

*4-Pin M12 D Code Cordset*

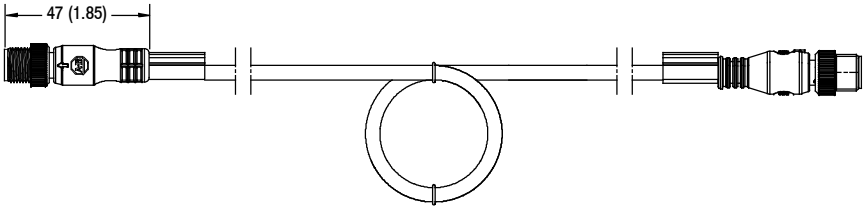
## Features

- Over molded housing suitable for IP67 applications and harsh industrial environments where extreme vibration, shock, chemicals and temperature are found.
- Flex-rated cable (cable must be tied down and not flexed within six inches of the connector
- Single-ended cordsets can be custom terminated with one of several field attachable connectors
- Designed to ODVA EtherNet/IP™ specifications and ISO IEC 24702, IEC 61918
- Twisted pairs maintain signal balance through cable to provide high noise immunity and return loss
- Suitable for noise environments $M_3I_3C_3E_3$

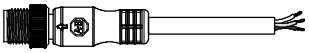
## Specifications

| | |
|---|---|
| **Mechanical** | |
| Coupling Nut Material | Nickel-plated brass |
| Housing Material | Polyurethane (PUR) |
| Contact Material | Gold-plated brass |
| Cable Type | Unshielded teal TPE, 4-conductor, stranded tinned wire, Industrial Cat5e, UL Listed, weld splatter, sunlight and oil-resistant |
| Cable Diameter [mm (in.)] | 5.84 (0.23) |
| Bend Radius | 10x diameter, min. |
| **Electrical** | |
| Cable Rating | Standard TIA 568-B, flex rated, 24 AWG: UL, CM, cULus and CM |
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -40…+75° (-40…+167°) |

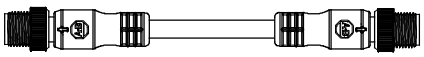
## Approximate Dimensions [mm (in.)]



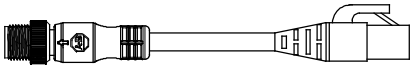

Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*



*Example of M12 to M12 Patchcord*

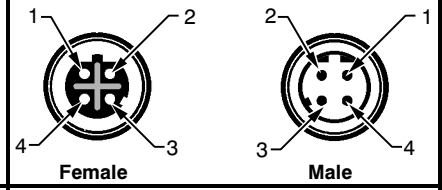
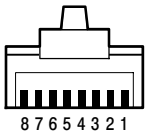


*Example of M12 to RJ45 Patchcord*

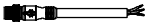
# Ethernet M12 D-Code Media

## Cordsets & Patchcords

### Pinout

| Color Code | Face View Pinout 4-Pin | | Face View RJ45 Pinout 8-Pin | |
|---|---|---|---|---|
| |  Female |  Male |  | |
| A | 1 White-Orange<br>2 White-Green | 3 Orange<br>4 Green | 1 White/Orange<br>2 Orange<br>3 White/Green<br>4 Blue<br>5 White/Blue<br>6 Green<br>7 White/Brown<br>8 Brown | TxData +<br>TxData -<br>Recv Data +<br>Unused<br>Unused<br>Recv Data -<br>Unused<br>Unused |

### Product Selection

#### M12 Cordset 

| First End Connector | Second End Connector | Cable | Cat. No. |
|---|---|---|---|
| Male M12 D-Code, Straight | Flying Leads | 4-Conductor, Teal TPE, Flex Rated | 1585D-M4TB-❶ |

#### M12 Patchcord

| First End Connector | Second End Connector | Cable | Cat. No. |
|---|---|---|---|
| Male M12 D-Code, Straight | Male M12 D-Code, Straight | 4-Conductor, Teal TPE, Flex Rated | **1585D-M4TBDM-❶** |
| Male M12 D-Code, Right Angle | Male M12 D-Code, Right Angle | 4-Conductor, Teal TPE, Flex Rated | 1585D-E4TBDE-❶ |
| Male M12 D-Code, Straight | Male M12 D-Code, Right Angle | 4-Conductor, Teal TPE, Flex Rated | 1585D-M4TBDE-❶ |
| Male M12 D-Code, Straight | Female M12 D-Code, Straight | 4-Conductor, Teal TPE, Flex Rated | 1585D-M4TBDF-❶ |

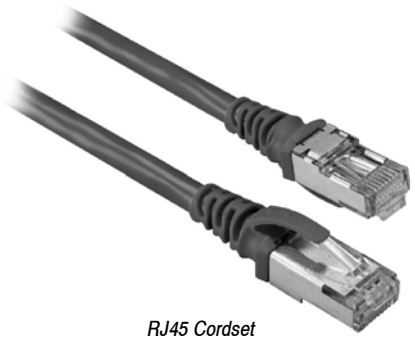
#### M12 to RJ45 Patchcord

| First End Connector | Second End Connector | Cable | Cat. No. |
|---|---|---|---|
| Male M12 D-Code | RJ45 | 4-Conductor, Teal TPE, Flex Rated | 1585D-M4TBJM-❶ |

### Accessories

| Description | Channel Bandwidth | Cat. No. |
|---|---|---|
| RJ45 Insulation Displacement Connector (IDC) | Cat. 6 | 1585J-M8CC-H❷ |
| RJ45 Crimp Connector with Boot | Cat. 5e | 1585J-M8CC-C❸ |

❶ Replace symbol with 1 (1 m), 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.
❷ Qty. = 1 piece.
❸ Qty. = 50 pieces.



*RJ45 Cordset*

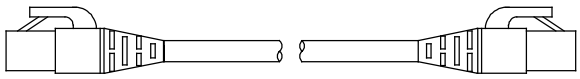
## Specifications

| | |
|---|---|
| Certifications | UL Listed |
| Connectors | RJ45 male to RJ45 male, Cat 6 |
| Cable Type | Unshielded 4- and 8-conductor, 24 AWG, Industrial Cat5e |
| Bend Radius | 10x diameter, min. |
| Enclosure Type Rating | IP20 |
| Nominal Outer Diameter [mm (in.)] | 5.84 (0.23) |
| Operating Temperature [C (F)] | -20…+60° (-4…+140°) |

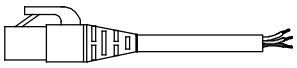
## Features

- Flex rated TPE, PVC, and Plenum cables for various applications
- Teal or red cable jacket
- Rugged strain relief and hitch mechanism to maintain network integrity
- Suitable for noise environments $M_3I_3C_3E_3$

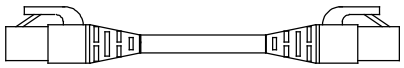
## Approximate Dimensions [mm (in.)]



Dimensions are approximate. Illustrations are not drawn to scale.



*Example of Cordset*

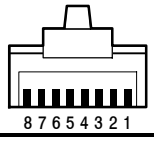


*Example of Patchcord*

# Ethernet RJ45 Media

## Cordsets & Patchcords

### Pinout

| Face View RJ45 Pinout | |
|---|---|
| 8-Pin | |
|  | |
| 1 White/Orange | TxData + |
| 2 Orange | TxData - |
| 3 White/Green | Recv Data + |
| 4 Blue | Unused |
| 5 White/Blue | Unused |
| 6 Green | Recv Data - |
| 7 White/Brown | Unused |
| 8 Brown | Unused |

### Product Selection

#### Cordset

| Cable Type | Cable Rating | Cat. No. |
|---|---|---|
| 4-conductor, teal robotic TPE | UL CM; cULus CM; Standard TIA 568-B | 1585J-M4TB-❶ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

#### Patchcords

| Cable Type | Cable Rating | Cat. No. |
|---|---|---|
| 8-conductor, teal riser PVC | UL CMR, CMG; cULus CMG; Standard TIA 568-B | **1585J-M8PBJM-❶** |
| 8-conductor, teal flex-rated robotic TPE | Weld splatter, sunlight and oil resistant; UL CM; cULus CM; Standard TIA 568-B, flex rated | 1585J-M8TBJM-❶ |
| 4-conductor, teal flex-rated robotic TPE | | 1585J-M4TBJM-❶ |
| 8-conductor, red flex-rated robotic TPE | | 1585J-M8VBJM-❶ |
| 8-conductor, red plenum | UL CMP; cULus CMP; Standard TIA 568-B | 1585J-M8MBJM-❶ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

#### Crossover Patchcords

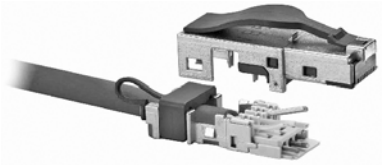
| Cable Type | Cable Rating | Cat. No. |
|---|---|---|
| 8-conductor, teal riser PVC | UL CMR, CMG; cULus CMG; Standard TIA 568-B | 1585J-M8PBJM-❶X |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

### Accessories

| Description | Cat. No. |
|---|---|
| RJ45 Insulation Displacement Connector (IDC) | 1585J-M8CC-H |
| RJ45 Crimp Connector with Boot | 1585J-M8CC-C❷ |

❷ Qty. = 50 pieces.



*RJ45 Insulation Displacement Connector (IDC)*

*RJ45 Crimp*

## Specifications

| | |
|---|---|
| Certifications | UL Listed |
| Connectors | RJ45 male |
| Enclosure Type Rating | IP20 |
| Operating Temperature [C (F)] | -20…+60° (-4…+140°) |

## Features

### IDC Connector

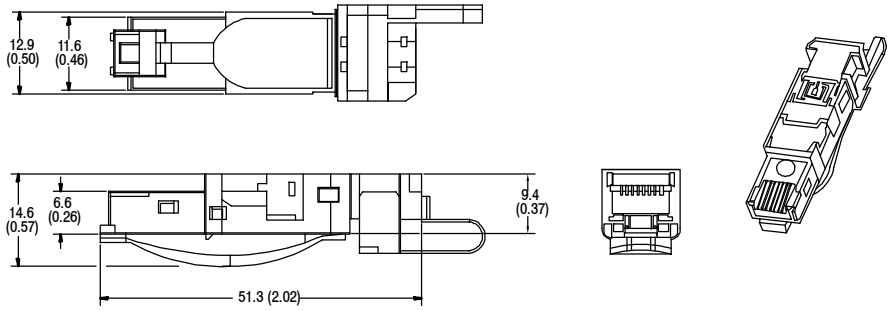
- Up to 8 conductors
- 26…22 AWG conductors
- 360° shielding
- Re-use IDC connector up to five times
- No tools or conductor stripping required
- Cat. 6

### Crimp Connector

- Up to 8 conductors
- 26…24 AWG
- Standard crimp connector with rugged boot
- Cat. 5e

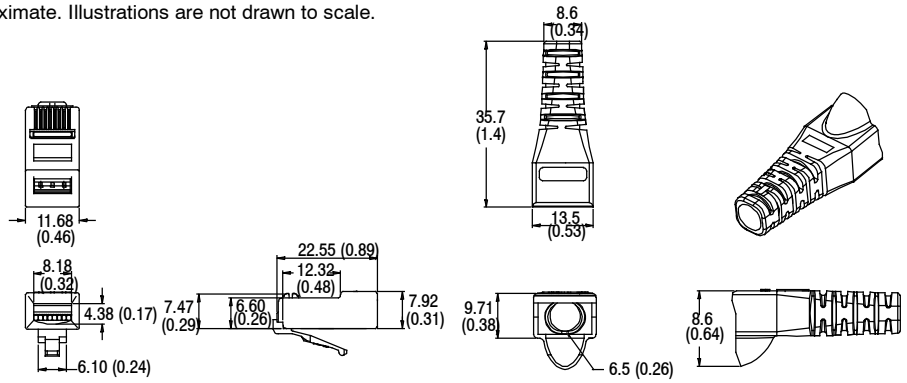
## Approximate Dimensions [mm (in.)]

### RJ45 Insulation Displacement Connector (IDC)




### RJ45 Crimp Connector

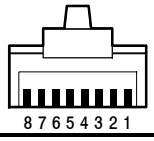
Dimensions are approximate. Illustrations are not drawn to scale.



# Ethernet RJ45 Media Accessories

## Field Attachable RJ45 Connectors

### Pinout

| Face View RJ45 Pinout | |
|---|---|
| 8-Pin | |
|  | |
| 1 White/Orange | TxData + |
| 2 Orange | TxData - |
| 3 White/Green | Recv Data + |
| 4 Blue | Unused |
| 5 White/Blue | Unused |
| 6 Green | Recv Data - |
| 7 White/Brown | Unused |
| 8 Brown | Unused |

### Product Selection

| Description | Electrical Connection | Housing Material | Insulation Material | Contact Material | Channel Bandwidth | Cat. No. |
|---|---|---|---|---|---|---|
| RJ45 Insulation Displacement Connector (IDC) | — | Diecast Zinc | Plastic | Gold-plated copper alloy | Cat. 6 | **1585J-M8CC-H❶** |
| RJ45 crimp connector with boot | 150V, 1.5 A | Clear Polycarbonate | | | Cat. 5e | 1585J-M8CC-C❷ |
| Crimp tool kit (crimper, cable stripper, cutter, conductor separator) | | | | | | 1585A-JCRIMP |

❶ Qty. = 1 pieces.
❷ Qty. = 50 piece.

*Field Attachable*

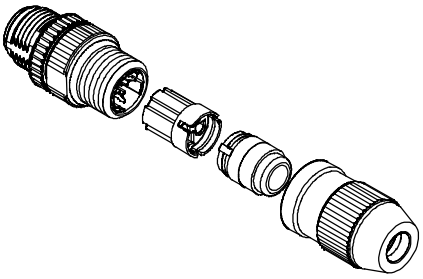
## Specifications

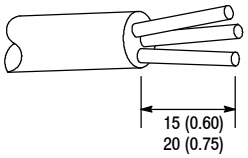
| | |
|---|---|
| **Mechanical** | |
| Coupling Nut | Zinc die-cast |
| Connector Shell Material | Zinc die-cast or polyamide |
| Contacts | Gold-plated brass |
| Maximum IDC Installation | 10 times |
| Conductor Outside Diameter | Unshielded: 26 AWG-22 AWG: 1.0…1.6 mm (0.04…0.063 in.); Shielded 24 AWG-22 AWG: 1.2…1.6 mm (0.04…0.063 in.) |
| **Electrical** | |
| Assembly Rating | 32V, 4 A |
| **Environmental** | |
| Enclosure Type Rating | IP67 |
| Operating Temperature [C (F)] | -25…85° (-13…185°) |
| Installation Temperature [C (F)] | -5…50° (23…185°) |

## Features

- Field installable with no hand tools needed
- Straight male or female shielded versions
- Allows easy modification of existing cable installations
- Insulation displacement technology for secure and reliable installation
- Metal body unit excellent in shielding applications

## Approximate Dimensions [mm (in.)]





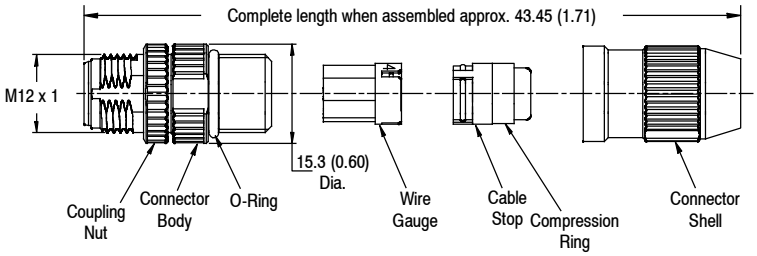
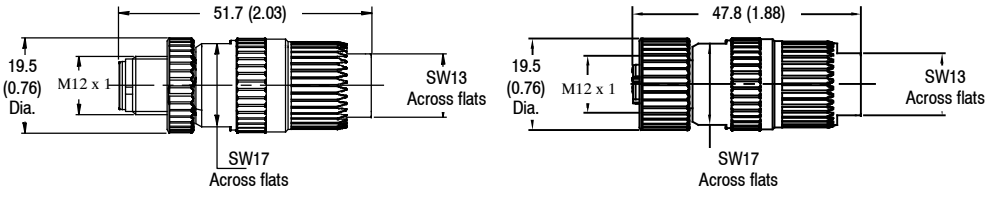



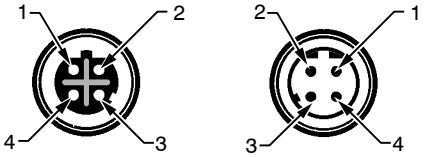

*Figure A*




*Male* *Female*

*Figure B*

## Pinout and Color Code

| Color Code | Face View M12 Pinout<br>4-Pin<br>  <br>Female | Male |
|---|---|---|
| A | 1 White-Orange<br>2 White-Green | 3 Orange<br>4 Green |



## Product Selection

| Pin Count | Connector Body | Cable Jacket Diameter [mm (in.)] | Wire Size | Assembly Rating | Dimensions | Cat. No. | |
|---|---|---|---|---|---|---|---|
| | | | | | | Straight Female | Straight Male |
| 4-Pin | Polyamide Small body unshielded | 4.0…5.1 (0.16…0.20) | 26…22 AWG | 32V 4 A | Figure A | — | **1585D-M4DC-H** |
| | Zinc die-cast Large body shielded | 5.5…7.2 (0.22…0.28) | 24…22 AWG | | Figure B | 1585D-F4DC-SH | 1585D-M4DC-SH |



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

*EtherNet M12 to RJ45 Adaptor*

## Specifications

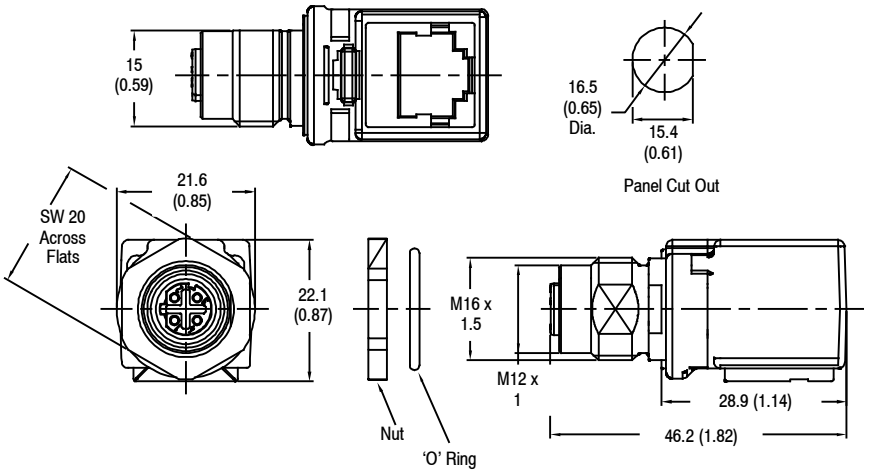
| | |
|---|---|
| Electrical Ratings | 32V 4 A |
| Receptacle Shell | Nickel-plated brass |
| Contacts | Brass with nickel plating |
| Wire Insulation | Oil-resistant PVC, 22 AWG stranded copper, 300V, UL Recognized |
| Enclosure Type Rating | IP67, 1200 psi (8270 kPa) washdown |
| Operating Temperature [C (F)] | -20…+85° (-4…+185°) |
| Certifications | UL Recognized for Canada and USA |

## Features

- M12 to RJ45 bulkhead
- Fluoroelastomer o-ring
- Convenient transition from IP67 ethernet to IP20

## Approximate Dimensions [mm (in.)]

**Ethernet Adaptor M12 Female to RJ45 Female Right Angle**




## Product Selection

| Description | Connector Body | Panel Mount Threads | Assembly Rating | Cat. No. |
|---|---|---|---|---|
| Female M12 Receptacle to RJ45 Female Adaptor Right Angle | Polyamide and Brass with Nickel Plating | PG 9 | 22 AWG<br>32V<br>4 A | **1585A-DD4JD** |

# Notes

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Inductive Proximity DeviceNet . . . . . page 10–12

Limit Switch DeviceNet . . . . . page 10–14

Encoder DeviceNet . . . . . page 10–16

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# Quick Selection Guide

| Specifications | <br>**RightSight™**<br>**Photoelectric Sensor** | <br>**SmartSight™ 9000**<br>**Photoelectric Sensor** | <br>**871TM**<br>**Inductive Proximity Sensor** |
|---|---|---|---|
| **Features** | • DeviceNet Network compatibility<br>• Patented 18 mm housing design with 1200 psi washdown rating<br>• Selectable COS/Strobe<br>• Advanced diagnostics, counter, and timers | • DeviceNet Network compatibility<br>• Harsh duty 30 mm housing<br>• 1200 psi washdown<br>• Advanced features such as teach, selectable COS/Strobe, counter, timers and diagnostics | • DeviceNet Network compatibility, stainless steel face and barrel, 1200 psi washdown rated, standard mounting, discrete or analog output, timing options, advanced diagnostics |
| **Output Type** | • DeviceNet | • DeviceNet | • DeviceNet |
| **Connections** | • 5-pin DC micro QD | • 5-pin DC micro QD<br>• 5-pin mini QD<br>• 2 m cable | • 5-pin DC micro QD<br>• 5-pin mini QD<br>• 2 m CPE cable |
| **Available Models** | • Polarized Retroreflective . . . . . 10-6<br>• Standard Diffuse . . . . . 10-6<br>• Sharp Cutoff Diffuse . . . . . 10-6<br>• Background Suppression . . . . . 10-6<br>• Infrared Fiber Optic . . . . . 10-7<br>• Transmitted Beam . . . . . 10-7 | • Retroreflective . . . . . page 10-10<br>• Polarized Retroreflective . . . . . page 10-10<br>• ClearSight™ . . . . . page 10-10<br>• Standard Diffuse . . . . . page 10-11<br>• Infrared Glass Fiber Optic . . . . . page 10-11<br>• Visible Red Glass Fiber Optic . . . . page 10-11<br>• Transmitted Beam . . . . . page 10-11 | • 18 mm shielded . . . . . 10-12<br>• 18 mm unshielded . . . . . 10-12<br>• 30 mm shielded . . . . . 10-12<br>• 30 mm unshielded . . . . . 10-12 |
| **Additional Info** | • See page 10-4 | • See page 10-8 | • See page 10-12 |

| Specifications | <br>**802DN**<br>**Limit Switch** | <br>**842D**<br>**Encoder** |
|---|---|---|
| **Features** | | • DeviceNet Network compatibility, advanced diagnostics |
| **Output Type** | • DeviceNet | • DeviceNet |
| **Connections** | • 5-pin DC micro QD<br>• 5-pin mini QD<br>• 2 m CPE cable | • 5-pin DC micro QD |
| **Available Models** | • Limit Switch without lever . . . . . 10-14<br>• Limit Switch with wide belt roller . . . . . 10-14 | • 26-bit absolute multi-turn . . . . . 10-16 |
| **Additional Info** | • See page 10-14 | • See page 10-16 |

# Introduction

## Description

Rockwell Automation/Allen-Bradley DeviceNet sensors interface directly to this industry-standard plant floor network without the need for additional I/O blocks or adaptors. In addition to the standard On/Off indication, DeviceNet compatible sensors provide advanced logic and diagnostic functions not available in competitive DeviceNet models. Logic functions include counters, timers and motion detection; the diagnostics warn of unstable application characteristics. For example, the 871TM DeviceNet proximity sensor will produce a diagnostic output when the target is too close to the sensor face or at the outside edge of the sensing range. Further, Allen-Bradley DeviceNet sensors may be configured for either strobing or change-of-state (COS) operating modes, normally open or normally closed outputs (light operate or dark operate for photoelectric sensors) and discrete or analog output. This flexibility allows a single sensor to be configured for a variety of applications.

DeviceNet sensors may be assigned any node address between 0 and 63. While a sensor's baud rate is determined automatically as it is added to the network (autobaud), it may also be manually programmed to 125, 250, or 500 kb/s. Configuration of all network and sensor parameters can be done over the network with Rockwell Software's RSNetWorx™ package and for field configuration or diagnostics, the DeviceView™ Hand-Held Configurator (2707-DNC) is available.

## Features

- Direct interface to DeviceNet network
- Strobing and COS protocols
- Autobaud detect
- Operating parameters configurable over the network
- Advanced diagnostics
- Integral timing and counting functions
- Mini, micro, or cable connection options

## DeviceNet Sensors

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# RightSight™ DeviceNet Sensors

## PHOTOSWITCH® Photoelectric Sensors

*DeviceNet RightSight*

## Description

RightSight DeviceNet photoelectric sensors interface directly to this industry standard plant floor network without the need for additional I/O blocks or adaptors.

## Features

- Compact RightSight housing
- 1200 psi (8270 kPa) washdown rating
- Direct interface to DeviceNet network
- Strobing and COS protocols
- On Delay and Off Delay/One-Shot timers
- Adjustable counter with output
- Adjustable motion detection
- Dual margin threshold diagnostics
- Autobaud

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | UL Listed, CSA Certified, and CE Marked for all applicable directives |
| Operating Environment | NEMA 4X, 6P; IP67 (IEC 529) 1200 psi (8270 kPa) washdown, IP69K |
| Operating Temperature [C (F)] | -25…+70° (-13…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5…95% (noncondensing) |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Polarized retro, diffuse, sharp cutoff diffuse, background suppression, fiber optic, transmitted beam |
| Sensing Range | See Product Selection table |
| Field of View | |
| Light Source | Visible red (660 nm), infrared (880 nm) |
| Operation Mode | Selectable light or dark operate |
| LED Indicator | See User Interface |
| Adjustments | Potentiometer for diffuse, sharp cutoff and fiber optic models only |
| **Electrical** | |
| Voltage | 11…25V DC |
| Current Consumption | 65 mA max |
| Sensor Protection | Miswire, hot insertion |
| **Communications** | |
| Response Time | 3 ms (11 ms for transmitted beam models) |
| Network Interface Type | DeviceNet |
| Messaging Type | Selectable change-of-state (COS) and strobing |
| Autobaud Detect | Selectable on/off |
| Communication Rate | Selectable 125 kb/s, 250 kb/s, 500 kb/s or autobaud |
| Node Address | Selectable 0…63 |
| Diagnostic Type | Selectable static or dynamic with dual thresholds (0.7…1.5 and 0.7…2.0) |
| **Mechanical** | |
| Housing Material | Mindel |
| Lens Material | Acrylic |
| Cover Material | Udel |
| Connection Types | 5-pin micro (M12) QD |
| Supplied Accessories | 18 mm mounting nut |
| Optional Accessories | Reflectors, cordsets, Rockwell Software RSNetworx for configuration |

## User Interface

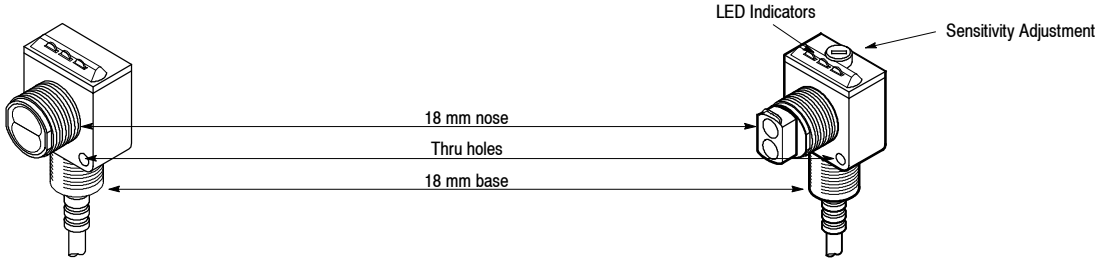
| Label | Color | State | Status |
|---|---|---|---|
| Output | Yellow | On | Target detected |
| Margin | Orange | Off | Margin < 2.0 |
| | | On | Margin > 2.0 |
| Status | Red/Green | Off | Sensor not powered |
| | | Green On Steady | Sensor active and allocated by a Master |
| | | Green Flashing | Sensor active but not allocated by a Master |
| | | Red Flashing | Minor correctable fault (baud rate) |
| | | Red On Steady | Major fault (possible duplicate address) |

### I/O Data Byte 1

| | Bit 0 | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 |
|---|---|---|---|---|---|---|---|---|
| | Sensor Output | Diagnostic | Diagnostic Margin 2x | Diagnostic Margin 3x | Motion Output | Counter Output | Not Used | Not Used |
| 0 | OFF | OK | OK | OK | Motion | Less Than Preset | | |
| 1 | ON | ALARM | Margin Unstable | Margin Unstable | No Motion | Preset Reached | | |

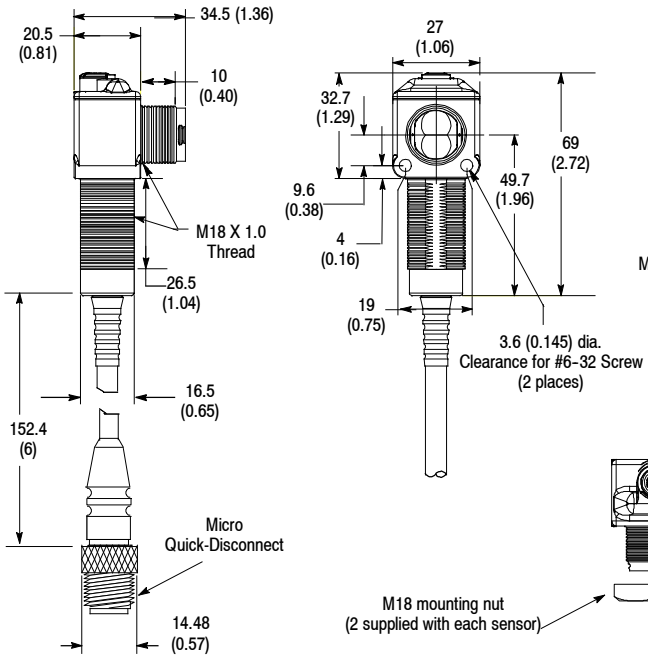
**RightSight Nonadjustable Sensor**
**(Polarized retro and background suppression models only)**

**RightSight Adjustable Sensor**
**(Diffuse, sharp cutoff and fiber optic models only)**

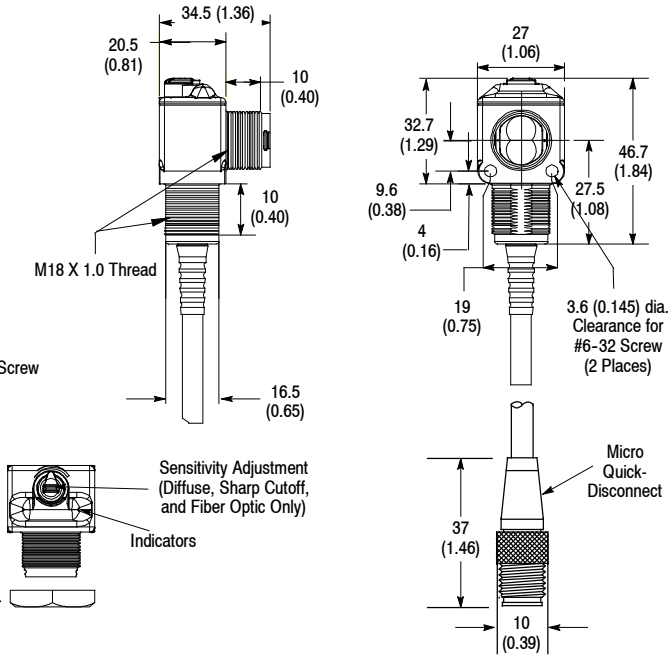



## Approximate Dimensions [mm (in.)]

**DeviceNet Models**



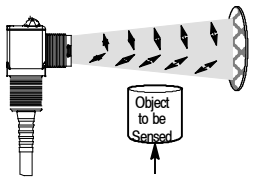
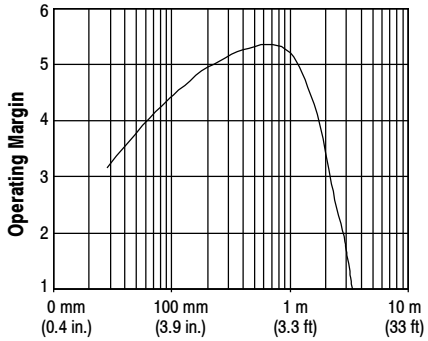
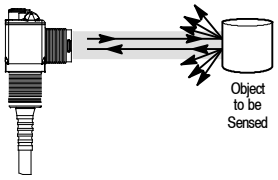
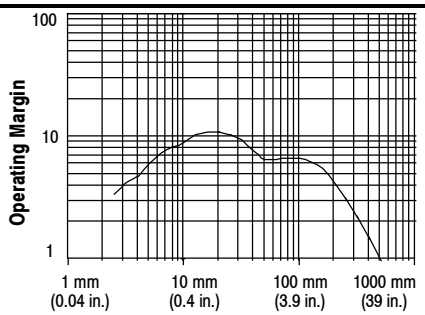
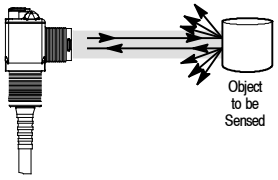
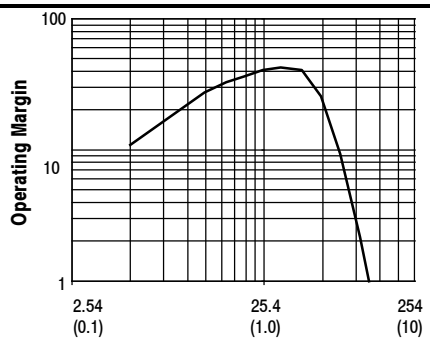
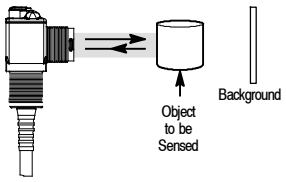
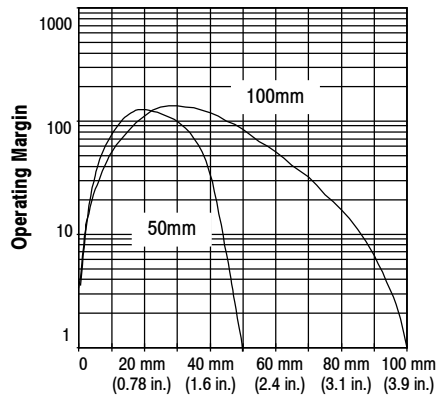

**DC Light Source Models**



# RightSight™ DeviceNet Sensors

## PHOTOSWITCH® Photoelectric Sensors

### Product Selection

| Sensing Mode | Min/Max Sensing Distance | Connection Type | Cat. No. | Typical Response Curve |
|---|---|---|---|---|
|  *Polarized Retroreflective*<br>**Field of View**: 1.5°<br>**Light Source**: Visible red 660 nm | 25 mm (1.0 in.)/ 3 m (9.8 ft) | 5-pin DC micro QD | **42EF-P2LDB-F5** |  **Distance to 76 mm Reflector—92-39** |
|  *Standard Diffuse*<br>**Field of View**: 5°<br>**Light Source**: Infrared 880 nm | 3 mm (0.12 in.)/ 500 mm (20 in.) | | **42EF-D1LDAK-F5** |  **Distance to White Target** |
|  *Sharp Cutoff Diffuse*<br>**Field of View**: 7°<br>**Light Source**: Infrared 880 nm | <130 mm (5 in.)<br>40 mm (1.5 in.) @ 30x margin | | 42EF-S1LDA-F5 |  **Distance to White Target [mm (in.)]** |
|  *Background Suppression*<br>**Field of View**: 20° (50 mm models)<br>8° (100 mm models)<br>**Light Source**: Infrared 880 nm | 3 mm (0.12 in.)/ 50 mm (2 in.) | | 42EF-B1LDBC-F5 |  **Distance to White Target** |
| | 3 mm (0.12 in.)/ 100 mm (4 in.) | | 42EF-B1LDBE-F5 | |



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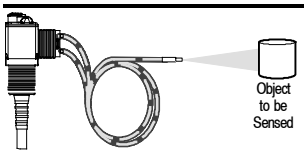
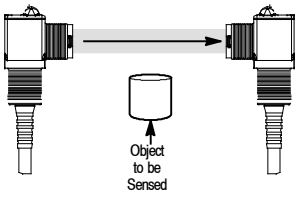
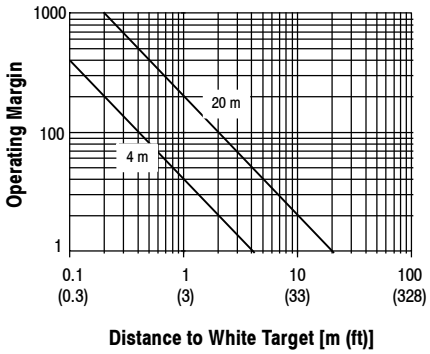
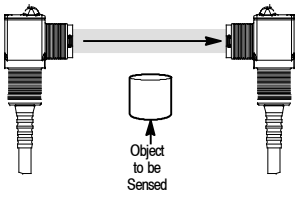
Preferred availability cat. nos. are printed in **bold**.

Allen-Bradley

## Product Selection (continued)

| Sensing Mode | Min/Max Sensing Distance | Connection Type | Cat. No. | Typical Response Curve |
|---|---|---|---|---|
|  *Large Aperture Glass Fiber Optic* **Light Source**: Infrared 880 nm | Depends on fiber optic cable selected | 5-pin DC micro QD | 42EF-G1LDA-F5 | Depends on fiber optic cable selected. See page 1-235 for fiber optic cable selection. |
|  *Transmitted Beam* **Light Source**: Infrared 880 nm | See receiver models below | 5-pin DC micro QD | 42EF-E1EDZB-F5 |  |
| | | 4-pin DC micro QD | 42EF-E1EZB-F4 | |
| | | 2m 300V cable | 42EF-E1EZB-A2 | |
|  *Transmitter Beam Receiver* **Field of View**: 7° | 25 mm (1 in.)/ 4 m (13 ft) | 5-pin DC micro QD | **42EF-R9LDBV-F5** | |
| | 25 mm (1 in.)/ 20 m (60 ft) | | 42EF-R9LDB-F5 | |

## Accessories

| Description | Cat. No. |
|---|---|
| Reflector, 76 mm (3 in.) diameter with center mount hole | 92-39 |
| Reflector, 32 mm (1.25 in.) diameter | 92-47 |
| Mounting bracket swivel/tilt | 60-2649 |
| 2 m (6.5 ft) micro QD cordset | 1485R-P2R5-C |
| 2 m (6.5 ft) micro QD patchcord | 1485R-P2R5-F5 |

For additional mounting brackets and accessories, see page 1-293.

**Refer to *www.rockwellautomation.com/resources/eds* for EDS files.**

# SmartSight™ 9000 DeviceNet Sensors

## Description

SmartSight photoelectric sensors interface directly to this industry standard plant floor network without the need for additional I/O blocks or adaptors. They combine the benefits of the Series 9000 mechanical and optical package with the DeviceNet bus system.

## Features

- Local and remote self-teach operation
- 1200 psi washdown rating
- Selectable strobing and COS
- Low margin diagnostics
- Adjustable motion detect
- On delay and off delay one-shot
- Adjustable counter with output

## General Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications (Ordinary Locations) | cULus Listed and CE Marked for all applicable directives |
| Operating Environment | NEMA 3, 4X, 6P, 12, 13; IP67 (IEC 529) 1200 psi (8270 kPa) washdown, IP69K |
| Operating Temperature [C(F)] | -25…+70° (-13…+158°) |
| Vibration | 10…55 Hz, 1 mm amplitude, meets or exceeds IEC 60947-5-2 |
| Shock | 30 g with 1 ms pulse duration, meets or exceeds IEC 60947-5-2 |
| Relative Humidity | 5....95% (noncondensing) |
| Ambient Light Immunity | Incandescent light 5000 lux |
| **Optical** | |
| Sensing Modes | Retroreflective, polarized retro, diffuse, clear object, transmitted beam |
| Sensing Range | See Product Selection table |
| Field of View | See Product Selection table |
| Light Source | Visible red (660 nm), infrared (880 nm) |
| Operation Mode | Selectable light operate or dark operate |
| LED Indicator | See table on page 10-9 |
| Adjustments | Push button for sensitivity adjustments |
| **Electrical** | |
| Voltage | 11…25V DC |
| Current Consumption | 75 mA max |
| Sensor Protection | Miswire, hot insertion |
| **Communications** | |
| Response Time | 3.5 ms |
| Network Interface Type | DeviceNet |
| Messaging Type | Selectable change-of-state (COS) and strobing |
| Autobaud Detect | Selectable on/off |
| Communication Rate | Selectable 125 kb/s, 250 kb/s, 500 kb/s or autobaud |
| Node Address | Selectable 0…63—via network or local switch |
| Diagnostic Type | Selectable static or dynamic with dual thresholds (0.7…1.5 and 0.7…2.0) |
| **Mechanical** | |
| Housing Material | Valox® |
| Lens Material | Acrylic |
| Cover Material | Neoprene |
| Connection Types | 5-pin DC micro QD, 5-pin DC mini QD, 2 m (6.5 ft) drop cable |
| Supplied Accessories | 129-130 mounting kit |
| Optional Accessories | Reflectors, cordsets, Rockwell Software RSNetWorx for configuration |

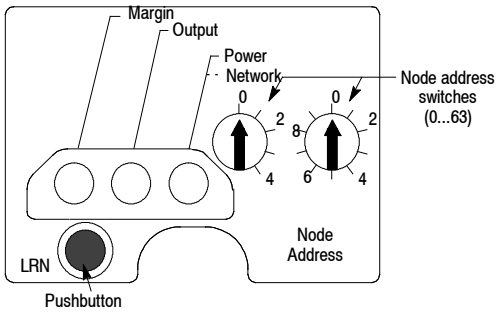
# SmartSight™ 9000 DeviceNet Sensors

## I/O Data

| | Bit 0 | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 |
|---|---|---|---|---|---|---|---|---|
| | Sensor Output | Diagnostic | Diagnostic Margin 2X | Diagnostic Margin 3X | Motion Output | Counter Output | Not Used | Not Used |
| 0 | OFF | OK | OK | OK | Motion | Less Than Preset | | |
| 1 | ON | ALARM | Margin Unstable | Margin Unstable | No Motion | Preset Reached | | |

## Indicators (refer to illustration)

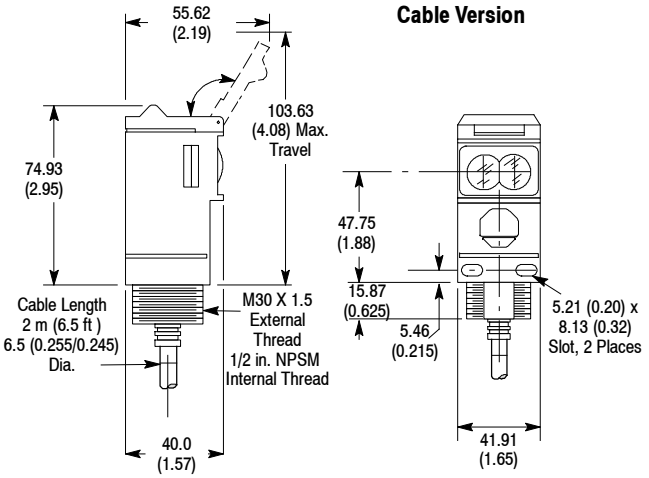
| Label | Color | State | Status |
|---|---|---|---|
| Output | Yellow | ON | Target detected |
| Margin | Orange | OFF | Margin < 2.0 |
| | | ON | Margin ≥2.0 |
| Status | Red/Green | OFF | Sensor not powered or auto baud |
| | | Green ON Steady | Sensor active and allocated by master |
| | | Green Flashing | Sensor active but not allocated by master |
| | | Red Flashing | Minor correctable fault (baud rate) |
| | | Red ON Steady | Major fault (possible duplicate address) |




**NOTE**: LED indicators are used during the *Self-Teach* operation of the sensor. Refer to publication 1000002281 for complete instructions on using this feature.

## Approximate Dimensions [mm (inches)]

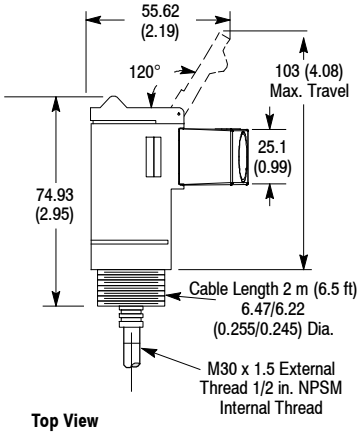
### All Models Except ClearSight

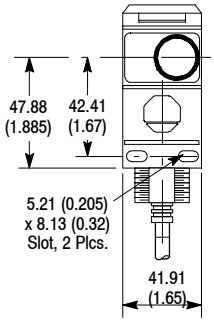



### Cable Version

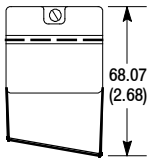



### ClearSight Models



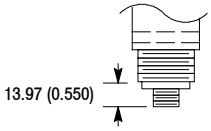




**Top View**

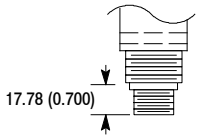



### Connector Version

**Micro Style**




**Mini Style**

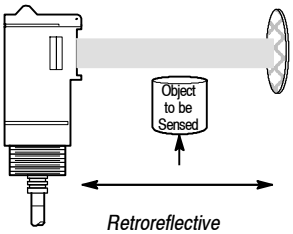
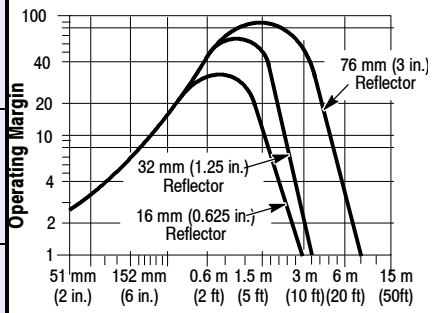
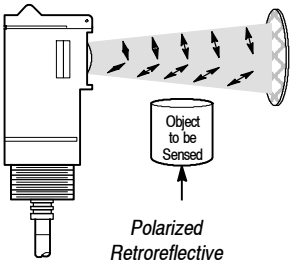
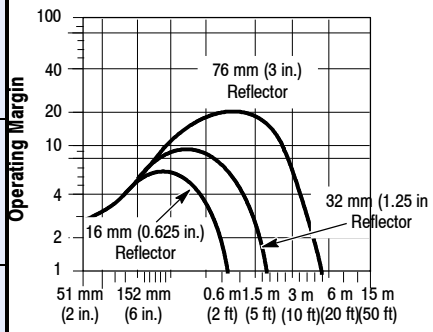
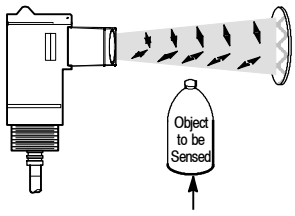
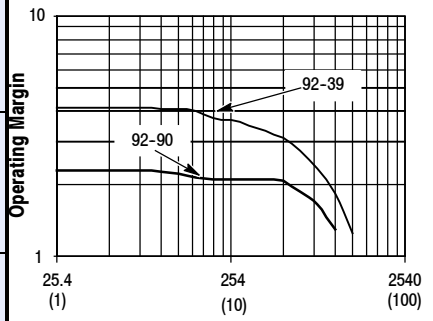
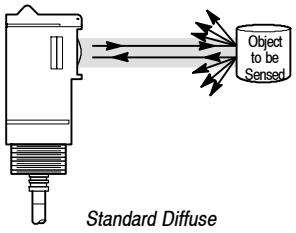
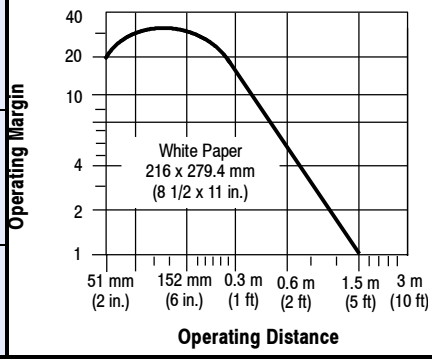



### Thread Size

| | |
|---|---|
| Micro Style | M12 x 1 1 Keyway |
| Mini Style | 7/8-16 UN 1 Keyway |

# SmartSight™ 9000 DeviceNet Sensors

## Product Selection

| Sensing Mode | Min/Max Sensing Distance | Connection Type | Cat. No. | Typical Response Curve |
|---|---|---|---|---|
|  *Retroreflective*<br>**Field of View**: 1.5°<br>**Light Source**: Visible red 660 nm | 51 mm (2 in.)<br>9.14 m (30 ft) with 76 mm (3 in.) Reflector | 2 m CPE cable | 42GNU-9020 |  |
| | | 5-pin DC micro QD | 42GNU-9020-QD | |
| | | 5-pin mini QD | 42GNU-9020-QD1 | |
|  *Polarized Retroreflective*<br>**Field of View**: 1.5°<br>**Light Source**: Visible red 660 nm | 51 mm (2 in.)<br>4.87 m (16 ft) with 76 mm (3 in.) Reflector | 2 m CPE cable | 42GNU-9220 |  |
| | | 5-pin DC micro QD | 42GNU-9220-QD | |
| | | 5-pin mini QD | 42GNU-9220-QD1 | |
|  *ClearSight ™*<br>**Field of View**: 1.5°<br>**Light Source**: Visible red 660 nm | 0…1200 mm (0…48 in.) | 2 m CPE cable | 42GNC-9220 |  |
| | | 5-pin DC micro QD | 42GNC-9220-QD | |
| | | 5-pin mini QD | 42GNC-9220-QD1 | |
|  *Standard Diffuse*<br>**Field of View**: 3.5°<br>**Light Source**: Infrared 880 nm | 50.8 mm (2 in.)<br>1.52 m (5 ft) to White Paper | 2 m CPE cable | 42GNP-9020 |  |
| | | 5-pin DC micro QD | 42GNP-9020-QD | |
| | | 5-pin mini QD | 42GNP-9020-QD1 | |



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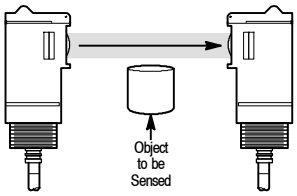
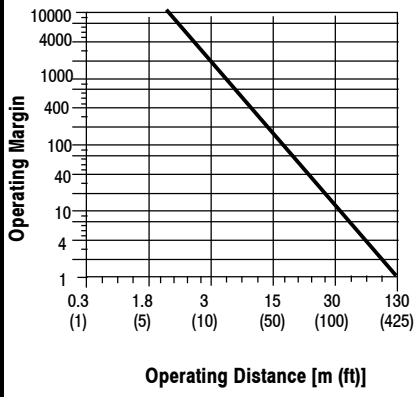
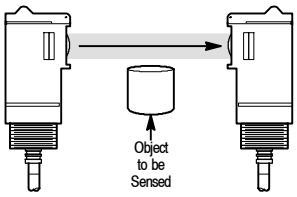
## Product Selection (continued)

| Sensing Mode | Min/Max Sensing Distance | Connection Type | Cat. No. | Typical Response Curve |
|---|---|---|---|---|
|  *Transmitted Beam* **Field of View**: 1.5° **Light Source**: Infrared 880 nm | 130 m (425 ft) | 5-pin DC micro QD | 42GNL-9040-QD |  |
| | | 5-pin DC mini QD | 42GNL-9040-QD1 | |
|  *Transmitted Beam Receiver* | 130 m (425 ft) | 2 m CPE cable | 42GNR-9020 | |
| | | 5-pin DC micro QD | 42GNR-9020-QD | |
| | | 5-pin mini QD | 42GNR-9020-QD1 | |

## Accessories

| Description | Cat. No. | Description | Cat. No. |
|---|---|---|---|
| Reflector, 76 mm (3 in.) Diameter with Center Mount Hole | 92-39 | Mounting Bracket Swivel/Tilt (nonClearSight models) | 60-2439 |
| Reflector, 32 mm (1.25 in.) Diameter | 92-47 | Mounting Bracket Swivel/Tilt (ClearSight models) | 60-2681 |

**Refer to *www.rockwellautomation.com/resources/eds* for EDS files.**

# 871TM DeviceNet Sensors

## Inductive Proximity Sensors

*871TM DeviceNet Cable Style*
*18, 30 mm*
*page 10-13*

*871TM DeviceNet Mini*
*Quick-Disconnect Style*
*18, 30 mm*
*page 10-13*

*871TM DeviceNet Micro*
*Quick-Disconnect Style*
*18, 30 mm*
*page 10-13*

## Features

- Connects directly to DeviceNet networks
- Autobaud
- Discrete and analog output
- Diagnostic capabilities available
  - Object too close
  - Sensor operational
  - Object too far
- Timing functions: On, Off, and One-Shot Delay configuration
- Configurable normally open/normally closed
- Motion detection
- Teach/learn target capabilities
- UL Listed, cUL Certified, and CE Marked for all applicable directives

## Specifications

| | |
|---|---|
| Current Drain | ≤60 mA |
| Operating Voltage | 11…25V DC |
| Repeatability | ≤1% at constant temperature |
| Hysteresis | 10% typical |
| Approvals | UL Listed, cUL Certified, and CE Marked for all applicable directives |
| Enclosure | NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529),<br>1200 psi (8270 kPa) washdown<br>Stainless steel face and barrel |
| Connections | Cable: 2 m (6.5 ft) length<br>Quick-Disconnect: 5-pin mini style<br>5-pin micro style |
| LEDs | Bicolor Red/Green: DeviceNet Network/Status<br>Amber: Output energized |
| Operating Temperature [mm (in.)] | -25…+70° (-13…+158°) |
| Shock | 30 g, 11 ms |
| Vibration | 55 Hz, 1 mm amplitude, 3 planes |

**Correction Factors**

| Target Material | Correction Factor |
|---|---|
| Steel | 1.0 |
| Stainless Steel | 0.9…1.0 |
| Brass | 0.3…0.5 |
| Aluminum | 0.1…0.4 |
| Aluminum ≤0.020 Thick | 0.9…1.1 |
| Copper | 0.4…0.6 |

## Indicators (refer to illustration)

| Label | Color | State | Status |
|---|---|---|---|
| Output | Yellow | On | Target detected |
| Status | Red/Green | Off | Sensor not powered |
| | | Green On Steady | Sensor active and allocated by a Master |
| | | Green Flashing | Sensor active but not allocated by a Master |
| | | Red Flashing | Minor correctable fault (baud rate) |
| | | Red On Steady | Major fault (possible duplicate address) |

## I/O Data

Strobe and Change-of-State Output:

| | Bit 0 | Bit 1 | Bit2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 |
|---|---|---|---|---|---|---|---|---|
| **Byte 1** | Sensor Output | Diagnostic | Coil Operational | Too Close | Too Far | Always In | Motion Detect | Counter Output |
| **Byte 2** | **Bit 0** | **Bit 1** | **Bit2** | **Bit 3** | **Bit 4** | **Bit 5** | **Bit 6** | **Bit 7** |
| | Analog Output (Strobe Only) | | | | | | | |

## Product Selection

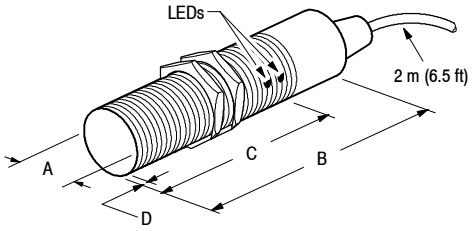
| Barrel Dia. | Nominal Sensing Distance [mm (in.)] | Shielded | Output Configuration | Cat. No. | | |
|---|---|---|---|---|---|---|
| | | | | Cable Style | Mini QD Style | Micro QD Style |
| 18 mm | 5 (0.20) | Y | Programmable N.O./N.C. | 871TM-D5ED18-S2 | 871TM-D5ED18-N5 | 871TM-D5ED18-D5 |
| | 8 (0.31) | N | | 871TM-D8ED18-S2 | 871TM-D8ED18-N5 | 871TM-D8ED18-D5 |
| 30 mm | 10 (0.39) | Y | | 871TM-D10ED30-S2 | 871TM-D10ED30-N5 | 871TM-D10ED30-D5 |
| | 15 (0.59) | N | | 871TM-D15ED30-S2 | 871TM-D15ED30-N5 | 871TM-D15ED30-D5 |

## Accessories

| Description | Page Number |
|---|---|
| Terminal Chambers | 8-1 |
| Mounting Brackets | 2-210…2-214 |
| End Caps | 2-219, 2-220 |
| Mounting Nuts | 2-221…2-222 |

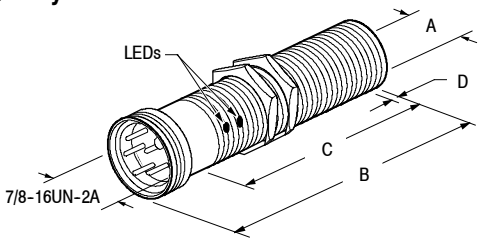
## Approximate Dimensions [mm (in.)]

### Cable Style

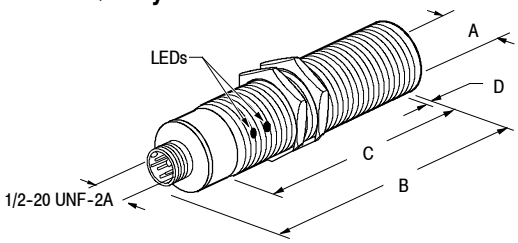



| Cable Style | | | | | |
|---|---|---|---|---|---|
| Thread Size | Shielded | mm (inches) | | | |
| | | A | B | C | D |
| M18 x 1 | Y | 18.0 (0.71) | 74.7 (2.94) | 60.0 (2.36) | 2.5 (0.10) |
| | N | | | 48.2 (1.90) | 14.4 (0.56) |
| M30 x 1.5 | Y | 30.0 (1.18) | 77.2 (3.04) | 61.3 (2.41) | 2.5 (0.10) |
| | N | | | 41.6 (1.64) | 17.9 (0.70) |

### Mini QD Style




### Micro QD Style




| Mini QD Style | | | | | | Micro QD Style | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Thread Size | Shielded | mm (inches) | | | | Thread Size | Shielded | mm (inches) | | | |
| | | A | B | C | D | | | A | B | C | D |
| M18 X 1 | Y | 18.0 (0.71) | 76.6 (3.02) | 54.9 (2.16) | 2.5 (0.10) | M18 X 1 | Y | 18.0 (0.71) | 84.3 (3.32) | 60.0 (2.36) | 2.5 (0.10) |
| | N | | | 43.1 (1.70) | 14.4 (0.56) | | N | 18.0 (0.71) | 84.3 (3.32) | 48.2 (1.90) | 14.4 (0.56) |
| M30 X 1.5 | Y | 30.0 (1.18) | 86.4 (3.40) | 61.3 (2.41) | 2.5 (0.10) | M30 X 1.5 | Y | 30.0 (1.18) | 85.7 (3.37) | 61.3 (2.41) | 2.5 (0.10) |
| | N | | | 41.6 (1.64) | 17.9 (0.70) | | N | 30.0 (1.18) | 85.7 (3.37) | 46.1 (1.81) | 17.9 (0.70) |

# 802DN Lever Type with DeviceNet Output • Spring Return

## NonPlug-In Style Oiltight Limit Switches

*NonPlug-In Style 802DN-AD5 without Lever*

## Specifications

| | |
|---|---|
| Enclosure Rating | NEMA 1, 4, 6P, 13; IP67 (IEC 529) |
| Certifications | UL Listed, CSA Certified, and CE Marked for applicable directives |
| Ambient Temperature [C (F)] | NonPlug-In limit switches are designed to operate in an ambient temperature range of -18…+54° (0…+130°) |

## Description

Bulletin 802DN DeviceNet limit switches have been designed with the same rugged features of our 802T NEMA limit switches with the features and benefits of DeviceNet built in. These limit switches utilize DeviceNet technology to address the primary customer needs. The three most common needs are increased information flow, an inexpensive way to connect limit switches to a DeviceNet network, and reduction of down time by using the advanced diagnostic capabilities only available though DeviceNet. 802DN limit switches are configured using RSNetWorx for DeviceNet. Online configuration help is available using the parameter help feature.

## Features

- Direct connection to DeviceNet network
- Autobaud
- Dual outputs with distinct programmable angles to operate
- Teach and learn angle
- Each output programmable to N.O. or N.C.
- Programmable travel to reset (hysteresis)
- Configurable counters with resets on each output

## Features (continued)

- Multiple timing functions

  Programmable in 1 ms increments
  - On delay timer
  - Off delay timer
  - One shot timer
- User-selectable discrete or analog output
- Multiple maintenance warnings
  - Overtravel alarm
  - Motion detection
  - Slow lever return alarm
  - Jam detect
- User defined counter preset used for Tracking total operations and maintenance alarming
- Supports change-of-state (COS) or strobing protocol

## High Degree of Versatility

Bulletin 802DN limit switches can be mounted in any position, with operating heads that can be rotated and fastened in any one of four positions 90° apart. Most operating levers are interchangeable and can be rotated and clamped in any position through 360°.

## NEMA Type 13 Construction

802DN limit switches feature NEMA Type 13 construction with synthetic rubber seals to protect the operating parts against entry of oil, dust, abrasives, water and coolant, within the limits of NEMA-specified tests.

## Easy Mounting and Wiring

Each switch base has four mounting holes: two “through” holes for front mounting and two tapped holes in the back for rear mounting. Three different wiring styles are available for ease of installation. Each of the models is available for order with one of the following: a five-pin micro quick-disconnect, a five-pin mini quick-disconnect, or a prewired two meter cable.

## Lever Type Switches

These switches are operated by means of a lever that is clamped to a knurled shaft extending from the operating head.

Lever type switches can be equipped with a variety of operating levers: roller lever, adjustable roller lever, micrometer adjustment roller lever, rod lever, one-way rod or roller lever and fork lever. These can be used interchangeably on all lever type switches.

The micrometer adjustment roller lever, Cat. No. **802T-W6**, is designed especially for installations where the exact position of the roller is critical. This lever has a pivoted roller which can be turned laterally. After clamping the lever to the switch shaft, the position of the roller can be precisely adjusted through an arc of 7.5° on either side of the center or straight-line position.

## Wide Belt Roller

The **802DN-WBR-XX** limit switches come packaged with a special lever arm. This limit switch has been specifically designed for precise position detection of conveyor belts. By using the advanced features of DeviceNet, this limit switch is ideal for this application.

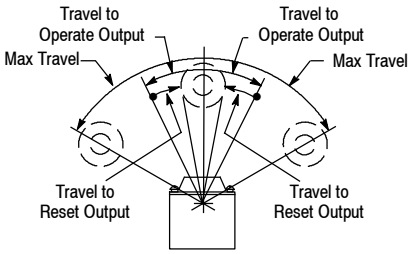
## Operating Levers

See pages 6-91…6-96.

# 802DN Lever Type with DeviceNet Output • Spring Return

## NonPlug-In Style Oiltight Limit Switches

## Range of Operation



*Switch Without Lever*

## Product Selection

| Lever Movement | Torque to Operate (Max) | Travel to Operate Output #1 | Travel to Operate Output #2 | Max Travel | Travel to Reset | Lever | Connection Type | Cat. No. |
|---|---|---|---|---|---|---|---|---|
| Clockwise or Counterclockwise | 0.34 N•m (3 lb•in.) | Programmable | Programmable | 54° | Programmable (5° min) | None | 2 m cable | 802DN-AS2 |
| | | | | | | | 5-pin mini | 802DN-AN5 |
| | | | | | | | 5-pin micro | 802DN-AD5 |
| | | | | | | Wide belt roller | 2 m cable | 802DN-WBRS2 |
| | | | | | | | 5-pin mini | 802DN-WBRN5 |
| | | | | | | | 5-pin micro | 802DN-WBRD5 |

## I/O Data

**Byte 1**

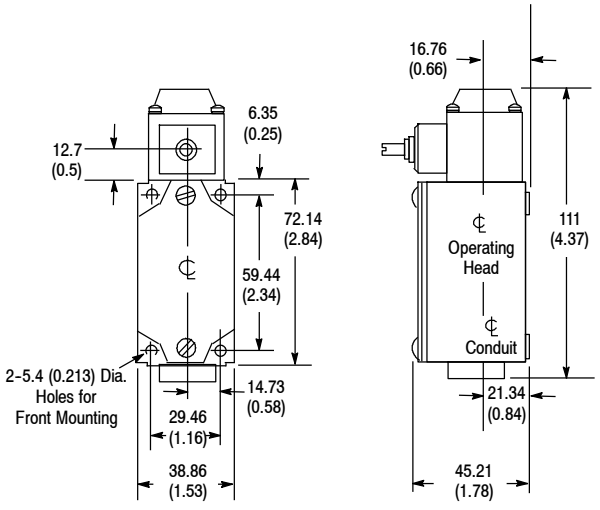
| Bit 0 | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 |
|---|---|---|---|---|---|---|---|
| Output 1 | Output 2 | Maintenance Diagnostic | Over Travel | Slow Return | Counter 1 Output | Counter 2 Output | Not Used |

**Byte 2**

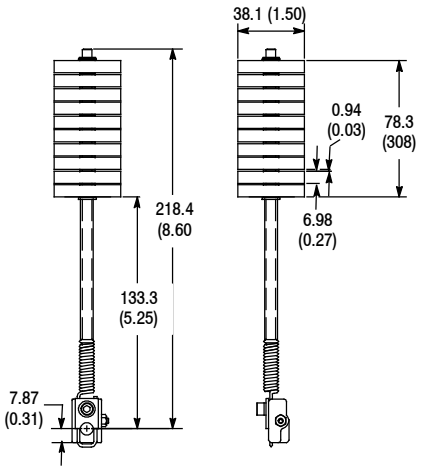
| Bit 0 | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 |
|---|---|---|---|---|---|---|---|
| Analog Output (Strobe Only) | | | | | | | |

Outputs 1 and 2 are programmable N.O./N.C.
See electronic data sheet for programming instructions.

## Approximate Dimensions [mm (in.)]




*NonPlug-In Switch*
*Shipping Wt. 0.45 kg (1 lb)*




*Wide Belt Roller*
*Lever Arm*

# Bulletin 842D DeviceNet Absolute Multi-Turn Magnetic Encoder

*DeviceNet Encoder*

## Description

The Bulletin 842D offers direct connection to DeviceNet for advanced functionality with reduced wiring cost. The following is a partial feature list:

## Features

- Magnetic design withstands 100 g shock and temperature extremes
- 26 bit multi-turn absolute encoder retains position data if power is lost
- Up to 8192 PPR & 8192 turns
- Connects via 5-pin micro QD
- Slotted rear cover allows address and baud rate selection
- Position reset button
- NEMA 4/IP66 housing

## Programmable Features

- Current position (0 to 67,108,864)
- Counts per revolution (1 to 8192)
- Revolutions (1 to 8192)
- Eight programmable cams with high/low limits & hysteresis
- Position change required for COS communication
- Counting direction (cw/ccw)

## Diagnostic Features

- Red and green LEDs
- Cumulative operating time
- Min./max. acceleration & velocity
- Maximum velocity warning flag
- Current velocity (RPM, RPS or STEPS/SEC)

## Specifications

| | |
|---|---|
| **Electrical** | |
| Code Format | Natural binary |
| Code Direction | CW or CCW (programmable) |
| Electrical Interface | DeviceNet specification release 2.0 |
| Operating Voltage | 11…25V DC (24V DC recommended) |
| Power Requirements | 1.8 W |
| Max # of Steps/Revolution | 8192 |
| Max # of Revolutions | 8192 |
| Position Forming Time | 0.3 ms |
| Delay on Power Up | 1050 ms |
| Preset Position | Via covered rear button or DeviceNet |
| **Mechanical** | |
| Angular Acceleration | 5 x $10^5$ rad/$s^2$ |
| Moment of Inertia | 35 $gcm^2$ (5.0 x $10^{-4}$ oz•in•$s^2$) |
| Operating Speed | 6000 RPM at max shaft loading |
| Starting Torque | 2.5 N•cm (3.5 oz•in) |
| Shaft Loading | Axial 11 lb (50 N)<br>Radial 67 lb (300 N) |
| **Environmental** | |
| Housing | Aluminum |
| Operating Temperature [C (F)] | -20…85° (-4…+185°) |
| Storage Temperature [C (F)] | -40…125° (-40…+257°) |
| Humidity | 98% noncondensing |
| Enclosure Type Rating | NEMA Type 4, 13, IP66 (IEC 529) |
| Shock | 100 g/6 ms |
| Vibration | 20g/10…2000 Hz |
| Approximate Weight [kg (lbs)] | 0.91 (2) |

## Accessories

| Description | Page Number |
|---|---|
| Flexible Couplings | 6-47 |
| Servo Clamps | 6-48 |
| Mating Connectors | 8-24 ❶ |
| Mounting Plates | 6-52 |

## Indicators

| LED | Status |
|---|---|
| Off | Not connected not on-line |
| Green Blinking | Active but not allocated by master |
| Green Steady | Active and allocated by master |
| Red Blinking | Minor fault and/or connection interrupt |
| Red Steady | Critical communication fault |

❶ Also see DeviceNet round media cable in the Network Media section of the *On-Machine ™ Connectivity* catalog.

# Bulletin 842D DeviceNet Absolute Multi-Turn Magnetic Encoder

## Product Selection

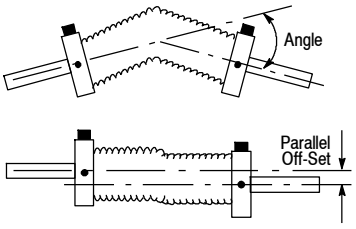
| Electrical Connection | Cat. No. |
|---|---|
| One 5-pin male micro QD | **842D-60131331BDA** |
| Two 5-pin micro QDs (one male & one female) | **842D-60131331BXA** |

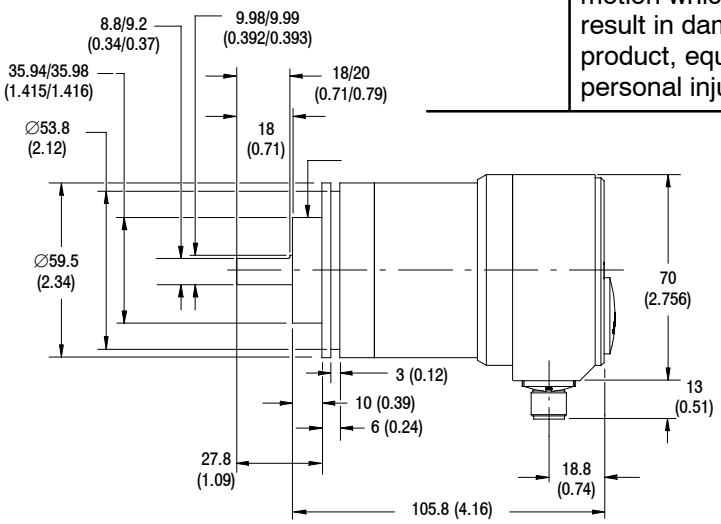
## Approximate Dimensions [mm (in.)]

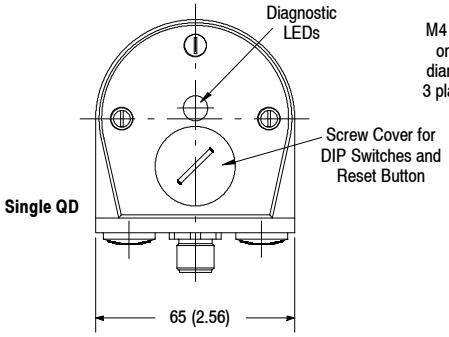
**ATTENTION** Rigidly coupling the encoder shaft to the machine shaft **will cause a failure** in either the bearings of the encoder or the bearings of the machine shaft.

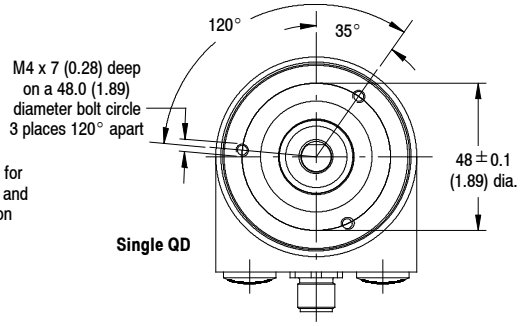
**WARNING** Pressing the preset position button results in a change of position reading. This can cause unexpected motion which could result in damage to the product, equipment, or personal injury.

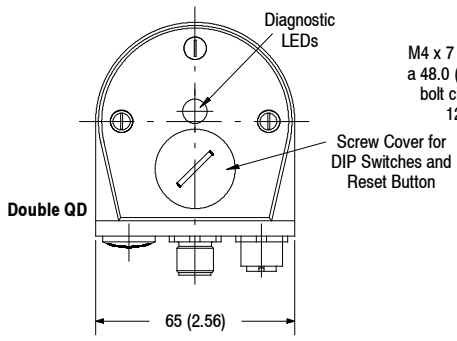
### Flexible Shaft Couplings

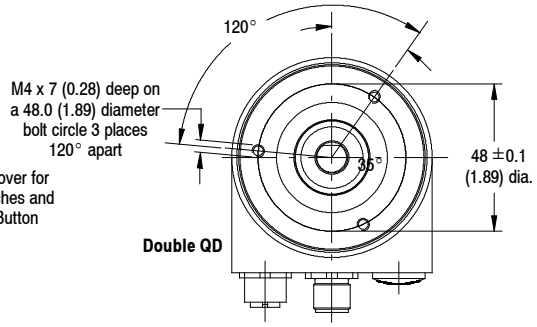


# Notes

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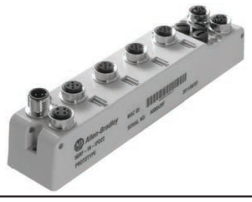
# Quick Selection Guide

| | | | | |
|---|---|---|---|---|
| |  | | | |
| **Description** | Interface Block | Transceivers | Tags | Handheld Interface |
| **Features** | • EtherNet/IP interface<br>• Embedded switch with DLR<br>• ISO 15693 / ISO 18000-3 M1<br>• Read/write ICODE tags SLI, SL2<br>• 1 and 2 channel interface offered<br>• 2 inputs with no outputs or 1 input and 1 output<br>• Compatible with all transceivers | • Maximum distance from EtherNet/IP interface is 300 ft<br>• Read/write ICODE tags SLI, SL2<br>• Read/write speeds up to 625 B/s<br>• ISO 15693 / ISO 18000-3 M1<br>• Max sensing range: 168 mm (rectangular), 85 mm (square), 60 mm (M30), and 30 mm (M18) | • ICODE ISO 15693 compliant<br>• EEPROM/FRAM memory<br>• Tag memory options: 128 B, 64 B, 256 B, and 2 KB<br>• Passive tags (no battery)<br>• Tag styles: label, smart card, disc, square<br>• Reusable Rislan tags assure long life in harsh environments<br>• High impact resistant tags<br>• Mount on metal tags<br>• High temperature tags | • 13.56 MHz high frequency RFID solution<br>• Wireless connectivity for streamlined dataflow<br>• Rugged for commercial and industrial environments<br>• IP65 rated – protects against dust and rain<br>• Touch screen<br>• 45- or 52-key models<br>• Stylus and stylus holder<br>• Compatible with all Allen-Bradley RFID tags<br>• Rechargeable battery |
| **Frequency** | 13.56 MHz | 13.56 MHz | 13.56 MHz | 13.56 MHz |
| **Connector** | (4) M12 | M12 | — | — |
| **Enclosure Rating** | IP67 | IP67 | IP68, IP69K | IP65 |
| **Product Selection** | Page 11-6 | Rectangular (Page 11-8)<br>Square (Page 11-10)<br>M30 (Page 11-12)<br>M18 (Page 11-14) | Page 11-16 | Page 11-19 |



New

## Radio Frequency Identification (RFID)

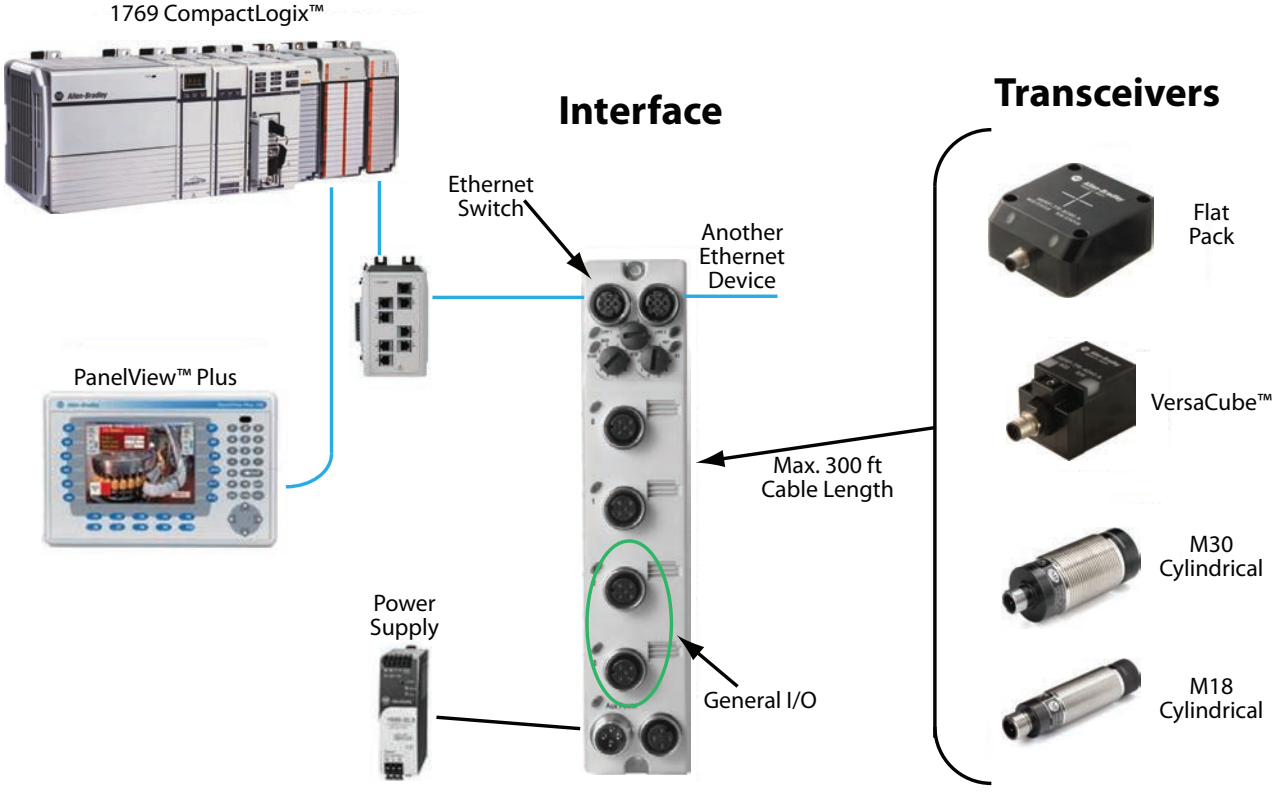
Allen-Bradley industrial RFID system consists of three key components:

- **Communication Interfaces:** To either a network or controller.
- **Transceivers:** At each point or station in the manufacturing process where identification or the reading/writing of information is desired.
- **RFID Tags:** One for each item, pallet, tote, or transport fixture used in the application.

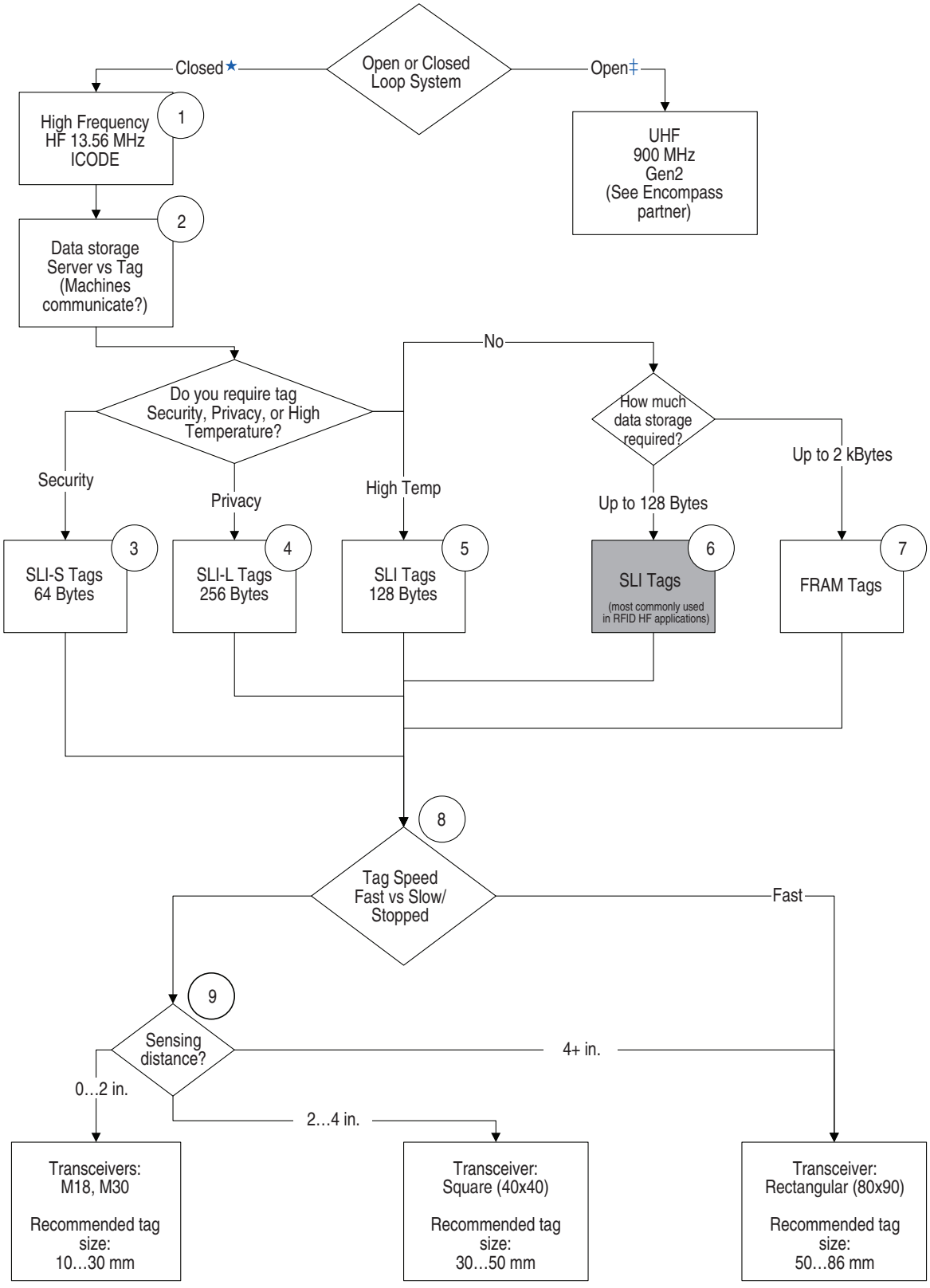
## System Features

- 1- and 2-channel EtherNet/IP™ interface offered
- Embedded switch, with Device Level Ring (DLR)
- Rugged transceiver styles designed for industrial locations
- 13.56 MHz high frequency technology ideal for light industrial applications
- Tag memory options: 128 B, 64 B, 256 B, and 2 KB
- Read/write speeds up to 625 B/s
- Different tag styles with sensing distances of up to 7.3 in. (185 mm)
- Reusable Rislan® tags assure long life and reliable performance in harsh environments
- AOP and AOI available

## Dual-Channel Integrated Architecture Application Diagram



## Selection Flowchart




★ Production steps contained within a manufacturing facility.
‡ Production steps outside of manufacturing facility.



New

1. High Frequency RFID products are typically used in industrial applications to follow a product through the manufacturing process. The transceiver to tag range is typically less than 7.3 in (185 mm). ICODE technology is advantageous because the tags are available from numerous suppliers in an infinite number of packages.

2. An application can track the process via the tag either by storing the data directly on the tag or linking the UID (Unique Identifier) to data in a server. In high speed applications (>1.5 m/s), it's recommended to read only the UID into the PLC. If the tags are used on multiple machines that do not communicate with each other, then the data is usually stored on the tag. By storing all the data on the tag, the data will be saved through power cycle events on the machine as well.

3. SLI-S tags are designed for applications requiring high tag security. Memory management can be password protected to ensure that only authorized users get read/write access.

4. SLI-L tags are designed for applications which require privacy. Tags have a password protected Privacy Mode in which the tag will not respond to commands until it receives the correct password.

5. High temperature tags are used when the tag needs to be used in extreme temperature applications. Temperature profiles are provided to show the length of time the tag can withstand the given temperature.

6. **Allen-Bradley offers label tags, smart cards, disc tags, and square tags, as well as tags for specialty applications such as high-impact and mount on metal. SLI tags are most commonly used in high frequency RFID applications.**

7. These tags are ideal for applications where the tags move throughout the facility on machines that are not communicating with each other.

8. This section helps determine the recommended transceiver for your application. If you have a high speed application, it's best to choose the largest transceiver which will provide the largest antenna range. This will provide the longest time the tag is in the field for read/write functions. This will also help when tag misalignment occurs. If your tag will be stopped when all read/write functions occur and tag misalignment is not an issue, smaller transceivers can be used.

9. The larger the transceiver, the larger the antenna field. The size of the field will determine how much time the tag will be in the field and the amount of tag misalignment can occur without read/write issues.

# EtherNet/IP Interface Block

## High Frequency 13.56 MHz ICODE

## Description

The EtherNet/IP interface block is designed to solve industrial high frequency 13.56 MHz RFID applications which require networking or multiple read/write points. Local LEDs allow for quick visual diagnosis of module status, network status, I/O status, and power status.

Each interface block can have up to two transceivers and two general I/O devices. This allows the RFID system to be easily integrated into an existing architecture. It also allows the RFID system to respond to sensor input and vice versa. For example, a sensor can detect the presence of an object and send a signal to the transceiver to read the RFID tag.

The high frequency 13.56 MHz RFID system is also highly configurable and expandable. The transceivers can be mounted up to 300 ft away from the interface blocks. The EtherNet/IP ports are configured as an embedded switch with Device Level Ring (DLR), which allows multiple interface blocks to be connected in star, tree, linear, and ring topologies. The RFID system is ISO 15693 compliant and compatible with tags of many different styles and sizes.

## Features

- 13.56 MHz RFID
- ISO 15693 / ISO 18000-3 M1
- Sealed housing rated for IP67 eliminates enclosure costs
- Low installation cost and easy to replace without rewiring because industry-standard M12 DC micro connectors are used for connection to the EtherNet/IP network and auxiliary power supply. I/O connectors are sealed M12 DC micro style
- Single or dual-port EtherNet/IP, configured as an embedded switch, supports star, tree, linear, and ring topologies
- Isolated power output port allows output device to be turned off, while maintaining power to the transceivers, the input port, and the EtherNet/IP connection
- Outputs electronically protected
- One- or two-channel RFID interface offered
- Two inputs/no outputs or one input/one output
- Compatible with all transceivers

## Specifications

| General | |
|---|---|
| **Enclosure Type Rating** | IP67 |
| **Mounting Type** | On-Machine, Panel |
| **Operating Temperature★** | -20…+60 °C (-4…+140 °F) |
| **Non-Operating Temperature★** | -40…+85 °C (-40…+185 °F) |
| **Relative Humidity** | 5…95% ‡ |
| **Operating Shock** | 30 g |
| **Weight** | 0.20 kg (0.45 lb) |
| **Vibration** | 5 g at 10…500 Hz |
| **Compliance** | CE, cULus, C-Tick |
| **Electrical** | |
| **Supply Voltage** | 24V DC |
| **Max. Output Current per RFID Transceiver Port** | 100 mA @ 24V DC |
| **Max. Output Current Rating per I/O Point** | 0.5 A @ 30V |
| **Max. Output Surge Current Rating per I/O Point** | 1.2 A |
| **Max. Current for Input Device Power per I/O Point** | 5 mA @ 30V |
| **Potential Max. Aux. Current per Module** | 4 A |

★ Unpackaged
‡ Non-condensing

| Module Status LED | |
|---|---|
| **Indicator State** | **Summary** |
| Off | No power |
| Flashing Green | Standby |
| Green | Device operational |
| Flashing Red | Minor fault |
| Red | Major fault |
| **Network Status LED** | |
| **Indicator State** | **Summary** |
| Off | No power or no IP address |
| Flashing Green | No connections |
| Green | Connected |
| Flashing Red | Connection timeout |
| Red | Duplicate IP |
| **Link1 and Link2 LEDs** | |
| **Indicator State** | **Summary** |
| Off | No link |
| Green | 100 Mbps |
| Flashing Green | 100 Mbps/active |
| Yellow | 10 Mbps |
| Flashing Yellow | 10 Mbps/active |
| **I/O LED** | |
| **Indicator State** | **Summary** |
| Off | I/O off |
| Yellow | I/O on |
| **RFID Port LED** | |
| **Indicator State** | **Summary** |
| Off | No power |
| Flashing Green | No tag present, but communicating |
| Green | Communicating |
| Flashing Red | No transceiver connected |
| Amber | Tag present |



New

# EtherNet/IP Interface Block

## High Frequency 13.56 MHz ICODE

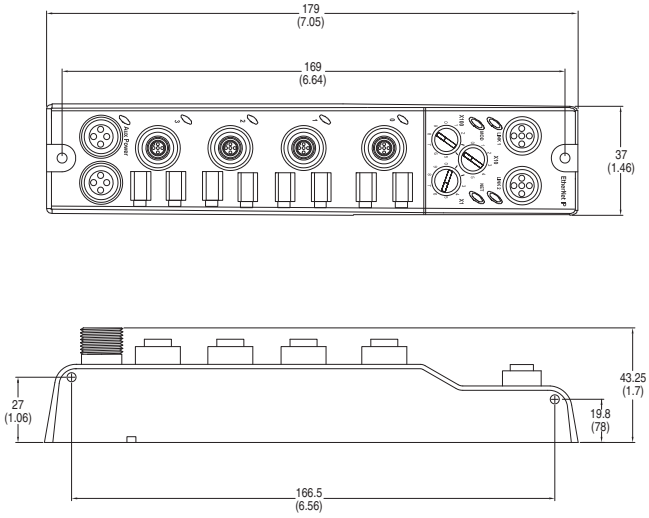
### Product Selection

| Interface Port ✶ | Inputs | Outputs | Cat. No. |
|---|---|---|---|
| 1 transceiver | 1 | 1 | 56RF-IN-IPS12 |
| 2 transceivers | 1 | 1 | 56RF-IN-IPD22 |
| 2 transceivers | 2 | — | 56RF-IN-IPD22A |

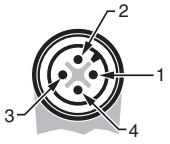
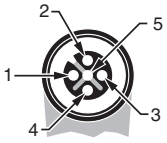
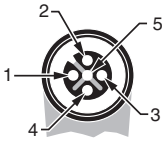
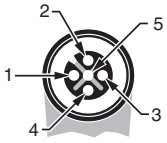
✶ Configured as embedded switch. Supports star, tree, linear, and ring topologies.

### Approximate Dimensions

Dimensions are not intended to be used for installation purposes.




### Pinouts

| | EtherNet/IP | Power Connector | RFID Transceiver Interface | Input Connector | Output Connector |
|---|---|---|---|---|---|
| Connector Diagram | |  |  |  |  |
| Pin | Function | Function | Function | Function | Function |
| 1 | TX+ | Output Power + | Sensors Power + | Sensor Power | Not Used |
| 2 | RX+ | Module Power + | Data+ | Not Used | Not Used |
| 3 | TX- | Module Power - | Sensor Power - | Return | Return |
| 4 | RX- | Output Power - | Data - | Input | Output |
| 5 | Shell | — | Shield/FE | Shield/FE | Shield/FE |

### Accessories

| Interface | Connector Style | Connector Type | No. of Pins | Shielding | Wire Size, AWG | Cat. No. |
|---|---|---|---|---|---|---|
| Transceiver | DC Micro (M12) patchcord | Straight female to straight male | 4 | Shielded | 22 | 889D-F5FCDM-J★ |
| | DC Micro (M12) cordset | Straight female | | | | 889D-F5FC-J‡ |
| | | Straight male | | | | 889D-M5FC-J‡ |
| | M12 terminal chamber | Straight female | | — | 18…22 | 871A-TS5-D1 |
| | | Straight male | | | | 871A-TS5-DM1 |
| Auxiliary Power | DC Micro (M12) patchcord | Straight female to straight male | 4 | Unshielded | 22 | 889D-F4ACDM-★ |
| | DC Micro (M12) cordset | Straight female | | | | 889D-F4AC-‡ |
| | | Straight male | | | | 889D-M4AC-‡ |
| | M12 terminal chamber | Straight female | | — | 22 | 871A-TS4-D |
| | | Straight male | | | | 871A-TS4-DM |
| EtherNet/IP | M12 D-code patchcord | Straight male to straight male | 4 | Shielded | 26 | 1585D-M4UBDM-§ |
| | | Straight male to right angle male | | | | 1585D-M4UBDE-§ |
| | | Right angle male to right angle male | | | | 1585D-E4UBDE-§ |
| | | Straight male to straight male | | Unshielded | 24 | 1585D-M4TBDM-§ |
| | | Straight male to right angle male | | | | 1585D-M4TBDE-§ |
| | | Right angle male to right angle male | | | | 1585D-E4TBDE-§ |

★ Replace symbol with **0M3** (0.3 m), **1** (1 m), **2** (2 m), **5** (5 m), or **10** (10 m) for standard cable lengths.
‡ Replace symbol with **2** (2 m), **5** (5 m), or **10** (10 m) for standard cable lengths.
§ Available in 0.3, 0.6, 1, 2, 5, 10, 15 m, and increments of 5 m up to 75 m.

# Rectangular Transceiver

## High Frequency 13.56 MHz ICODE Transceivers

## Description

The rectangular transceiver is the largest transceiver in the Allen-Bradley high frequency 13.56 MHz RFID family measuring 80 x 90 mm. This transceiver is ISO 15693 compliant and can read/write ICODE tags SLI and SL2, allowing infinite tag configuration options from various manufacturers. Local LEDs allow for quick visual diagnosis of module status and read/write status.

Rectangular transceivers are recommended for high-speed/high-performance applications because of their large sensing range. Transceivers can be mounted up to 300 ft (91.4 m) away from the interface module, and tags are readable from distances up to 6.6 in. (168 mm). This transceiver has an enclosure rating of IP67 and is designed to withstand harsh industrial environments.

## Features

- 13.56 MHz high frequency RFID solution
- ICODE ISO 15693/ISO 18000-3 M1 Compliant
- Read/write speeds up to 625 B/s
- Built-in LEDs for diagnostics
- Reliable performance in harsh environments

## Typical Applications

- Asset tracking
- Data acquisition
- Product handling
- Tool management
- Automotive
- Food and pharmaceutical
- Security and entrance

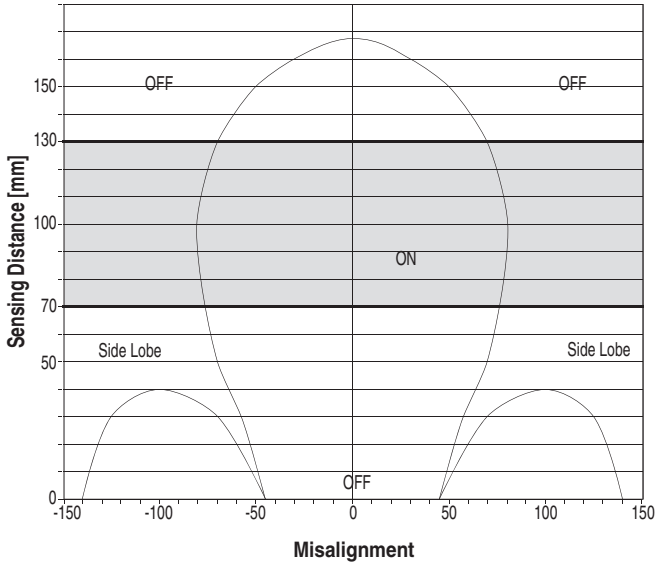
## Specifications

| | |
|---|---|
| **Supply Voltage** | 24V DC |
| **Max. Current Consumption** | 100 mA |
| **Tag Compatibility** | ICODE tags SLI, SL2<br>ISO 15693/ISO 18000-3 M1 |
| **Connector** | M12 4-pin male |
| **Communication Systems** | Half duplex communication system (RS-485) |
| **Baud Rate (Host)** | 9600, 19200, 38400, and 115200 bps |
| **Frequency** | 13.56 MHz |
| **Baud Rate (Tag)** | 26.48 Kbps |
| **Data Length** | 8-bit |
| **Operating Temperature** | -25…+70 °C (-13…+158 °F) |
| **Storage Temperature** | -40…+85 °C (-40…+185 °F) |
| **Operating Humidity★** | 35…95% RH |
| **Storage Humidity★** | 25…85% RH |
| **Vibration** | 10 g at 10…500 Hz |
| **Shock Resistance** | 50 g |
| **Enclosure Rating** | IP67 |
| **Recommended Sensing Distance‡** | 4 in. (102 mm) |
| **Max. Sensing Distance‡** | 6.6 in. (168 mm) |
| **Max. Distance from Interface Module** | 300 ft (91.4 m) |
| **Compliance** | CE, cULus, C-Tick |
| **Type of Equipment** | Industrial control |

★ Non-condensing

‡ Range reference for a 50 mm diameter tag.

## Scanning Area




**Note:** Ideal tag distance for maximum performance is 70…130 mm.



New

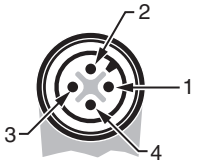
## Product Selection

| Description | Cat. No. |
|---|---|
| Rectangular 80 x 90 mm transceiver | 56RF-TR-8090 |

## LED Illumination Pattern

| LED Display | | Content |
|---|---|---|
| **Module Status LED** | Green light | Power ON |
| | No illumination | No power |
| **Read/Write LED** | Green light | Normal operation |
| | Flashing green (short interval) | Communicating |
| | Flashing amber (short interval) | Sensing tag |
| | Flashing red (long interval) | Communication error |
| | Flashing green (long interval) | No tag |

## Connector Pinout




| Pin | Signal |
|---|---|
| 1 | 24V DC |
| 2 | Data + |
| 3 | GND |
| 4 | Data - |

## Accessories

### Cordsets

| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 4-pin | A | Foil Shield | 22 | 889D-F5FC-J2 | 889D-R5FC-J2 | 889D-M5FC-J2 | 889D-E5FC-J2 |

★ The **2** at the end of the cat. no. is for 2 m cable length. Replace the **2** with **5** (5 m) or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FC-J**2** becomes Cat. No. 889D-F5FC-J**10**.

### Patchcords

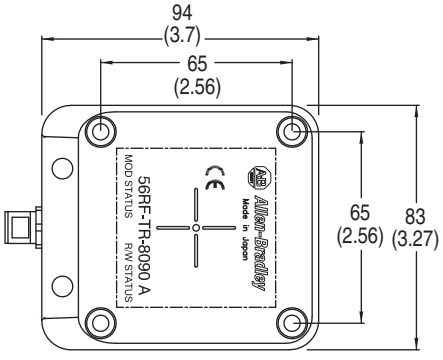
| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female Straight Male | Straight Female Right Angle Female | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 4-pin | A | Foil Shield | 22 | 889D-F5FCDM-J2 | 889D-F5FCDE-J2 | 889D-R5FCDM-J2 | 889D-R5FCDE-J2 |

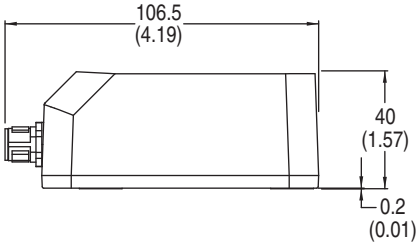
★ The **2** at the end of the cat. no.is for 2 m cable length. Replace the **2** with **0M3** (0.3 m), **1** (1 m), **5** (5 m), or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FCDM-J**2** becomes Cat. No. 889D-F5FCDM-J**0M3**.

**Note:** Stainless steel connectors may be ordered by adding an **S** to the cat. no. (e.g. Cat. No. 889D**S**-F5FCDM-J*).

## Approximate Dimensions

Dimensions are not intended to be used for installation purposes.



# Square Transceiver

## High Frequency 13.56 MHz ICODE Transceivers

## Description

The square transceiver is designed for use with the Allen-Bradley high frequency 13.56 MHz RFID system. This transceiver is ISO 15693 compliant and can read/write ICODE tags SLI and SL2, allowing infinite tag configuration options from various manufacturers. Local LEDs allow for quick visual diagnosis of module status and read/write status.

Square transceivers have universal mounting capability and measure 40 x 40 mm. Transceivers can be mounted up to 300 ft (91.4 m) away from the interface module, and tags are readable from distances up to 3.3 in. (85 mm). This transceiver has an enclosure rating of IP67 and is designed to withstand harsh industrial environments.

## Features

- 13.56 MHz high frequency RFID solution
- ICODE ISO 15693/ISO 18000-3 M1 Compliant
- Read/write speeds up to 625 B/s
- Transceivers can be mounted up to 300 ft away from interface modules
- Built-in LEDs for diagnostics
- Universal mounting
- Reliable performance in harsh environments

## Typical Applications

- Asset tracking
- Data acquisition
- Product handling
- Tool management
- Automotive
- Food and pharmaceutical
- Security and entrance

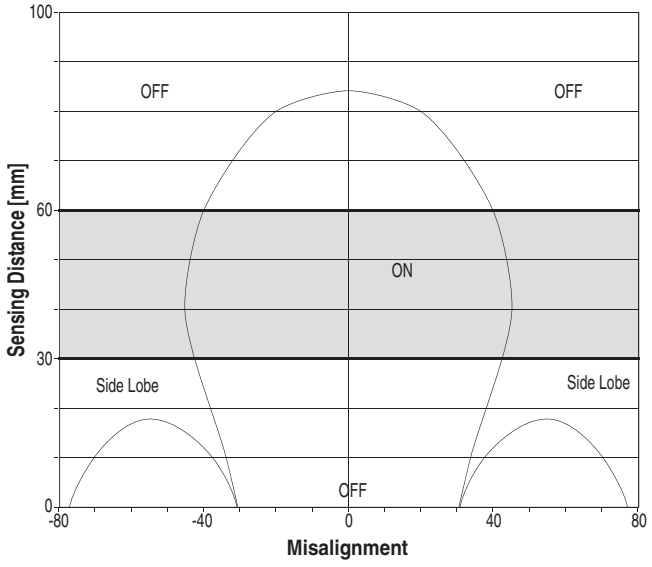
## Specifications

| | |
|---|---|
| **Supply Voltage** | 24V DC |
| **Max. Current Consumption** | 100 mA |
| **Tag Compatibility** | ICODE tags SLI, SL2<br>ISO 15693/ISO 18000-3 M1 |
| **Connector** | M12 4-pin male |
| **Communication Systems** | Half duplex communication system (RS-485) |
| **Baud Rate (Host)** | 9600, 19200, 38400, and 115200 bps |
| **Frequency** | 13.56 MHz |
| **Baud Rate (Tag)** | 26.48 Kbps |
| **Data Length** | 8-bit |
| **Operating Temperature** | -25…+60 °C (-13…+140 °F) |
| **Storage Temperature** | -40…+85 °C (-40…+185 °F) |
| **Operating Humidity★** | 35…95% RH |
| **Storage Humidity★** | 25…85% RH |
| **Vibration** | 10 g at 10…500 Hz |
| **Shock Resistance** | 50 g |
| **Enclosure Rating** | IP67 |
| **Recommended Sensing Distance‡** | 2 in. (50 mm) |
| **Max. Sensing Distance‡** | 3.3 in. (85 mm) |
| **Max. Distance from Interface Module** | 300 ft (91.4 m) |
| **Compliance** | CE, cULus, C-Tick |
| **Type of Equipment** | Industrial control |

★ Non-condensing

‡ Range reference for a 50 mm diameter tag.

## Scanning Area




**Note:** Ideal tag distance for maximum performance is 30…60 mm.



New

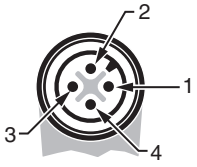
## Product Selection

| Description | Cat. No. |
|---|---|
| Square 40 x 40 mm transceiver | 56RF-TR-4040 |

## LED Illumination Pattern

| LED Display | | Content |
|---|---|---|
| **Module Status LED** | Green light | Power ON |
| | No illumination | No power |
| **Read/Write LED** | Green light | Normal operation |
| | Flashing green (short interval) | Communicating |
| | Flashing amber (short interval) | Sensing tag |
| | Flashing red (long interval) | Communication error |
| | Flashing green (long interval) | No tag |

## Connector Pinout




| Pin | Signal |
|---|---|
| 1 | 24V DC |
| 2 | Data + |
| 3 | GND |
| 4 | Data - |

## Accessories

### Cordsets

| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 4-pin | A | Foil Shield | 22 | 889D-F5FC-J2 | 889D-R5FC-J2 | 889D-M5FC-J2 | 889D-E5FC-J2 |

★ The **2** at the end of the cat. no. is for 2 m cable length. Replace the **2** with **5** (5 m) or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FC-J**2** becomes Cat. No. 889D-F5FC-J**10**.

### Patchcords

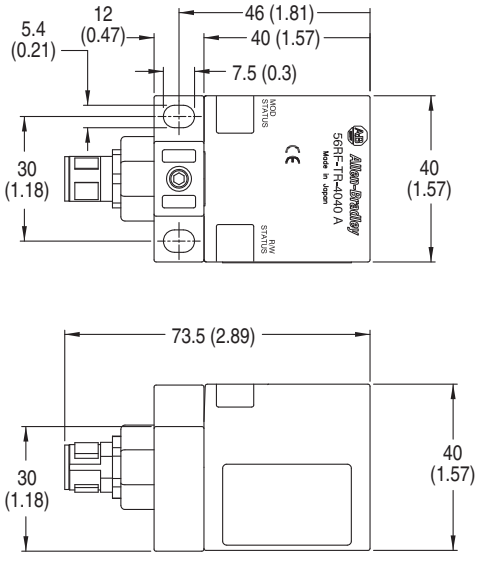
| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female Straight Male | Straight Female Right Angle Female | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 4-pin | A | Foil Shield | 22 | 889D-F5FCDM-J2 | 889D-F5FCDE-J2 | 889D-R5FCDM-J2 | 889D-R5FCDE-J2 |

★ The **2** at the end of the cat. no.is for 2 m cable length. Replace the **2** with **0M3** (0.3 m), **1** (1 m), **5** (5 m), or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FCDM-J**2** becomes Cat. No. 889D-F5FCDM-J**0M3**.

**Note:** Stainless steel connectors may be ordered by adding an **S** to the cat. no. (e.g. Cat. No. 889D**S**-F5FCDM-J*).

## Approximate Dimensions

Dimensions are not intended to be used for installation purposes.



# Cylindrical M30 Transceiver

## High Frequency 13.56 MHz ICODE Transceivers

## Description

The cylindrical M30 transceiver is designed for use with the Allen-Bradley high frequency 13.56 MHz RFID system. This transceiver is ISO 15693 compliant and can read/write ICODE tags SLI and SL2, allowing infinite tag configuration options from various manufacturers. Local LEDs allow for quick visual diagnosis of module status and read/write status.

Cylindrical M30 transceivers are recommended for panel mounting and for use with smaller tags with a diameter of 10…30 mm. Transceivers can be mounted up to 300 ft (91.4 m) away from the interface module, and tags are readable from distances up to 3.0 in. (75 mm). This transceiver has an enclosure rating of IP67 and is designed to withstand harsh industrial environments.

## Features

- 13.56 MHz high-frequency RFID solution
- ICODE ISO 15693/ISO 18000-3 M1 Compliant
- Read/write speeds up to 625 B/s
- Transceivers can be mounted up to 300 ft away from interface modules
- Built-in LEDs for diagnostics
- Reliable performance in harsh environments

## Typical Applications

- Asset tracking
- Data acquisition
- Product handling
- Tool management
- Automotive
- Food and pharmaceutical
- Security and entrance

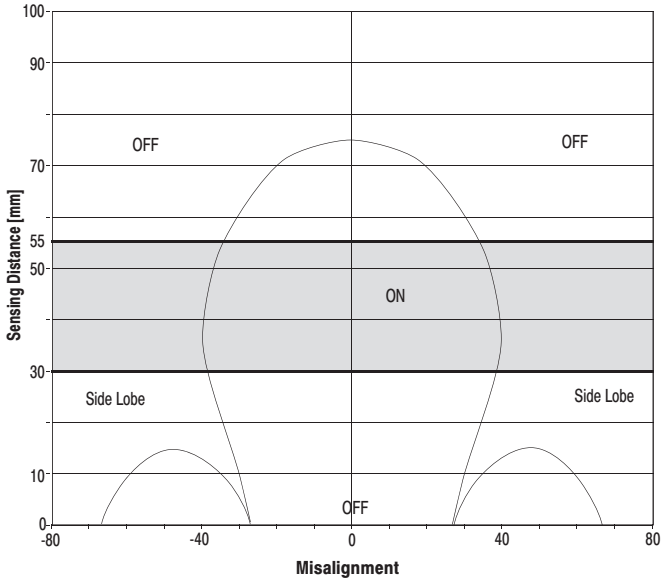
## Specifications

| | |
|---|---|
| **Supply Voltage** | 24V DC |
| **Max. Current Consumption** | 100 mA |
| **Tag Compatibility** | ICODE tags SLI, SL2<br>ISO 15693/ISO 18000-3 M1 |
| **Connector** | M12 4-Pin Male |
| **Communication Systems** | Half duplex communication system (RS-485) |
| **Baud Rate (Host)** | 9600, 19200, 38400, and 115200 bps |
| **Frequency** | 13.56 MHz |
| **Baud Rate (Tag)** | 26.48 Kbps |
| **Data Length** | 8-bit |
| **Operating Temperature** | -25…+70 °C (-13…+158 °F) |
| **Storage Temperature** | -40…+85 °C (-40…+185 °F) |
| **Operating Humidity★** | 35…95% RH |
| **Storage Humidity★** | 25…85% RH |
| **Vibration** | 10 g at 10…500 Hz |
| **Shock Resistance** | 50 g |
| **Enclosure Rating** | IP67 |
| **Recommended Sensing Distance‡** | 45 mm |
| **Max. Sensing Distance‡** | 75 mm |
| **Max. Distance from Interface Module** | 300 ft |
| **Compliance** | CE |

★ Non-condensing

‡ Range reference for a 50 mm diameter tag.

## Scanning Area




**Note:** Ideal tag distance for maximum performance is 30…55 mm.



New

# Cylindrical M30 Transceiver

## High Frequency 13.56 MHz ICODE Transceivers

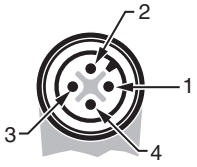
### Product Selection

| Description | Cat. No. |
|---|---|
| M30 cylindrical transceiver | 56RF-TR-M30 |

### LED Illumination Pattern

| LED Display | | Content |
|---|---|---|
| **Module Status LED** | Green light | Power ON |
| | No illumination | No power |
| **Read/Write LED** | Green light | Normal operation |
| | Flashing green (short interval) | Communicating |
| | Flashing amber (short interval) | Sensing tag |
| | Flashing red (long interval) | Communication error |
| | Flashing green (long interval) | No tag |

### Connector Pinout




| Pin | Signal |
|---|---|
| 1 | 24V DC |
| 2 | Data + |
| 3 | GND |
| 4 | Data - |

### Accessories

#### Cordsets

| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 4-pin | A | Foil Shield | 22 | 889D-F5FC-J2 | 889D-R5FC-J2 | 889D-M5FC-J2 | 889D-E5FC-J2 |

★ The **2** at the end of the cat. no. is for 2 m cable length. Replace the **2** with **5** (5 m) or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FC-J**2** becomes Cat. No. 889D-F5FC-J**10**.

#### Patchcords

| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female Straight Male | Straight Female Right Angle Female | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 4-pin | A | Foil Shield | 22 | 889D-F5FCDM-J2 | 889D-F5FCDE-J2 | 889D-R5FCDM-J2 | 889D-R5FCDE-J2 |

★ The **2** at the end of the cat. no.is for 2 m cable length. Replace the **2** with **0M3** (0.3 m), **1** (1 m), **5** (5 m), or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FCDM-J**2** becomes Cat. No. 889D-F5FCDM-J**0M3**.

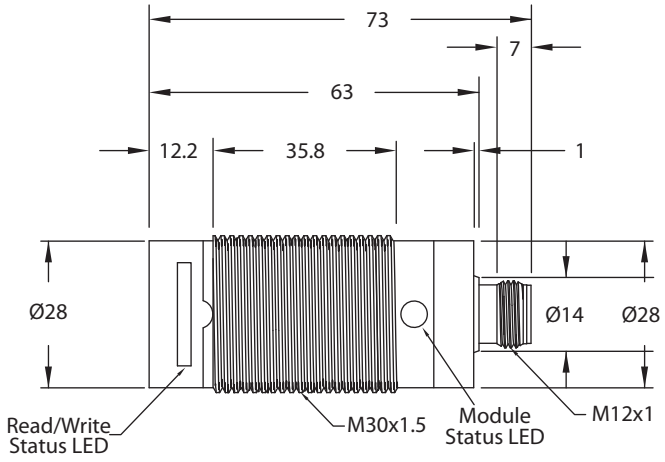
**Note:** Stainless steel connectors may be ordered by adding an **S** to the cat. no. (e.g. Cat. No. 889D**S**-F5FCDM-J*).

#### Mounting Brackets

| Description | Cat. No. |
|---|---|
| Swivel/tilt style | 60-2439 |
| Right angle style | 871A-BRN30 |

### Approximate Dimensions

Dimensions are not intended to be used for installation purposes.



# Cylindrical M18 Transceiver

## High Frequency 13.56 MHz ICODE Transceivers

### Description

The cylindrical M18 transceiver is designed for use with the Allen-Bradley high frequency 13.56 MHz RFID system. This transceiver is ISO 15693 compliant and can read/write ICODE tags SLI and SL2, allowing infinite tag configuration options from various manufacturers. Local LEDs allow for quick visual diagnosis of module status and read/write status.

Cylindrical M18 transceivers are recommended for panel mounting and for use with smaller tags with a diameter of 10…30 mm. Transceivers can be mounted up to 300 ft (91.4 m) away from the interface module, and tags are readable from distances up to 2.2 in. (55 mm). This transceiver has an enclosure rating of IP67 and is designed to withstand harsh industrial environments.

### Features

- 13.56 MHz high frequency RFID solution
- ICODE ISO 15693/ISO 18000-3 M1 Compliant
- Read/write speeds up to 625 B/s
- Transceivers can be mounted up to 300 ft away from interface modules
- Built-in LEDs for diagnostics
- Reliable performance in harsh environments

### Typical Applications

- Asset tracking
- Data acquisition
- Product handling
- Tool management
- Automotive
- Food and pharmaceutical
- Security and entrance

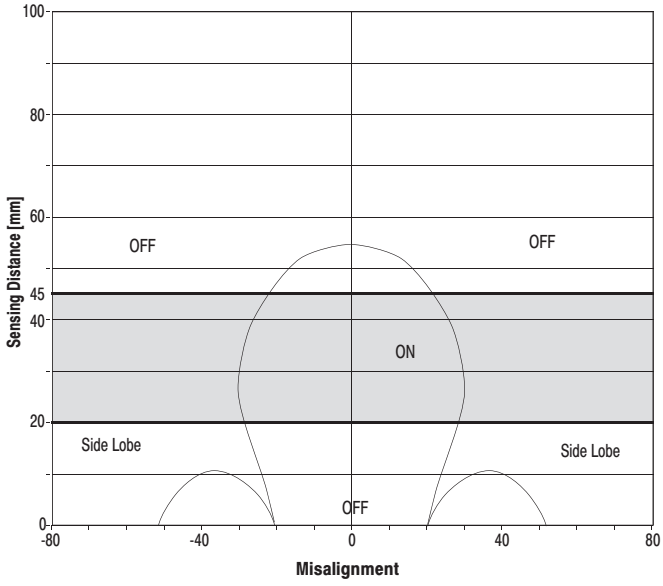
### Specifications

| | |
|---|---|
| **Supply Voltage** | 24V DC |
| **Max. Current Consumption** | 100 mA |
| **Tag Compatibility** | ICODE tags SLI, SL2<br>ISO 15693/ISO 18000-3 M1 |
| **Connector** | M12 4-Pin Male |
| **Communication Systems** | Half duplex communication system (RS-485) |
| **Baud Rate (Host)** | 9600, 19200, 38400, and 115200 bps |
| **Frequency** | 13.56 MHz |
| **Baud Rate (Tag)** | 26.48 Kbps |
| **Data Length** | 8-bit |
| **Operating Temperature** | -25…+70 °C (-13…+158 °F) |
| **Storage Temperature** | -40…+85 °C (-40…+185 °F) |
| **Operating Humidity★** | 35…95% RH |
| **Storage Humidity★** | 25…85% RH |
| **Vibration** | 10 g at 10…500 Hz |
| **Shock Resistance** | 50 g |
| **Enclosure Rating** | IP67 |
| **Recommended Sensing Distance‡** | 30 mm |
| **Max. Sensing Distance‡** | 55 mm |
| **Max. Distance from Interface Module** | 300 ft |
| **Compliance** | CE |

★ Non-condensing

‡ Range reference for a 50 mm diameter tag.

### Scanning Area




**Note:** Ideal tag distance for maximum performance is 20…45 mm.



New

# Cylindrical M18 Transceiver

## High Frequency 13.56 MHz ICODE Transceivers

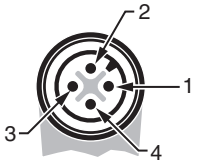
### Product Selection

| Description | Cat. No. |
|---|---|
| M18 cylindrical transceiver | 56RF-TR-M18 |

### LED Illumination Pattern

| LED Display | | Content |
|---|---|---|
| **Module Status LED** | Green light | Power ON |
| | No illumination | No power |
| **Read/Write LED** | Green light | Normal operation |
| | Flashing green (short interval) | Communicating |
| | Flashing amber (short interval) | Sensing tag |
| | Flashing red (long interval) | Communication error |
| | Flashing green (long interval) | No tag |

### Connector Pinout




| Pin | Signal |
|---|---|
| 1 | 24V DC |
| 2 | Data + |
| 3 | GND |
| 4 | Data - |

### Accessories

#### Cordsets

| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ Straight Female | Right Angle Female | Straight Male | Right Angle Male |
|---|---|---|---|---|---|---|---|
| 4-pin | A | Foil Shield | 22 | 889D-F5FC-J2 | 889D-R5FC-J2 | 889D-M5FC-J2 | 889D-E5FC-J2 |

★ The **2** at the end of the cat. no. is for 2 m cable length. Replace the **2** with **5** (5 m) or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FC-J**2** becomes Cat. No. 889D-F5FC-J**10**.

#### Patchcords

| No. of Pins | Color Code | Shield | Wire Size [AWG] | Cat. No. ★ Straight Female Straight Male | Straight Female Right Angle Female | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
|---|---|---|---|---|---|---|---|
| 4-pin | A | Foil Shield | 22 | 889D-F5FCDM-J2 | 889D-F5FCDE-J2 | 889D-R5FCDM-J2 | 889D-R5FCDE-J2 |

★ The **2** at the end of the cat. no.is for 2 m cable length. Replace the **2** with **0M3** (0.3 m), **1** (1 m), **5** (5 m), or **10** (10 m) for standard cable lengths. Example: Cat. No. 889D-F5FCDM-J**2** becomes Cat. No. 889D-F5FCDM-J**0M3**.

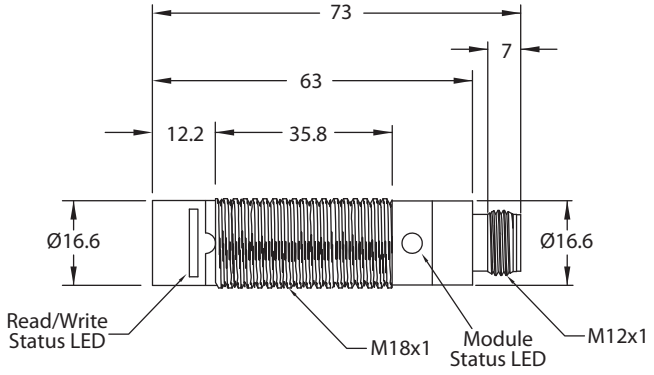
**Note:** Stainless steel connectors may be ordered by adding an **S** to the cat. no. (e.g. Cat. No. 889D**S**-F5FCDM-J*).

#### Mounting Brackets

| Description | Cat. No. |
|---|---|
| Swivel/tilt style | 60-2649 |
| Right angle style | 871A-BRN18 |

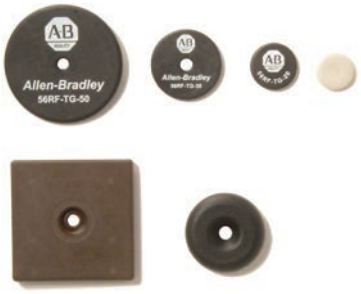
### Approximate Dimensions

Dimensions are not intended to be used for installation purposes.



# ICODE Tags

## High Frequency 13.56 MHz ICODE Tags




### Description

Industrial RFID systems are designed to withstand harsh environments. Reusable read/write tags allow for flexibility in information and application. ISO 15693 is an open standard for high frequency 13.56 MHz RFID. ICODE tags are available in many different styles and sizes to fit most applications.

### Features

- 13.56 MHz high frequency RFID solution
- ICODE ISO 15693 Compliant
- EEPROM/FRAM Memory
- 64 B, 128 B, 256 B, and 2 KB read/write tags
- Read/write speeds up to 500 B/s
- Passive tags (no battery)
- Reusable Rislan® tags
- Reliable performance in harsh environments
- Label tags
- Smart card tags
- Disc tags
- Square tags
- High impact resistant tags
- Mount on metal tags
- High temperature tags
- ICODE tags have data retention of 10 years and 100,000 write cycles
- FRAM 2K B tags are rated for 10 billion read/write cycles

### Typical Applications

- Asset tracking
- Data acquisition
- Product handling
- Tool management
- Automotive
- Food and pharmaceutical
- Security and entrance

### Specifications

| | |
|---|---|
| **Disc Tags (10 mm)** | |
| **Memory Size and Type** | ICODE SLI-S 256 B – EEPROM |
| **Operating Temperature** | -25…+70 °C (-13…+158 °F) |
| **Materials** | Epoxy, transparent yellowish |
| **Weight** | 130 mg |
| **Disc Tags (16 mm)** | |
| **Memory Size and Type** | ICODE SLI 128 B – EEPROM<br>ICODE SLI-L 64 B – EEPROM |
| **Axial Compression Strength** | 1000 N |
| Radial Compression Strength | 1000 N |
| **Operating Temperature** | -25…+70 °C (-13…+158 °F) |
| **Protection** | IP69K |
| **Materials** | Modified thermoplastic, white |
| **Weight** | 1.0 g ± 0.15 g |
| **Disc Tags (20, 30, and 50 mm)** | |
| **Memory Size and Type** | ICODE SLI 128 B – EEPROM<br>F-Mem 2K B |
| **Vibration (IEC 68.2.6)** | 10 g at 10…2000 Hz |
| **Shock (IEC 68.2.29)** | 40 g |
| **Operating Temperature** | -25…+85 °C (-13…+185 °F) |
| **Protection** | IP69K |
| **Materials** | PA6 Modified, black |
| **Weight** | 1.3 g (20 mm)<br>3.0 g (30 mm)<br>9.5 g (50 mm) |
| **Mount on Metal Options** | 20 mm, 50 mm |
| **Label Tags (50 x 50 mm, 54 x 86 mm)** | |
| **Memory Size and Type** | ICODE SLIx 128 B – EEPROM<br>ICODE SLI 128 B – EEPROM |
| **Bending Diameter** | > 50 mm, tension less than 10 N |
| **Static Pressure** | < 10 MPa (10 N/mm²) |
| **Operating Temperature** | -40…+85 °C (-40…+185 °F) |
| **Transponder Face Material** | Opaque Matt Paper 79 |
| **Transponder Backing Material** | Siliconized Paper 56 |
| **Transponder Antenna Material** | Aluminum |
| **Smart Cards (54 x 86 mm)** | |
| **Memory Size and Type** | ICODE SLI 128 B – EEPROM |
| **Operating Temperature (ISO/IEC 10373)** | -35…+50 °C (-30…+122 °F) |
| **Materials** | PVC, white |
| **High Impact Resist Tags (35 mm disc)** | |
| **Memory Size and Type** | ICODE SLI 128 B – EEPROM |
| **Vibration (IEC 68.2.6)** | 10 g at 10…2000 Hz |
| **Shock (IEC 68.2.29)** | 40 g |
| **Operating Temperature** | -25…+85 °C (-13…+185 °F) |
| **Protection** | IP69K |
| **Materials** | PA6 high impact |
| **Weight** | 7.8 g |
| **High Temperature Tags (50 x 50 mm)** | |
| **Memory Size and Type** | ICODE SLI 128 B – EEPROM |
| **Data Retention** | 10 years |
| **Write Endurance** | 100,000 cycles |
| **RF Data Transfer Rate** | 26 kbit/s |
| **Temperature Range** | -55…+240 °C (-67…+464 °F) |
| **Protection** | IP68 |
| **Materials** | PPS resin |
| **Weight** | 25.7 g |



New

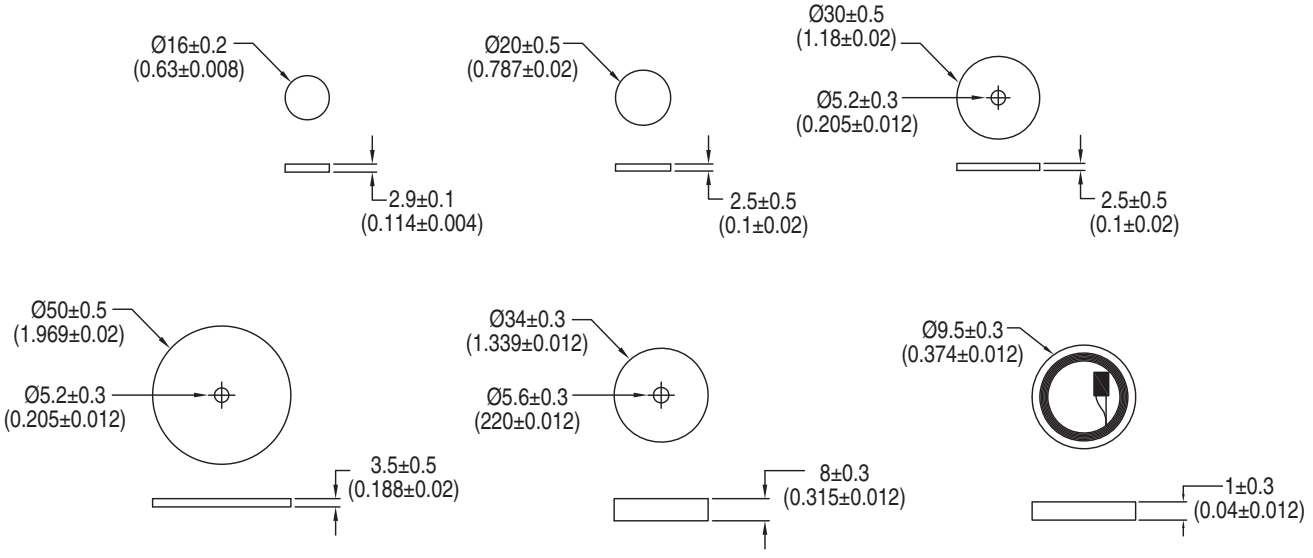
## Product Selection

| Type | Memory Size | Available User Memory | Outline | Dimensions | Application | Transceiver-Tag Sensing Distance, Max. [mm (in.)] | | | | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Rectangular | Square | M30 | M18 | |
| SLI | 128 B | 112 B | Label | 54x86 mm | Most common | 185 | 100 | 72 | 52 | 56RF-TG-5486 |
| | | | | 50x50 mm | | 150 | 90 | 66 | 50 | 56RF-TG-5050 |
| | | | Smart card | 54x86 mm | | 185 | 100 | 79 | 55 | 56RF-TG-5486SC |
| | | | Disc | 16 mm | | 76 | 51 | 35 | 27 | 56RF-TG-16 |
| | | | | 20 mm | | 78 | 53 | 41 | 32 | 56RF-TG-20 |
| | | | | 30 mm | | 106 | 68 | 52 | 40 | 56RF-TG-30 |
| | | | | 50 mm | | 168 | 85 | 75 | 55 | 56RF-TG-50 |
| | | | | 35 mm | High impact resist | 105 | 60 | 45 | 38 | 56RF-TG-35HIR |
| | | | | 20 mm | Mount on metal | 35 | 23 | 20 | 18 | 56RF-TG-20MOM |
| | | | | 50 mm | | 63 | 32 | 29 | 25 | 56RF-TG-50MOM |
| SLI-L | 64 B | 32 B | Disc | 16 mm | Privacy | 76 | 51 | 35 | 27 | 56RF-TG-16-64B |
| SLI-S | 256 B | 160 B | Disc | 10 mm | Security | 45 | 20 | 16 | 12 | 56RF-TG-10-256B |
| FRAM | 2048 B | 2K B | Disc | 20 mm | High memory | 78 | 53 | 36 | 28 | 56RF-TG-20-2KB |
| | | | | 30 mm | | 106 | 68 | 44 | 35 | 56RF-TG-30-2KB |
| | | | | 50 mm | | 168 | 85 | 62 | 48 | 56RF-TG-50-2KB |
| SLI | 128 B | 112 B | Square | 50 mm | High temperature | 155 | 95 | 71 | 59 | 56RF-TG-50HT |

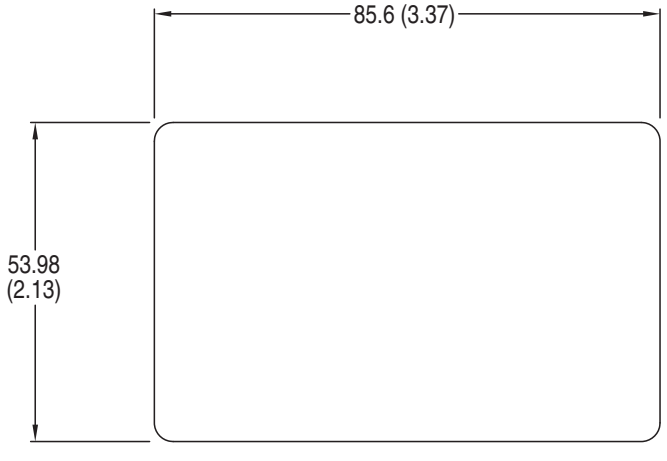
## Approximate Dimensions

Dimensions are not intended to be used for installation purposes.

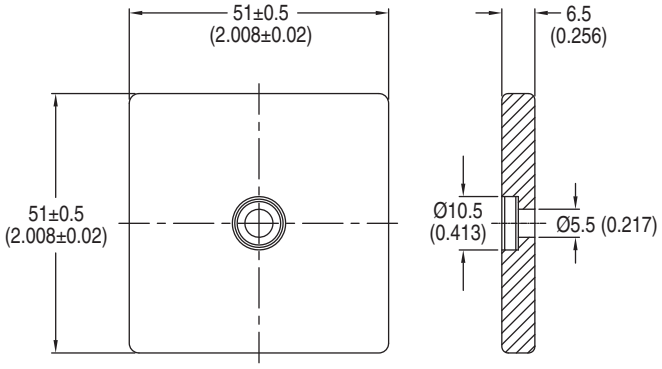
### Disc Tags




### Smart Cards



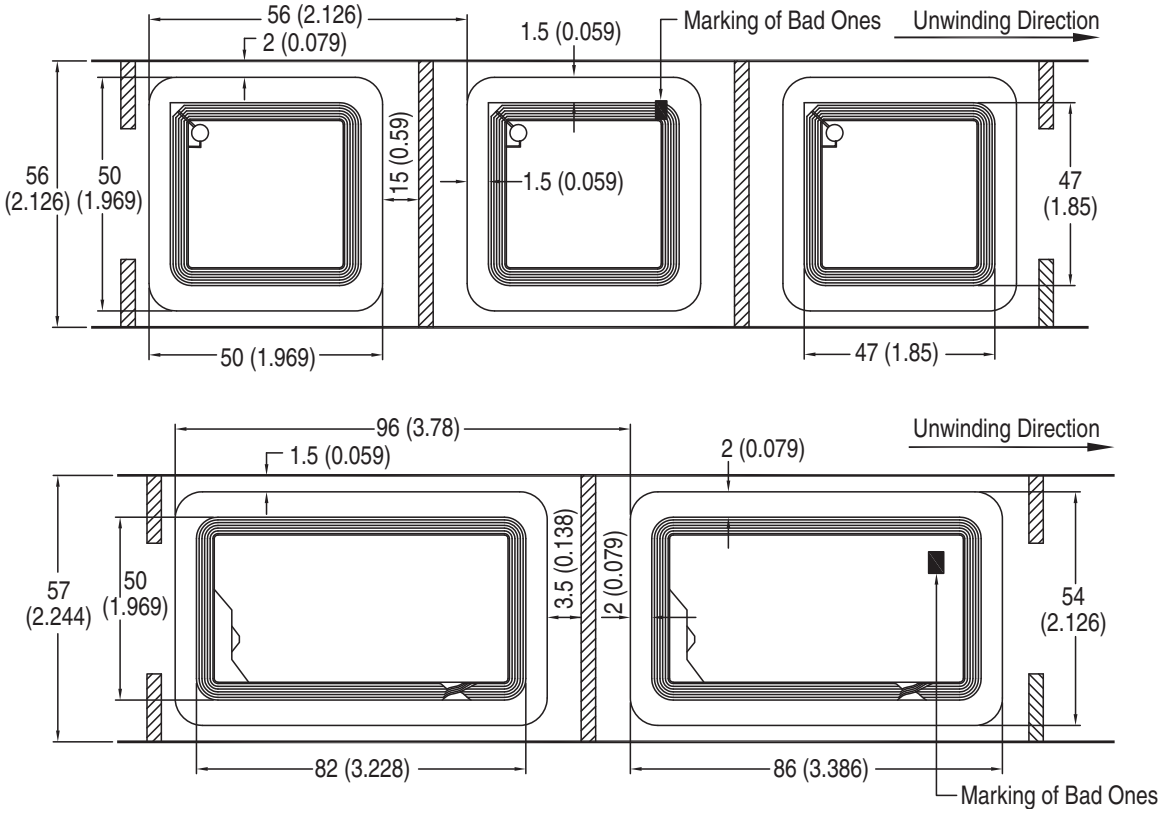

### High Temperature Tags



# ICODE Tags

## High Frequency 13.56 MHz ICODE Tags

### Label Tags






New

# Handheld Interfaces

## High Frequency 13.56 MHz ICODE

### Description

The Allen-Bradley RFID ICODE handheld interface maximizes both mobility and performance for high frequency 13.56 MHz RFID applications. Each handheld interface comes with multiple connectivity methods, such as wireless, Bluetooth, and USB. The RFID handheld interface is IP65 rated for harsh industrial and outdoor environments.

With its portability and ability to read, write, and save RFID tags, the RFID ICODE handheld interface is the ideal accessory for system setup, field service, fleet management, time and attendance, and any other situation where tags cannot be easily read by a stationary transceiver.

### Features

- 13.56 MHz high frequency RFID solution
- Wireless connectivity for streamlined dataflow
- Rugged for commercial and industrial environments
- IP65 rated – protects against dust and rain
- Touch screen
- 45- or 52-key models
- Stylus and stylus holder
- Compatible with all Allen-Bradley RFID tags
- Rechargeable battery

### Typical Applications

- Asset tracking
- Data acquisition
- Product handling
- Tool management
- Automotive
- Food and pharmaceutical
- Security and entrance

### Specifications

| | |
|---|---|
| **Operating System** | Microsoft® Windows® CE .NET 5.0 |
| **Processor** | Intel® PXA270 XScale® Technology Processor – 624MHz |
| **Memory** | 512MB FLASH built-in<br>128MB SDRAM |
| **Mass Storage** | Type 2 Compact FLASH Card user accessible |
| **Interface** | One RS-232 Serial Port<br>USB (Host and Client)<br>Internal Wireless LAN 802.11b/g<br>Internal Bluetooth® |
| **Battery** | Nickel Metal Hydride Extended Capacity Rechargeable battery 2500 mAh, 7.2V |
| **Recharge/Line Power** | 11…18V DC, 1.5 A |
| **Operating Time** | 9 hr (typical) |
| **Storage Temperature** ✶ | -20…+70 °C (-4…+158 °F) |
| **Operating Temperature** | -20…+50 °C (-4…+122 °F) |
| **Charging Temperature** ❄ | 0…40 °C (32…104 °F) |
| **Humidity** ‡ | 5…95% |
| **Enclosure Rating** | IP65 |
| **Weight** | With battery: 32.3 oz (915 g)<br>Without battery: 23 oz (652 g) |
| **Certifications** | FCC Class A<br>EN55022, 1998. (CISPR 22) Class A,<br>EN55022/IEC 6100-4-6 RF CONTINUOUS CONDUCTED EN55024, 1998 – ETSI EN 301 489-1,2002 – ETSI EN 301 489-3,2002 – EN/IEC 61000-4-2 ESD – EN/IEC 61000-4-3 RF ELECTROMAGNETIC FIELD – EN/IEC 61000-4-4 FAST TRANSIENTS<br>RoHS Compliant |

✶ No batteries installed.
❄ Fast charge will not start below 0 °C (32 °F).
‡ No condensation.

# Handheld Interfaces

## High Frequency 13.56 MHz ICODE

### Product Selection

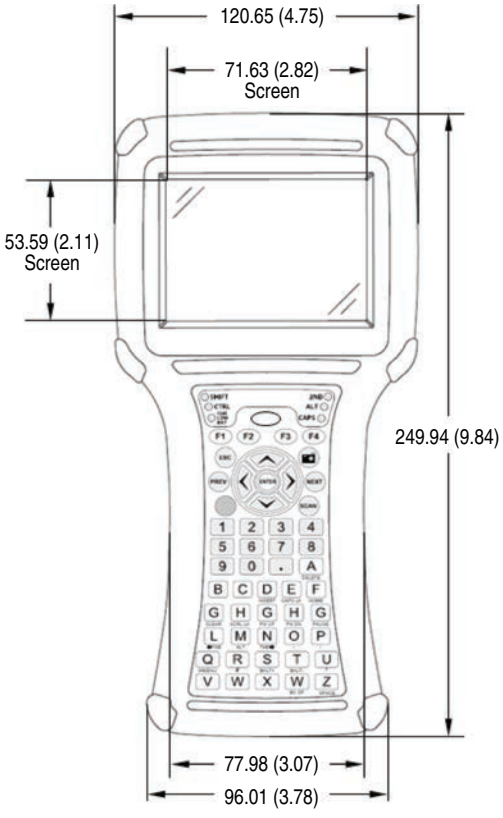
| Description | Cat. No. |
|---|---|
| RFID ICODE handheld interface, 52-key directional pad | **57RF-HH-56A** |
| RFID ICODE handheld interface, 45-key pad | 57RF-HH-56B |

### Accessories

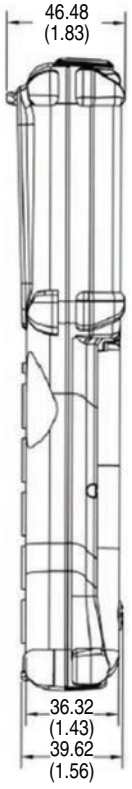
| Description | Cat. No. |
|---|---|
| Single position charging cradle with domestic power supply cable, USB cable, stylus | 57RF-HH-56US1 |
| Domestic wall mount power supply, serial cable, USB cable, stylus | **57RF-HH-56US2** |
| Power supply kit (includes power supply, adapters for USA, European, Australian, UK, and rest of world), serial cable, USB cable, stylus | 57RF-HH-56IN |
| Battery pack (rechargeable) | 57RF-HH-56BAT |
| Serial cable (15 ft, straight, 9-pin female connector, RS-232, molded) | 57RF-HH-56CA |
| Industrial Compact Flash 64 MB Memory Card | 1784-CF64 |
| Industrial Compact Flash 128 MB Memory Card | 1784-CF128 |

### Approximate Dimensions

Dimensions are not intended to be used for installation purposes.




**Front View**




**Side View**



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Preferred availability cat. nos. are printed in **bold**.

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**The Accessories in this section may be used across multiple product lines. Accessories specific to a product line can be found at the end of the respective section.**

# Barriers and Isolators

Intrinsically Safe Zener Diode Barriers

Intrinsically Safe Galvanic Isolators

## Description

For applications involving sensor use in hazardous locations, Rockwell Automation offers a line of Intrinsic Safety Zener Diode Barriers and Galvanic Isolators. Both are economical solutions for instrumentation and control systems in hazardous locations as defined by NEC article 500 and CEC Part I, Section 18.

Zener diode barriers are *passive* protective interface assemblies that limit the amount of energy (voltage and current) that enters a hazardous area in the event of a fault (i.e., overvoltage, shorted field wiring). The energy is limited to an amount that would not be sufficient to ignite the potentially explosive atmosphere. Designed in a slim 1/2 inch wide housing, each barrier contains zener diodes that limit the voltage while a resistor prevents excessive current from being transferred to the hazardous area. In the barriers offered by Rockwell Automation, a replaceable fuse is used to protect the barrier from miswiring and transients.

The principle of a keyed fuse assembly has been employed. In case of a fault due to overvoltage, polarity misconnection or transients, only the protective keyed fuse assembly needs to be replaced.

The replacement of the fuse assembly can be done by the user at the job site. The barriers do not have to be returned to the manufacturer for replacement.

Intrinsically Safe or Galvanic Isolators are *active* protective interface assemblies that limit the amount of energy allowed to enter a hazardous area under fault conditions. Sometimes called Transformer Isolated Barriers, they separate intrinsically safe wiring from non-intrinsically safe wiring through the use of the same isolation coils found in power transformers. Galvanic isolators, unlike zener diode barriers, do not require grounding—therefore they may reduce ground loop problems as well as installation and maintenance costs. The slim 3/4 inch wide housing on DC models also conserves valuable mounting space. DIP switches provide convenient programming of output and diagnostic functions while multiple LEDs provide visual indication of module and circuit status.

Rockwell Automation zener diode barriers and galvanic isolators are DIN Rail mountable and designed primarily for use with intrinsically safe proximity sensors and photoelectrics. All Rockwell Automation barriers and isolators are UL Listed, FM Certified, CSA and CE Marked for all applicable directives.

# Intrinsically Safe Zener Diode Barriers

## Features

- Replaceable fuse
- Low internal resistance
- Short-circuit protected
- Reverse polarity protection
- Slim 1/2 inch wide housing
- UL Listed, FM, CSA and PTB Certified, and CE Marked for all applicable Directives

## Specifications

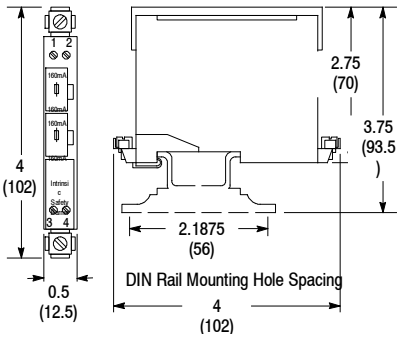
| | |
|---|---|
| **Environmental** | |
| Certifications | UL, FM, CSA PTB, and CE Marked for all applicable directives |
| Operating Temperature [C (F)] | +20…+60° (-4…+140°) |
| Vibration | 55 Hz (1.5 mm amplitude) |
| Shock | 20 g |
| Relative Humidity | 0…95% (noncondensation) |
| **Electrical** | |
| Leakage Current | ≤1 µA |
| Protection Type | Reverse polarity (protected by replaceable fuse), over-voltage (protected by replaceable fuse), and short-circuit (incorporated) |
| Replaceable Fuse Rating | 160 A |
| Operating Frequency | ≤100 kHz @ Isc > 50 mA; ≤50 kHz @ Isc ≤0.50 mA |
| Short Circuit Protection | Incorporated |
| **Mechanical** | |
| Material | Polyamide |
| Mounting Location | Nonhazardous or Class 1, Division 2 or Zone 2/Zone 22 locations |
| I.S. Connections for | Class I, II, III; Div 1 and 2; Groups A-G and Zones 0, 1, 2, 20, 21, 22; Group IIC and IIB |
| Enclosure Rating | IP40 (IEC529) |

## Compatible Sensors

### Photoelectrics

| Sensor Style | Sensing Mode | Connection Type | Cat. No. Sensor | Cat. No. Barriers Used† |
|---|---|---|---|---|
| 9000 Through Beam Photoelectric | Emitter | 2 m Cable | 42GRL-9540 | 897H-S120 |
| | | 4-Pin Micro | 42GRL-9540-QD | |
| | | 4-Pin Mini | 42GRL-9540-QD1 | |
| | Receiver | 2 m Cable | 42GRR-9500 | 897H-S214 or 897H-S150 |
| | | 4-Pin Micro | 42GRR-9500-QD | |
| | | 4-Pin Mini | 42GRR-9500-QD1 | |
| 5000 Photoelectric | Retroreflective | Screw Terminals | 42DRU-5500 | 897H-S120 or 897H-S140 or 897H-S150 |
| | Polarized Retroreflective | | 42DRU-5700 | |
| | Standard Diffuse | | 42DRP-5500 | |
| | Fiber Optic | | 42DRA-5500 | |

## Approximate Dimensions [mm (in.)]




### Proximities

| Sensor Style | Barrel Diameter | Shielding | Cat. No. Sensor | Cat. No. Barriers Used† |
|---|---|---|---|---|
| Stainless Steel Face and Barrel Proximity Sensor | 12 mm | Shielded | 871TM-DR2ENE12-⊗ | 897H-S214 or 897H-S120 |
| | | Unshielded | 871TM-DR4ENE12-⊗ | |
| | 18 mm | Shielded | 871TM-DR2ENE18-⊗ | |
| | | Unshielded | 871TM-DR4ENE18-⊗ | |
| | 30 mm | Shielded | 871TM-DR2ENE30-⊗ | |
| | | Unshielded | 871TM-DR4ENE30-⊗ | |

⊗ Replace symbol with desired termination. A2 for 2 meter PVC cable and D4 for 4-pin micro QD.

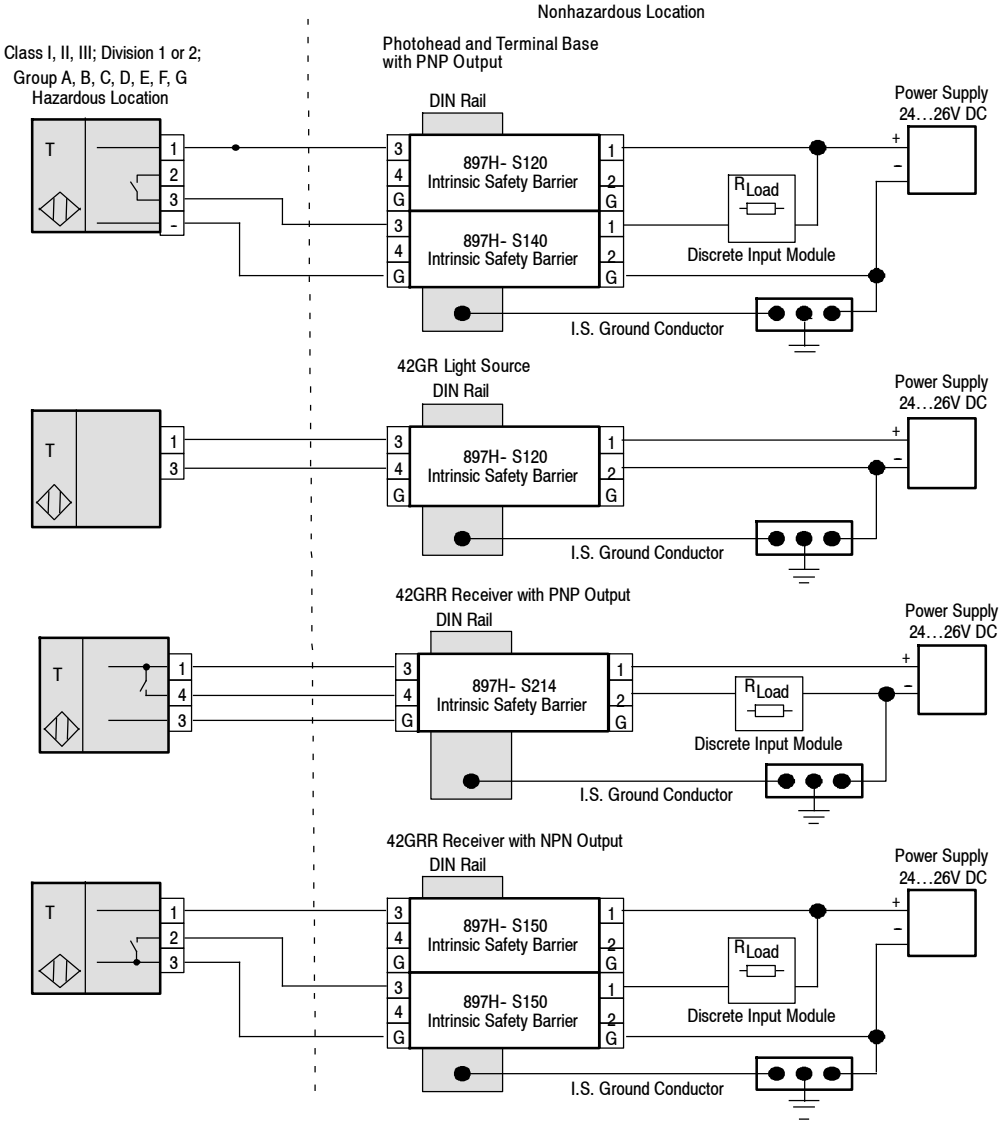
# Intrinsically Safe Zener Diode Barriers

## Product Selection

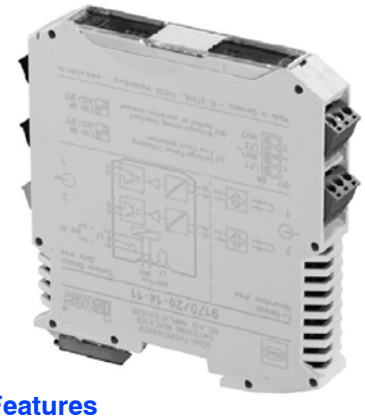
| Rated Voltage | Internal Resistance | Classification | FM Entity Parameters | | | | | ATEX Certified Stahl Part No. | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|
| | | | Supply Voltage, Max. | Current, Max. | Power, Max. | Permissible External Capacity | Permissible External Inductance, Max. | | |
| 24V DC | 286…319 ohms | A, B, E | 28V | 100 mA | 700 Mw | 0.083 µF | 1.6 mH | 9001/01-280-100-101 | **897H-S120** |
| | | D, F, G | | | | 0.65 µF | 11 mH | | |
| | 0 ohms | A, B, E | | | | 0.083 µF | 1.6 mH | 9001/03-280-000-101 | **897H-S140** |
| | | D, F, G | | | | 0.65 µF | 230 mH | | |
| | 599…666 ohms | A, B, E | | | | 0.083 µF | 1.6 mH | 9001/01-280-050-101 | **897H-S150** |
| | | D, F, G | | | | 0.65 µF | 230 mH | | |
| | 269…290 ohms | A, B,E | | | | 0.083 µF | 1.6 mH | 9002/13-280-110-001 | **897H-S214** |
| | | D, F, G | | | | 0.65 µF | 230 mH | | |
| | 321…356 ohms | A, B | | | | 0.083 µF | 1.6 mH | 9002/11-280-186-001 | **897H-S233** |
| | | D, F, G | | | | 0.65 µF | 230 mH | | |
| Replacement Fuse Assembly | | | | | | | | | **897H-F160** |

**Note**: Safety Parameters stated above are per input.

## Typical Wiring Diagram



# Intrinsically Safe Galvanic Isolators



## Features

- DIN Rail mounting with power bus option
- Removable field connection terminals
- Single- and two-input versions
- Variety of output types
- Certified to worldwide standards
- SIL 2 and 3 rated
- Intrinsically safe connections for Class I, II, III, Div 1; Groups A–G; Zones 1, 2, 21, and 22; [Ex ia], IIC/IIB

## Specifications

| | |
|---|---|
| **Environmental** | |
| Certifications | FM, CSA, UL, PTB and CE Marked for all applicable directives |
| Operating Temperature [C (F)] | -20…+65° (-4…+149°) |
| Relative Humidity | <95% RH |
| Enclosure Type Rating | IP30 |
| **Electrical** | |
| Number of Inputs | 2 |
| Switching Current @ Voltage, Max. | 8V @ 8.2 mA (to EN 60947-5-6 NAMUR) |
| Input Current | On > 2.1 mA; Off < 1.2 mA |
| Input Resistance | 1000 Ω |
| Switching Frequency (Hz) | < 15 Hz |
| Switch Delay | On to Off: 15 ms; Off to On: 15 ms |
| Status Indicators | Green = Power; Yellow = Output Closed; Red = Wire Break/Short |
| **Mechanical** | |
| Material | Polyamide 6GF |
| Mounting | 35 mm DIN Rail |
| Conductor Size, Max. | 0.2…2.5 mm$^2$ (24-14 AWG) |
| Weight [g (lbs)] | 160 (0.35) |

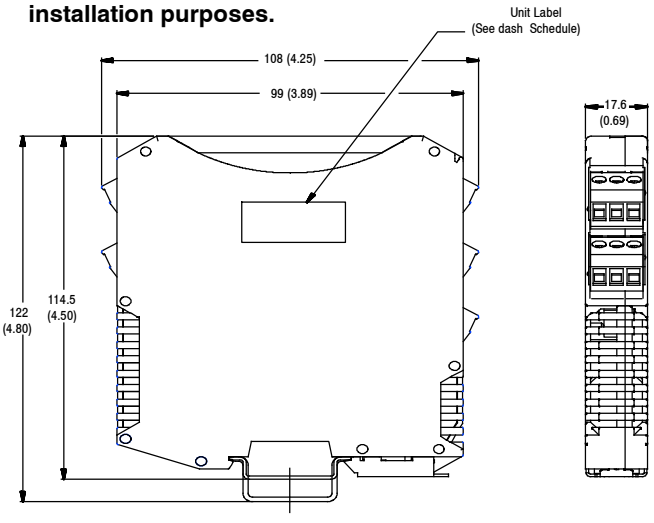
## Compatible Sensors

**NAMUR Style**

| Sensor Style | Sensing Mode | Connection Type | Cat. No. |
|---|---|---|---|
| Nickel-Plated Brass Barrel, Plastic Face Proximity Sensor | 8 mm | Shielded | 871C-DH1M8-❶ |
| | | Unshielded | 871C-DH2M8-❶ |
| | 12 mm | Shielded | 871C-DH1M12-❶ |
| | | Unshielded | 871C-DH2M12-❶ |
| | 18mm | Shielded | 871C-DH1M18-❶ |
| | | Unshielded | 871C-DH2M18-❶ |
| | 30 mm | Shielded | 871C-DH1M30-❶ |
| | | Unshielded | 871C-DH2M30-❶ |

## Approximate Dimensions [mm (in.)]

**Dimensions are not intended to be used for installation purposes.**



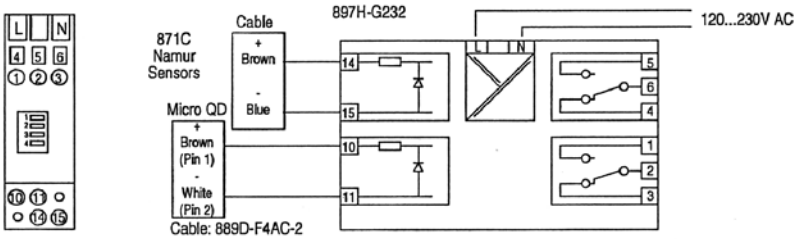

❶ Replace symbol with desired termination. A2 for 2 meter PVC cable and D4 for 4-pin micro QD.

# Intrinsically Safe Galvanic Isolators

## Product Selection

| Power Supply | Input Type | Output Type/ Output Rating/ Response Time | Classification | FM Entity Parameter | | | | | ATEX Certified Stahl Cat. No. | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Voltage, Max. | Current, Max. | Power, Max. | Max. Permiss. External Capacity | Max. Permiss. External Inductance | | |
| 120…230 V AC | (2) NAMUR Sensors or Dry-Contacts | SPDT Relay/250V AC @ 4 A/ 10 ms | A, B, E | 10.6V | 24 mA | 64 mW | 2.32 µF | 63 mH | 9170/20-12-21s | 897H-G232 |
| | | | D, F, G | | | | 16.2 µF | 230 mH | | |
| 24V DC | | | A, B, E | | | | 2.32 µF | 63 mH | 9170/20-12-11s | 897H-G231 |
| | | | D, F, G | | | | 16.2 µF | 230 mH | | |
| 24V DC | | Transistor, Open Collector/ 35V DC @ 50 mA/ 30 µs | A, B, E | | | | 2.32 µF | 63 mH | 9170/20-14-11s | 897H-G211 |
| | | | D, F, G | | | | 16.2 µF | 230 mH | | |

## Typical Wiring Diagrams

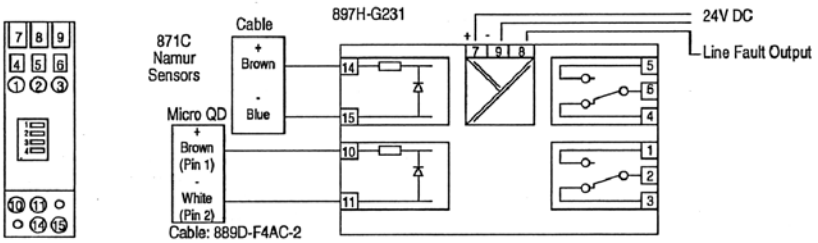



Dip Switch Settings

1 2 3 4 / 1 1 1 1 N.O.

1 2 3 4 / 1 0 3 0 N.C.

Switch 1, 2 Channel 1 (2 Config N.O./N.C.)
Switch 3, 4 Channel 2 (4 Config N.O./N.C.)
Turn Switch 1 & 3 "On" to configure short ckt/open wire detection. Use a 22K Ohm in parallel for open wire detection, or a 2.7K Ohm in series for short ckt detection.

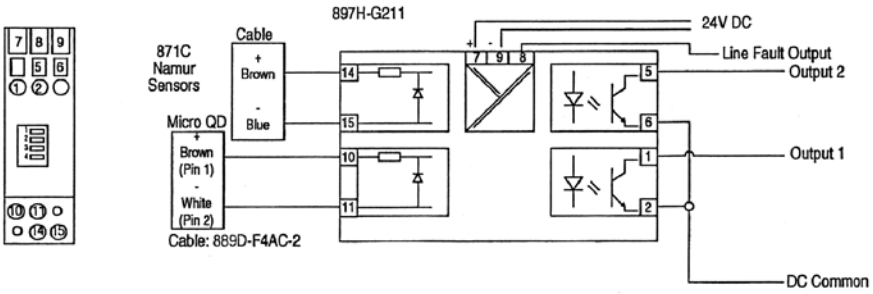



Dip Switch Settings

1 2 3 4 / 1 1 1 1 N.O.

1 2 3 4 / 1 0 3 0 N.C.

Switch 1, 2 Channel 1 (2 Config N.O./N.C.)
Switch 3, 4 Channel 2 (4 Config N.O./N.C.)
Turn Switch 1 & 3 "On" to configure short ckt/open wire detection. Use a 22K Ohm in parallel for open wire detection, or a 2.7K Ohm in series for short ckt detection.




Dip Switch Settings

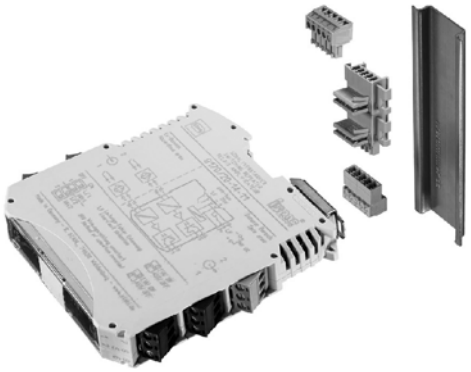
1 2 3 4 / 1 1 1 1 N.O.

1 2 3 4 / 1 0 3 0 N.C.

Switch 1, 2 Channel 1 (2 Config N.O./N.C.)
Switch 3, 4 Channel 2 (4 Config N.O./N.C.)
Turn Switch 1 & 3 "On" to configure short ckt/open wire detection. Use a 22K Ohm in parallel for open wire detection, or a 2.7K Ohm in series for short ckt detection.

It is recommended that wiring for intrinsically safe systems be identified as such through the use of light blue jacketing and/or through appropriate labels. Such labels are required by NEC Article 504 and ANSI/ISA RP-12.6 to be placed at no more than 25 foot intervals. When installing intrinsically safe equipment the user should refer to all relevant national standards and/or those standards set forth by the "authority having jurisdiction" at the installation site.

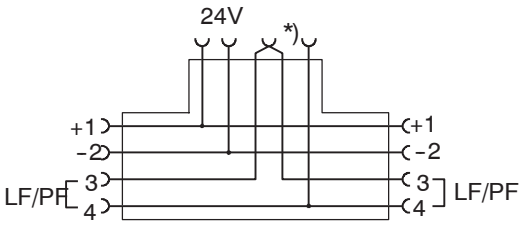
# Galvanic Isolators



## Description

Rockwell Automation Galvanic Isolators can be daisy chained together via power bus connectors. The snap-on connectors save time and simplify wiring for power distribution and error identification on a series of modules. Each end on a string of bussed isolators is terminated with a screw terminal connector. The line fault and power supply failure line are bridged on these connectors to close the current.

## Wiring Diagram




## Approximate Dimensions [mm (in.)]

### Accessory Connectors

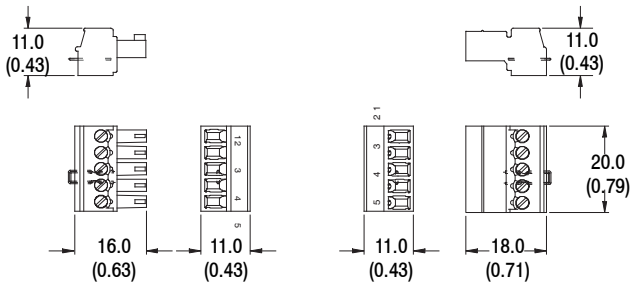



Figure 1

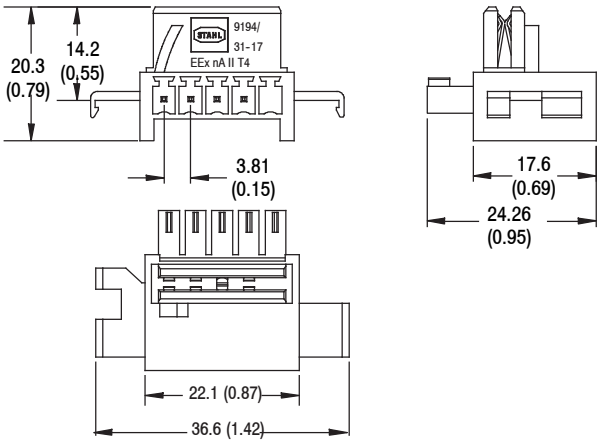



Figure 2

Dimensions are not intended to be used for installation purposes.

## Product Selection

| Description | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|
| Power Bus Screw Terminal Connector | See Figure 1 | 897H-GDRC |
| Power Bus T-Connector | See Figure 2 | 897H-GDRCT |

# Intrinsically Safe Wiring Labels/DIN Mounting Rail

## Description

It is recommended that wiring for intrinsically safe systems be identified as such through the use of light blue jacketing and/or through appropriate labels. Such labels are required by NEC Article 504 and ANSI/ISA RP-12.6 to be placed at no more than 25 foot intervals. When installing intrinsically safe equipment the user should refer to all relevant national standards and/or those standards set forth by the "authority having jurisdiction" at the installation site.

## Intrinsically Safe Wiring Labels

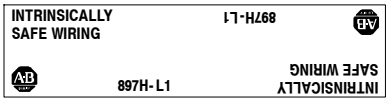



Figure 1

Figure 2

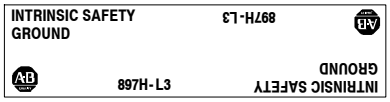
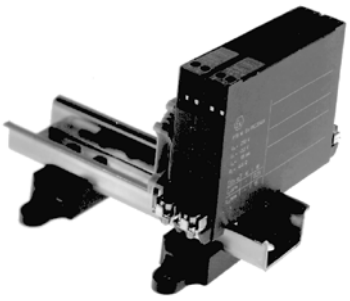



Figure 3

| Quantity | Description | Figure | Cat. No. |
|---|---|---|---|
| 25 | Intrinsically Safe Wiring | 1 | **897H-L1-25** |
| 100 | Intrinsically Safe Wiring | | **897H-L1-100** |
| 25 | Intrinsically Safe Wiring | 2 | **897H-L2-25** |
| 100 | Intrinsically Safe Wiring | | **897H-L2-100** |
| 25 | Intrinsic Safety Ground | 3 | **897H-L3-25** |

## Description

DIN Rail provides convenient and simple mounting of barriers, isolators, and other control equipment. DIN Rail is available from Rockwell Automation/ Allen-Bradley in one meter sections (Cat. No. **64-134**) or as part of a mounting kit (Cat. No. **64-136**). By isolating the DIN Rail from the mounting surface, the mounting kit allows 897H-series shunt diode barriers to be grounded directly to the rail.



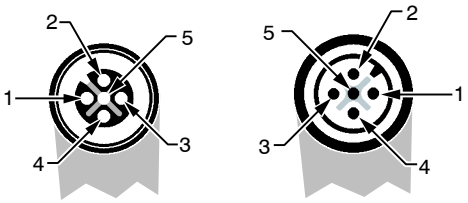
#64-136 TS35 DIN Mounting Rail Kit
(Barriers not included)

#64-134 TS35 DIN Mounting Rail

## Mounting Accessories

| Description | Cat. No. |
|---|---|
| 1 m (3.3 ft) prepunched zinc-plated and chromated steel mounting rail per EN50022/DIN46277 (TS35) | **64-134** |
| DIN Rail mounting kit includes 12 inch DIN Rail, two insulated standoffs, and two grounding terminals | **64-136** |

## Pinout and Color Code

| | Face View Pinout | |
|---|---|---|
| | 4-Pin | |
| |  | |
| | Female | Male |
| **Color Code** | 1–Brown<br>2–White<br>3–Blue<br>4–Black<br>5–NA | |

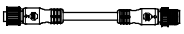
## Description

As defined in the National Electric Code (NEC), intrinsically safe wiring must be identified by color coding with light blue jacketed cable or by labeling at regular 25 foot or less intervals. When installing intrinsically safe equipment, the user should refer to all relevant national standards and/or those standards set forth by the "authority having jurisdiction" at the installation site. Rockwell Automation cordsets and patchcords with blue PVC jacketing provide a cost effective solution for easy identification of intrinsically safe wiring. Unlike tags, that may fall off or become unreadable, this rugged cable maintains its visibility, even in harsh environments. No labor time is required for labeling the cable while it is being installed or during maintenance.

## Product Selection

### Cordsets

| Pin Count | Color Code | Jacket Color | Wire Gauge | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female | Right Angle Female | Straight Male | Right Angle Male |
| 4-Pin | A | Blue | 22 AWG | 889D-F4LC-❶ | 889D-R4LC-❶ | 889D-M4LC-❶ | 889D-E4LC-❶ |

### Patchcords 

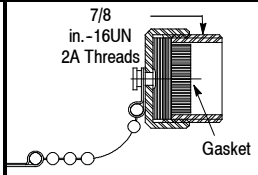
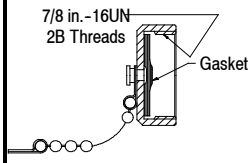
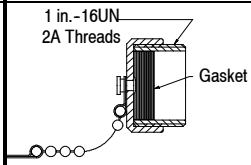
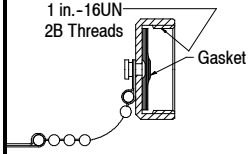
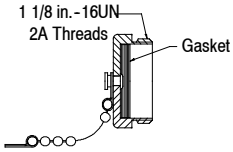
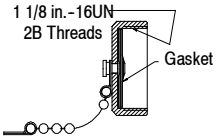
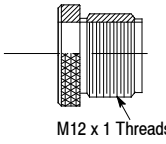
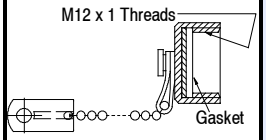
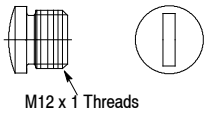
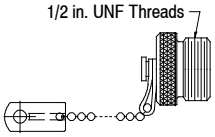
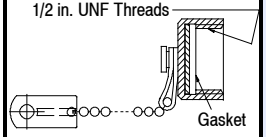
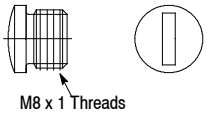
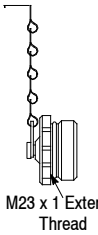
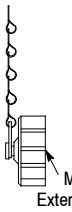
| Pin Count | Color Code | Jacket Color | Wire Gauge | Cat. No. | | | |
|---|---|---|---|---|---|---|---|
| | | | | Straight Female Straight Male | Straight Female Right Angle Male | Right Angle Female Straight Male | Right Angle Female Right Angle Male |
| 4-Pin | A | Blue | 22 AWG | **889D-F4LCDM-❷** | 889D-F4LCDE-❷ | 889D-R4LCDM-❷ | 889D-R4LCDE-❷ |

❶ Replace symbol with 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.
❷ Replace symbol with 0M3 (1 ft), 1 (1 m), 2 (2 m), 5 (5 m) or 10 (10 m) for standard cable lengths.

**Note**: See DC Micro Style Cordsets and Patchcords for complete specifications (page 8-1).

# Sealing Caps

## Product Selection

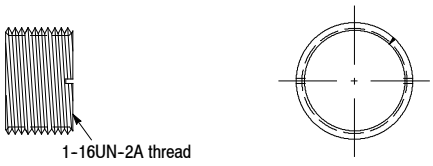
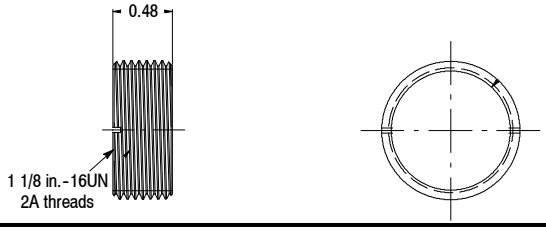
| Connector Style | Material | Thread Config. | Approximate Dimensions [mm (in.)] | Cat. No. | Thread Config. | Approximate Dimensions [mm (in.)] | Cat. No. |
|---|---|---|---|---|---|---|---|
| Mini | Aluminum | External |  | **1485A-C1** | Internal |  | **889A-NCAP** |
| Mini-Plus (7 and 8 pin) | Aluminum | External |  | 889A-NM2CAP | Internal |  | 889A-N2CAP |
| Mini-Plus (9, 10, and 12 pin) | Aluminum | External |  | 889A-NM3CAP | Internal |  | 889A-N3CAP |
| DC Micro | Aluminum | External |  | 1485A-C3 | Internal |  | 889A-DCAP |
| | Plastic | External |  | **1485A-M12** | — | — | — |
| AC Micro | Aluminum | External |  | **889A-RMCAP** | Internal |  | 889A-RCAP |
| Pico | Plastic | External |  | **889A-PMCAP** | — | — | — |
| M23 | Nickel-plated Brass | External |  | 889A-MMCAP | Internal |  | 889A-MCAP |



Visit our website: *www.ab.com/catalogs*.
Preferred availability cat. nos. are printed in **bold**.

# Coupling Adaptors/Mounting Accessories/Power Supplies

## Coupling Adaptors

| Connector Style | Material | Approximate Dimensions [mm (in)] | Cat. No. |
|---|---|---|---|
| Mini | Aluminum | | **889A-NADPT** |
| Mini-Plus (7 and 8 pin) | |  | **889A-N2ADPT** |
| Mini-Plus (9, 10, and 12 pin) | |  | 889A-N3ADPT |

## Mounting Accessories

| Description | Cat. No. |
|---|---|
| Mounting nuts for 1/2-14 NPT threaded receptacles are available in bags of 10 pieces | **889A-U1NUT-10** |
| Flat, sealing washers for 1/2-14 NPT threaded receptacles are available in bags of 10 pieces | **889A-U1FSL-10** |

## Bulletin 1606 Power Supplies

## Product Selection

| | Output Power | Output Voltage | Output Current | Special Feature(s) | Stocked Item | Parallel Operation (Selectable) | Meets EN 61000-3-2 (PFC) | Cat. No. |
|---|---|---|---|---|---|---|---|---|
| **1606-XLP Compact** | | | | | | | | |
| Compact Single Phase | 30 W | DC 10…12V | 3 A | NEC Class 2 | X | — | N/A | 1606-XLP30B |
| | | DC 24…28V | 1.3 A | NEC Class 2 | X | — | N/A | 1606-XLP30E |
| | 50 W | DC 12…15V | 4.2 A | Output Voltage Adjustable<br>NEC Class 2 | X | — | N/A | 1606-XLP50B |
| | | DC 24…28V | 2.1 A | NEC Class 2 | X | — | N/A | 1606-XLP50E |
| | 72 W | DC 24…28V | 3 A | NEC Class 2 | X | — | N/A | 1606-XLP72E |
| **1606-XL Standard Single Phase** | | | | | | | | |
| Standard Single Phase | 60 W | DC 24V | 2.5 A | NEC Class 2 | X | — | N/A | 1606-XL60D |
| | 120 W | | 5 A | — | X | — | Yes | 1606-XL120D |
| | 240 W | DC 24…28V | 10 A | FM Class 1 Div. 2 T3A | X | — | Yes | 1606-XL240EP |

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**† Indicates obsolete product. For information on these products, please visit our web site at *www/ab.com/catalogs* and select Sensors.**

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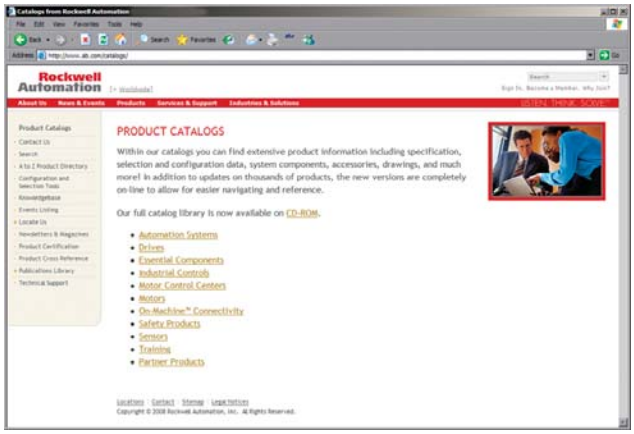
**† Indicates obsolete product. For information on these products, please visit our web site at *www/ab.com/catalogs* and select Sensors.**

# Metric Conversion Factors

| From | To | Multiply by |
|---|---|---|
| **Length** | | |
| Inches (in.) | Millimeters (mm) | 25.4 |
| Inches (in.) | Centimeters (cm) | 2.54 |
| Feet (ft) | Meters (m) | 0.305 |
| Yards (yds) | Meters (m) | 0.914 |
| Millimeters (mm) | Inches (in.) | 0.0393 |
| Centimeters (cm) | Inches (in.) | 0.394 |
| Meters (m) | Feet (ft) | 3.28 |
| Meters (m) | Yards (yds) | 1.09 |
| **Area** | | |
| Square inches (sq in.) | Square millimeters ($mm^2$) | 645 |
| Square inches (sq in.) | Square centimeters ($cm^2$) | 6.45 |
| Square feet (sq ft) | Square meters ($m^2$) | 0.0929 |
| Square yards (sq yds) | Square meters ($m^2$) | 0.836 |
| Square millimeters ($mm^2$) | Square inches (sq in.) | 0.00155 |
| Square centimeters ($cm^2$) | Square inches (sq in.) | 0.155 |
| Square meters ($m^2$) | Square feet (sq ft) | 10.8 |
| Square meters ($m^2$) | Square yards (sq yds) | 1.20 |
| **Weight** | | |
| Ounces (oz) | Grams (g) | 28.3 |
| Pounds (lb) | Kilograms (kg) | 0.454 |
| Grams (g) | Ounces (oz) | 0.0353 |
| Kilograms (kg) | Pounds (lb) | 2.20 |
| **Volume** | | |
| Cubic inches (cu in) | Cubic centimeters ($cm^3$) | 16.4 |
| Cubic feet (cu ft) | Cubic meters ($m^3$) | 0.0283 |
| Cubic inches (cu in) | Liters (l) | 0.0164 |
| Cubic feet (cu ft) | Liters (l) | 28.3 |
| Gallons (Imp) | Liters (l) | 4.55 |
| Gallons (US) | Liters (l) | 3.79 |
| Cubic centimeters ($cm^3$) | Cubic inches (cu in) | 0.061 |
| Cubic meters ($m^3$) | Cubic feet (cu ft) | 35.3 |
| Liters (l) | Cubic inches (cu in) | 61.0 |
| Liters (l) | Cubic feet (cu ft) | 0.0353 |
| Liters (l) | Gallons (Imp) | 0.220 |
| Liters (l) | Gallons (US) | 0.264 |
| **Pressure** | | |
| Pounds/square inch (psi) | kiloPascals (kPa) | 6.89 |
| Pounds/square inch (psi) | Bars (Bar) | 0.0689 |
| kiloPascals (kPa) | Pounds/square inch (psi) | 0.145 |
| Bars (Bar) | Pounds/square inch (psi) | 14.5 |
| **Torque** | | |
| Pound inch (lb•in.) | Newton meters (N•m) | 0.113 |
| Newton meters (N•m) | Pound inch (lb•in.) | 8.85 |
| **Temperature** | | |
| Degrees Fahrenheit (°F) | Degrees Celsius (°C) | ❶ |
| Degrees Celsius (°C) | Degrees Fahrenheit (°F) | ❷ |

❶ Conversion Formula: 5/9 (°F -32°F) = °C
❷ Conversion Formula: 9/5 (°C +32°F) = °F.

# On-Line Resources




## Sensors Catalog

### *www.ab.com/catalogs*

For the most current version of this *Sensors* catalog, visit the Allen-Bradley catalog web site at www.ab.com/catalogs. With our on-line catalog, you can search for information by product type or by part number.

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Control-Matched Variable Speed AC & DC Motors
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