Technical Data

Original Instructions

Allen-Bradley by ROCKWELL AUTOMATION

Inductive Proximity Sensor Specifications

Bulletin Numbers 802PR, 871C, 871D, 871F, 871FM, 871L, 871P, 871R, 871T, 871TM, 871TS, 871Z, 871ZC, 871ZT, 872C, 872L

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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Added 871TM 3-wire DC Standard Range Tubular Sensors	43

Term	Definition
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	A proximity sensor that features both normally open (N.O.) and normally closed (N.C.) outputs, which can be used simultaneously.
Correction Factors	Suggested multiplication factors that take variations in the target material composition into account. When figuring actual sensing distance, multiply this factor 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 that causes a decrease in the strength of the electromagnetic or electrical field that the sensing coil is produces.
Differential Travel (Hysteresis)	The distance between the operating point and the release point. (See Hysteresis)
Dual Output	Sensor that has two outputs, which can be complementary or of one type (that is, two N.O. or two N.C.).
Effective Operating Distance (Sr)	The operating distance of an individual proximity switch measured at a 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 2 milliseconds.
Flush Mounting	A shielded proximity sensor that can be flush mounted in metal up to the plane of the active sensing face.
Free Zone	The area around the proximity switch that 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 chatters (continuously switch on and off) when significant vibration is 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 that 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 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 that does not contain iron.
Normally Closed (N.C.)	Output opens when an object is detected in the active switching area. See Figure 2 on page 4.
Normally Open (N.O.)	Output closes when an object is detected in the active switching area. See Figure 2 on page 4.
NPN	The sensor switches the load to the negative terminal. Connect the load between the sensor output and positive terminal. See Figure 3 on page 4.
Operating Distance, Assured	0...81% of the rated operating distance for inductive proximity switches.
Operating Distance, Rated	The operating distance that the manufacturer specifies and is used as a reference value. Also known as nominal sensing distance.
PNP	The sensor switches the load to the positive terminal. Connect the load between the sensor output and negative terminal. See Figure 3 on page 4.
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 that is 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 the state of) the proximity output.
Sensing Range	The sensing range is the distance within which the sensor detects a target under fluctuations of temperature and voltage.
Shielded	Sensor that can be flush mounted in metal up to the plane of the active sensing face. See Figure 1 on page 4.
Short Circuit Protection (SCP)	Sensor that is protected from damage when a shorted condition exists for an indefinite or defined period.
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 that 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 that switches a load that is connected in series to the power supply. Power for the proximity switch is always obtained through the load.
Unshielded	Sensors that have longer sensing distances and a wider magnetic field but are sensitive to surrounding metal. See Figure 1 on page 4.
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.

Figure 1 - Shielded and Unshielded

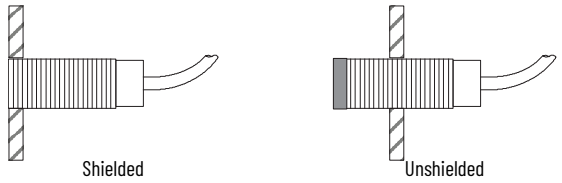


Figure 2 - Normally Open and Normally Closed

Figure 3 - NPN and PNP

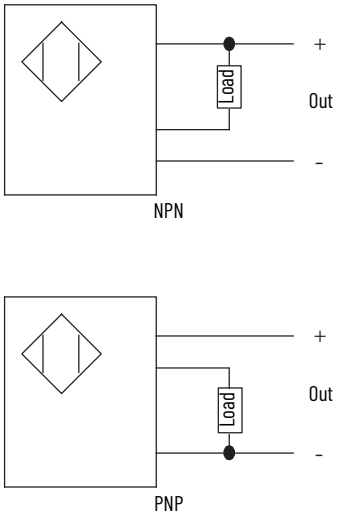


Figure 4 - Voltage Symbols

Figure 5 - Connectors

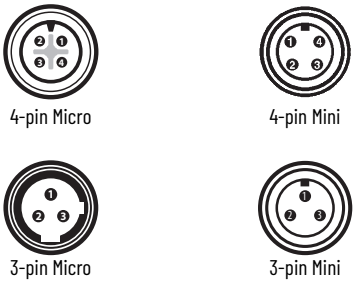
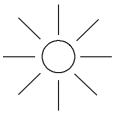
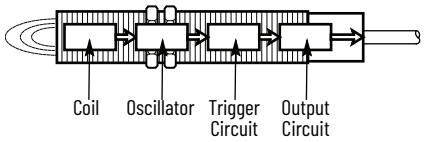


Figure 6 - LED

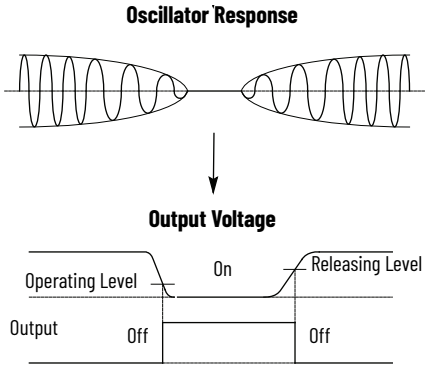


The following information describes the application of inductive proximity sensors.

Principles of Operation

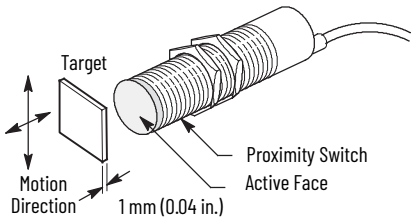


Inductive proximity sensors are designed to operate by generating an electromagnetic field and detecting the eddy current losses that are generated when ferrous and nonferrous metal target objects enter the field. The sensor consists of a coil on a ferrite core, an oscillator, a trigger-signal level 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 that turns the solid-state output ON or OFF.



A metal target that approaches an inductive proximity sensor absorbs the energy that the oscillator generates. When the target is in close range, the energy drain stops the oscillator and changes the output state.

Standard Target



The active face of an inductive proximity switch is the surface where a high-frequency electromagnetic field emerges.

A standard target is a mild steel square, 1 mm (0.04 in.) 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

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 the sensing distance of inductive proximity sensors. If a target constructed from one of the materials that are listed in Table 1 is used, multiply the nominal sensing distance by the correction factor that is listed to determine the nominal sensing distance for that target. Ferrous-selective sensors do not detect brass, aluminum, or copper, while nonferrous selective sensors do not detect steel or ferrous-type stainless steels.

The correction factors that are listed in Table 1 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

Table 1 - Correction Factors

Target Material	Approximate Correction Factor
Mild steel	1.0
Stainless steel	0.85
Brass	0.50
Aluminum	0.45
Copper	0.40

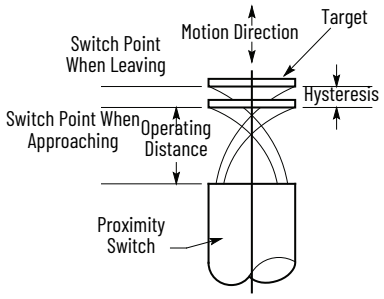
The size and shape of the target can also affect the sensing distance. Use the following as a general guideline when correcting for the size and shape of a target:

- Flat targets are preferable
- Rounded targets can 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 can increase the sensing distance
- Foils can increase the sensing distance

Hysteresis (Differential Travel)

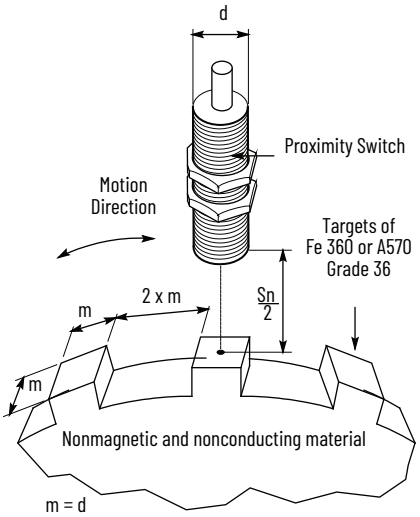
The difference between the operate and release points is called hysteresis or differential travel. The amount of target travel that is required for release after operation must be accounted for when you select target and sensor locations. Hysteresis is required to help prevent chattering (turning on 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.



Switching Frequency

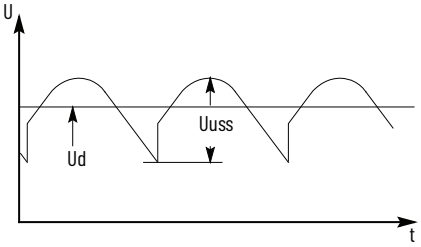
The switching frequency is the maximum speed at which a sensor delivers discrete individual pulses as the target enters and leaves the sensing field. This value is always dependent on target size, distance from sensing face, speed of target, and switch type. This value indicates the maximum possible number of switching operations per second. IEC 60947-5-2 specifies the measuring method for determining switching frequency with standard targets.



Ripple

Ripple is the alternating voltage that is superimposed on the DC voltage (peak-to-peak) in percent (%).

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 Proximity Sensors

More reliable operation is dependent on the strength of the magnetic field and the distance between the current line and the sensor.

Figure 7 - Perpendicular Mounting to the Current Line

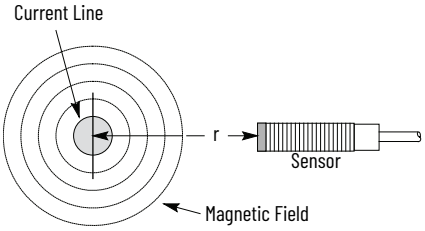
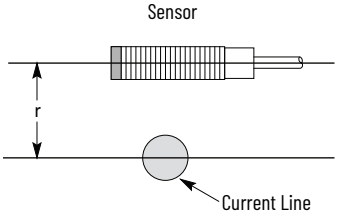


Figure 8 - Parallel Mounting to the Current Line

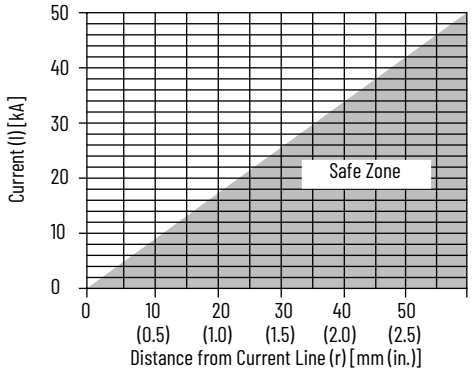


Use the following chart or formulas to determine the spacing requirements between the current line and proximity sensor. Select a distance that falls within the safe zone.

- H = I/2pr
- B = H/0.796
- Gauss - 10*B

where:

I = welding current (kA)
H = field strength (kA/m)
B = flux (mT)
r = distance between sensor and current carrying lines (m)



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.

Figure 9 - Wiring Diagram for Series Connected Current Sink Sensors (NPN)

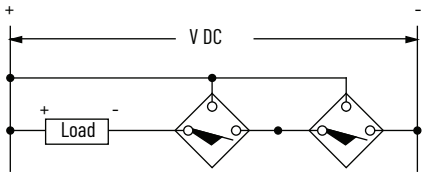
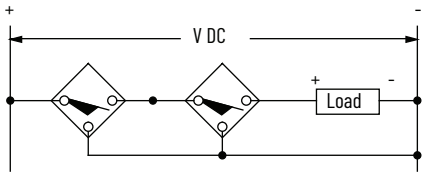


Figure 10 - Wiring Diagram for Series Connected Current Source Sensors (PNP)



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 that are connected in parallel must be less than the maximum OFF-state current of the load device.

ATTENTION: Care must be taken when designing parallel proximity circuits. If too much leakage current flows into the load it can cause the solid-state input to change state or a small relay not to drop out. Sensors that are connected in parallel do not provide a higher load current capability.

Figure 11 - Wiring Diagram for Parallel Connected Current Sink Sensors (NPN)

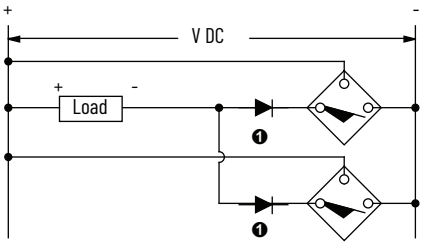
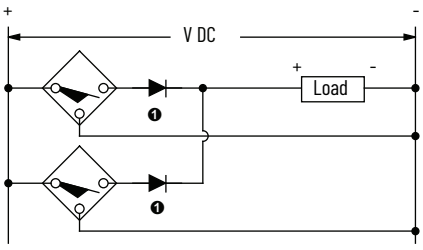
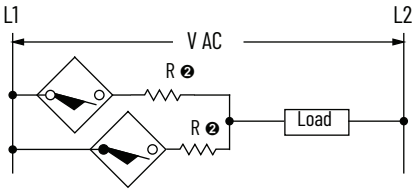


Figure 12 - Wiring Diagram for Parallel Connected Current Source Sensors (PNP)



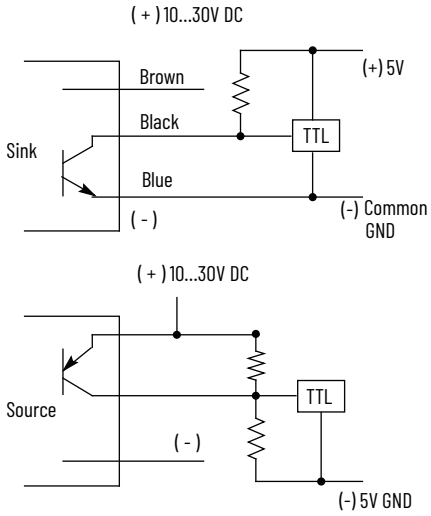
❶ Add the diode as shown to each output to maintain the individual output indicator function.

Figure 13 - Wiring Diagram for Parallel Connected AC Sensors



❷ Add R in series with sensor to maintain minimum voltage when sensor is switching.

TTL Wiring

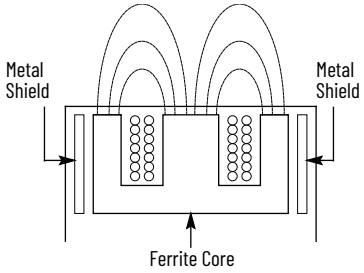


ATTENTION: When using sourcing outputs, ground must be floating and cannot be common, or short circuit results.

Shielded vs. Unshielded Inductive Sensors

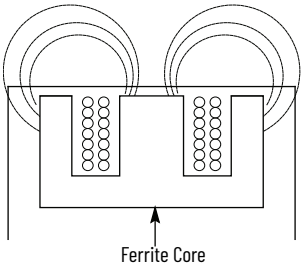
Shielded construction includes a metal band which surrounds the ferrite core and coil arrangement. Unshielded sensors do not have this metal band.

Figure 14 - Shielded Sensor



Shielded construction includes a metal band which surrounds the ferrite core and coil arrangement.

Figure 15 - Unshielded Sensor



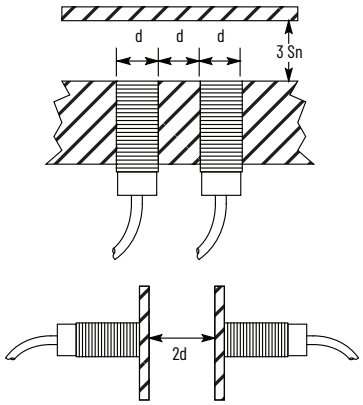
Unshielded sensors do not have this metal band.

Spacing Between Shielded Sensors (Flush-mountable) and Nearby Metal Surfaces

Shielded proximity sensors allow the electromagnetic field to be concentrated to the front of the sensor face. Shielded construction allows the proximity to be mounted flush in the surrounding metal without causing a false trigger.

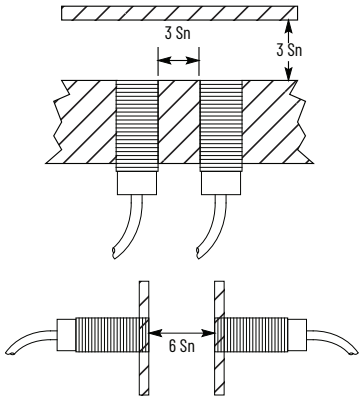
Tubular Style

Figure 16 - Tubular Style



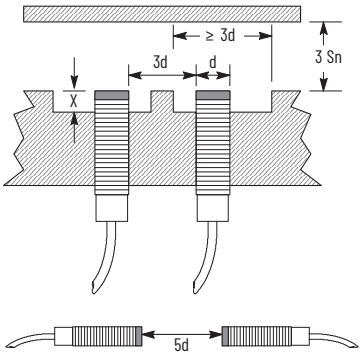
d = diameter or width of active sensing face
Sn = nominal sensing distance

Figure 17 - Tubular Style Extended Sensing (872C)



d = diameter or width of active sensing face
Sn = nominal sensing distance

Figure 18 - Tubular-style Long-range Sensing (872C)

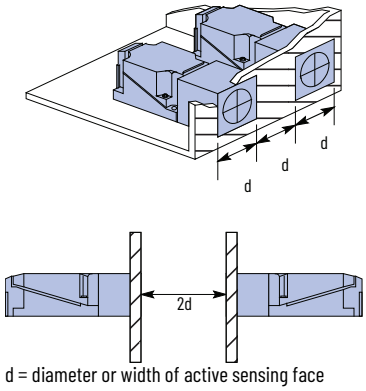


d = diameter or width of active sensing face

Housing Diameter [mm (in.)]	Dimension X [mm (in.)]
6.5 (0.26)	1 (0.04)
12 (0.47)	2 (0.08)
18 (0.71)	4 (0.16)
30 (1.18)	6 (0.24)

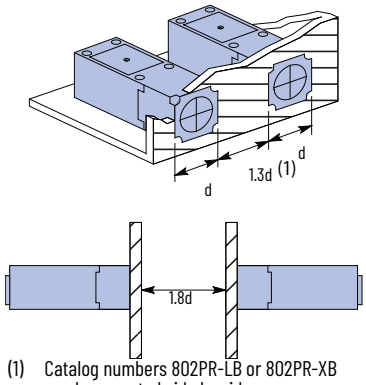
Limit Switch Style

Figure 19 - Limit Switch Style (871L/872L)



d = diameter or width of active sensing face

Figure 20 - Limit Switch Style (802PR)

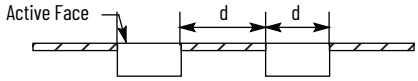


(1) Catalog numbers 802PR-LB or 802PR-XB can be mounted side by side.

d = diameter or width of active sensing face

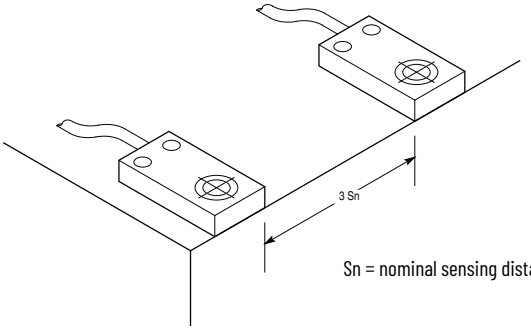
Flat Pack Style

Figure 21 - Flat Pack Style (871F)



d = diameter or width of active sensing

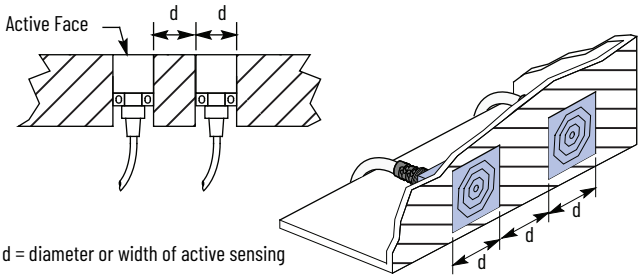
Figure 22 - Miniature Flat Pack Style (871FM)



Sn = nominal sensing distance

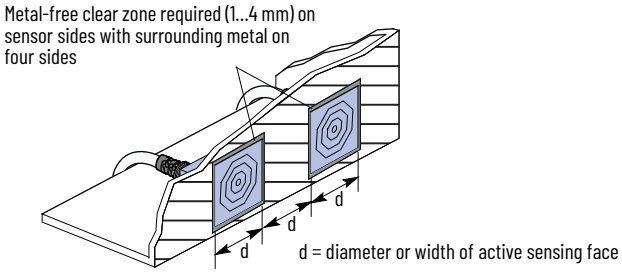
Cube Style

Figure 23 - 871P VersaCube® Sensor — 2- and 3-wire



d = diameter or width of active sensing

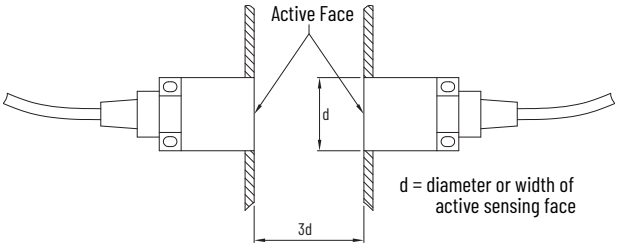
Figure 24 - 871P VersaCube Sensor — 4-wire



d = diameter or width of active sensing face

Surrounding Metal Thickness [mm (in.)]	Number of Sides	Orientation	Opening Required [mm (in.)]	Metal-free Clear Zone (Each Side) [mm (in.)]
< 3 (0.12)	4	Front sensing face with bracket on back	44 x 44 (1.73 x 1.73)	4 (0.16)
3 (0.12)	1, 2, or 3		40 x 40 (1.57 x 1.57)	None
≥3 (0.12)	4		41 x 41 (1.61 x 1.61	1 (0.04)

Figure 25 - Spacing Between Opposing Sensors



d = diameter or width of active sensing face

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 must be no closer than three times the rated nominal sensing distance of the sensor.

Tubular Style

Figure 26 - Tubular Style

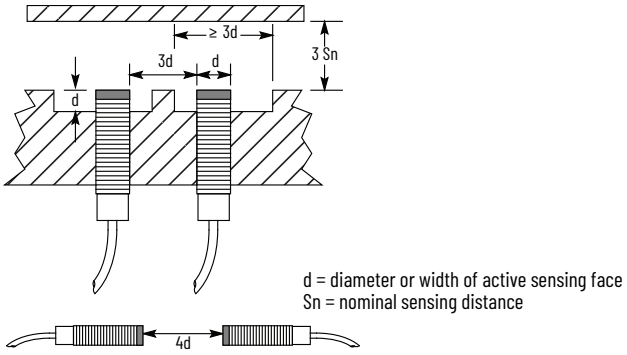


Figure 27 - Tubular-style Extended Sensing (872C)

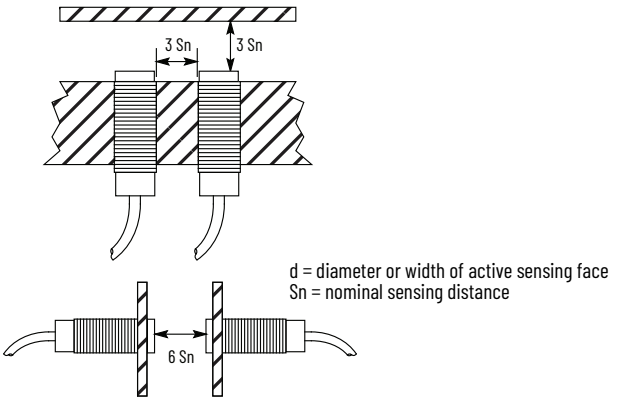
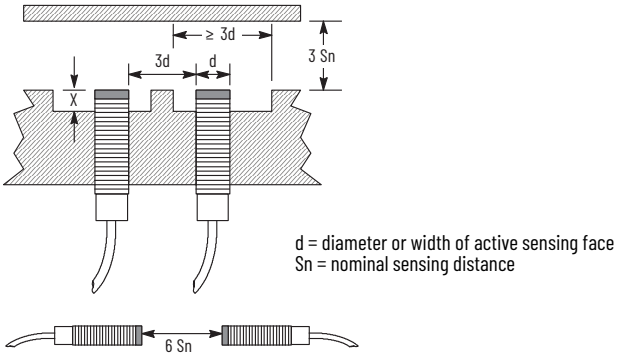


Figure 28 - Tubular-style Long Range Sensing (872C)



Housing Diameter [mm (in.)]	Dimension X [mm (in.)]
8 (0.31)	8 (0.31)
12 (0.47)	13 (0.51)
18 (0.71)	20 (0.79)
30 (1.18)	35 (1.38)

Limit Switch Style

Figure 29 - Limit Switch Style (871L and 872L)

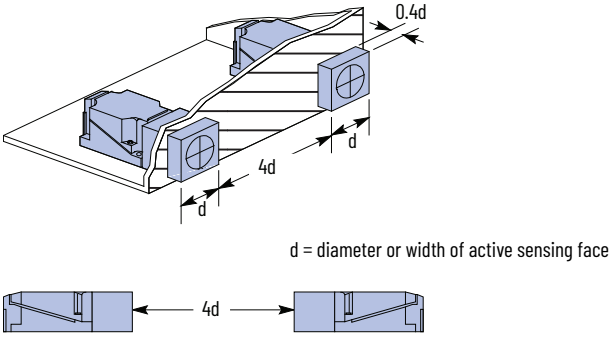
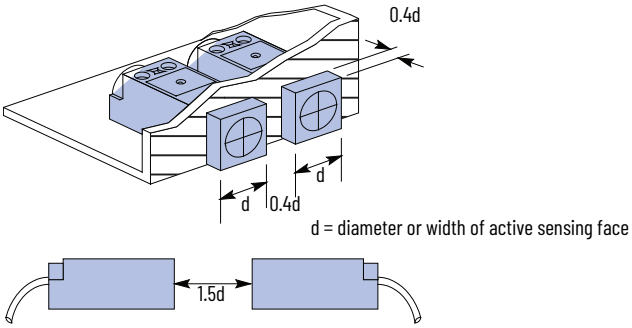


Figure 30 - Limit Switch Style (802PR)



Flat Pack Style

Figure 31 - Flat Pack Style (871F)

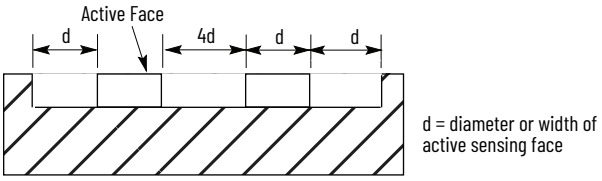
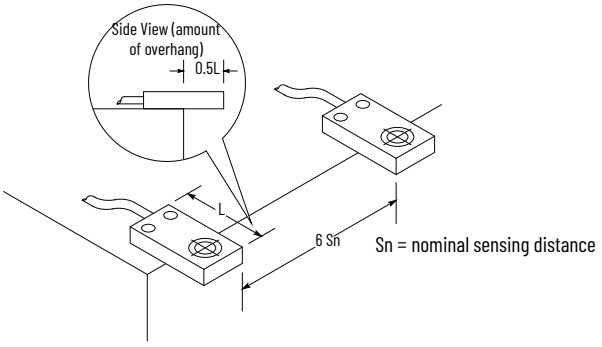
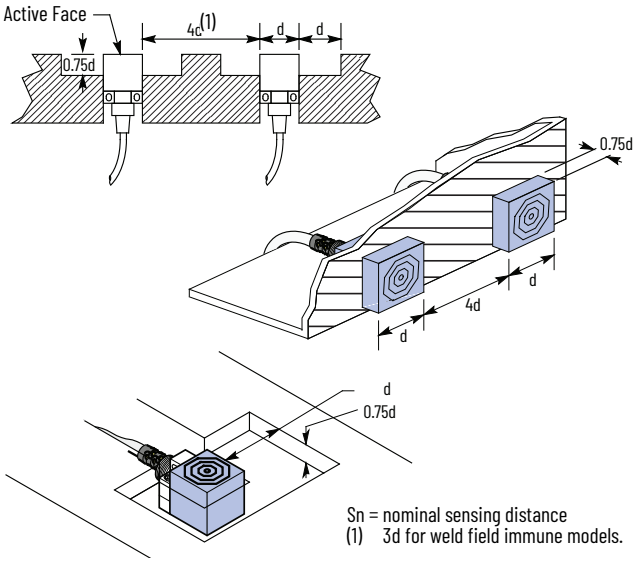


Figure 32 - Miniature Flat Pack Style (871FM)



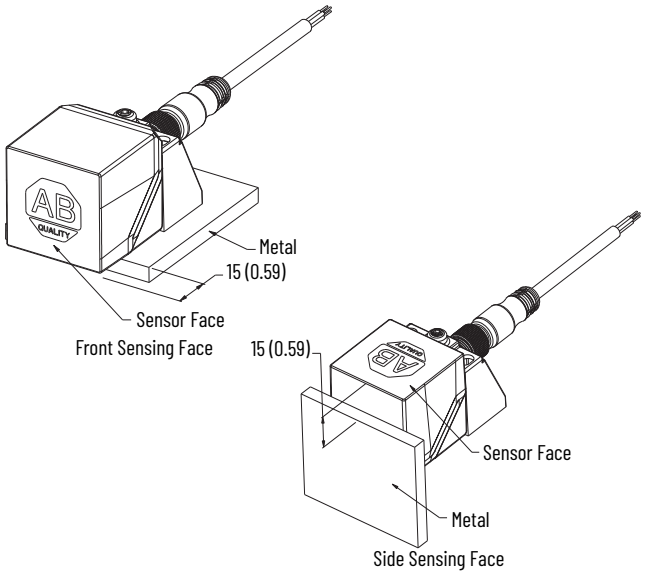
Cube Style

Figure 33 - 871P VersaCube Sensor — 2- and 3-wire



Sn = nominal sensing distance
(1) 3d for weld field immune models.

Figure 34 - 871P VersaCube Sensor — 4-wire [mm (in.)]



Surrounding Metal Thickness [mm (in.)]	Number of Sides	Orientation	Metal-free Clear Zone (Each Side) [mm (in.)]
3 (0.12)	1	Front sensing face with bracket on back	15 (0.59) protrusion
		Side sensing face with bracket on back	15 (0.59) protrusion(1)
	2, 3, or 4	Front sensing face with bracket on back	30 (1.18) protrusion

(1) Sensing distance deviation can be up to -15%.

Figure 35 - Spacing Between Sensors

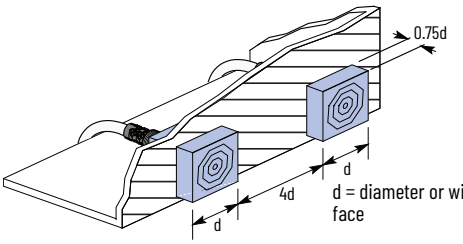
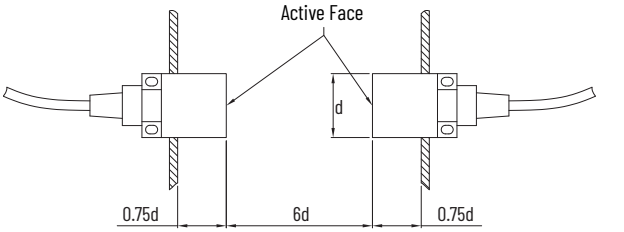
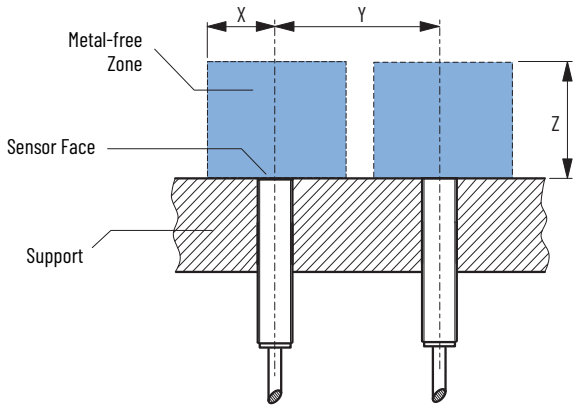


Figure 36 - Spacing Between Opposing Sensors



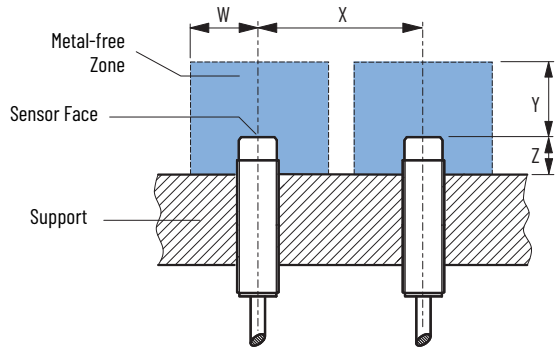
871TM 3-wire DC Long Range Sensors Spacing

Figure 37 - Shielded Sensors



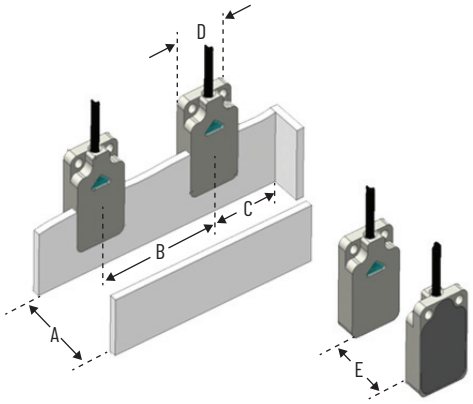
Sensor Diameter [mm (in.)]	Dimension [mm (in.)]		
	X	Y	Z
8 (0.31)	6 (0.24)	22 (0.87)	9 (0.35)
12 (0.47)	12 (0.47)	50 (1.97)	18 (0.71)
18 (0.71)	25 (0.98)	50 (1.97)	30 (1.18)
30 (1.18)	45 (1.77)	110 (4.33)	60 (2.36)

Figure 38 - Unshielded Sensors



Sensor Diameter [mm (in.)]	Dimension [mm (in.)]			
	W	X	Y	Z
8 (0.31)	18 (0.71)	60 (2.36)	18 (0.71)	• Aluminum: 9 (0.35) • Steel: 14 (0.55) • Brass: 10 (0.39) • Stainless steel: 13 (0.51)
12 (0.47)	12 (0.47)	50 (1.97)	18 (0.71)	• Aluminum: 13 (0.51) • Steel: 21 (0.83) • Brass: 14 (0.55) • Stainless steel: 20 (0.79)
18 (0.71)	25 (0.98)	50 (1.97)	30 (1.18)	• Aluminum: 22 (0.87) • Steel: 36 (1.42) • Brass: 22 (0.87) • Stainless steel: 43 (1.69)
30 (1.18)	45 (1.77)	110 (4.33)	60 (2.36)	• Aluminum: 31 (1.22) • Steel: 17 (0.67) • Brass: 34 (1.34) • Stainless steel: 17 (0.67)

871FM Miniature Metal Flat Pack Sensors Spacing



Sensor [WxLxH mm (in.)]	Dimension [mm (in.)]				
	A	B	C	D	E
20 x 32 x 8 (0.79 x 1.26 x 0.31) shielded, 7 (0.28) sensing	24 (0.94)	24 (0.94)	20 (0.79)	20 (0.79)	48 (1.89)
30 x 52 x 14 (1.18 x 2.05 x 0.55) shielded, 10 (0.39) sensing	45 (1.77)	45 (0.79)	30 (1.18)	30 (1.18)	90 (3.54)

Enclosure Ratings

NEMA Enclosures

Table 2 - Enclosures for Nonhazardous Locations

For a Degree of Protection Against:	Designed to Meet Tests No. (1)	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 (2)	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				✓	✓		✓	✓

(1) See below for abridged description of NEMA enclosure test requirements. See NEMA Standards Publication No. 250 for complete test specifications.
(2) Nonhazardous materials, not Class III ignitable or combustible.

Table 3 - Enclosures for Hazardous Locations (Division 1 or 2) (1)

For A Degree of Protection Against Atmospheres Typically Containing: (2)	Designed to Meet Tests: (3)	Class (National Electrical Code)	Type						
			7, Class I Group:				9, Class II Group:		
			A	B	C	D	E	F	G
Acetylene	Explosion Test Hydrostatic Test Temperature Test	I	✓						
Hydrogen, manufactured gas		I	✓	✓					
Diethyl Ether, Ethylene, Hydrogen Sulfide		I			✓				
Acetone, Butane, Gasoline, Propane, Toluene		I			✓	✓			
Metal dusts and other combustible dusts with resistivity of less than 10^5 ohm-cm.	Dust Penetration Test Temperature Test with Dust Blanket	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.		II							✓
Fibers, flyings	(4)	III							✓

(1) For indoor locations only unless cataloged with additional NEMA Type enclosure numbers suitable for outdoor use as shown in Table 2 on page 14. 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.
Classifications of hazardous locations are subject to the approval of the authority having jurisdiction. See the National Electrical Code.
(2) For listing of additional materials and information noting the properties of liquids, gases, and solids, see NFPA 497M-1991, Classification of Gases, Vapors, and Dusts for Electrical Equipment in Hazardous (Classified) Locations.
(3) See abridged description of test requirements below. For complete requirements, see UL Standard 698, compliance with which is required by NEMA enclosure standards.
(4) 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—see the Abridged Descriptions of IEC Enclosure Test Requirements below. For complete test requirements, refer to IEC 529.

First Numeral (1)		Second Numeral (1)	
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	Dusttight (no dust observable inside enclosure at end of test)
6	Powerful water jets	**7**	Temporary submersion
		8	Continuous submersion
		9	Close range high-pressure washdown

(1) The IEC standard permits the use of certain supplementary letters with the characteristic numerals, for example, IP69K (K signifies high temperature water).

EXAMPLE IP41 describes an enclosure that is designed to protect against the entry of tools or objects greater than 1 mm (0.04 in.) in diameter and to protect against vertically dripping water under specified test conditions.

IMPORTANT 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; for example, IP_5/IP_7.

Notes:

Figure 39 - Machine Tools

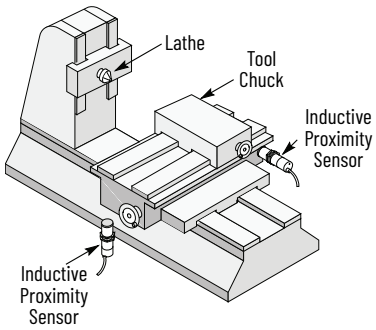


Figure 40 - Plating Line

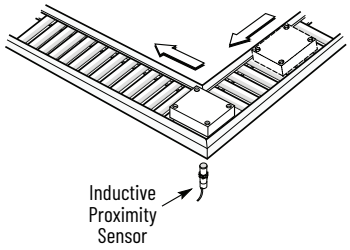


Figure 41 - Plating Line

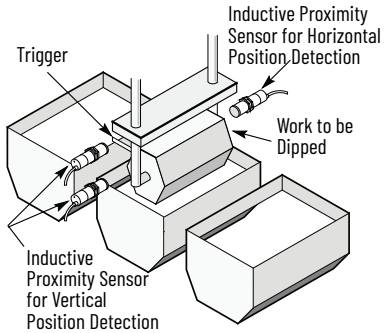


Figure 42 - Grinding Machines

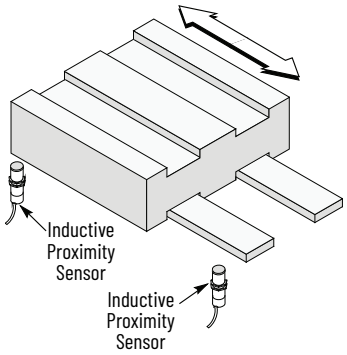


Figure 43 - Wood Industry

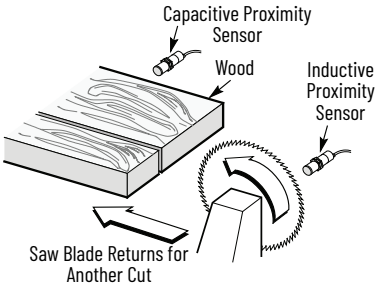


Figure 44 - Conveyor Belts

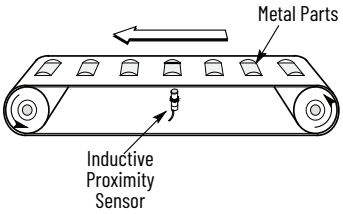


Figure 45 - Petroleum Industry — Valve Position

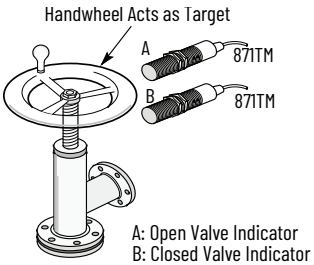


Figure 46 - Foil Seasoning Bag

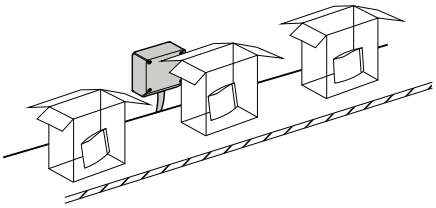


Figure 46 shows an inductive proximity sensor being used to detect a foil seasoning bag inside of a cardboard container.

Figure 47 - Can Tops

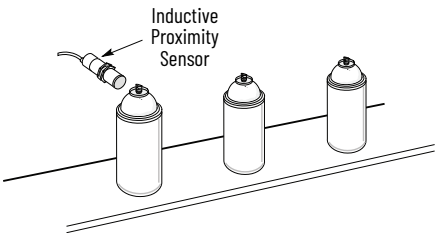


Figure 47 shows a ferrous-selective inductive proximity sensor being used to sort ferrous and nonferrous can tops.

Figure 48 - Food Industry

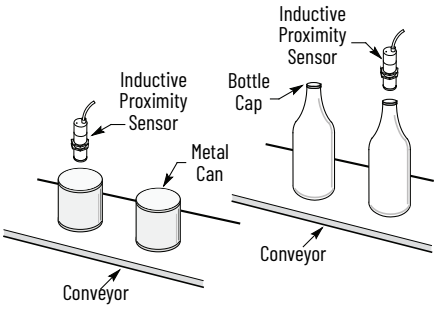


Figure 49 - Stainless-steel Sheet Welder

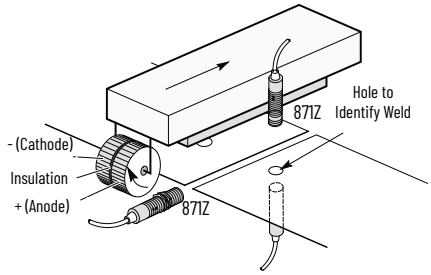


Figure 50 - On Line Parts Sorting

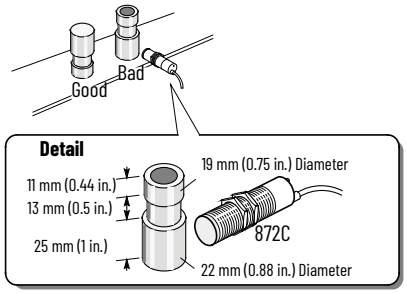


Figure 51 - Railroad Yard Position Sensing

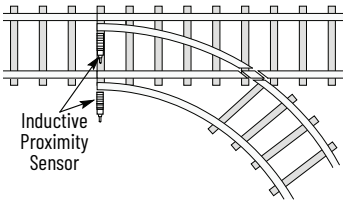


Figure 52 - Coolant Resistant Sensing

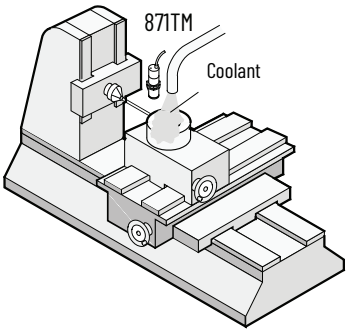


Figure 53 - Up and Downslope Control of Continuous Tube Welder

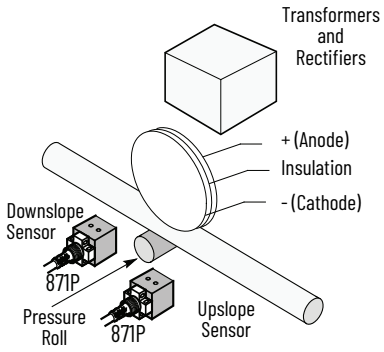


Figure 54 - Nut Placement on Transformer

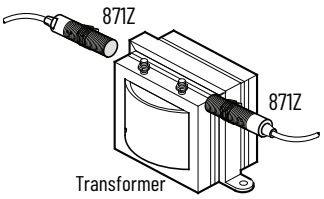


Figure 55 - Closed Barrier Indicator

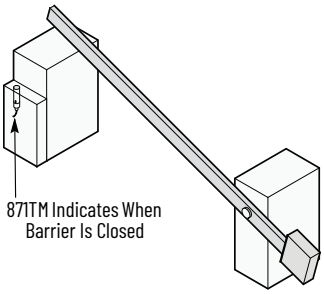


Figure 56 - Detect Presence of Bushing in Piston

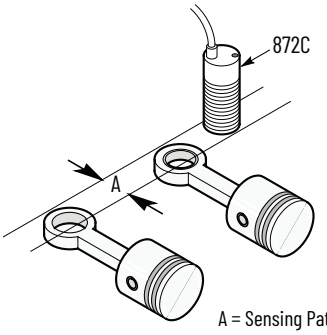


Figure 57 - Control the Presence of Mild Steel Bars in Grate Welding

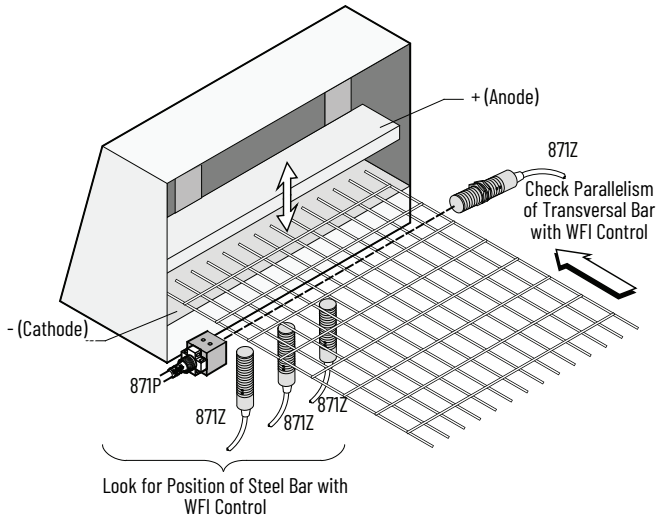
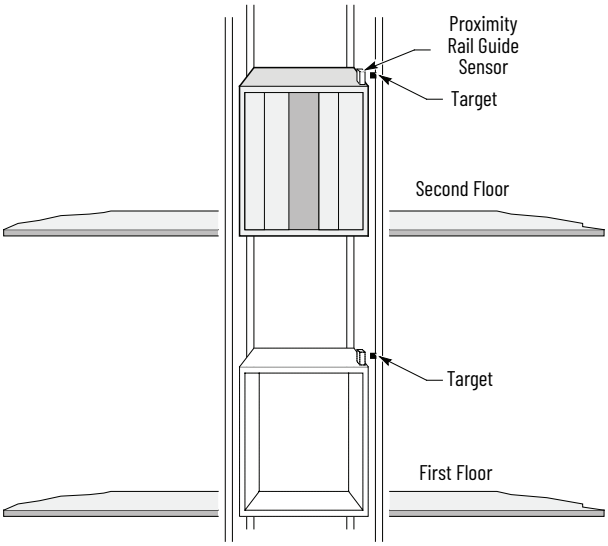


Figure 58 - Elevator Positioning



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 that is tailored to your requirements.

871C 2-wire AC Full Featured Tubular Sensors

871C Cable Style
18 mm and 30 mm Diameter

871C Mini Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871C AC Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm Diameter	18 mm and 30 mm Diameter
Load current	5...200 mA	5...250 mA
Inrush current (one cycle)	≤ 2 A	≤ 4 A
Leakage current	≤ 1.9 mA at 120V AC	
Operating voltage	20...250V AC	
Voltage drop	≤ 10V at 5...200 mA	≤ 10V at 5...250 mA
Repeatability	≤ 10% at constant temperature	
Hysteresis	10% typical	
Protection type	False pulse, transient noise, short circuit, overload (trigger at 250 mA typical)	False pulse, transient noise, short circuit, overload (trigger at 320 mA typical)
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC529)	
Housing material	Plastic face, threaded nickel-plated brass barrel	
Connection type	• Cable: 2 m (6.5 ft) length, 2-conductor PVC • Quick disconnect: 3-pin AC micro, 3-pin mini	
Status indicator	• Red: Output energized/short circuit (flashing) • Green: Power	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g (1.06 oz), 11 ms	
Vibration	55 Hz, 1 mm (0.04 in.) amplitude, 3 planes	

Correction Factors

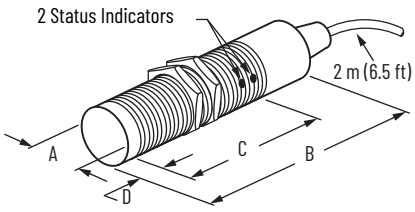
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9
Brass	0.5
Aluminum	0.45
Copper	0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.		
					Cable Style	Mini QD Style	AC Micro QD Style
12 (0.47)	2 (0.08)	Yes	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 (0.71)	5 (0.2)	Yes	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 (1.18)	10 (0.39)	Yes	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

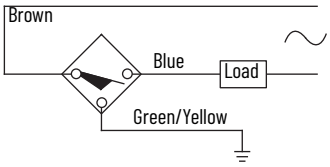
Approximate Dimensions

Cable Style

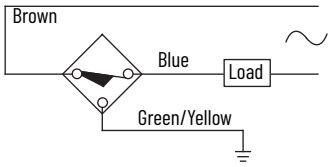


Wiring Diagrams

Normally Open



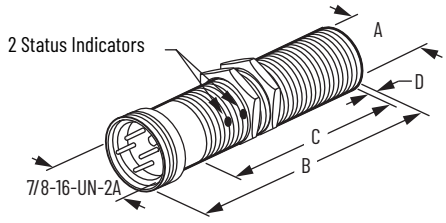
Normally Closed



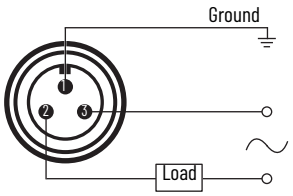
IMPORTANT Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	78.99 (3.11)	47.24 (1.86)	0.8 (0.03)
M18 x 1	Yes	18 (0.71)	74.68 (2.94)	61.6 (2.43)	
M30 x 1.5	Yes	30 (1.18)	77.52 (3.05)	64.31 (2.53)	

Mini QD Style



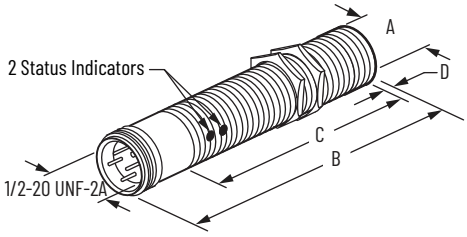
Normally Open or Normally Closed



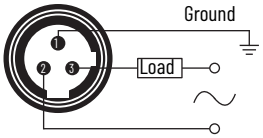
IMPORTANT
- No ground wire on 12 mm. Attach housing to ground.
- Load can be switched to pin 3.

Thread Size	Dimensions [mm (in.)]		
	A	B	C
M12 x 1	12 (0.47)	93.45 (3.68)	46.08 (1.81)
M18 x 1	18 (0.71)	75.82 (2.99)	53.9 (2.12)
M30 x 1.5	30 (1.18)	86.66 (3.41)	64.31 (2.53)

AC Micro QD Style



Normally Open or Normally Closed



IMPORTANT
- No ground wire on 12 mm. Attach housing to ground.
- Load can be switched to pin 2.

Thread Size	Dimensions [mm (in.)]		
	A	B	C
M12 x 1	12 (0.47)	90.42 (3.56)	46.99 (1.85)
M18 x 1	18 (0.71)	83.54 (3.29)	61.6 (2.43)
M30 x 1.5	30 (1.18)	86 (3.39)	64.31 (2.53)

871C 2-wire AC Plastic Barrel Tubular Sensors

871C Cable Style
18 mm and 30 mm Diameter

Specifications

Attribute	18 mm Diameter	30 mm Diameter
Load current	≤ 180 mA	≤ 300 mA
Inrush current (one cycle)	≤ 1 A	≤ 3 A
Leakage current	≤ 1.7 mA	
Operating voltage	24...250V AC	
Voltage drop	≤ 11V	
Hysteresis	≤ 20% typical	
Protection type	Transient noise	
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 4, 4X, 12, 13; IP67 (IEC529)	
Housing material	Plastic face and threaded barrel	
Connection type	Cable: 2 m (6.5 ft) length, 2-conductor PVC	
Status indicator	Red: Output energized	
Operating temperature	-25...+55 °C (-13...+131 °F)	
Shock	30 g (1.06 oz), 11 ms	
Vibration	55 Hz, 1 mm (0.039 in.) amplitude, 3 planes	

Correction Factors

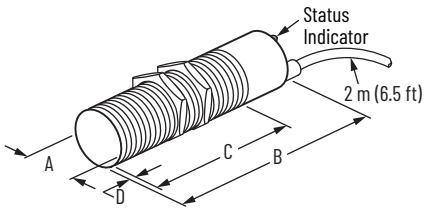
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.3...0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No. Cable Style
18 (0.71)	5 (0.2)	Yes	N.O.	8	871C-C5S18
			N.C.		871C-D5S18
	8 (0.31)	No	N.O.		871C-C8R18
			N.C.		871C-D8R18
30 (1.18)	10 (0.39)	Yes	N.O.		871C-C10S30
	15 (0.59)	No	N.O.		871C-C15R30
			N.C.		871C-D15R30

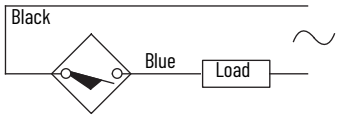
Approximate Dimensions

Cable Style



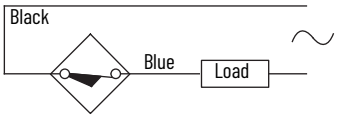
Wiring Diagrams

Normally Open



IMPORTANT Load can be switched to black wire.

Normally Closed



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M18 x 1	Yes	18 (0.71)	81 (3.19)	61 (2.4)	2 (0.08)
	No (1)				
M30 x 1.5	Yes	30 (1.18)			
	No (1)				

(1) Unshielded proximity sensors require a metal-free zone around the sensing face. Any metal immediately opposite the sensing face must be no closer than three times the rated nominal sensing distance of the sensor.

871C Analog Output, 3-wire DC Tubular Sensors

871C Cable Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm Diameter	18 mm Diameter	30 mm Diameter
Analog output	0...10V sourcing		
Load current	5 mA		
Operating voltage	18...30V DC		
Repeatability	≤ 1%		
Ripple	10%		
Slew speed	1.0 V/ms	0.7 V/ms	0.1 V/ms
Δ Output/Δ distance	0.25 mm/V	0.375 mm/V	0.875 mm/V
Linearity tolerance	6.25%		
Temperature drift	±0.3V		
Protection type	Transient noise, reverse polarity, short circuit, and overload		
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations		
Enclosure type rating	NEMA 1, 2, 3, 4, 12, 13; IP67 (IEC529)		
Housing material	Nickel-plated brass barrel, plastic face (PBT)		
Connection type	Cable: 2 m (6.5 ft) length, 3-conductor PVC		
Status indicator	None		
Operating temperature	-25...+70 °C (-13...+158 °F)		
Shock	30 g (1.06 oz), 11 ms		
Vibration	55 Hz, 1 mm amplitude, 3 planes		

Correction Factors

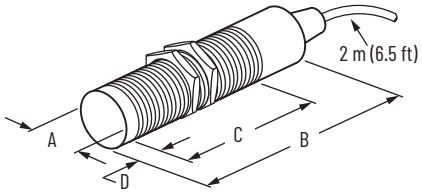
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.2...0.3

Product Selection

Barrel Diameter [mm (in.)]	Linear Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No. Cable Style
12 (0.47)	0.5...2.5 (0.02...0.1)	Yes	Analog voltage	PNP	100	871C-D3AP12-E2
18 (0.71)	1...4 (0.04...0.16)	Yes			100	871C-D4AP18-E2
30 (1.18)	1...9 (0.04...0.35)	Yes			400	871C-D9AP30-E2
	7...14 (0.27...0.55)	No			30	871C-D14AP30-E2

Approximate Dimensions

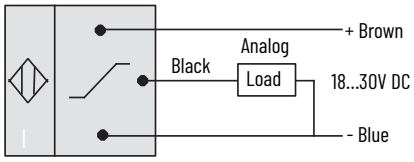
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



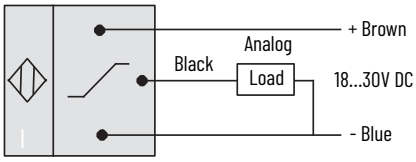
Thread Size	Dimensions [mm (in.)]			
	A	B	C	D
12 mm	12 (0.47)	81 (3.15)	58 (2.28)	12 (0.47)
18 mm	18 (0.71)			
30 mm	30 (1.18)		70 (2.75)	

Wiring Diagrams

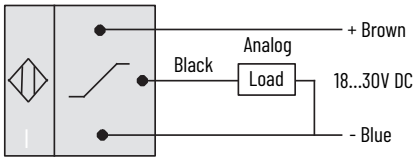
12 mm Diameter



18 mm Diameter

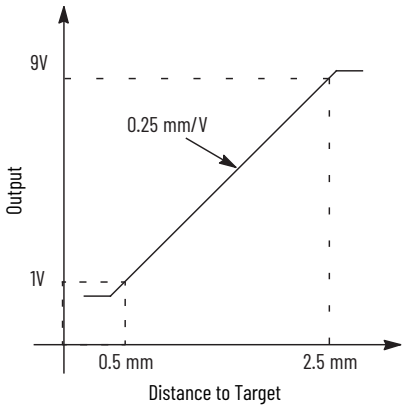


30 mm Diameter

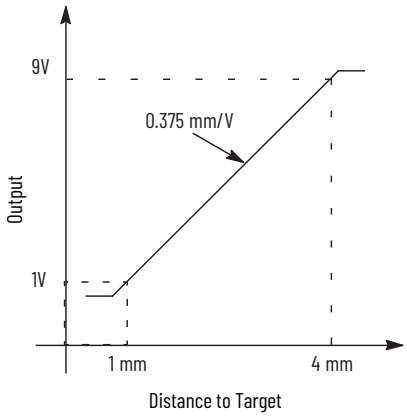


Nominal Output

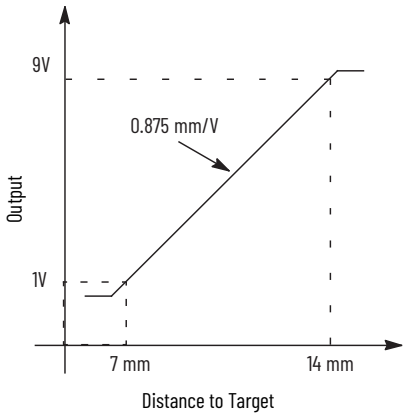
12 mm Diameter



18 mm Diameter



30 mm Diameter



871C 2-wire NAMUR Intrinsically Safe, Cable Style Tubular Sensors

871C NAMUR Cable Style
8 mm, 12 mm, 18 mm, and 30 mm Diameter

871C NAMUR Micro Quick Disconnect Style
8 mm, 12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	8 mm, 12 mm, 18 mm, and 30 mm Diameter
Output type	NAMUR (conforms to DIN 19 234)
Load current, nominal	< 1 mA (target present), > 3 mA (target absent)
Operating voltage	5...15V DC (8.2V DC nom., Ri = 1 kΩ, DIN 19 234)
Ripple	5%
Repeatability	< 10%
Hysteresis	10% typical
Protection type (realized in amplifier)	Reverse polarity, false pulse, transient noise, short circuit, and overload
Certifications	FM Approved: • Class I, II, III; Divisions 1, 2; Groups A, B, C, D, E, F, G • Class I; Zone 0, 1, 2; Groups IIC, IIB, IIA; T6; CSA Certified • Class I, II, III; Divisions 1, 2; Groups A, B, C, D, E, F, G • Class I; Zone 0, 1, 2; Groups IIC, IIB, IIA; CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 4, IP67 (IEC529)
Housing material	Nickel-plated brass barrel, plastic face
Connection type	• Cable: 2 m (6.5 ft) length, 2-conductor 22 AWG PVC • Quick disconnect: 4-pin micro style
Status indicator	None
Operating temperature	-25...+60 °C (-13...+140 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 plane

ATTENTION: You must adhere to operating parameters.

Entity Parameters

Sensor			Barrier
V_{max}	16V	≥	V_t
I_{max}	60 mA	≥	I_t
C_i	150 $_n$F	≤	C_a
L_i	200 µH	≤	L_a

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

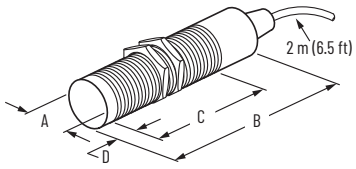
Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
					Cable Style	Micro QD Style
8 (0.31)	1 (0.03)	Yes	NAMUR (conforms to DIN 19 234)	2000	871C-DH1M8-A2	871C-DH1M8-D4
	2 (0.08)	No		1000	871C-DH2M8-A2	871C-DH2M8-D4
12 (0.47)	2 (0.08)	Yes		2000	871C-DH2M12-A2	871C-DH2M12-D4
	4 (0.16)	No		1000	871C-DH4M12-A2	871C-DH4M12-D4
18 (0.71)	5 (0.2)	Yes		1000	871C-DH5M18-A2	871C-DH5M18-D4
	8 (0.31)	No		500	871C-DH8M18-A2	871C-DH8M18-D4
30 (1.18)	10 (0.39)	Yes		500	871C-DH10M30-A2	871C-DH10M30-D4
	15 (0.59)	No		300	871C-DH15M30-A2	871C-DH15M30-D4
Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight)						889D-F4AC-2

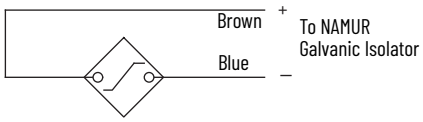
IMPORTANT The sensor output conforms to NAMUR specification (DIN 19 234) when used with Cat. No. 937TH-DISAR-DC2, 937TS-DISAR-KD2, 937TS-DISAR-KF2, or 937TH-DISAT-DC Intrinsically Safe Output Switch Amplifier. Installation must be in accordance with the National Electrical Code, ANSI/ISA RP12.6, or per other regulations by the authority having jurisdiction over the installation site as appropriate.

Approximate Dimensions

Cable Style

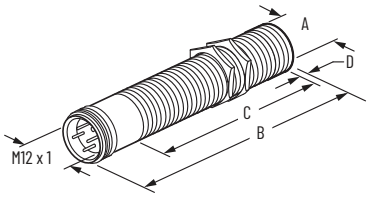


Wiring Diagrams

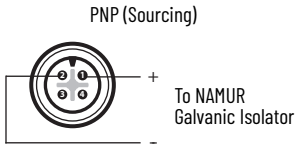


Thread Size	Shielded	Dimensions [mm (in.)]		
		A	B	C
M8 x 1	Yes	8 (0.31)	30 (1.18)	–
	No			5 (0.2)
M12 x 1	Yes	12 (0.47)		–
	No			6 (0.24)
M18 x 1	Yes	18 (0.71)		–
	No			8 (0.31)
M30 x 1.5	Yes	30 (1.18)	40 (1.57)	–
	No			12 (0.47)

Micro QD Style



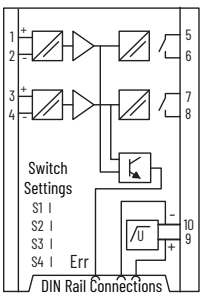
Normally Open



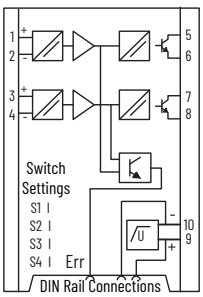
Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M8 x1	Yes	8 (0.31)	50 (1.97)	28 (1.1)	–
	No			23 (0.91)	5 (0.2)
M12 x 1	Yes	12 (0.47)		30 (1.18)	–
	No			24 (0.94)	6 (0.24)
M18 x 1	Yes	18 (0.71)		30 (1.18)	–
	No			22 (0.87)	8 (0.31)
M30 x 1.5	Yes	30 (1.36)	60 (2.36)	40 (1.57)	–
	No			28 (1.1)	12 (0.47)

Block Diagram

Relay Output
937TH-DISAR-DC2
Dual Channel



Transistor Output
937TH-DISAT-DC2
Dual Channel



871C 3-wire DC Mini Tubular Sensors

871C NAMUR Cable Style
8 mm, 12 mm, 18 mm, and 30 mm

871C NAMUR Micro Quick Disconnect Style
8 mm, 12 mm, 18 mm, and 30 mm

871C NAMUR Micro Quick Disconnect Style
8 mm, 12 mm, 18 mm, and 30 mm

871C NAMUR Micro Quick Disconnect Style
8 mm, 12 mm, 18 mm, and 30 mm

871C NAMUR Micro Quick Disconnect Style
8 mm, 12 mm, 18 mm, and 30 mm

IO-Link

Specifications

Attribute	3 mm Smooth Barrel and 4 mm Threaded Barrel	4 mm Smooth Barrel and 5 mm Threaded Barrel
Environmental		
Operating environment	NEMA 1, 2, 3, 4, 12, 13 IP67 (IEC 529)	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Vibration	55 Hz, 1 mm amplitude, 3 planes	
Shock	30 g (1.06 oz), 11 ms	
Electrical		
Load current	≤ 100 mA	< 200 mA
Leakage current	≤ 0.1 mA	
Operating voltage	10...30V DC	
Voltage drop	≤ 2V	
Repeatability	≤ 5%	
Hysteresis	10% typical	
Protection type	False pulse, transient noise, reverse polarity, and short circuit	
IO-Link (Enabled on Normally Open, PNP Models Only)		
Protocol	IO-Link V1.0	
Interface type	IO-Link	
Mode	COM 2 (38.4 kBd)	
Cycle time 1	10.4 ms, minimum	
SIO (standard I/O)	Supported (pin 4 for either IO-Link or standard I/O)	
Mechanical		
Housing material	Small threaded or smooth stainless steel barrel, polyester face	
Status indicator	Yellow: Output energized	
Status indicator (IO-Link mode)	Steady yellow: Sensor in IO-Link mode	
Connection type	Pico™ QD (M8), 2 m (6.6 ft) cable, Pico with lead	

Correction Factors

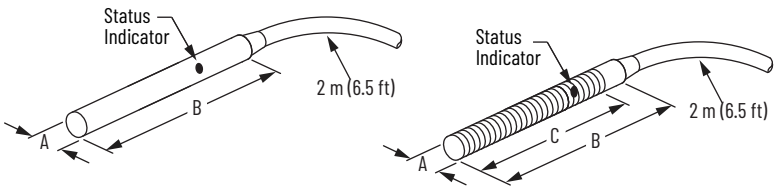
Sensor Type/ Target Material	3 mm Diameter Smooth		4 mm Diameter Smooth or Threaded		5 mm Diameter Smooth or Threaded	
	0.6 mm Sr	1.0 mm Sr	0.8 mm Sr	1.5 mm Sr	1 mm Sr	1.5 mm Sr
Steel	1	1	1	1	1	1
Copper	0.5	0.45	0.45	0.4	0.45	0.4
Aluminum	0.55	0.5	0.5	0.4	0.5	0.4
Brass	0.65	0.6	0.55	0.5	0.55	0.5
Stainless steel 304	0.8	0.8	0.8	0.75	0.8	0.75

Product Selection

Barrel Diameter [mm (in.)]	Barrel Type [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.		
							Cable Style	Pico QD Style	Pico with Lead Style
3 (0.12)	Smooth	0.6 (0.02)	Yes	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 (0.16)	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 (0.2)	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 standard QD cordset: -2 = 2 m (6.5 ft)								889P-F3AB-2	

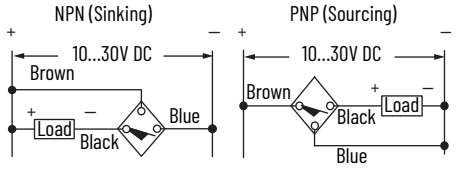
Approximate Dimensions

Cable Style



Wiring Diagrams

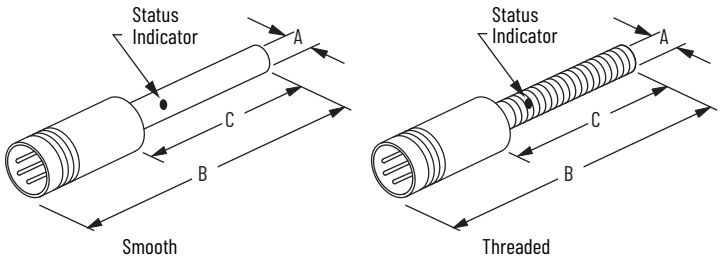
Normally Open



Smooth Diameter	Thread Size	Shielded	Dimensions [mm (in.)]		
			A	B	C
3	–	Yes	3 (0.12)	22 (0.87)	–
4	–		4 (0.16)	25 (0.98)	–
4	M4 x 0.5	Yes	4 (0.16)	22 (0.87)	19 (0.75)
5	M5 x 0.5		5 (0.2)	25 (0.98)	20 (0.79)

Approximate Dimensions

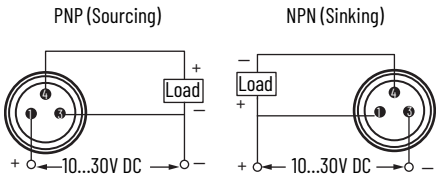
Pico QD Style



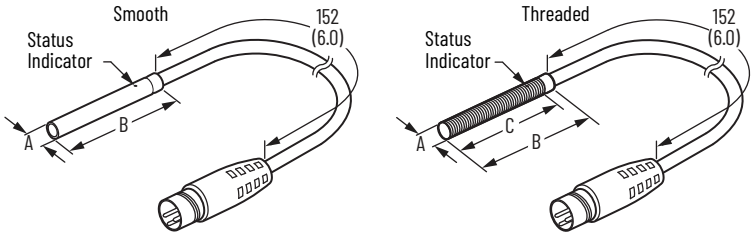
Smooth Diameter	Thread Size	Shielded	Dimensions [mm (in.)]		
			A	B	C
4	–	Yes	4 (0.16)	38 (1.5)	19 (0.74)
5	M5 x 0.5		5 (0.2)	38 (1.5)	23 (0.9)

Wiring Diagrams

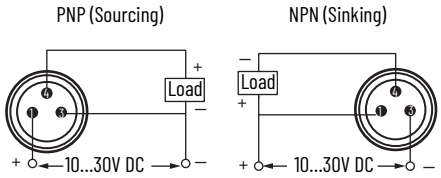
Normally Open



Pico with Lead Style

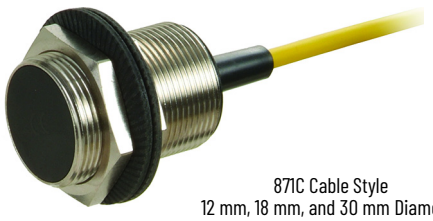


Normally Open



Smooth Diameter	Shielded	Dimensions [mm (in.)].		
		A	B	C
3	Yes	3 (0.1)	22 (0.87)	–
4		4 (0.16)	22 (0.87)	19 (0.74)

871C 3-wire DC Extended Temperature Tubular Sensors



871C Cable Style
12 mm, 18 mm, and 30 mm Diameter

871C DC M12 Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Load current	1...200 mA
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 2.4V
Repeatability	≤ 10%
Hysteresis	≤ 15% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 12, 13; IP67 (IEC529)
Housing material	Threaded nickel-plated brass barrel, plastic face
Connection type	• Cable: 2 m (6.5 ft) length, 3-conductor PUR • Quick disconnect: 4-pin M12 micro style
Status indicator	Orange: Output energized
Operating temperature	-40...+100 °C (-40...+212 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

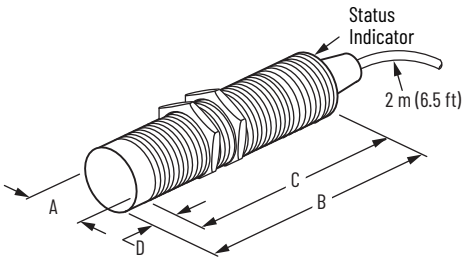
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9
Brass	0.5
Aluminum	0.45
Copper	0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Cable Style	Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	PNP	2000	871C-DT2NP12-U2	871C-DT2NP12-D4
	4 (0.16)	No			1000	871C-DT4NP12-U2	871C-DT4NP12-D4
18 (0.71)	5 (0.2)	Yes	N.O.	PNP	1000	871C-DT5NP18-U2	871C-DT5NP18-D4
	8 (0.31)	No			500	871C-DT8NP18-U2	871C-DT8NP18-D4
30 (1.18)	10 (0.39)	Yes	N.O.	PNP	500	871C-DT10NP30-U2	871C-DT10NP30-D4
	15 (0.59)	No			300	871C-DT15NP30-U2	871C-DT15NP30-D4
Recommended cordset: 2 m (6.5 ft)							889D-F4AC-2

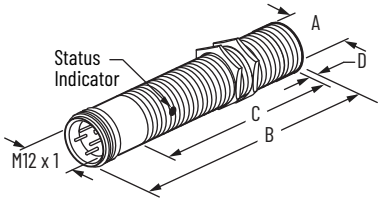
Approximate Dimensions

Cable Style



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	40 (1.57)	40 (1.57)	–
	No			34 (1.34)	6 (0.24)
M18 x 1	Yes	18 (0.71)		40 (1.57)	–
	No			32 (1.26)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)		40 (1.57)	–
	No			28 (1.12)	12 (0.47)

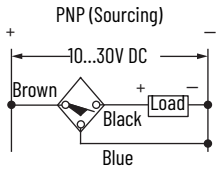
M12 Micro QD Style



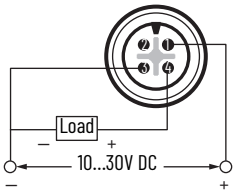
Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	60 (2.36)	40 (1.57)	–
	No			34 (1.34)	6 (0.24)
M18 x 1	Yes	18 (0.71)		40 (1.57)	–
	No			32 (1.26)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)		40 (1.57)	–
	No			28 (1.12)	12 (0.47)

Wiring Diagrams

Normally Open



Normally Open PNP (Sourcing)



871T 3-wire DC Stainless Steel Barrel Tubular Sensors

871C Cable Style
12 mm and 18 mm Diameter

871C Mini Quick Disconnect Style
18 mm Diameter

Specifications

Attribute	12 mm Diameter	18 mm Diameter
Load current	≤ 300 mA	≤ 400 mA
Leakage current	≤ 10 µA	
Operating voltage	10...30V DC	
Voltage drop	≤ 1V	
Repeatability	≤ 10%	
Hysteresis	≤ 10% typical	
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload	
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 4, 12 and 13; IP67 (IEC529)	
Housing material	Stainless steel 303 barrel, plastic face	
Connections	• Cable: 3 m (10 ft) length, 3-conductor PVC • Quick disconnect: 4-pin mini style	
Status indicator	Red: Output energized	
Operating temperature	-40...+70 °C (-40...+158 °F)	

Correction Factors

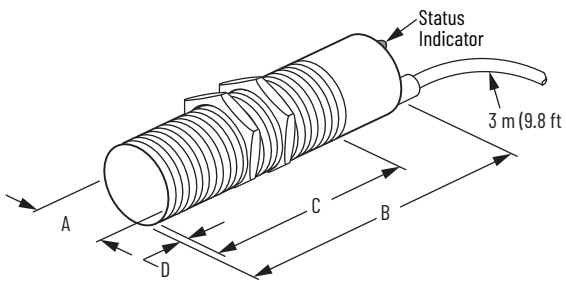
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.9
Brass	0.3...0.5
Aluminum	0.3...0.4
Copper	0.3...0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Cable Style	Mini QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	NPN	2000	871T-R2A12	—
				PNP		871T-L2A12	—
	4 (0.16)	No	N.O.	NPN	1000	871T-R4B12	—
				PNP		871T-L4B12	—
18 (0.71)	5 (0.2)	Yes	N.O.	NPN	1000	871T-R5A18	871T-R5J18
				PNP		871T-L5A18	871T-L5J18
	8 (0.31)	No	N.O.	NPN	500	871T-R8B18	871T-R8K18
				PNP		871T-L8B18	871T-L8K18
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)							889N-F4AFC-6F

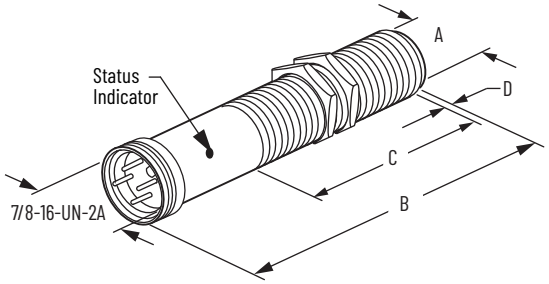
Approximate Dimensions

Cable Style



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M12 x 1	Yes	12 (0.47)	80 (23.15)	53.8 (2.12)	0.8 (0.03)
	No			46.5 (1.83)	8.1 (0.32)
M18 x 1	Yes	18 (0.71)	81.5 (3.21)	55.6 (2.19)	0.8 (0.03)
	No		81.3 (3.2)	43.7 (1.72)	12.3 (0.48)

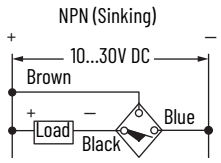
Mini QD Style

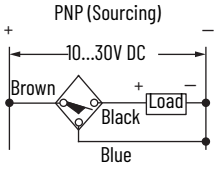


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M18 x 1	Yes	18 (0.71)	96.9 (3.81)	51.9 (2.04)	0.8 (0.03)
	No			40.4 (1.59)	12.3 (0.48)

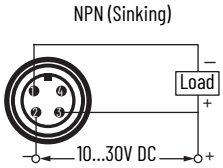
Wiring Diagrams

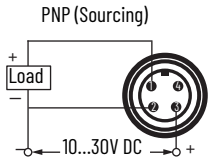
Normally Open





Normally Open





871T 2-wire AC Stainless Steel Barrel Tubular Sensors

871T Cable Style
12 mm and 18 mm Diameter

871T Mini Quick Disconnect Style
18 mm Diameter

Specifications

Attribute	12 mm Diameter	18 mm Diameter
Load current	≤ 300 mA	≤ 500 mA
Inrush current (one cycle)	≤ 3 A	≤ 5 A
Leakage current	≤ 1.5 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	
Protection type	False pulse, transient noise	
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 4, 12 and 13; IP67 (IEC529)	
Housing material	Stainless steel 303 barrel, plastic face	
Connection type	• Cable: 3 m (10 ft) length, 12 mm 2 conductor PVC, 18 mm 3 conductor PVC • Quick disconnect: 3-pin mini style	
Status indicator	Red: Output Energized	
Operating temperature	-40...+70 °C (-40...+158 °F)	
Shock	30 g (1.06 oz), 11 ms	
Vibration	55 Hz, 1 mm amplitude, 3 planes	

Correction Factors

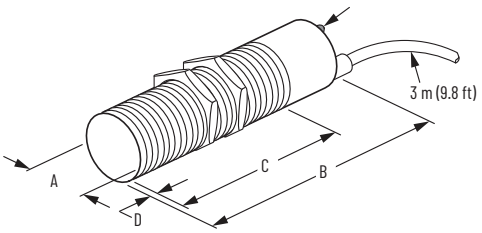
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.9
Brass	0.3...0.5
Aluminum	0.3...0.4
Copper	0.3...0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
					Cable Style	Mini QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	50	871T-G2A12	–
	4 (0.16)	No			871T-G4B12	–
	2 (0.08)	Yes	N.C.		871T-H2A12	–
	4 (0.16)	No			871T-H4B12	–
18 (0.71)	5 (0.2)	Yes	N.O.		871T-G5A18	871T-G5J18
	8 (0.31)	No			871T-G8B18	871T-G8K18
	5 (0.2)	Yes	N.C.		871T-H5A18	871T-H5J18
	8 (0.31)	No			871T-H8B18	871T-H8K18
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)						889N-F3AFC-6F

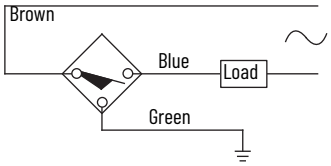
Approximate Dimensions

Cable Style



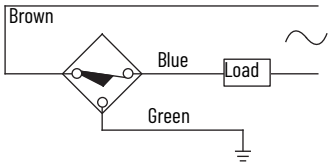
Wiring Diagrams

Normally Open



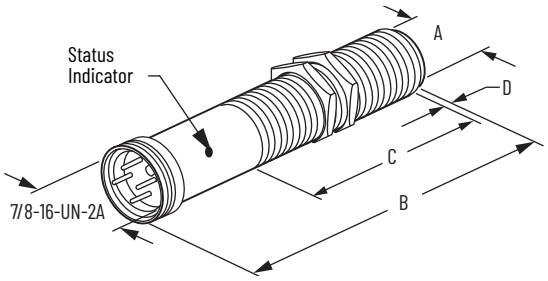
IMPORTANT No green wire on 12 mm. Attach housing to ground.

Normally Closed

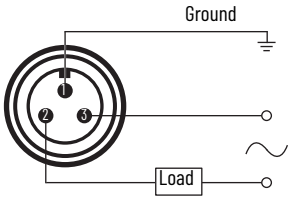


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M12 x 1	Yes	12 (0.47)	80 (23.15)	53.8 (2.12)	0.8 (0.03)
	No			46.5 (1.83)	8.1 (0.32)
M18 x 1	Yes	18 (0.71)	81.5 (3.21)	55.6 (2.19)	0.8 (0.03)
	No		81.3 (3.2)	43.7 (1.72)	12.3 (0.48)

Mini QD Style



Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 3.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M18 x 1	Yes	18 (0.71)	96.9 (3.81)	51.9 (2.04)	0.8 (0.03)
	No			40.4 (1.59)	12.3 (0.48)

871T 4-wire AC Ferrous Selective

871T Cable Style
18 mm Diameter

871T Mini Quick Disconnect Style
18 mm Diameter

Specifications

Attribute	18 mm Diameter
Load current	≤ 500 mA
Inrush current (one cycle)	≤ 5 A
Supply Current, min	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 and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 3, 4, 12 and 13; IP67 (IEC529)
Housing material	Stainless steel face and threaded barrel
Connections	• Cable: 3.6 m (12 ft) length, 5-conductor PVC • Quick disconnect: 5-pin mini style
Status indicator	• Red: Output energized • Green: Power
Operating temperature	0…70 °C (32…158 °F)

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel [1]	0.8…1.1
Brass	0.0
Aluminum	0.0
Copper	0.0

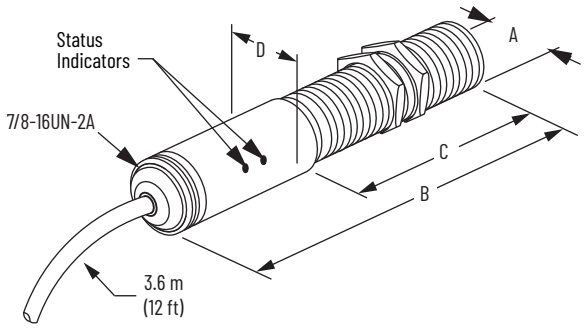
(1) Stainless steel 10% contains carbon.

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
					Cable Style	Mini QD 5-pin Style
18 (0.71)	5 (0.2)	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

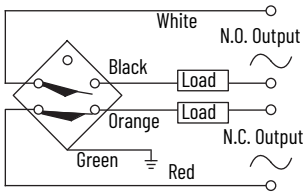
Approximate Dimensions

Cable Style



Wiring Diagrams

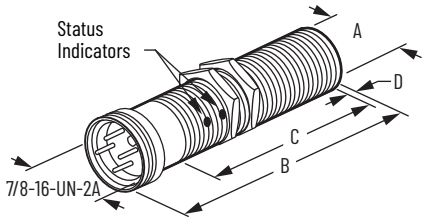
Complementary Normally Open or Normally Closed



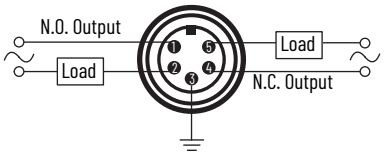
IMPORTANT
- N.O. output must be wired for operation. N.C. output is optional.
- N.O. load can be switched to white wire.
- N.C. load can be switched to red wire.

Thread Size	Dimensions [mm (in.)]			
	A	B (Max)	C (Min)	D (Max)
M18 x 1	18 (0.71)	101.6 (4)	50.8 (2)	20.3 (0.8)

Mini QD Style



Normally Open or Normally Closed



IMPORTANT
- N.O. output must be wired for operation. N.C. output is optional.
- N.O. load can be switched to pin 1.
- N.C. load can be switched to pin 4.

Thread Size	Dimensions [mm (in.)]			
	A	B (Max)	C (Min)	D (Max)
M18 x 1	18 (0.71)	101.6 (4)	50.8 (2)	20.3 (0.8)

871TM 3-wire DC Short Barrel Tubular Sensors

871TM Cable Style
12 mm, 18 mm, and 30 mm Diameter

871TM Mini Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM DC Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Load current	≤ 200 mA
Capacitive load	≤ 1 µF
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 1V DC at 200 mA
Repeatability	≤ 10% at constant temperature
Hysteresis	10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit (trigger at 340 mA typical), overload
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13 IP67 (IEC529) all models; 1200 psi (8270 kPa) washdown; ToughLink™ and micro connector versions are also rated IP69K (IEC 529)
Housing material	Stainless steel face and threaded barrel
Connection type	• Cable: 2 m (6.5 ft) length, A2 - 3-conductor PVC, C2 - 3-conductor 22 AWG-ToughLink, H2 - 3-conductor 18 AWG ToughLink • Quick disconnect: 4-pin mini style, 4-pin M12 micro style
Status indicators	• Red: Output energized • Green: Power/short circuit (flashing) — 18 mm models only
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

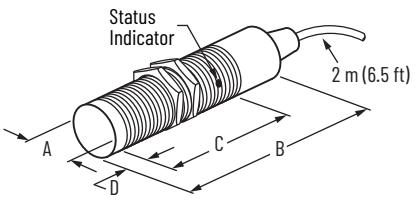
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9...1.0
Brass	0.3...0.5
Aluminum	0.1...0.4
Aluminum (≤ 0.02 thick)	0.9...1.1
Copper	0.1...0.2

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.			
						PVC Cable	ToughLink Cable	Mini QD Style	M12 Micro QD Style
12 (0.47)	2 (0.08)	Yes	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)	No	N.O.	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)	Yes	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)	No	N.C.	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 (0.71)	5 (0.2)	Yes	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)	No	N.O.	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 (0.2)	Yes	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)	No	N.C.	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 (1.18)	10 (0.39)	Yes	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)	No	N.O.	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)	Yes	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)	No	N.C.	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

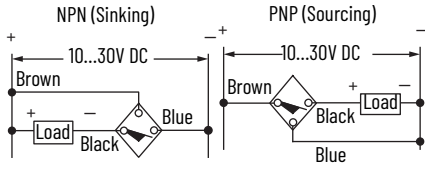
Approximate Dimensions

Cable Style

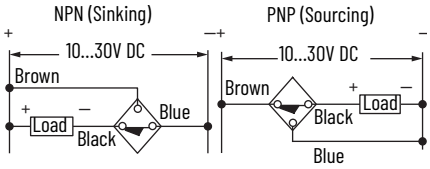


Wiring Diagrams

Normally Open

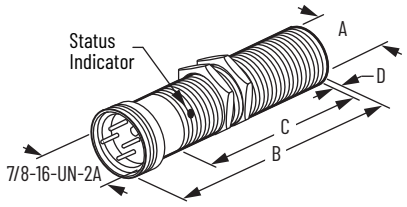


Normally Closed

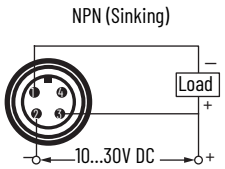


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	49.8 (1.96)	26.4 (1.04)	2.5 (0.1)
	No			19.5 (0.77)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	55.4 (2.18)	41.7 (1.64)	2.5 (0.1)
	No				14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	57.9 (2.28)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

Mini QD Style



Normally Open



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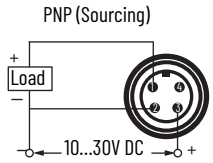
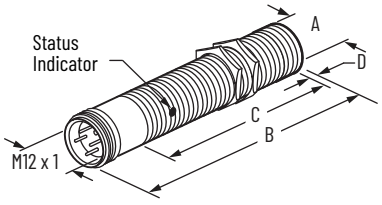
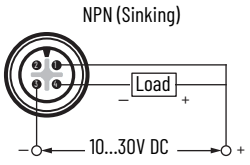


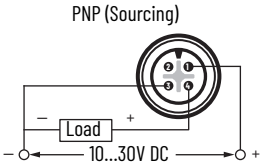
Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	63.5 (2.5)	25.4 (1)	2.5 (0.1)
	No			18.5 (0.73)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	56.1 (2.21)	35.1 (1.38)	2.5 (0.1)
	No			29.2 (1.15)	14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	68.1 (2.68)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

M12 Micro QD Style



Normally Open or Normally Closed





Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	61.5 (2.4)	26.4 (1.04)	2.5 (0.1)
	No			28 (1.1)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	65.1 (2.56)	41.7 (1.64)	2.5 (0.1)
	No				14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	66.3 (2.61)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

871TM 3-wire DC Weld Field Immune Tubular Sensors

871TM DC Pico Quick Disconnection Style
8 mm

871TM DC Micro Quick Disconnect Style
12 mm

871TM DC Micro Quick Disconnect Style
18 mm

Specifications

Attribute	8 mm, 12 mm, and 18 mm
Load current	≤ 200 mA
Leakage current	≤ 0.1 mA
Operating voltage	10...30V DC
Voltage drop	≤ 2V DC at 200 mA
Repeatability	≤ 5% at constant temperature, maximum sensing range
Hysteresis	15% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit (trigger at 340 mA typical), overload
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	IP68/IP69K
Housing material	Stainless steel face and threaded barrel, resistant to weld splatter
Connection type	Quick disconnect: 4-pin micro style, 3-pin Pico style
Status indicators	Yellow: Output energized/360° visibility flashing status indicator indicates target that is located between 80...100% of rated sensing distance
Operating temperature	-25...+85 °C (-13...+185 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes
Weld field Immunity	≤ 40 mT (400 Gauss)

Correction Factors

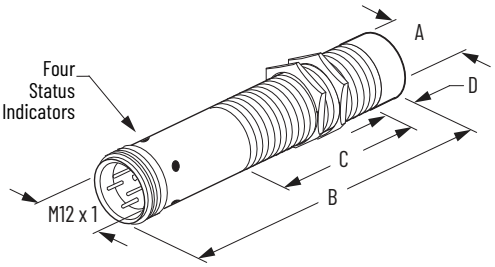
Target Material	Barrel Size and Sensing Range		
	M8	M12	M18
	3 mm	6 mm	10 mm
Steel	1.00		
Copper	1.00	0.85	1.15
Aluminum	1.00	1.00	1.40
Brass	1.30	1.30	1.50
Stainless steel (1 mm/2 mm)	0.4/0.70	0.5/0.90	0.1/0.6

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Pico QD Style	Micro QD Style
8 (0.31)	3	Yes	N.O.	PNP	≤ 15	871TM-MW3NP8-P3	–
12 (0.47)	6	Yes	N.O.	PNP		–	871TM-MW6NP12-D4
18 (0.71)	10	Yes	N.O.	PNP		–	871TM-MW10NP18-D4

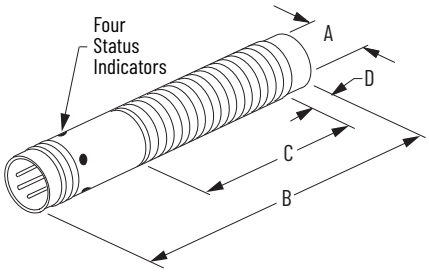
Approximate Dimensions

Micro QD Style



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	60 (2.36)	41 (1.61)	—
M18 x 1	Yes	18 (0.71)	63.5 (2.5)	42.5 (1.67)	—

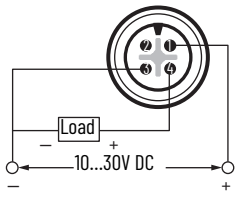
Pico QD Style



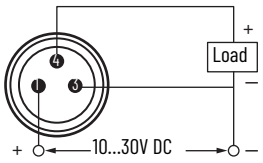
Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M8 x 1	Yes	8 (0.31)	60 (2.35)	45.5 (1.79)	—

Wiring Diagrams

Normally Open



Normally Open



871TM 3-wire DC Standard Range Tubular Sensors

871TM 12 mm Diameter Cable and DC Micro Quick Disconnect Variants

871TM 18 mm Diameter Cable and DC Micro Quick Disconnect Variants

871TM 30 mm Diameter Cable and DC Micro Quick Disconnect Variants

IO-Link

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Load current	≤ 200 mA
Capacitive Load	≤ 1 mF
Leakage current	≤ 0.1 mA
Operating voltage	10...30V DC
Voltage drop	≤ 2V DC at 200 mA
Repeatability	≤ 5% at constant temperature
Hysteresis	10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit (trigger at 340 mA typical), overload
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	12 mm, 18 mm, 30 mm diameter models: IP68/IP69K
Housing material	Stainless steel face and threaded barrel
Connection type	• Cable: 2 m (6.5 ft) length • Quick disconnect: 4-pin micro style
Status indicators	Yellow: Output energized/360° status indicator visibility, flashing status indicator indicates target that is located between 80...100% of rated sensing distance
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes
IO-Link (Enabled on Normally Open, PNP Models Only)	
Protocol	IO-Link V1.1
Interface Type	IO-Link
Mode	COM2 (38.4 kBd)
Cycle Time, min (1)	8 ms
SIO (Standard I/O)	Supported (pin 4 for either IO-Link or standard I/O)

(1) These products have been tested to comply with IO-Link test specification IEC 61131-9. Environmental EMC and Physical Layer testing have not been performed with the device running in IO-Link mode.

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						M12 Micro QD Style	PUR Cable Style
12 (0.47)	3 (0.12)	Shielded	N.C.	NPN	100	871TM-M3CN12-D4	–
				PNP		871TM-M3CP12-D4	–
			N.O.	NPN		871TM-M3NN12-D4	871TM-M3NN12-A2
				PNP		871TM-M3NP12-D4	871TM-M3NP12-A2
	4 (0.16)	Unshielded	N.C.	NPN	100	871TM-N4CN12-D4	–
				PNP		871TM-N4CP12-D4	–
			N.O.	NPN		871TM-N4NN12-D4	871TM-N4NN12-A2
				PNP		871TM-N4NP12-D4	871TM-N4NP12-A2
18 (0.71)	5 (0.2)	Shielded	N.C.	NPN	100	871TM-M5CN18-D4	–
				PNP		871TM-M5CP18-D4	–
			N.O.	NPN		871TM-M5NN18-D4	871TM-M5NN18-A2
				PNP		871TM-M5NP18-D4	871TM-M5NP18-A2
	8 (0.31)	Unshielded	N.C.	PNP	100	871TM-N8CP18-D4	–
			N.O.	NPN		871TM-N8NN18-D4	871TM-N8NN18-A2
				PNP		871TM-N8NP18-D4	871TM-N8NP18-A2
30 (1.18)	10 (0.39)	Shielded	N.C.	PNP	50	871TM-M10CP30-D4	–
			N.O.	NPN		871TM-M10NN30-D4	871TM-M10NN30-A2
				PNP		871TM-M10NP30-D4	871TM-M10NP30-A2
	15 (0.59)	Unshielded	N.C.	PNP	50	871TM-N15CP30-D4	–
			N.O.	NPN		871TM-N15NN30-D4	871TM-N15NN30-A2
				PNP		871TM-N15NP30-D4	871TM-N15NP30-A2

Correction Factors

Instructions for unshielded sensor:

1. To determine the appropriate correction factor, only use Table 4.
2. To determine derated sensing distance (if applicable), multiply the sensor type with the target material by the sensing range.

Instructions for shielded sensor:

1. To determine the appropriate correction factor, use Table 4 and Table 5.
2. In Table 4, determine the appropriate correction factor, based on the type and the target material.
3. In Table 5, multiply the result from Table 4 by the material the sensor is mounted in. The result is the final correction factor.

Table 4 - Sensor Type and Target Material Correction Factor

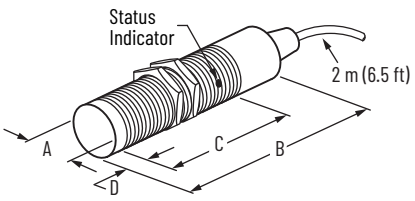
Sensor Type/ Target Material (No Surrounding Metal)	M12		M18		M30	
	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded
Steel	1.0	1.0	1.0	1.0	1.0	1.0
Copper	0.9	0.9	0.8	0.9	0.7	0.9
Aluminum	1.1	1.0	1.0	1.1	1.1	1.1
Brass	1.5	1.3	1.3	1.4	1.3	1.4
Stainless steel (1 mm)	0.2	0.2	0.6	0.4	0.8	0.3
Stainless steel (2 mm)	0.6	0.6	0.8	0.8	0.9	0.6

Table 5 - Surrounding Material

Surrounding Material Type	M12	M18	M30
Steel	1.0	1.0	0.9
Aluminum	0.9	0.9	0.9
Brass	0.9	0.9	0.8
Stainless steel	0.9	0.9	0.9

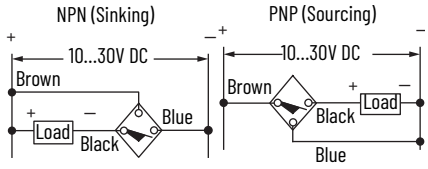
Approximate Dimensions

Cable Style

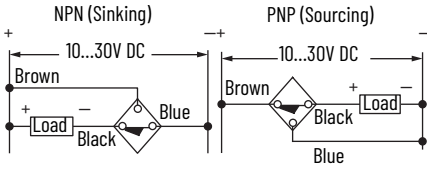


Wiring Diagrams

Normally Open

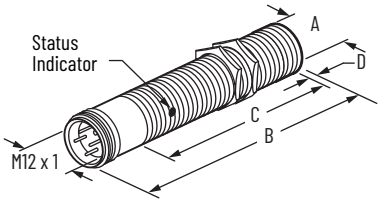


Normally Closed



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	50 (1.97)	50 (1.97)	—
	No			45 (1.77)	5 (0.2)
M18 x 1	Yes	18 (0.71)	51 (2.01)	51 (2.01)	—
	No			44 (1.73)	7 (0.28)
M30 x 1.5	Yes	30 (1.18)	50 (1.97)	50 (1.97)	—
	No			40 (1.57)	10 (0.39)

M12 Micro QD Style



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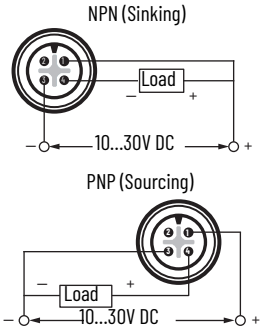
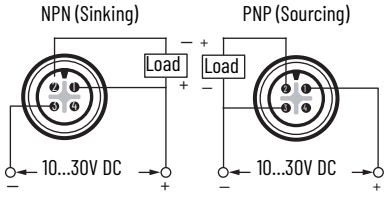


Normally Closed

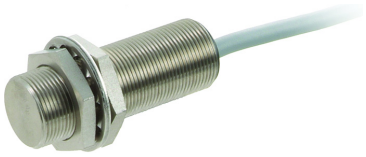


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	60 (2.36)	41 (1.61)	—
	No			36 (1.42)	5 (0.2)
M18 x 1	Yes	18 (0.71)	63.5 (2.5)	42 (1.65)	—
	No			35 (1.38)	7 (0.28)
M30 x 1.5	Yes	30 (1.18)	63.5 (2.5)	42 (1.65)	—
	No			32 (1.26)	10 (0.39)

871TM 3-wire DC Long-range Sensing Tubular Sensors

871TM M8 Pico Quick Disconnection Style
8 mm Diameter

871TM DC M12 Micro Quick Disconnect Style
12 mm Diameter



871TM DC Cable Style
18 mm Diameter

871TM DC M12 Micro Quick Disconnect Style
30 mm Diameter

IO-Link

Specifications

Attribute	8 mm, 12 mm, 18 mm, and 30 mm Diameter
Load current	≤ 200 mA
Capacitive Load	≤ 1 mF
Leakage current	≤ 0.1 mA
Operating voltage	10...30V DC
Voltage drop	≤ 2V DC at 200 mA
Repeatability	≤ 5% at constant temperature
Hysteresis	10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit (trigger at 340 mA typical), overload
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	• 12 mm, 18 mm, 30 mm diameter models: IP68/IP69K • 8 mm diameter quick disconnect models: IP67 • 8 mm diameter cable models: IP68
Housing material	Stainless steel face and threaded barrel
Connection type	• Cable: 2 m (6.5 ft) length • Quick disconnect: 4-pin micro style, 3-pin Pico style
Status indicators	Yellow: Output energized/360° status indicator visibility, flashing status indicator indicates target that is located between 80...100% of rated sensing distance
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes
IO-Link (Enabled on Normally Open, PNP Models Only)	
Protocol	IO-Link V1.1
Interface Type	IO-Link
Mode	COM2 (38.4 kBd)
Cycle Time, min (1)	8 ms
SIO (Standard I/O)	Supported (pin 4 for either IO-Link or standard I/O)

(1) These products have been tested to comply with IO-Link test specification IEC 61131-9. Environmental EMC and Physical Layer testing have not been performed with the device running in IO-Link mode.

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.		
						PUR Cable Style	M12 Micro QD Style	M8 Pico QD Style
8 (0.31)	3 (0.12)	Yes	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)	No		NPN		871TM-N6NN8-J2	871TM-N6NN8-D4	871TM-N6NN8-P3
				PNP		871TM-N6NP8-J2	871TM-N6NP8-D4	871TM-N6NP8-P3
	3 (0.12)	Yes	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)	No		NPN		871TM-N6CN8-J2	871TM-N6CN8-D4	871TM-N6CN8-P3
				PNP		871TM-N6CP8-J2	871TM-N6CP8-D4	871TM-N6CP8-P3
12 (0.47)	6 (0.23)	Yes	N.O.	NPN	400	871TM-M6NN12-A2	871TM-M6NN12-D4	–
				PNP		871TM-M6NP12-A2	871TM-M6NP12-D4	–
	10 (0.39)	No		NPN		871TM-N10NN12-A2	871TM-N10NN12-D4	–
				PNP		871TM-N10NP12-A2	871TM-N10NP12-D4	–
	6 (0.23)	Yes	N.C.	NPN		871TM-M6CN12-A2	871TM-M6CN12-D4	–
				PNP		871TM-M6CP12-A2	871TM-M6CP12-D4	–
	10 (0.39)	No		NPN		871TM-N10CN12-A2	871TM-N10CN12-D4	–
				PNP		871TM-N10CP12-A2	871TM-N10CP12-D4	–
18 (0.71)	10 (0.39)	Yes	N.O.	NPN	200	871TM-M10NN18-A2	871TM-M10NN18-D4	–
				PNP		871TM-M10NP18-A2	871TM-M10NP18-D4	–
	20 (0.79)	No		NPN		871TM-N20NN18-A2	871TM-N20NN18-D4	–
				PNP		871TM-N20NP18-A2	871TM-N20NP18-D4	–
	10 (0.39)	Yes	N.C.	NPN		871TM-M10CN18-A2	871TM-M10CN18-D4	–
				PNP		871TM-M10CP18-A2	871TM-M10CP18-D4	–
	20 (0.79)	No		NPN		871TM-N20CN18-A2	871TM-N20CN18-D4	–
				PNP		871TM-N20CP18-A2	871TM-N20CP18-D4	–
30 (1.18)	20 (0.79)	Yes	N.O.	NPN	80	871TM-M20NN30-A2	871TM-M20NN30-D4	–
				PNP		871TM-M20NP30-A2	871TM-M20NP30-D4	–
	40 (1.57)	No		NPN		871TM-N40NN30-A2	871TM-N40NN30-D4	–
				PNP		871TM-N40NP30-A2	871TM-N40NP30-D4	–
	20 (0.79)	Yes	N.C.	NPN		871TM-M20CN30-A2	871TM-M20CN30-D4	–
				PNP		871TM-M20CP30-A2	871TM-M20CP30-D4	–
	40 (1.57)	No		NPN		871TM-N40CN30-A2	871TM-N40CN30-D4	–
				PNP		871TM-N40CP30-A2	871TM-N40CP30-D4	–
Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight)							889D-F4AC-2	889P-F3AB-2

Correction Factors

Instructions for unshielded sensor:

1. To determine the appropriate correction factor, only use Table 6 on page 48.
2. To determine derated sensing distance (if applicable), multiply the sensor type with the target material by the sensing range.

Instructions for shielded sensor:

1. To determine the appropriate correction factor, use Table 6 on page 48 and Table 7 on page 48.
2. In Table 6 on page 48, determine the appropriate correction factor, based on the type and the target material.
3. In Table 7 on page 48, multiply the result from Table 6 on page 48 by the material the sensor is mounted in. The result is the final correction factor.

Table 6 - Sensor Type and Target Material Correction Factor

Sensor Type/ Target Material (No Surrounding Metal)	8 mm Diameter		12 mm Diameter		18 mm Diameter		30 mm Diameter	
	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded	Unshielded	Shielded
Steel	1	1	1	1	1	1	1	1
Copper	0.90	085	0.85	0.80	0.80	0.90	0.90	0.90
Aluminum	1	1	1	1	1	1	1	1
Brass	1.35	1.4	1.3	1.4	1.2	1.35	1.3	1.2
Stainless steel	0.3/0.6	0.3/0.9	0.5/0.9	NA/0.65	0.5/0.9	0.2/0.7	0.35/0.7	NA/0.25

Table 7 - Surrounding Material

Surrounding Material Type	8 mm Diameter	12 mm Diameter	18 mm Diameter	30 mm Diameter
	Shielded			
Steel	1	0.7	0.75	0.9
Aluminum	0.9	1.15	0.9	0.7
Brass	0.9	1.05	0.75	0.6
Stainless steel	1	0.8	0.8	1.3

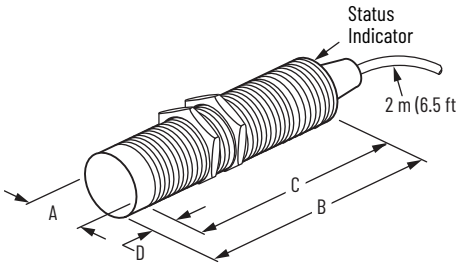
The Table 8 indicates the protrusion distance from the mounting device for the unshielded sensor face.

Table 8 - Protrusion Distance

Surrounding Material Type	8 mm Diameter	12 mm Diameter	18 mm Diameter	30 mm Diameter
	Unshielded [mm (in.)]			
Steel	15 (0.59)	22 (0.87)	36 (1.42)	18 (0.71)
Aluminum	9 (0.35)	13 (0.51)	22 (0.87)	34 (1.34)
Brass	10 (0.39)	15 (0.59)	22 (0.87)	34 (1.34)
Stainless steel	14 (0.55)	21 (0.83)	43 (1.69)	18 (0.71)

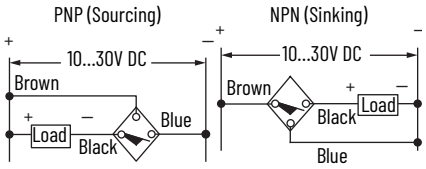
Approximate Dimensions

Cable Style



Wiring Diagrams

Normally Open



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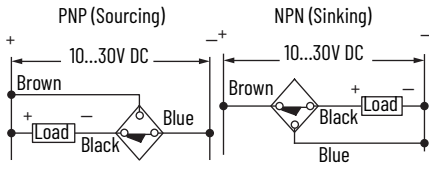
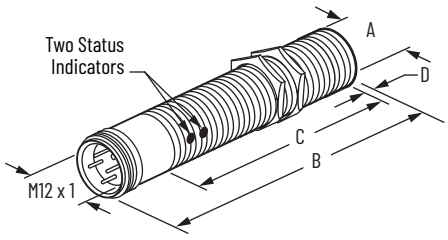


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M8 x 1	Yes	8 (0.31)	46 (1.81)	45 (1.76)	—
	No			41 (1.61)	4 (0.16)
M12 x 1	Yes	12 (0.47)	51 (2.01)	50. (1.96)	—
	No			45 (1.77)	5 (0.19)
M18 x 1	Yes	18 (0.71)	51 (2.01)	50 (1.96)	—
	No			43 (1.69)	7 (0.27)
M30 x 1.5	Yes	30 (1.18)	51 (2.01)	50 (1.96)	—
	No			40 (1.57)	10 (0.39)

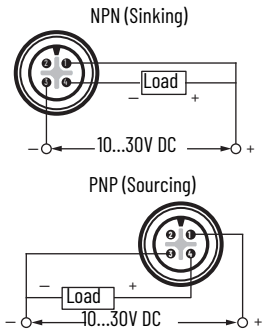
Approximate Dimensions

M12 Micro Style



Wiring Diagrams

Normally Open



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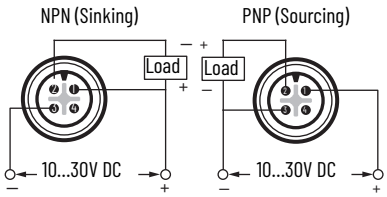
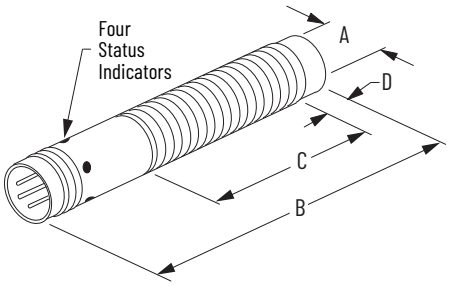


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M8 x 1	Yes	8 (0.31)	66 (2.59)	46 (1.81)	–
	No			42 (1.65)	4 (0.16)
M12 x 1	Yes	12 (0.47)	60 (2.26)	41. (1.61)	–
	No			36 (1.42)	5 (0.19)
M18 x 1	Yes	18 (0.71)	63.5 (2.5)	42.5 (1.67)	–
	No			35.5 (1.4)	7 (0.27)
M30 x 1.5	Yes	30 (1.18)	63.5 (2.50)	42.5 (1.67)	–
	No			32.5 (1.28)	10 (0.39)

M8 Pico Style



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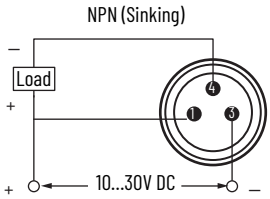

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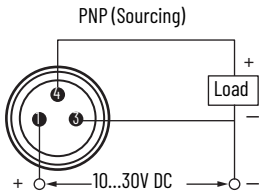


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M8 x 1	Yes	8 (0.31)	60 (2.36)	46 (1.81)	–
	No			42 (1.65)	4 (0.16)

871TM 3-wire DC Ferrous Selective Tubular Sensors

871TM DC Micro Quick Disconnection Style
12 mm Diameter

871TM DC ToughLink Cable Style
12 mm Diameter

871TM DC Mini Quick Disconnect Style
12 mm Diameter

871TM DC Micro Cable Style
12 mm Diameter

Specifications

Attribute	12 mm Diameter
Load current	≤ 200 mA
Capacitive Load	≤ 1 µF
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 1V DC at 200 mA
Repeatability	≤ 10% at constant temperature
Hysteresis	10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit (trigger at 340 mA typical), overload
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC529) all models; 1200 psi (8270 kPa) washdown; ToughLink and micro connector versions are also rated IP69K (IEC 529)
Housing material	Stainless steel face and threaded barrel
Connection type	• Cable: 2 m (6.5 ft) length, A2 - 3-conductor PVC, C2 3-conductor 22 AWG ToughLink, H2 - 3-conductor 18 AWG ToughLink; • Quick disconnect: 4-pin mini style, 4-pin micro style
Status indicators	Red: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.05 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0...1.0 (1)
Brass	0.0
Aluminum	0.0
Aluminum (> 0.003 thick)	0.0
Copper	0.0

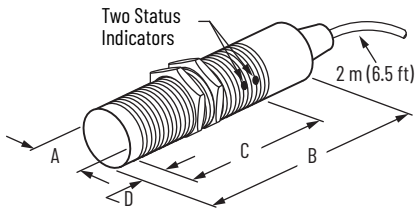
(1) Variations due to differences in alloy composition.

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.			
						PVC Cable	ToughLink Cable	Mini QD Style	Micro QD Style
12 (0.47)	1 (0.04)	Yes	N.O.	PNP	25	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

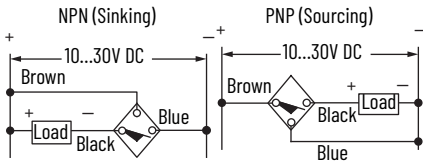
Approximate Dimensions

Cable Style



Wiring Diagrams

Normally Open



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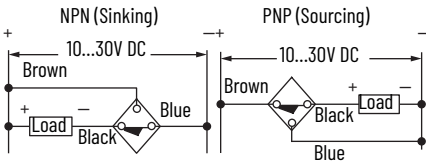
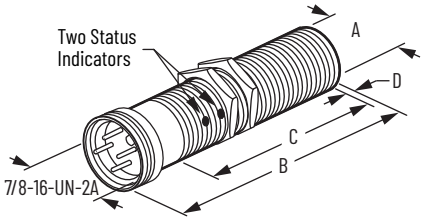


Thread Size	Shielded	Target Type	Dimensions [mm (in.)]			
			A	B	C	D
M12 x 1	Yes	Ferrous	12 (0.47)	51 (2.01)	27.5 (1.08)	—

Mini QD Style



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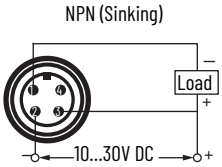

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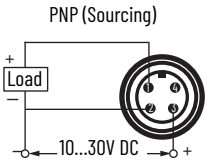
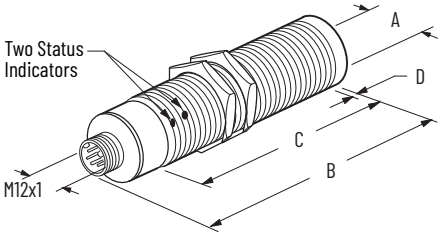
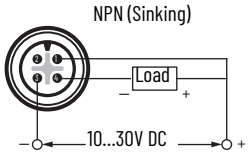


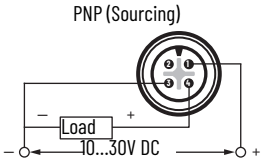
Thread Size	Shielded	Target Type	Dimensions [mm (in.)]			
			A	B	C	D
M12 x 1	Yes	Ferrous	12 (0.47)	61.3 (2.45)	30.4 (1.2)	—

Micro QD Style



Normally Open or Normally Closed





Thread Size	Shielded	Target Type	Dimensions [mm (in.)]			
			A	B	C	D
M12 x 1	Yes	Ferrous	12 (0.47)	62.3 (2.45)	30.4 (1.2)	0.9 (0.04)

871TM 2-wire DC Short Barrel Tubular Sensors

871TM Cable Style
12 mm, 18 mm, and 30 mm Diameter

871TM Mini Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM DC M12 Micro
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Load current	≤ 25 mA
Load current, Minimum	2 mA
Leakage current	≤ 0.9 mA
Operating voltage	10...30V DC
Voltage drop	≤ 8V
Repeatability	10% typical
Hysteresis	10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, overload
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529) all models; 1200 psi (8270 kPa) washdown; ToughLink and micro connector versions are also rated IP69K (IEC 529)
Housing material	Stainless steel face and threaded barrel
Connection type	• Cable: 2 m (6.5 ft) length, A2 - 2-conductor PVC, C2 - 2-conductor 22 AWG ToughLink, H2 - 2-conductor 18 AWG ToughLink • Quick disconnect: 4-pin mini style, 4-pin M12 micro style
Status indicators	Red: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

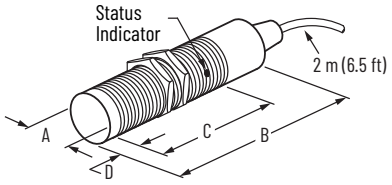
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9...1.0
Brass	0.3...0.5
Aluminum	0.1...0.4
Aluminum (≤ 0.02 thick)	0.9...1.1
Copper	0.1...0.2

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.			
					PVC Cable	ToughLink Cable	Mini QD Style	Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	75	871TM-DH2NE12-A2	871TM-DH2NE12-C2	871TM-DH2NE12-N4	871TM-DH2NE12-D4
	4 (0.16)	No			871TM-DH4NE12-A2	871TM-DH4NE12-C2	871TM-DH4NE12-N4	871TM-DH4NE12-D4
	2 (0.08)	Yes	N.C.	70	871TM-DH2CE12-A2	871TM-DH2CE12-C2	871TM-DH2CE12-N4	871TM-DH2CE12-D4
	4 (0.16)	No			871TM-DH4CE12-A2	871TM-DH4CE12-C2	871TM-DH4CE12-N4	871TM-DH4CE12-D4
18 (0.71)	5 (0.2)	Yes	N.O.	60	871TM-DH5NE18-A2	871TM-DH5NE18-H2	871TM-DH5NE18-N4	871TM-DH5NE18-D4
	8 (0.31)	No			871TM-DH8NE18-A2	871TM-DH8NE18-H2	871TM-DH8NE18-N4	871TM-DH8NE18-D4
	5 (0.2)	Yes	N.C.	40	871TM-DH5CE18-A2	871TM-DH5CE18-H2	871TM-DH5CE18-N4	871TM-DH5CE18-D4
	8 (0.31)	No			871TM-DH8CE18-A2	871TM-DH8CE18-H2	871TM-DH8CE18-N4	871TM-DH8CE18-D4
30 (1.18)	10 (0.39)	Yes	N.O.	40	871TM-DH10NE30-A2	871TM-DH10NE30-H2	871TM-DH10NE30-N4	871TM-DH10NE30-D4
	15 (0.59)	No			871TM-DH15NE30-A2	871TM-DH15NE30-H2	871TM-DH15NE30-N4	871TM-DH15NE30-D4
	10 (0.39)	Yes	N.C.	30	871TM-DH10CE30-A2	871TM-DH10CE30-H2	871TM-DH10CE30-N4	871TM-DH10CE30-D4
	15 (0.59)	No			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

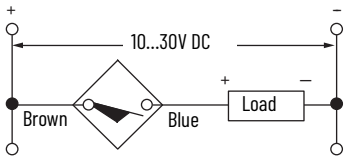
Approximate Dimensions

Cable Style

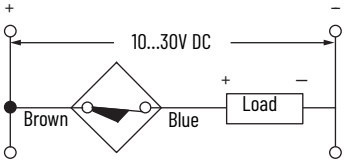


Wiring Diagrams

Normally Open

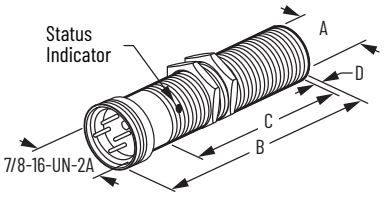


Normally Closed

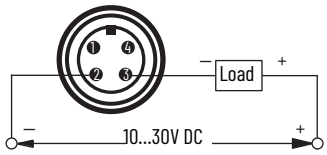


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	49.8 (1.96)	26.4 (0.1)	2.5 (0.1)
	No			19.5 (0.77)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	55.4 (2.18)	41.7 (1.64)	2.5 (0.1)
	No				14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	57.9 (2.28)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

Mini QD Style



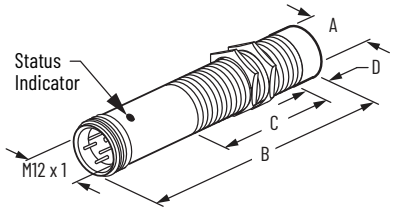
Normally Open or Normally Closed



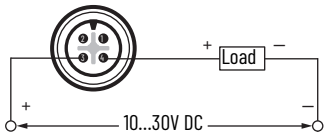
IMPORTANT Load can be switched to pin 2

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	63.5 (2.5)	25.4 (1)	2.5 (0.1)
	No			18.5 (0.73)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	56.1 (2.21)	35.1 (1.38)	2.5 (0.1)
	No			29.2 (1.15)	14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	68.1 (2.68)	49.1 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

M12 Micro QD Style



Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 3

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	61 (2.4)	26.4 (1.04)	2.5 (0.1)
	No			19.6 (0.77)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	65 (2.56)	41.7 (1.64)	2.5 (0.1)
	No				14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	66.3 (2.61)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

871TM 2-wire AC/DC All Stainless Steel Tubular Sensors

871TM AC/DC Cable Style
12 mm, 18 mm, and 30 mm Diameter

871TM AC/DC Mini
Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM AC Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM AC/DC EAC M12 Micro
Quick Disconnect Style
12 mm Diameter

871TM AC/DC ToughLink
Cable Style
12 mm, 18 mm, and 20 mm Diameter

Specifications

Attribute	12 mm Diameter	18 mm and 30 mm Diameter
Load current	5...200 mA	5...250 mA
Inrush current (one cycle)	≤ 2 A	≤ 4 A
Leakage current	≤ 1.9 mA at 120V AC	
Operating voltage	20...250V AC/DC	
Voltage drop	≤ 10V at 5...200 mA	≤ 10V at 5...250 mA
Repeatability	≤ 10% at constant temperature	
Hysteresis	7% typical	
Protection type	False pulse, transient noise, short circuit (trigger at 5 A typical), and overload (trigger at 260 mA typical)	False pulse, transient noise, short circuit (trigger at 8 A typical), and overload (trigger at 320 mA typical)
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, UKCA Marked for all applicable regulations, and CCC Certified (select models)	
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529) all models; 1200 psi (8270 kPa) washdown; ToughLink and micro connector versions are also rated IP69K (IEC 529)	
Housing material	Stainless steel face and threaded barrel	
Connection type	• Cable: 2 m (6.5 ft) length; A2 - 2-conductor 22 AWG PVC, C2 - 2-conductor 22 AWG ToughLink, H2 - 3-conductor 18 AWG ToughLink • Quick disconnect: 3-pin mini style, 3-pin micro style, 4-pin EAC M12 micro style	
Status indicators	• Red: Output energized • Green: Power • Short circuit: Red and green flashing	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g (1.06 oz), 11 ms	
Vibration	55 Hz, 1 mm amplitude, 3 planes	

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9...1.0
Brass	0.3...0.5
Aluminum	0.1...0.4
Aluminum (≤ 0.02 Thick)	0.9...1.1
Copper	0.1...0.2

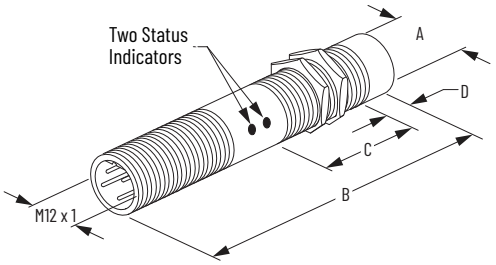
Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Config.	Switching Frequency [Hz]	Cat. No.				
					PVC Cable	ToughLink Cable	Mini QD	Micro QD	EAC Micro
12 (0.47)	3 (0.12)	Yes	N.O.	35	871TM-B3N12-A2 (1)	871TM-B3N12-C2	871TM-B3N12-N3	871TM-B3N12-R3	–
			N.C.	30	871TM-B3C12-A2(1)	871TM-B3C12-C2	871TM-B3C12-N3	871TM-B3C12-R3	–
	4 (0.16)	No	N.O.	20	871TM-B4N12-A2(1)	871TM-B4N12-C2	871TM-B4N12-N3	871TM-B4N12-R3	871TM-B4N12-B4(1)
			N.C.	15	871TM-B4C12-A2	871TM-B4C12-C2	871TM-B4C12-N3	871TM-B4C12-R3	–
18 (0.71)	5 (0.2)	Yes	N.O.	20	871TM-B5N18-A2(1)	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)	No	N.O.	15	871TM-B8N18-A2(1)	871TM-B8N18-H2(1)	871TM-B8N18-N3	871TM-B8N18-R3	–
			N.C.	12	871TM-B8C18-A2(1)	871TM-B8C18-H2	871TM-B8C18-N3	871TM-B8C18-R3	–
30 (1.18)	10 (0.39)	Yes	N.O.	15	871TM-B10N30-A2(1)	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)	No	N.O.	12	871TM-B15N30-A2(1)	871TM-B15N30-H2(1)	871TM-B15N30-N3(1)	871TM-B15N30-R3(1)	–
			N.C.	10	871TM-B15C30-A2(1)	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

(1) CCC Certified

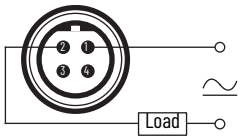
Approximate Dimensions

EAC M12 Micro QD Style



Wiring Diagrams

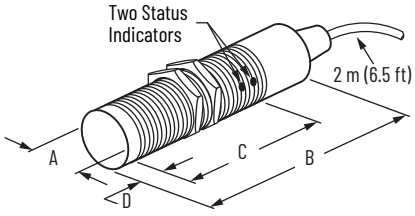
Normally Open



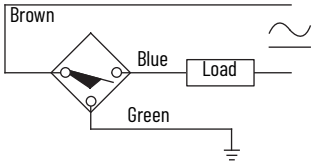
IMPORTANT
- No ground pin. Attach housing to ground.
- Load can be switched to pin 2.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	No	12 (0.47)	83 (3.27)	31.7 (1.25)	9.4 (0.37)

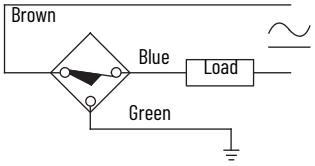
Cable Style



Normally Open



Normally Closed

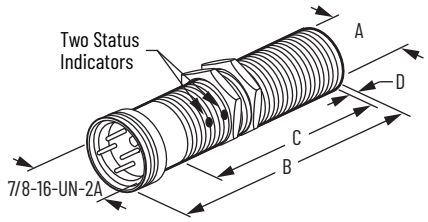


IMPORTANT
- No green wire on 12 mm and on sensors with PVC cable (-A2). Attach housing to ground.
- Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	72.1 (2.84)	38.4 (1.51)	2.5 (0.1)
	No			31.5 (1.24)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	74.7 (2.94)	60 (2.35)	2.5 (0.1)
	No			48.2 (1.9)	14.4 (0.56)
M30 x 1.5	Yes	30 (1.18)	77.2 (3.04)	61.3 (2.41)	2.5 (0.1)
	No			46.1 (1.81)	17.9 (0.7)

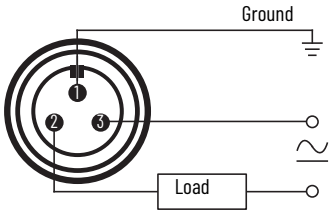
Approximate Dimensions

Mini QD Style



Wiring Diagrams

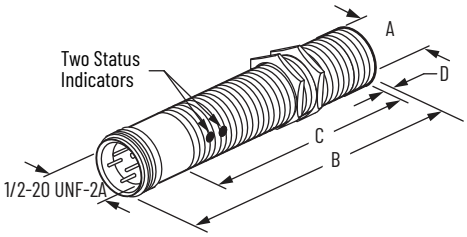
Normally Open or Normally Closed



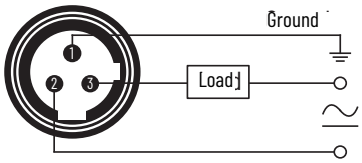
IMPORTANT
- No ground pin on 12 mm. Attach housing to ground.
- Load can be switched to pin3

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	85.6 (3.37)	37.8 (1.49)	2.5 (0.1)
	No			31.7 (1.25)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	56.1 (2.21)	54.9 (2.16)	2.5 (0.1)
	No			43.1 (1.7)	14.4 (0.56)
M30 x 1.5	Yes	30 (1.18)	68.1 (2.68)	61.3 (2.41)	2.5 (0.1)
	No			46.1 (1.81)	17.9 (0.7)

AC Micro QD Style



Normally Open or Normally Closed



IMPORTANT
- No ground pin on 12 mm. Attach housing to ground.
- Load can be switched to pin 2

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	83.4 (3.28)	38.4 (1.51)	2.5 (0.1)
	No			31.5 (1.24)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	84.3 (3.32)	60 (2.36)	2.5 (0.1)
	No			48.2 (1.9)	14.4 (0.56)
M30 x 1.5	Yes	30 (1.18)	85.7 (3.37)	61.3 (2.41)	2.5 (0.1)
	No			46.1 (1.81)	17.9 (0.7)

871TM 2-wire AC/DC PLC Interfacer

871TM AC/DC Cable Style
12 mm, 18 mm, and 30 mm Diameter

871TM AC/DC Mini Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM AC Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM AC/DC EAC M12 Micro Quick Disconnect Style
12 mm Diameter

871TM AC/DC ToughLink Cable Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Load current	2...25 mA
Leakage current	≤ 0.9 mA at 24V DC ≤ 1.7 mA at 20...120V AC/DC ≤ 2.5 mA at 121...250V AC/DC
Operating voltage	20...250V AC/DC (standard models)20...132V AC/DC (high temperature models)
Voltage drop	≤ 8V at 25 mA DC ≤ 10V at 25 mA AC
Repeatability	10% typical
Hysteresis	10% typical
Protection type	False pulse, transient noise, radio frequency (10V per meter, frequency range 20...1000 MHz) (1)
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, UKCA Marked for all applicable regulations, and CCC Certified (select models)
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529) all models; 1200 psi (8270 kPa) washdown; ToughLink and micro connector versions are also rated IP69K (IEC 529)
Housing material	Stainless steel face and threaded short barrel
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 • Quick disconnect: 3-pin mini style, 3-pin micro style, 4-pin EAC M12 micro style
Status indicators	Red: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F) (standard models) 0...100 °C (32...212 °F) (high temperature models)
Shock	30 g (1.06 oz), 11 ms (standard models) 5 g (0.18 oz), 11 ms (high temperature models)
Vibration	55 Hz, 1 mm amplitude, 3 planes (standard models) 30...120 Hz, 1 mm amplitude, 3 planes (high temperature models)

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.8...1.0
Brass	0.4...0.7
Aluminum	0.4...0.7
Copper	0.1...0.2

(1) Radio frequency protection is not available on high temperature models.

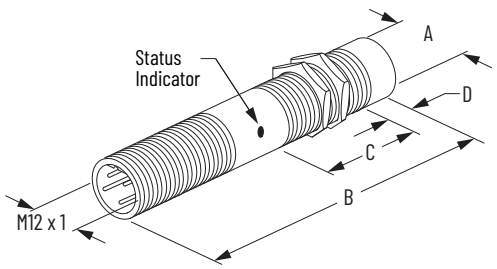
Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Config.	Switching Frequency [Hz]	Cat. No.				
					PVC Cable	ToughLink Cable	Mini QD	Micro QD	EAC Micro
12 (0.47)	2 (0.08)	Yes	N.O.	75	871TM-BH2N12-A2 (1)	871TM-BH2N12-C2 (1)	871TM-BH2N12-N3 (1)	871TM-BH2N12-R3 (1)	871TM-BH2N12-B4 (1)
	4 (0.16)	No		35	871TM-BH4N12-A2 (1)	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 (0.71)	5 (0.2)	Yes	N.O.	65	871TM-BH5N18-A2 (1)	871TM-BH5N18-H2	871TM-BH5N18-N3 (2)	871TM-BH5N18-R3	–
	8 (0.31)	No		30	871TM-BH8N18-A2 (1)	871TM-BH8N18-H2 (3)	871TM-BH8N18-N3 (4)	871TM-BH8N18-R3	–
	5 (0.2)	Yes	N.C.	65	–	–	–	871TM-BH5C18-R3	–
	8 (0.31)	No		30	–	–	–	871TM-BH8C18-R3	–
30 (1.18)	10 (0.39)	Yes	N.O.	45	871TM-BH10N30-A2 (1)	871TM-BH10N30-H2	871TM-BH10N30-N3 (5)	871TM-BH10N30-R3 (1)	–
	15 (0.59)	No		20	871TM-BH15N30-A2 (1)	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

(1) CCC Certified
(2) For a high temperature model, order Cat. No. 871TM-BX21-N3
(3) For a high temperature model, order Cat. No. 871TM-BX22-H2
(4) For a high temperature model, order Cat. No. 871TM-BX22-N3
(5) For a high temperature model, order Cat. No. 871TM-BX23-N3

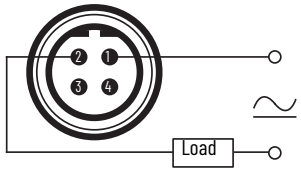
Approximate Dimensions

EAC M12 Micro QD Style



Wiring Diagrams

Normally Open

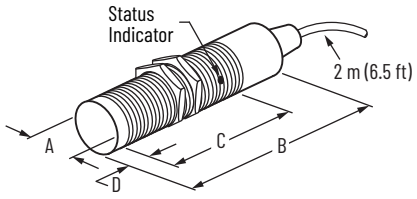


IMPORTANT
- No ground pin. Attach housing to ground.
- Load can be switched to pin 2.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	No	12 (0.47)	61 (2.4)	26.4 (1.04)	2.5 (0.1)

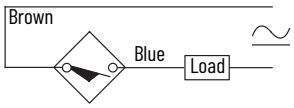
Approximate Dimensions

Cable Style



Wiring Diagrams

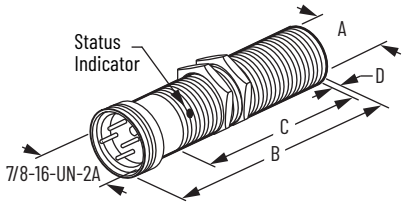
Normally Open



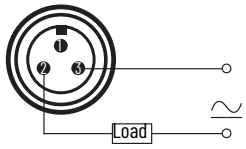
IMPORTANT
- Attach housing to ground.
- Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	49.8 (1.96)	26.4 (1.04)	2.5 (0.1)
	No			19.5 (0.77)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	55.4 (2.18)	41.7 (1.64)	2.5 (0.1)
	No				14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	57.9 (2.28)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

Mini QD Style



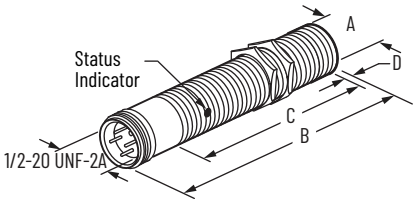
Normally Open



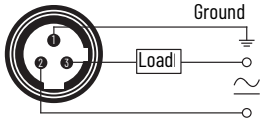
IMPORTANT
- Attach housing to ground.
- Load can be switched to pin3.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	63.5 (2.5)	25.4 (1)	2.5 (0.1)
	No			18.5 (0.73)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	56.1 (2.21)	35.1 (1.38)	2.5 (0.1)
	No			29.2 (1.15)	14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	68.1 (2.68)	49.1 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

Micro QD Style



Normally Open or Normally Closed



IMPORTANT
- No ground pin on 12 mm. Attach housing to ground.
- Load can be switched to pin 3.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	83.4 (3.28)	26.4 (1.04)	2.5 (0.1)
	No			19.6 (0.77)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	84.3 (3.32)	41.7 (1.64)	2.5 (0.1)
	No				14.5 (0.57)
M30 x 1.5	Yes	30 (1.18)	85.7 (3.37)	41.9 (1.65)	2.5 (0.1)
	No			39.4 (1.55)	18 (0.71)

871TM 2-wire DC Intrinsically Safe

871TM Intrinsically Safe
Cable Style

871TM Intrinsically Safe
M12 Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871TM Intrinsically Safe
ToughLink Cable Style
12 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Outputs	Normally open
Load current, max	25 mA
Load current, min	2 mA
Leakage current	t ≤ 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 Approved and CSA Certified for: • Class I, II, III; Divisions 1, 2; Groups A, B, C, D, E, F, G when used with an approved intrinsic safety barrier • Class I, II, III; Division 2; Groups A, B, C, D, E, F, G without intrinsic safety barrier UL Listed for use in non-hazardous locations See control drawing 75001-437 or Division 1 Installation Wiring Diagrams on page 62 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)
Housing material	Stainless steel face and barrel
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 • Quick disconnect: 4-pin micro style
Status indicators	Red: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

IMPORTANT Operating parameters must be adhered to.

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 (≤ 0.02 thick)	0.9...1.1
Copper	0.1...0.2

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_{ta}

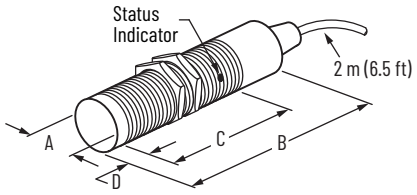
Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.		
					PVC Cable	ToughLink Cable	Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	75	871TM-DR2NE12-A2	871TM-DR2NE12-C2	871TM-DR2NE12-D4
	4 (0.16)	No			871TM-DR4NE12-A2	871TM-DR4NE12-C2	871TM-DR4NE12-D4
18 (0.71)	5 (0.2)	Yes		60	871TM-DR5NE18-A2	871TM-DR5NE18-H2	871TM-DR5NE18-D4
	8 (0.31)	No			871TM-DR8NE18-A2	871TM-DR8NE18-H2	871TM-DR8NE18-D4
30 (1.18)	10 (0.39)	Yes		40	871TM-DR10NE30-A2	871TM-DR10NE30-H2	871TM-DR10NE30-D4
	15 (0.59)	No			871TM-DR15NE30-A2	871TM-DR15NE30-H2	871TM-DR15NE30-D4
Recommended standard QD cordset: -2 = 2 m (6.5 ft)							889D-F4LC-2

IMPORTANT The sensor output is designed and approved as Intrinsically Safe for use in Division 1, 2; Class I, II, III; Groups A, B, C, D, E, F, G hazardous location areas when used with a Cat. No. 937ZH-DPBN-1 or 937ZH-DPDP-2 Intrinsically Safe Zener Barrier or can be used in Division 2 locations without a barrier. Installation must be in accordance with the National Electrical Code, ANSI/ISA RP12.6, or per other regulations by the authority having jurisdiction over the installation site as appropriate.

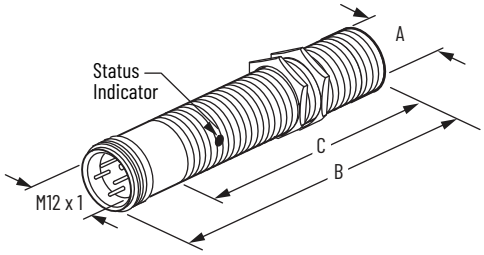
Approximate Dimensions

Cable Style



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	72.1 (2.84)	36.1 (1.42)	2.5 (0.1)
	No			29.2 (1.15)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	75.7 (2.94)	56.2 (1.22)	2.5 (0.1)
	No			44.5 (1.75)	14.4 (0.56)
M30 x 1.5	Yes	30 (1.18)	77.2 (3.04)	58.4 (2.3)	2.5 (0.1)
	No			43.2 (1.7)	17.9 (0.7)

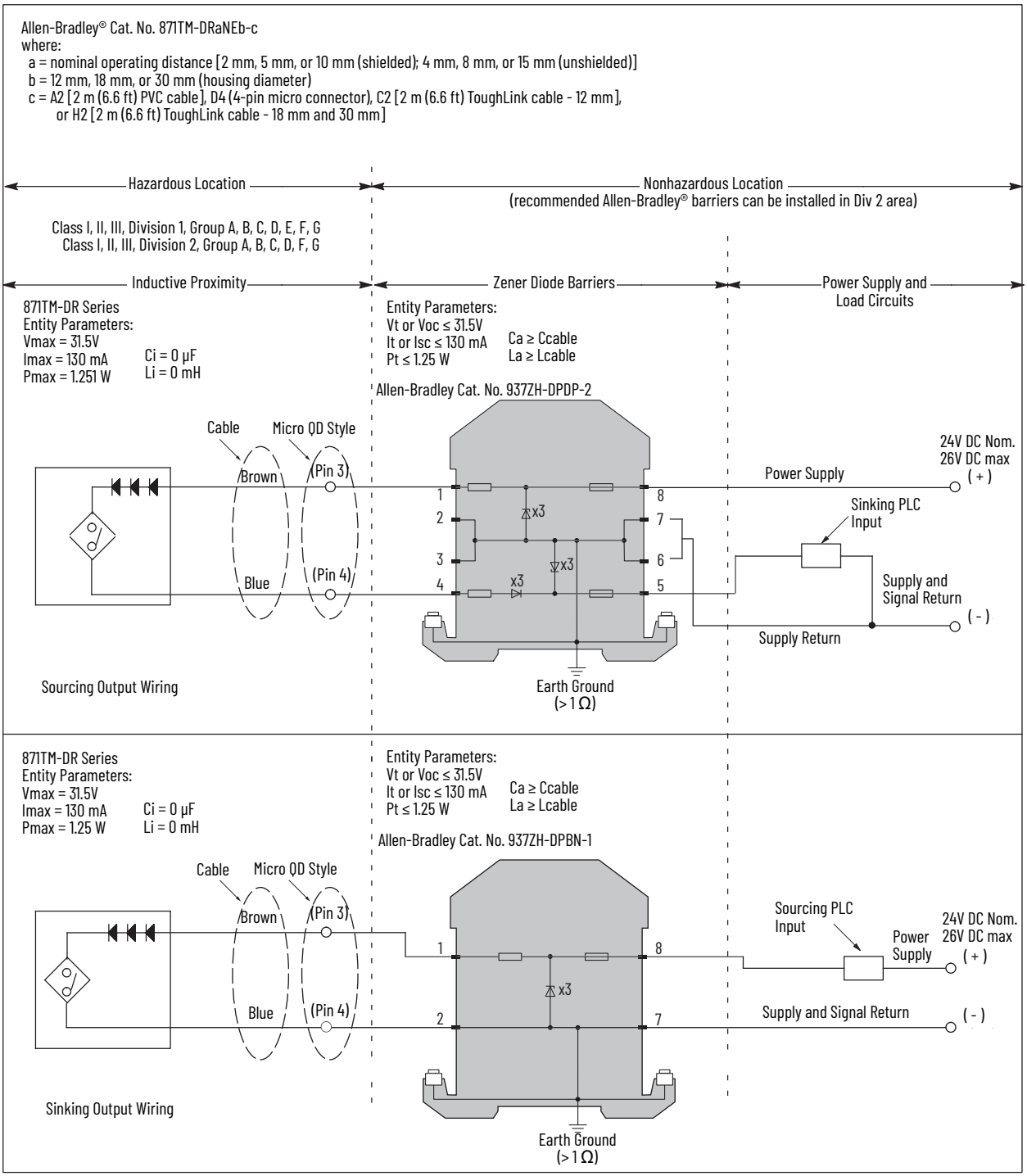
M12 Micro QD Style



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	83.3 (3.28)	36.1 (1.42)	2.5 (0.1)
	No			29.2 (1.15)	9.4 (0.37)
M18 x 1	Yes	18 (0.71)	84.3 (3.32)	56.3 (22.2)	2.5 (0.1)
	No			44.5 (1.75)	14.4 (0.56)
M30 x 1.5	Yes	30 (1.18)	86.1 (3.39)	58.4 (2.3)	2.5 (0.1)
	No			43.2 (1.7)	17.9 (0.7)

Division 1 Installation Wiring Diagrams

Figure 59 - Wiring Diagram [a]

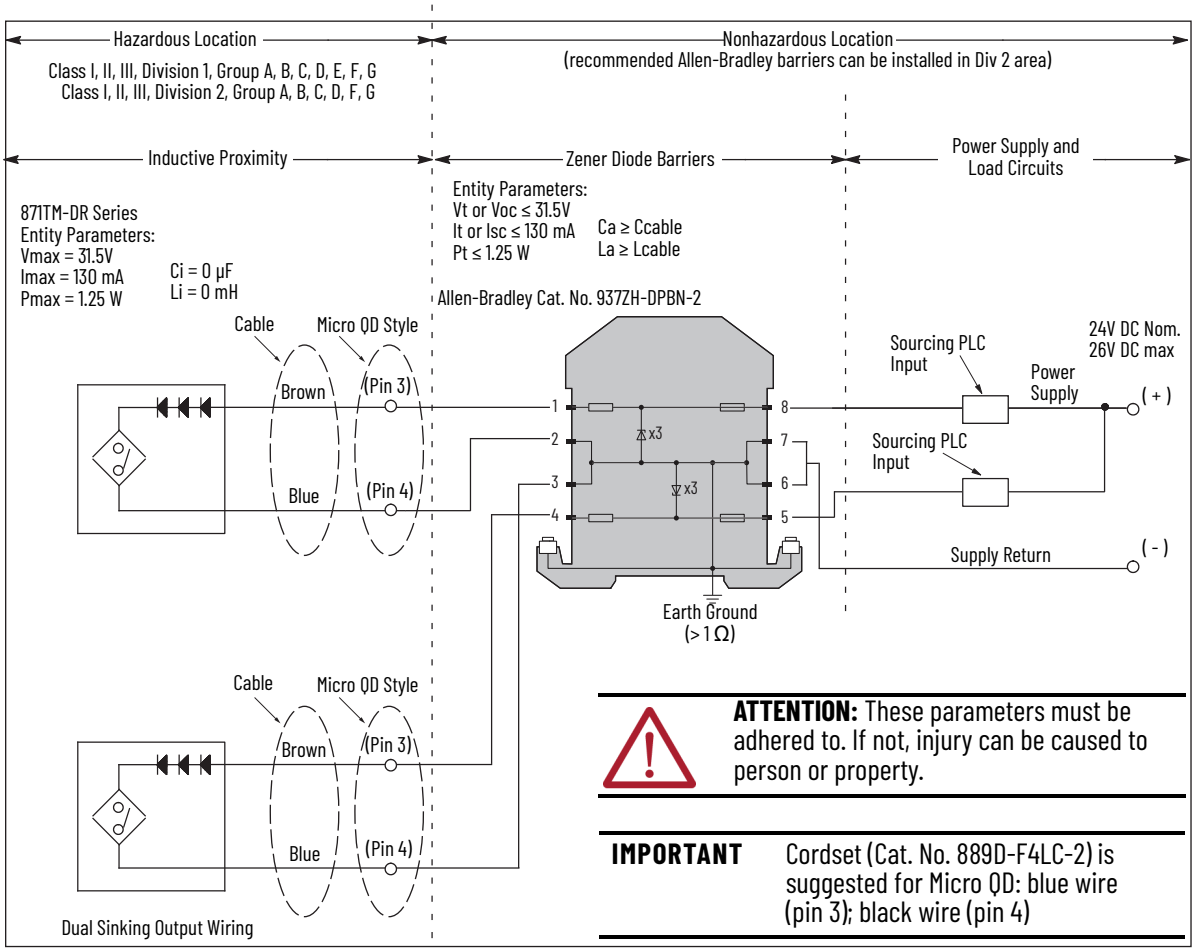


ATTENTION: These parameters must be adhered to. If not, injury may be caused to person or property.

IMPORTANT Cordset (Cat. No. 889D-F4LC-2) is suggested for Micro QD: blue wire (pin 3); black wire (pin 4)

(a) From control drawing 75001-437.

Figure 60 - Wiring Diagram, Continued [a]



ATTENTION: These parameters must be adhered to. If not, injury can be caused to person or property.

IMPORTANT Cordset (Cat. No. 889D-F4LC-2) is suggested for Micro QD: blue wire (pin 3); black wire (pin 4)

Factory Mutual Installation Notes

1. Installation must be in accordance with the National Electrical Code (NFPA 70, Article 504), ANSI/ISA-RP12.6, and manufacturer instructions.
2. If the electrical parameters of the cable that is used are unknown, the following values can be used: Capacitance — 60 pF/ft.; Inductance — 0.20 µH/ft.
3. 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 grounding terminal of the barrier.
4. The Barrier bus must be insulated from other grounded metal. Use Power Rail 937A-PR08, 937A-PR20, and Power Feed Module 937A-PSFD.
5. The maximum nonhazardous location voltage must not exceed 250V AC or DC.
6. Barriers are not required for Division 2 (31.5V DC max). Division 2 applications must be installed in accordance with the NEC.

WARNING: Substitution of components can impair Intrinsic Safety.

7. No revision to the drawing without prior FMRC approval.

(a) From control drawing 75001-437.

Canadian Standards Association Installation Notes

1. Installation must be in accordance with the Canadian Electrical Code (Part I), ANSI/ISA-RP12.6, and manufacturer instructions.
2. If the electrical parameters of the cable that is used are unknown, the following values can be used: Capacitance —60 pF/ft.; Inductance — 0.20 µH/ft.
3. 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 grounding terminal of the barrier.
4. The Barrier bus must be insulated from other grounded metal. Use Power Rail 937A-PR08, 937A-PR20, and Power Feed Module 937A-PSFD.
5. The maximum nonhazardous location voltage must not exceed 250V AC or DC.
6. Barriers are not required for Division 2 (31.5V DC max). Division 2 applications must be installed in accordance with the CEC.
7. 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.

WARNING: Substitution of components can impair Intrinsic Safety.

8. No revision to the drawing without prior CSA approval.

871TS Food and Beverage

871TS DC M12 Micro Quick Disconnect Style
12 mm and 18 mm Diameter

Specifications

Attribute	12 mm and 18 mm Diameter
Load current	≤ 200 mA
Leakage current	≤ 15 µA
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, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67, IP68, and IP69K
Housing material	Stainless steel 316L barrel, PPS (FDA Certified) plastic face
Connection type	Quick disconnect: 4-pin M12 micro style
Status indicator	Yellow: Output energized
Operating temperature	-40...+80 °C (-40...+176 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

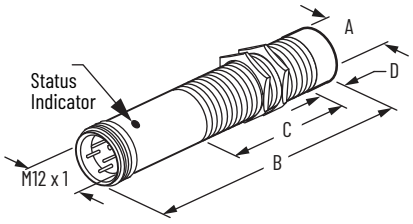
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.2...0.3

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No. Micro QD Cable
12 (0.47) threaded	2 (0.08)	Yes	N.O. and N.C.	NPN	2000	871TS-D2BN12-D4
				PNP		871TS-D2BP12-D4
	4 (0.16)	Yes		NPN	2000	871TS-M4BN12-D4
				PNP		871TS-M4BP12-D4
	4 (0.16)	No		NPN	2000	871TS-D4BN12-D4
				PNP		871TS-D4BP12-D4
	8 (0.31)	No		NPN	2000	871TS-N8BN12-D4
				PNP		871TS-N8BP12-D4
18 (0.71) threaded	5 (0.2)	Yes	N.O. and N.C.	NPN	1500	871TS-D5BN18-D4
				PNP		871TS-D5BP18-D4
	8 (0.31)	Yes		NPN	1500	871TS-M8BN18-D4
				PNP		871TS-M8BP18-D4
	8 (0.31)	No		NPN	1500	871TS-D8BN18-D4
				PNP		871TS-D8BP18-D4
	12 (0.47)	No		NPN	1500	871TS-N12BN18-D4
				PNP		871TS-N12BP18-D4
18 (0.71) smooth	8(0.31)	Yes	N.O. and N.C.	PNP	1500	871TS-MM8BP18-D4
	12(0.47)	No		PNP	1500	871TS-NM12BP18-D4
Recommended standard QD cordset: -2 = 2 m (6.5 ft)						889D-F4AC-2

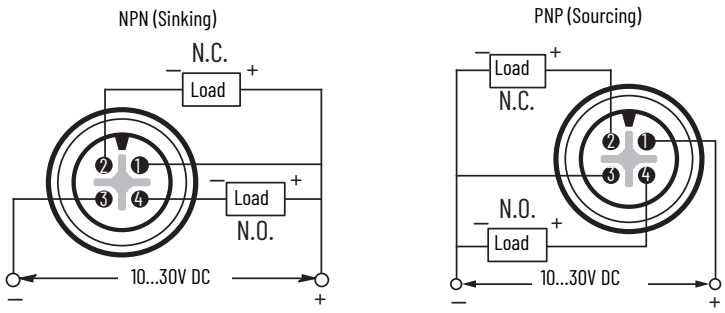
Approximate Dimensions

Micro QD Style



Wiring Diagrams

Normally Open and Normally Closed



Barrel Type	Thread Size	Shielded	Dimensions [mm (in.)]			
			A	B	C	D
Threaded	M12 x 1	Yes	12 (0.47)	65 (2.56)	38.1 (1.5)	–
		No			32.5 (1.28)	6.5 (0.26)
	M18 x 1	Yes	18 (0.71)	63 (2.48)	34.5 (1.36)	–
		No			26.5 (1.04)	8 (0.31)
Smooth	18 x 1	Yes	18 (0.71)	63 (2.48)	–	–
		No			–	8 (0.31)

871Z 3-wire DC Weld Field Immune

871Z DC Mini Quick Disconnect Style
18 mm and 30 mm Diameter

871Z DC M12 Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
Load current	≤ 200 mA
Load current, min	1 mA
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 2.4V
Repeatability	≤ 10%
Hysteresis	≤ 15% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload
Weld field immunity	20,000 A at 25.4 mm (1 in.)
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 12 and 13; IP67 (IEC529)
Housing material	Threaded PTFE-coated brass barrel and PTFE face
Connection type	Quick disconnect: 4-pin mini style, 4-pin M12 micro style
Status indicator	Red: Output Energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

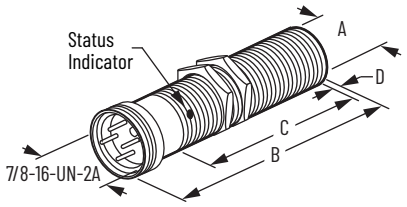
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.3...0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Mini QD Style	M12 Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	PNP	15	–	871Z-DW2NP12-D4
18 (0.71)	5 (0.2)					871Z-DW5NP18-N4	871Z-DW5NP18-D4
30 (1.18)	10 (0.39)					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

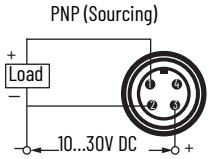
Approximate Dimensions

Mini QD Style



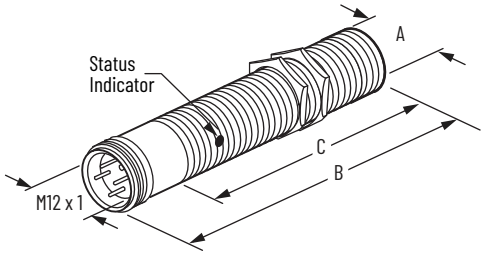
Wiring Diagrams

Normally Open

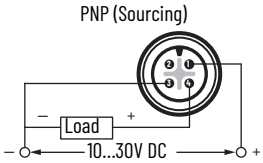


Thread Size	Shielded	Dimensions [mm (in.)]		
		A	B	C
M18 x 1	Yes	18 (0.71)	90 (3.54)	53 (2.09)
M30 x 1		30 (1.18)	90 (3.54)	56 (2.2)

M12 Micro QD Style



Normally Open



Thread Size	Shielded	Dimensions [mm (in.)]		
		A	B	C
M12 x 1	Yes	12 (0.47)	70 (2.76)	50 (1.97)
M18 x 1		18 (0.71)	80 (3.15)	60 (2.36)
M30 x 1		30 (1.18)	80 (3.15)	60 (2.36)

871Z 2-wire AC/DC Weld Field Immune

871Z AC/DC Cable Style
18 mm and 30 mm Diameter

871Z AC/DC Mini Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

871Z AC Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm Diameter	18 mm and 30 mm Diameter
Load current	5...200 mA	5...250 mA
Inrush current (one cycle)	≤ 2 A	≤ 4 A
Leakage current	≤ 1.9 mA at 120V AC	
Operating voltage	20...250V AC/DC	
Voltage drop	≤ 10V at 5...200 mA	≤ 10V at 5...250 mA
Repeatability	≤ 10% at constant temperature	
Hysteresis	7% typical	
Protection type	Short circuit (trigger at 5 A typical), false pulse, reverse polarity (DC output), overload (trigger at 260 mA typical), and transient noise	Short circuit (trigger at 8 A typical), false pulse, reverse polarity (DC output), overload (trigger at 320 mA typical), and transient noise
Weld field immunity	20,000 A at 25.4 mm (1 in.)	
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 3R, 4, 4X, 6, 6P, 12, 13; IP67 (IEC529)	
Housing material	Threaded PTFE-coated brass barrel and thermoset plastic face	
Connection type	• Cable: 2 m (6.5 ft) length H2 - 3 conductor 18 AWG ToughLink • Quick disconnect: 3-pin micro style, 3-pin mini style	
Status indicator	• Red: Output energized • Red flashing: Short circuit/overload • Green: Power	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g (1.06 oz), 11 ms	
Vibration	55 Hz, 1 mm amplitude, 3 planes	

Correction Factors

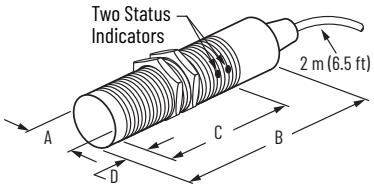
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.3...0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.		
					Cable Style	Mini QD Style	Micro QD Style
12 (0.47)	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 (0.71)	5 (0.2)	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 (1.18)	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-F3WFC-6F	889R-F3WEA-2

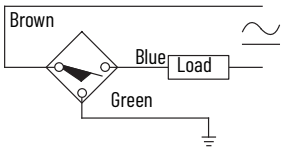
Approximate Dimensions

Cable Style [1]

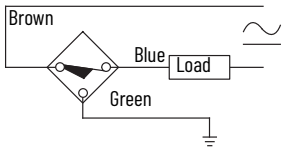


Wiring Diagrams

Normally Open

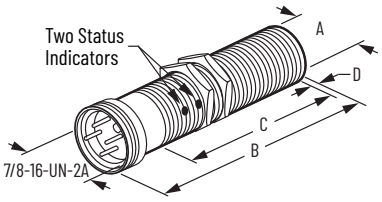


Normally Closed

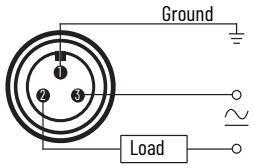


Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M18 x 1	Yes	18 (0.71)	74.68 (2.94)	61.6 (2.43)	0.8 (0.03)
M30 x 1	No	30 (1.18)	77.52 (3.05)	64.3 (2.53)	

Mini QD Style [1]



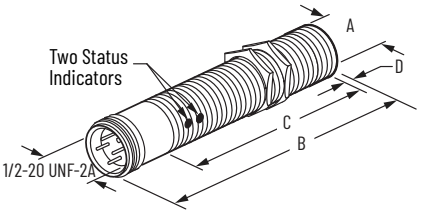
Normally Open and Normally Closed



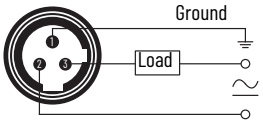
IMPORTANT
- Load can be switched to pin 3.
- No ground pin on 12 mm. Attach hosing to ground.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	93.45 (3.68)	46.2 (1.82)	0.8 (0.03)
	No			40.7 (1.52)	8.1 (0.32)
M18 x 1	Yes	18 (0.71)	75.82 (2.99)	57.28 (2.26)	0.8 (0.03)
M30 x 1	No	30 (1.18)	86.66 (3.41)	64.3 (2.53)	0.8 (0.03)

Micro QD Style [1]



Normally Open and Normally Closed



IMPORTANT
- Load can be switched to pin 2.
- No ground pin on 12 mm. Attach hosing to ground.

(1) Rear portion of barrel left uncoated for ground contact on 12 mm models

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	90.1 (3.55)	46.7 (1.85)	0.8 (0.03)
	No			39.7 (1.56)	8.1 (0.32)
M18 x 1	Yes	18 (0.71)	83.5 (3.29)	61.6 (2.43)	0.8 (0.03)
M30 x 1	No	30 (1.18)	86 (3.38)	64.3 (2.53)	0.8 (0.03)

871ZT 3-wire DC Weld Field Immune/Equal Sensing

871ZT DC M12 Micro
Quick Disconnect Style
12 mm, 18 mm, and 30 mm Diameter

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameter
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, and overload
Weld field immunity	Up to 1260 Gauss (M5)
Certifications	UL Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	IP67 (IEC 529)
Housing material	Threaded PTFE-coated brass barrel and PTFE face
Connection type	Quick disconnect: 4-pin M12 micro style
Status indicator	360° status indicator visibility; Orange: Target present
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

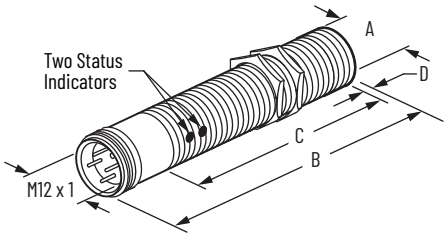
Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9...1.1
Brass	0.9...1.1
Aluminum	0.9...1.1
Copper	0.9...1.1

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.
						Micro QD Style
12 (0.47)	3 (0.12)	Yes	N.O.	PNP	2000	871ZT-MB3NP12-D4
	8 (0.31)	No				871ZT-NB8NP12-D4
18 (0.71)	5 (0.2)	Yes			2500	871ZT-MB5NP18-D4
	12 (0.47)	No				871ZT-NB12NP18-D4
30 (1.18)	10 (0.39)	Yes			600	871ZT-MB10NP30-D4
	20 (0.79)	No			1000	871ZT-NB20NP30-D4
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)						889D-F4WE-2

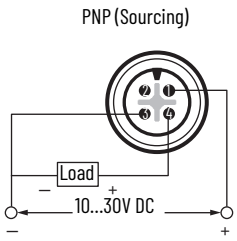
Approximate Dimensions

M12 Micro QD Style



Wiring Diagrams

Normally Open



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	65 (2.56)	50 (1.97)	–
	No			40 (1.58)	10 (0.39)
M18 x 1	Yes	–		50 (1.97)	–
	No	18 (0.71)		40.5 (1.59)	10 (0.39)
M30 x 1	Yes	–		50.5 (1.99)	–
	No	30 (1.18)		37.5 (1.48)	13 (0.51)

872C WorldProx 2-wire DC

DC Cable Style
12 mm, 18 mm, and 30 mm

DC M12 Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameters
Load current	≤ 100 mA (5 mA, min)
Leakage current	≤ 0.9 mA
Operating voltage	10...30V DC
Voltage drop	≤ 6V
Repeatability	≤ 2%
Hysteresis	10% typical
Protection type	Reverse polarity, transient noise, short circuit, overload, and false pulse
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6P, 12, 13, IP67 (IEC 529) Nickel-plated brass barrel, plastic face (PBT)
Housing material	Threaded nickel-plated brass barrel and plastic face
Connections	• Cable: 2 m (6.5 ft) length, 4.4 mm (0.175 in.) diameter, 2-conductor 26 AWG PVC • Quick disconnect: 4-pin micro style
Status indicator	Red: Output energized, 360° visibility
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

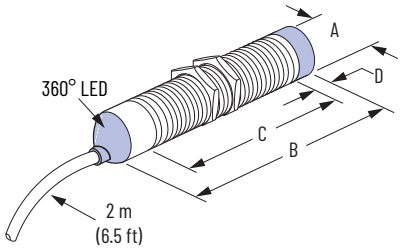
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.2...0.3

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
					Cable Style	Micro QD Style
12 (0.47)	3 (0.12)	Yes	N.O.	2000	872C-D3NE12-A2	872C-D3NE12-D4
			N.C.		872C-D3CE12-A2	872C-D3CE12-D4
	4 (0.16)	No	N.O.		872C-D4NE12-A2	872C-D4NE12-D4
			N.C.		872C-D4CE12-A2	872C-D4CE12-D4
18 (0.71)	5 (0.2)	Yes	N.O.	1000	872C-D5NE18-A2	872C-D5NE18-D4
			N.C.		872C-D5CE18-A2	872C-D5CE18-D4
	8 (0.31)	No	N.O.		872C-D8NE18-A2	872C-D8NE18-D4
			N.C.		872C-D8CE18-A2	872C-D8CE18-D4
30 (1.18)	10 (0.39)	Yes	N.O.	500	872C-D10NE30-A2	872C-D10NE30-D4
			N.C.		872C-D10CE30-A2	872C-D10CE30-D4
	15 (0.59)	No	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

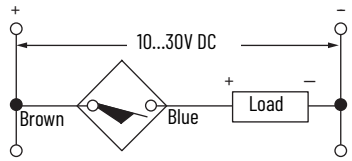
Approximate Dimensions

Cable Style

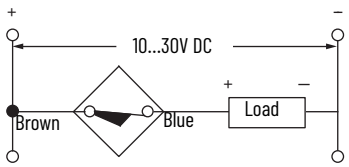


Wiring Diagrams

Normally Open



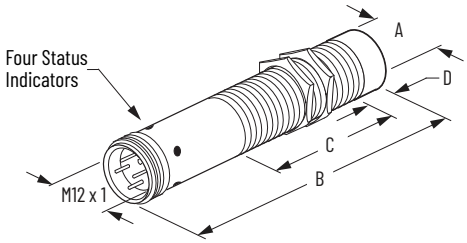
Normally Closed



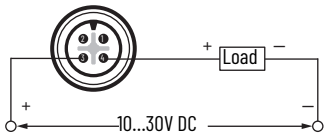
IMPORTANT Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M12 x 1	Yes	12 (0.47)	50.8 (2)	46.7 (1.84)	–
	No		58.7 (2.31)		7.9 (0.31)
M18 x 1	Yes	18 (0.71)	50.8 (2)		–
	No		63 (2.48)		12.2 (0.48)
M30 x 1.5	Yes	30 (1.18)	50.8 (2)		–
	No		63 (2.48)		12.2 (0.48)

M12 Micro Style



Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 3.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M12 x 1	Yes	12 (0.47)	65 (2.56)	38.1 (1.5)	–
	No		72.4 (2.85)		7.9 (0.31)
M18 x 1	Yes	18 (0.71)	65 (2.56)		–
	No		76.5 (3.01)		12.2 (0.48)
M30 x 1.5	Yes	30 (1.18)	65 (2.56)	46.7 (1.84)	–
	No		76.5 (3.01)		12.2 (0.48)

872C WorldProx QuadroPlex 2-wire DC

DC M12 Micro Quick Disconnect Style
12 mm, 18 mm, and 30 mm

Specifications

Attribute	12 mm Diameter	18 mm and 30 mm Diameters
Load current	100 mA (5 mA, min)	200 mA (5 mA, min)
Leakage current	≤ 1 mA	
Operating voltage	10...30V DC	
Voltage drop	≤ 6V at 100 mA	≤ 6.5V at 200 mA ≤ 6V at 100 mA
Repeatability	≤ 10% at constant temperature	
Hysteresis	10% typical	
Protection type	Transient noise, short circuit, overload, and false pulse	
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 4, 6P, 12, 13, IP67 (IEC 529) Nickel-plated brass barrel, plastic face (PBT)	
Housing material	Threaded nickel-plated brass barrel and plastic face	
Connections	Quick disconnect: 4-pin M12 micro style	
Status indicator	Red: Output energized, 360° visibility	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g, 11 ms	
Vibration	55 Hz, 1 mm amplitude, 3 planes	

Correction Factors

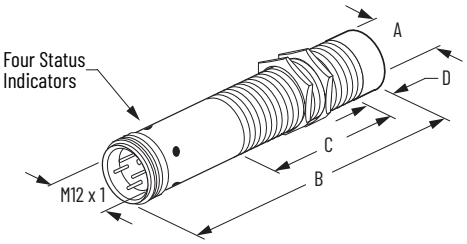
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.2...0.3

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
					Micro QD Style
12 (0.47)	3 (0.12)	Yes	N.O. or N.C.	2000	872C-M3Q12-D4
	4 (0.16)	No			872C-N4Q12-D4
18 (0.71)	5 (0.2)	Yes		1000	872C-M5Q18-D4
	8 (0.31)	No			872C-N8Q18-D4
30 (1.18)	10 (0.39)	Yes		500	872C-M10Q30-D4
	15 (0.59)	No			872C-N15Q30-D4
Recommended standard QD cordset: -2 = 2 m (6.5 ft)					889D-F4AC-2

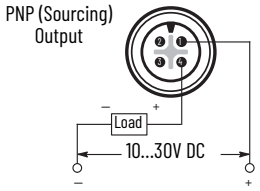
Approximate Dimensions

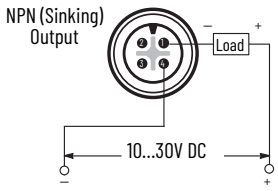
M12 Micro Style



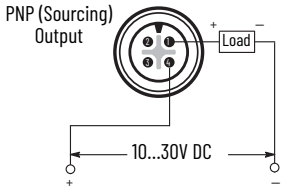
Wiring Diagrams

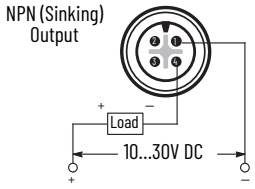
Normally Open





Normally Closed





Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M12 x 1	Yes	12 (0.47)	65 (2.56)	38.1 (1.5)	—
	No		72.4 (2.85)		7.9 (0.31)
M18 x 1	Yes	18 (0.71)	65 (2.56)		—
	No		76.5 (3.01)		12.2 (0.48)
M30 x 1.5	Yes	30 (1.18)	65 (2.56)		—
	No		76.5 (3.01)		12.2 (0.48)

872C WorldProx Long Range Sensing 3-wire DC

DC M12 Micro Quick Disconnect Style
6.5 mm, 8 mm, 12 mm, 18 mm, and 30 mm

DC Pico Quick Disconnect Style
6.5 mm and 8 mm

Specifications

Attribute	6.5, 8, 12, 18, and 30 mm Diameters
Load current	≤ 200 mA
Leakage current	≤ 0.1 mA
Operating voltage	10...30V DC
Voltage drop	≤ 2V
Repeatability	≤ 5%
Hysteresis	10% typical
Protection type	Reverse polarity, transient noise, short circuit, overload, and false pulse
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6P, 12, 13, IP67 (IEC 529) Chrome-plated brass barrel, plastic face (PBT)
Housing material	Threaded chrome-plated brass barrel and plastic face
Connections	Quick disconnect: 4-pin M12 micro style and 3-pin Pico style
Status indicator	Amber: Output energized, 360° visibility
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factor
Steel	1.0
Stainless steel	0.6...0.8
Brass	0.3...0.6
Aluminum	0.3...0.5
Copper	0.2...0.5

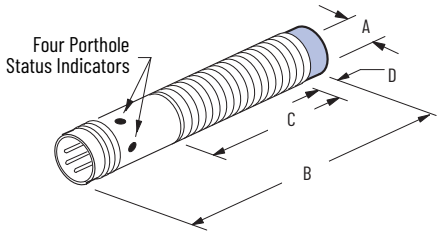
IMPORTANT Special mounting and installation considerations can be necessary due to the long-range sensing capabilities of these products. The Inductive Proximity Sensors Basics on page 5 and Applications on page 17 sections of the catalog must be used as a guideline. See pages Spacing Between Shielded Sensors (Flush-mountable) and Nearby Metal Surfaces on page 9 and Spacing Between Unshielded Sensors (Nonflush-mountable) and Nearby Metal Surfaces on page 11.

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						M12 Micro QD Style	Pico QD Style
6.5 (0.26)	3 (0.12)	Yes	N.O.	NPN	1000	872C-M3NN7-D4	872C-M3NN7-P3
				PNP		872C-M3NP7-D4	872C-M3NP7-P3
8 (0.31)	6 (0.23)	No	N.O.	NPN	500	872C-N6NN8-D4	872C-N6NN8-P3
				PNP		872C-N6NP8-D4	872C-N6NP8-P3
12 (0.47)	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 (0.71)	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 (1.18)	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

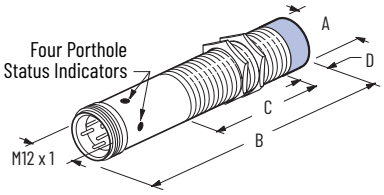
Approximate Dimensions

Pico QD Style



Thread Size	Smooth Diameter [mm (in.)]	Shielded	Dimensions [mm (in.)]			
			A	B (Max)	C (Min)	D (Max)
–	6.5 (0.26)	Yes	6.5 (0.26)	60 (2.36)	–	–
M8 x 1	–	No	8 (0.31)	60 (2.36)	41.5 (1.63)	4 (0.15)

M12 Micro QD Style



Thread Size	Smooth Diameter [mm (in.)]	Shielded	Dimensions [mm (in.)]			
			A	B (Max)	C (Min)	D (Max)
–	6.5 (0.26)	Yes	6.5 (0.26)	66 (2.59)	–	–
M8 x 1	–	No	8 (0.31)	66 (2.59)	40 (1.57)	4 (0.15)
M12 x 1	–	Yes	12 (0.47)	60 (2.36)	40 (1.57)	–
		No			35.3 (1.38)	5.7 (0.22)
M18 x 1	–	Yes	18 (0.71)	63.5 (2.5)	42 (1.65)	–
		No			32 (1.25)	10 (0.39)
M30 x 1.5	–	Yes	30 (1.18)	73.5 (2.89)	52 (2.04)	–
		No			42 (1.65)	10 (0.39)

Wiring Diagrams

Normally Open or Normally Closed

Normally Open

872C WorldProx 3 and 4-wire DC - Standard and Extended Sensing

DC Micro Quick Disconnect Style
8 mm, 12 mm, 18 mm, and 30 mm

DC Pico Quick Disconnect Style
6.5 mm, 8 mm, and 12 mm

DC Cable Style
6.5 mm, 8 mm, 12 mm, 18 mm, and 30 mm

Pigtail Cable with Integral Micro QD Connector
8 mm, 12 mm, 18 mm, and 30 mm

Specifications

Attribute	8 mm	12 mm	18 mm	30 mm
Load current	≤ 100 mA	≤ 200 mA		
Leakage current	≤ 5 µA	≤ 20 µA		
Operating voltage	5...30V DC	10...30V DC		
Voltage drop	≤ 1.5V	< 1V		
Switching frequency	≤ 2500 Hz	≤ 2650 Hz (1)	≤ 1950 Hz (1)	≤ 1150 Hz (1)
No-load supply current	≤ 10 mA	<15 mA		
Repeatability	≤ 5%			
Hysteresis	≤ 10% typical	5% typical		
Protection type	False pulse on power, transient noise, reverse polarity, short circuit, and overload			
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations			
Enclosure type rating	IP67	IP67, IP68 — 24 hr at 1 m (3.3 ft)		
Housing material	Nickel-plated brass barrel nuts with integral locking feature, plastic face (LCP)	White bronze-plated brass barrel nuts with integral locking feature, plastic face (PBT)		
Connections	• Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 3.5 mm (0.138 in.) diameter (PVC); 3.3 mm diameter (PUR); 3 x 0.14 mm² PVC or PP • Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length • Connector: 3-pin M12 or 3-pin M8	• Cable (PVC/PUR): 2 m (6.5 ft), 5 m (16.4 ft), 10 m (32.8 ft) length, 4.3 mm (0.17 in.) diameter; 3 x 0.34 mm² (0.01 in.²) or 4 x 0.34 mm² PVC or PUR • Cable (Pigtail): 0.2 m (0.7 ft), 0.5 m (1.6 ft), 1 m (3.3 ft) length, integral connector (M12) 3 or 4-pin micro QD • Quick disconnect: 3 or 4-pin micro QD (M12) or [3-pin Pico QD (M8) for 12 mm only]		
Status indicator	Amber: Output energized			
Operating temperature	-25...+70 °C (-13...+158 °F)	-40...+85 °C (-40...+185 °F)		
Shock	30 g (1.06 oz), 11 ms half-sine			
Vibration	55 Hz, 1 mm amplitude, 3 planes			

Nominal Sensing Distance

Size	Description	Dimensions [mm (in.)]	
		Standard Sensing Range	Extended Sensing Range
6.5 mm	Shielded	2 (0.08)	—
	Unshielded	3 (0.12)	—
8 mm	Shielded	2 (0.08)	3 (0.12)
	Unshielded	3 (0.12)	4 (0.16)
12 mm	Shielded	—	4 (0.16)
	Unshielded	4 (0.16)	8 (0.31)
18 mm	Shielded	5 (0.2)	8 (0.31)
	Unshielded	8 (0.31)	12 (0.47)
30 mm	Shielded	10 (0.39)	15 (0.59)
	Unshielded	15 (0.59)	25 (0.98)

Correction Factors

Target Material	6.5 mm	8 mm	12 mm	18 mm	30 mm
Steel	1.0	1.0	1.0	1.0	1.0
Stainless steel	0.7...0.8	0.7...0.8	0.79...0.85	0.73...0.75	0.7...0.74
Brass	0.45...0.55	0.45...0.55	0.49...0.55	0.44...0.55	0.46...0.53
Aluminum	0.3...0.4	0.45...0.55	0.4...0.47	0.35...0.49	0.4...0.5
Copper	0.2...0.3	0.35...0.45	0.35...0.43	0.29...0.46	0.37...0.43

(1) Select models have switching frequency less than previously specified. See Product Selection - Standard Range on page 80 and Product Selection - Extended Range on page 81 for specific switching frequency of each model.

Product Selection - Standard Range

Table 9 - Standard Barrel

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.			
						Cable Style	Micro QD Style	Pico QD Style	Pigtail Style
8 (0.31)	2 (0.08)	Yes	N.O.	PNP	2500	872C-D2NP8-E2 (1)	872C-D2NP8-D4	872C-D2NP8-P3	872C-D2NP8-FD05
				NPN		872C-D2NN8-E2 (1)	872C-D2NN8-D4	872C-D2NN8-P3	–
			N.C.	PNP		872C-D2CP8-E2 (1)	872C-D2CP8-D4	872C-D2CP8-P3	–
	3 (0.12)	No	N.O.	PNP		872C-D3NP8-E2	872C-D3NP8-D4	872C-D3NP8-P3	–
				NPN		–	872C-D3NN8-D4	872C-D3NN8-P3	–
			N.C.	PNP		–	872C-D3CP8-D4	872C-D3CP8-P3	–
12 (0.47)	4 (0.16)	No	N.O.	PNP	2650	872C-D4NP12-E2	872C-D4NP12-D4	–	–
				NPN		–	872C-D4NN12-D4	–	–
			N.C.	PNP		–	872C-D4CP12-D4	–	–
18 (0.71)	5 (0.2)	Yes	N.O.	PNP	1950	872C-D5NP18-E2	872C-D5NP18-D4	–	–
				NPN		872C-D5NN18-E2	–	–	–
	8 (0.31)	No	N.O.	PNP	1650	872C-D8NP18-E2	872C-D8NP18-D4	–	–
30 (1.18)	10 (0.39)	Yes	N.O.	PNP	1100	–	872C-D10NP30-D4	–	–
	15 (0.59)	No		PNP	1150	–	872C-D15NP30-D4	–	–

(1) The 2 at the end of the catalog number indicates a 2 m (6.6 ft) cable. Change to a 5 for a 5 m (16.4 ft) cable.

Table 10 - Short Barrel

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.		
						Cable Style	Micro QD Style	Pico QD Style
8 (0.31)	2 (0.08)	Yes	N.O.	PNP	2500	872C-DH2NP8-E2	872C-DH2NP8-D4	872C-DH2NP8-P3
12 (0.47)	4 (0.16)	No	N.O.	PNP	2650	–	872C-DH4NP12-D4	–
				NPN		–	872C-DH4NN12-D4	–
18 (0.71)	5 (0.2)	Yes	N.O.	PNP	1950	–	872C-DH5NP18-D4	–
	8 (0.31)	No		PNP	1650	–	872C-DH8NP18-D4	–
30 (1.18)	15 (0.59)	No	N.O.	PNP	1150	–	872C-DH15NP30-D4	–

Product Selection - Extended Range

Table 11 - Standard Barrel

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.			
						Cable Style (1) (2)	Micro QD Style	Pico QD Style	Pigtail Style (3)
8 (0.31)	3 (0.12)	Yes	N.O.	PNP	2500	872C-M3NP8-E2	872C-M3NP8-D4	872C-M3NP8-P3	872C-M3NP8-FD02
				NPN		872C-M3NN8-E2	872C-M3NN8-D4	872C-M3NN8-P3	—
			N.C.	PNP		—	872C-M3CP8-D4	872C-M3CP8-P3	—
				NPN		872C-M3CN8-E2	872C-M3CN8-D4	872C-M3CN8-P3	—
	4 (0.16)	No	N.O.	PNP		872C-N4NP8-E2	872C-N4NP8-D4	872C-N4NP8-P3	872C-N4NP8-FD02
				NPN		872C-N4NN8-E2	872C-N4NN8-D4	872C-N4NN8-P3	—
			N.C.	PNP		872C-N4CP8-E2	872C-N4CP8-D4	872C-N4CP8-P3	—
				NPN		872C-N4CN8-E2	872C-N4CN8-D4	872C-N4CN8-P3	—
12 (0.47)	4 (0.16)	Yes	N.O.	PNP	2550	872C-M4NP12-E2	872C-M4NP12-D4	872C-M4NP12-P3	—
				NPN		—	—	872C-M4NN12-P3	—
			N.C.	PNP		—	—	872C-M4CP12-P3	—
				NPN		—	—	872C-M4CN12-P3	—
			N.O./N.C.	PNP		872C-M4BP12-E2	872C-M4BP12-D4	—	872C-M4BP12-FD02
				NPN		872C-M4BN12-E2	872C-M4BN12-D4	—	872C-M4BN12-FD02
	8 (0.31)	No	N.O.	PNP	1650	872C-N8NP12-E2	872C-N8NP12-D4	872C-N8NP12-P3	—
				NPN		872C-N8NN12-E2	—	872C-N8NN12-P3	—
			N.C.	PNP		—	—	872C-N8CP12-P3	—
				NPN		—	—	872C-N8CN12-P3	—
			N.O./N.C.	PNP		872C-N8BP12-E2	872C-N8BP12-D4	—	872C-N8BP12-FD05
				NPN		872C-N8BN12-E2	872C-N8BN12-D4	—	872C-N8BN12-FD10
18 (0.71)	8 (0.31)	Yes	N.O.	PNP	1350	872C-M8NP18-E2	872C-M8NP18-D4	—	872C-M8NP18-FD02
				NPN		—	—	—	872C-M8NN18-FD02
			N.O./N.C.	PNP		872C-M8BP18-E2	872C-M8BP18-D4	—	872C-M8BP18-FD02
				NPN		872C-M8BN18-E2	872C-M8BN18-D4	—	872C-M8BN18-FD02
	12 (0.47)	No	N.O.	PNP	1300	872C-N12NP18-E2	872C-N12NP18-D4	—	872C-N12NP18-FD02
				NPN		872C-N12NN18-E2	—	—	—
			N.O./N.C.	PNP		872C-N12BP18-E2	872C-N12BP18-D4	—	872C-N12BP18-FD02
				NPN		872C-N12BN18-E2	872C-N12BN18-D4	—	872C-N12BN18-FD02
30 (1.18)	15 (0.59)	Yes	N.O.	PNP	550	872C-M15NP30-E2	872C-M15NP30-D4	—	872C-M15NP30-FD02
			N.O./N.C.	PNP		872C-M15BP30-E2	872C-M15BP30-D4	—	872C-M15BP30-FD02
				NPN		872C-M15BN30-E2	872C-M15BN30-D4	—	872C-M15BN30-FD02
	25 (0.98)	No	N.O.	PNP	400	872C-N25NP30-E2	872C-N25NP30-D4	—	—
			N.O./N.C.	PNP		872C-N25BP30-E2	872C-N25BP30-D4	—	—
				NPN		872C-N25BN30-E2	872C-N25BN30-D4	—	872C-N25BN30-FD02

(1) The 2 at the end of the catalog number indicates a 2 m (6.6 ft) cable. Change to a 5 for a 5 m (16.4 ft) cable or 10 for a 10 m (32.8 ft) cable.
Example: Cat. No. 872C-M15BP30-E**2** becomes Cat. No. 872C-M15BP30-E**5**.

(2) The E in the catalog number indicates a PVC cable. Change to a J for a PUR cable.
Example: Cat. No. 872C-MH3NP8-**E**2 becomes 872C-MH3NP8-**J**2.

(3) The 02 at the end of the catalog number indicates a 0.2 m (0.066 ft) cable. Change to a 05 for a 0.5 m (1.64 ft) cable or 10 for a 1 m (3.28 ft) cable.
Example: Cat. No. 872C-M15BN30-FD**02** becomes Cat. No. 872C-M15BN30-FD**10**.

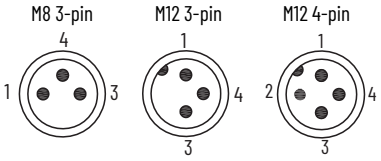
Table 12 - Short Barrel

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Config.		Switching Frequency [Hz]	Cat. No.			
						Cable Style (1) (2)	Micro QD Style	Pico QD Style	Pigtail Style (3)
8 (0.31)	3 (0.12)	Yes	N.O.	PNP	2500	872C-MH3NP8-E2	872C-MH3NP8-D4	872C-MH3NP8-P3	872C-MH3NP8-FD02
				NPN		872C-MH3NN8-E2	872C-MH3NN8-D4	872C-MH3NN8-P3	872C-MH3NN8-FD05
			N.C.	PNP		872C-MH3CP8-E2	872C-MH3CP8-D4	872C-MH3CP8-P3	–
				NPN		872C-MH3CN8-E2	–	–	–
	4 (0.16)	No	N.O.	PNP		872C-NH4NP8-E2	872C-NH4NP8-D4	872C-NH4NP8-P3	–
				NPN		872C-NH4NN8-E2	872C-NH4NN8-D4	872C-NH4NN8-P3	–
			N.C.	PNP		872C-NH4CP8-E2	872C-NH4CP8-D4	–	–
				NPN		872C-NH4CN8-E2	–	–	–
12 (0.47)	4 (0.16)	Yes	N.O.	PNP	2550	872C-MH4NP12-E2	872C-MH4NP12-D4	872C-MH4NP12-P3	–
				NPN		–	–	872C-MH4NN12-P3	–
			N.C.	PNP		–	–	872C-MH4CP12-P3	–
				NPN		872C-MH4CN12-E2	–	872C-MH4CN12-P3	–
			N.O./N.C.	PNP		872C-MH4BP12-E2	872C-MH4BP12-D4	–	872C-MH4BP12-FD02
				NPN		872C-MH4BN12-E2	872C-MH4BN12-D4	–	–
	8 (0.31)	No	N.O.	PNP	1650	872C-NH8NP12-E2	872C-NH8NP12-D4	872C-NH8NP12-P3	872C-NH8NP12-FD02
				NPN		–	–	872C-NH8NN12-P3	–
			N.C.	PNP		–	–	872C-NH8CP12-P3	–
				NPN		–	–	872C-NH8CN12-P3	–
			N.O./N.C.	PNP		872C-NH8BP12-E2	872C-NH8BP12-D4	–	872C-NH8BP12-FD02
				NPN		872C-NH8BN12-E2	872C-NH8BN12-D4	–	–
18 (0.71)	8 (0.31)	Yes	N.O.	PNP	1350	872C-MH8NP18-E2	872C-MH8NP18-D4	–	872C-MH8NP18-FD02
				NPN		872C-MH8NN18-E2	–	–	–
			N.O./N.C.	PNP		872C-MH8BP18-E2	872C-MH8BP18-D4	–	872C-MH8BP18-FD02
				NPN		872C-MH8BN18-E2	872C-MH8BN18-D4	–	872C-MH8BN18-FD02
	12 (0.47)	No	N.O.	PNP	1300	872C-NH12NP18-E2	872C-NH12NP18-D4	872C-NH12NP18-P3	872C-NH12NP18-FD02
			N.C.	NPN		–	872C-NH12CN18-D4	–	–
			N.O./N.C.	PNP		872C-NH12BP18-E2		–	872C-NH12BP18-FD02
				NPN		872C-NH12BN18-E2	872C-NH12BN18-D4	–	–
30 (1.18)	15 (0.59)	Yes	N.O.	PNP	550	872C-MH15NP30-E2	872C-MH15NP30-D4	–	–
				NPN		–	872C-MH15NN30-D4	–	–
			N.C.	PNP		–	872C-MH15CP30-D4	–	–
			N.O./N.C.	PNP		872C-MH15BP30-E2	872C-MH15BP30-D4	–	–
				NPN		872C-MH15BN30-E2	872C-MH15BN30-D4	–	–
	25 (0.98)	No	N.O.	PNP	400	872C-NH25NP30-E2	872C-NH25NP30-D4	–	872C-NH25NP30-FD02
			N.O./N.C.	PNP		872C-NH25BP30-E2	872C-NH25BP30-D4	–	–
				NPN		872C-NH25BN30-E2	872C-NH25BN30-D4	–	–

(1) The 2 at the end of the catalog number indicates a 2 m (6.6 ft) cable. Change to a 5 for a 5 m (16.4 ft) cable or 10 for a 10 m (32.8 ft) cable.
(2) The E in the catalog number indicates a PVC cable, for a PUR cable change to a J. Example: Cat. No. 872C-MH3NP8-**E**2 becomes 872C-MH3NP8-**J**2.
(3) The 02 at the end of the catalog number indicates a 0.2 m (0.066 ft) cable. Change to a 05 for a 0.5 m (1.64 ft) cable or 10 for a 1 m (3.28 ft) cable.
Example: Cat. No. 872C-M15BN30-FD**02** becomes Cat. No. 872C-M15BN30-FD**10**.

Wiring

Figure 61 - 8 mm, 12 mm, 18 mm, and 30 mm Pinouts



- 1 BN (brown)
- 2 WH (white)
- 3 BU (blue)
- 4 BK (black)

Figure 62 - 8 mm, 12 mm, 18 mm, and 30 mm 3-wire DC Wiring

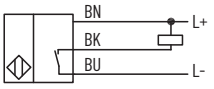
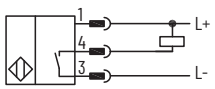
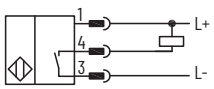
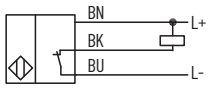
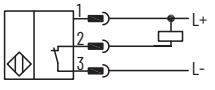
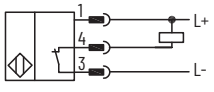
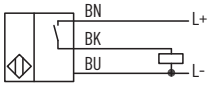
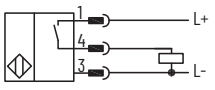
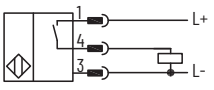
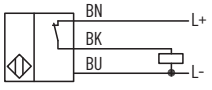
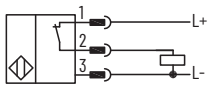
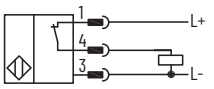
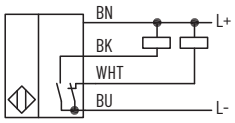
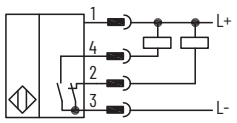
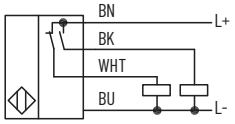
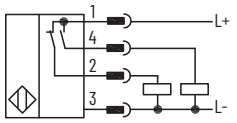
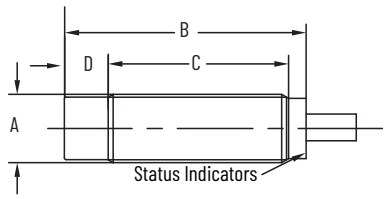
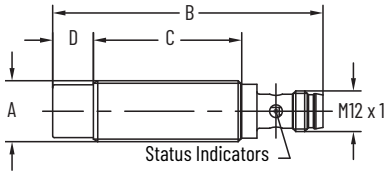
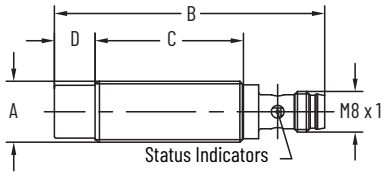
NPN N.O.	Cable	M12 Micro Connector	M8 Pico Connector
NPN N.O.			
NPN N.C.			
PNP N.O.			
PNP N.C.			

Figure 63 - 12 mm, 18 mm, and 30 mm 4-wire DC Complementary Wiring

NPN/PNP	Cable	M12 Micro Connector	M8 Pico Connector
NPN N.O. + N.C. Complementary			
PNP N.O. + N.C. Complementary			

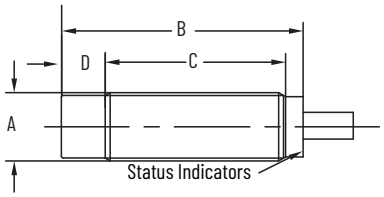
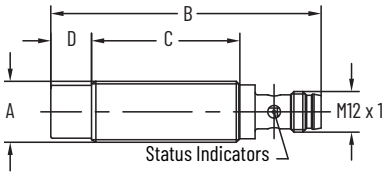
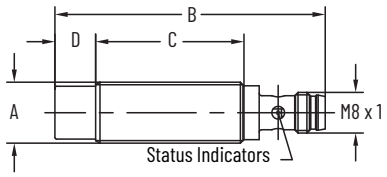
Approximate Dimensions

Table 13 - Standard Barrel Length

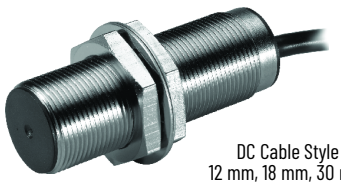
	Thread Size	Barrel Type	Smooth Diameter	Shielded	Dimensions [mm (in.)]			
					A	B (Max)	C (Min)	D (Max)
Cable Style	–	Nickel-plated brass	6.5 (1)	Yes	6.5 (0.26)	33 (1.3)	–	–
	M8 x 1		–	Yes	8 (0.31)	36.8 (1.45)	30.2 (1.19)	–
				No	–	35 (1.38)		5 (0.2)
	M12 x 1	White bronze-plated brass	–	Yes	12 (0.47)	53.2 (2.09)	47 (1.85)	–
				No		63.2 (2.49)	49 (1.93)	8 (0.31)
	M18 x 1		–	Yes	18 (0.71)	50 (1.97)	47 (1.85)	–
				No		60 (2.36)		10 (0.39)
	M30 x 1.5		–	Yes	30 (1.18)	51.2 (2.02)	48.2 (1.9)	–
				No		60 (2.36)	39 (1.54)	18 (0.71)
Micro QD Style	M8 x 1	Nickel-plated brass	–	Yes	8 (0.31)	55 (2.16)	30 (1.18)	–
				No		60 (2.36)		5 (0.2)
	M12 x 1	White bronze-plated brass	–	Yes	12 (0.47)	64.5 (2.54)	48.5 (1.91)	–
				No		74.5 (2.93)	50.5 (1.99)	8 (0.31)
	M18 x 1		–	Yes	18 (0.71)	66 (2.6)	47 (1.85)	–
				No		76 (2.99)		10 (0.39)
	M30 x 1.5		–	Yes	30 (1.18)	67.2 (2.65)	48.2 (1.9)	–
				No		76 (2.99)	39 (1.54)	18 (0.71)
Pico QD Style	–	Nickel-plated brass	6.5 (1)	Yes	6.5 (0.26)	49 (1.93)	–	–
	M8 x 1		–	Yes	8 (0.31)	50 (1.97)	35 (1.38)	–
				No		55 (2.16)		5 (0.2)
	M12 x 1	White bronze-plated brass	–	Yes	12 (0.47)	63 (2.48)	47 (1.85)	–
				No		73 (2.87)	49 (1.93)	8 (0.31)

(1) 6.5 mm diameter is standard only.

Table 14 - Short Barrel Length

	Thread Size	Barrel Type	Shielded	Dimensions [mm (in.)]			
				A	B (Max)	C (Min)	D (Max)
Cable Style	M8 x 1	Nickel-plated brass	Yes	8 (0.31)	25 (0.98)	25 (0.98)	–
			No		30(1.18)		5 (0.2)
	M12 x 1	White bronze-plated brass	Yes	12 (0.47)	38.2 (1.5)	32 (1.26)	–
			No		43.2 (1.7)	29 (1.14)	8 (0.31)
	M18 x 1		Yes	18 (0.71)	35 (1.38)	32 (1.26)	–
			No		45 (1.77)		10 (0.39)
	M30 x 1.5		Yes	30 (1.18)	36.2 (1.43)	33.2 (1.31)	–
			No		45 (1.77)	24 (0.94)	18 (0.71)
Micro Style	M8 x 1	Nickel-plated brass	Yes	8 (0.31)	45 (1.77)	20 (0.79)	–
			No		50 (1.97)		5 (0.2)
	M12 x 1	White bronze-plated brass	Yes	12 (0.47)	44.5 (1.75)	28.5 (1.12)	–
			No		54.5 (2.15)	30.5 (1.2)	8 (0.31)
	M18 x 1		Yes	18 (0.71)	46 (1.81)	27 (1.06)	–
			No		56 (2.2)		10 (0.39)
	M30 x 1.5		Yes	30 (1.18)	47.2 (1.86)	28.2 (1.11)	–
			No		61 (2.4)	24 (0.94)	18 (0.71)
Pico Style	M8 x 1	Nickel-plated brass	Yes	8 (0.31)	45 (1.77)	30 (1.18)	–
			No		50 (1.97)		5 (0.2)
	M12 x 1	White bronze-plated brass	Yes	12 (0.47)	43 (1.69)	27 (1.06)	–
			No		53 (2.09)	29 (1.14)	8 (0.31)

872C WorldProx 4-wire DC Complementary Output



DC Cable Style
12 mm, 18 mm, 30 mm

DC Micro Quick Disconnect Style
12 mm, 18 mm, 30 mm

Specifications

Attribute	12 mm, 18 mm, and 30 mm Diameters
Load current	≤ 200 mA
Leakage current	≤ 10 mA
Operating voltage	10...30V DC
Voltage drop	≤ 1.6V
Repeatability	≤ 8%
Hysteresis	≤ 10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload
Certifications	UL Listed, cUL Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6P, 12, 13, IP67 (IEC 529); Nickel-plated brass barrel
Housing material	Threaded nickel-plated brass barrel and plastic face
Connections	• Cable: 2 m (6.5 ft) length 4-conductor PVC • Quick disconnect: 4-pin micro style
Status indicator	Red: Output energized, 360° visibility
Operating temperature	-25...+70° C (-13...+158 °F)
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

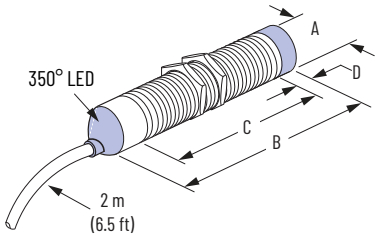
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.2...0.3

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Cable Style	M12 Micro QD Style
12 (0.47)	3 (0.12)	Yes	N.O. and N.C.	PNP	2000	872C-D3BP12-E2	872C-D3BP12-D4
18 (0.71)	5 (0.2)				1000	872C-D5BP18-E2	872C-D5BP18-D4
30 (1.18)	10 (0.39)				500	872C-D10BP30-E2	872C-D10BP30-D4
Recommended standard QD cordset: -2 = 2 m (6.5 ft)							889D-F4AC-2

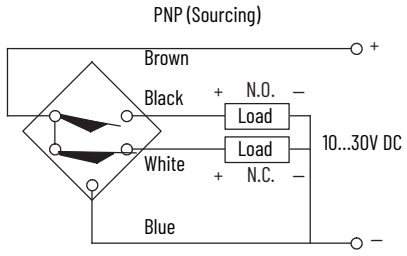
Approximate Dimensions

Cable Style



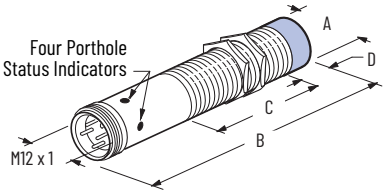
Wiring Diagrams

Complementary Normally Open or Normally Closed

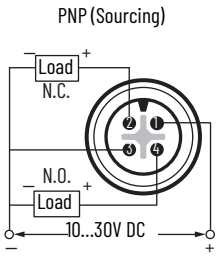


Thread Size	Shielded	Dimensions [mm (in.)]		
		A	B	C
M12 x 1	Yes	12 (0.47)	50.8 (2)	46.7 (1.84)
M18 x 1	Yes	18 (0.71)		
M30 x 1.5	Yes	30 (1.18)		

M12 Micro QD Style

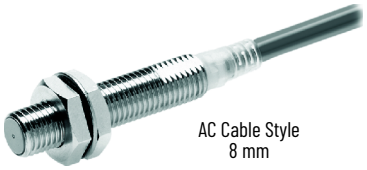


Normally Open



Thread Size	Shielded	Dimensions [mm (in.)]		
		A	B	C
M12 x 1	Yes	12 (0.47)	65 (2.56)	38.1 (1.5)
M18 x 1	Yes	18 (0.71)		
M30 x 1.5	Yes	30 (1.18)		48.7 (1.88)

872C WorldProx 2-wire AC



AC Cable Style
8 mm

AC Cable Style
12 mm, 18 mm, 30 mm

Mini Quick Disconnect Style
18 mm, 30 mm

AC Micro Quick Disconnect Style
12 mm, 18 mm, 30 mm

Specifications

Attribute	8 mm	12 mm, 18 mm, and 30 mm
Load current	100 mA, max	≤ 300 mA
Minimum Load current	5 mA	
Inrush current (1 cycle)	≤ 2 A	
Leakage current	≤ 2 mA	
Operating voltage	20...240V AC	20...250V AC
Voltage drop	≤ 5V	
Repeatability	≤ 5%	
Hysteresis	15%	≤ 15% typical
Protection type	False pulse, transient noise, and overload	
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 4, 12, 13 IP67 (IEC 529) Nickel-plated brass barrel	
Housing material	Threaded nickel-plated brass barrel and plastic face	
Connections	• Cable: 2 m (6.5 ft) length 3-conductor PVC • Quick disconnect: 3-pin micro style, 3-pin mini style	
Status indicator	Red: Output energized, 360° visibility	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g, 11 ms	
Vibration	55 Hz, 1 mm amplitude, 3 planes	

Correction Factors

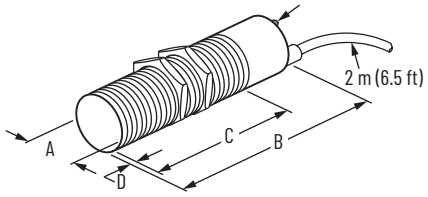
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.9
Brass	0.5
Aluminum	0.45
Copper	0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.		
					Cable Style	Mini QD Style	Micro QD Style
8 (0.31)	1.5 (0.06)	Yes	N.O.	25	872C-A1N8-A2	–	–
			N.C.		872C-A1C8-A2	–	–
	2 (0.08)	No	N.O.		872C-A2N8-A2	–	–
			N.C.		872C-A2C8-A2	–	–
12 (0.47)	2 (0.08)	Yes	N.O.	15	872C-A2N12-A2	–	872C-A2N12-R3
			N.C.		872C-A2C12-A2	–	872C-A2C12-R3
	4 (0.16)	No	N.O.		872C-A4N12-A2	–	872C-A4N12-R3
			N.C.		872C-A4C12-A2	–	872C-A4C12-R3
18 (0.71)	5 (0.2)	Yes	N.O.	15	872C-A5N18-A2	872C-A5N18-N3	872C-A5N18-R3
			N.C.		872C-A5C18-A2	872C-A5C18-N3	872C-A5C18-R3
	10 (0.39)	No	N.O.		872C-A10N18-A2	872C-A10N18-N3	872C-A10N18-R3
			N.C.		872C-A10C18-A2	872C-A10C18-N3	872C-A10C18-R3
30 (1.18)	10 (0.39)	Yes	N.O.	15	872C-A10N30-A2	872C-A10N30-N3	872C-A10N30-R3
			N.C.		872C-A10C30-A2	872C-A10C30-N3	872C-A10C30-R3
	15 (0.59)	No	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

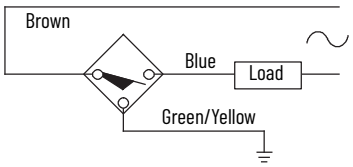
Approximate Dimensions

Cable Style

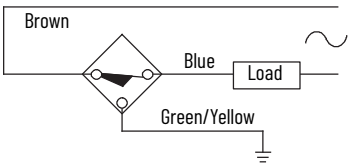


Wiring Diagrams

Normally Open



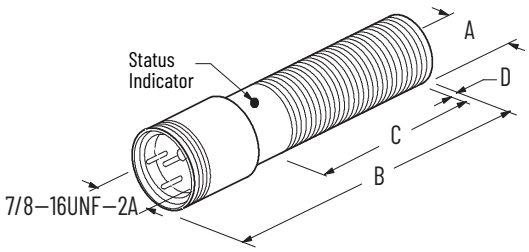
Normally Closed



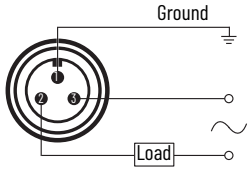
IMPORTANT Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M8 x 1	Yes	8 (0.32)	47 (1.85)	36 (1.42)	–
	No	6 (0.24)	47 (1.85)	36 (1.42)	6 (0.24)
M12 x 1	Yes	12 (0.47)	70 (2.76)	60 (2.36)	–
	No			54 (2.13)	6 (0.24)
M18 x 1	Yes	18 (0.71)	60 (2.36)	50 (1.96)	–
	No			42 (1.65)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	60 (2.36)	50 (1.96)	–
	No			38 (1.5)	12 (0.47)

Mini QD Style



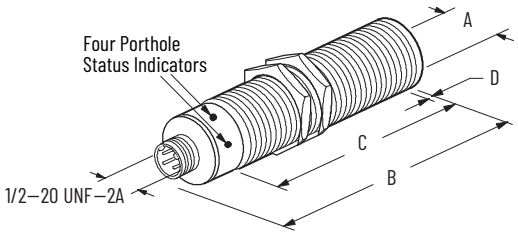
Normally Open or Normally Closed



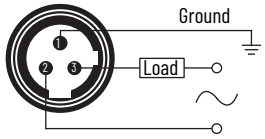
IMPORTANT Load can be switched to pin 3.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M18 x 1	Yes	18 (0.71)	91 (3.58)	52 (2.05)	–
	No			44 (1.73)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	91 (3.58)	52 (2.25)	–
	No			40 (1.57)	12 (0.47)

Micro QD Style



Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 2.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	75 (2.95)	45 (1.77)	–
	No			40 (1.57)	6 (0.24)
M18 x 1	Yes	18 (0.71)	80 (3.15)	60 (2.36)	–
	No			52 (2.05)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	80 (3.15)	50 (1.96)	–
	No			38 (1.5)	12 (0.47)

872C WorldProx 2-wire AC - Extended Sensing

AC Cable Style
12 mm, 18 mm, 30 mm

Mini Quick Disconnect Style
18 mm, 30 mm

AC Micro Quick Disconnect Style
12 mm, 18 mm, 30 mm

Specifications

Attribute	12 mm, 18 mm, and 30 mm
Load current	≤ 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 at 10 mA, ≤ 7V at 300 mA
Repeatability	≤ 5%
Hysteresis	≤ 10% typical
Protection type	False pulse, transient noise, and overload
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 12, 13 IP67 (IEC 529) Nickel-plated brass barrel
Housing material	Threaded nickel-plated brass barrel and plastic face
Connections	• Cable: 2 m (6.5 ft) length 3-conductor PVC • Quick disconnect: 3-pin micro style, 3-pin mini style
LED (light-emitting diode)	Red: Output energized, 360° visibility
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

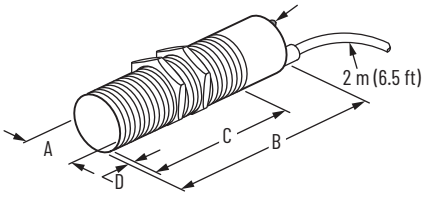
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.9
Brass	0.5
Aluminum	0.45
Copper	0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.		
					Cable Style	Mini QD Style	Micro QD Style
12 (0.47)	4 (0.16)	Yes	N.O.	20	872C-F4N12-A2	—	872C-F4N12-R3
			N.C.		872C-F4C12-A2	—	872C-F4C12-R3
	8 (0.31)	No	N.O.		872C-G8N12-A2	—	872C-G8N12-R3
			N.C.		872C-G8C12-A2	—	872C-G8C12-R3
18 (0.71)	8 (0.31)	Yes	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)	No	N.O.		872C-G12N18-A2	872C-G12N18-N3	872C-G12N18-R3
			N.C.		872C-G12C18-A2	872C-G12C18-N3	872C-G12C18-R3
30 (1.18)	15 (0.59)	Yes	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)	No	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

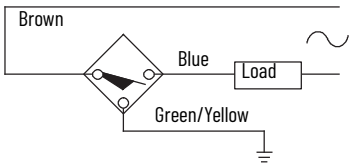
Approximate Dimensions

Cable Style

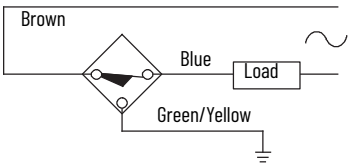


Wiring Diagrams

Normally Open



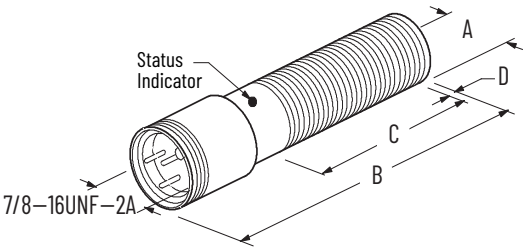
Normally Closed



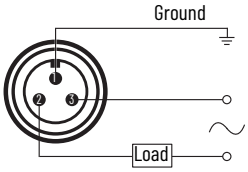
IMPORTANT Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	70 (2.76)	60 (2.36)	–
	No			54 (2.13)	6 (0.24)
M18 x 1	Yes	18 (0.71)	60 (2.36)	50 (1.96)	–
	No			42 (1.65)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	60 (2.36)	50 (1.96)	–
	No			38 (1.5)	12 (0.47)

Mini QD Style



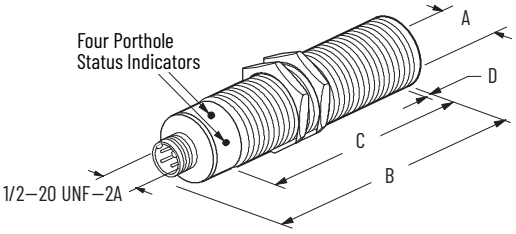
Normally Open or Normally Closed



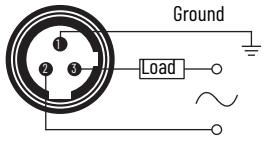
IMPORTANT Load can be switched to pin 3.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M18 x 1	Yes	18 (0.71)	91 (3.58)	52 (2.05)	–
	No			44 (1.73)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	91 (3.58)	52 (2.25)	–
	No			40 (1.57)	12 (0.47)

Micro QD Style



Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 2.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	75 (2.95)	45 (1.77)	–
	No			40 (1.57)	6 (0.24)
M18 x 1	Yes	18 (0.71)	80 (3.15)	60 (2.36)	–
	No			52 (2.05)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	80 (3.15)	50 (1.96)	–
	No			38 (1.5)	12 (0.47)

872C WorldProx 2-wire AC/DC

AC Cable Style
12 mm, 18 mm, 30 mm

AC Micro Quick Disconnect Style
12 mm, 18 mm, 30 mm

Specifications

Attribute	12 mm	18 mm and 30 mm
Load current	300 mA	350 mA
Minimum Load current	2 mA	
Inrush current (1 cycle)	≤ 2 A	
Leakage current	≤ 1.7 mA at 120V and ≤ 1.9 mA at 250V	
Operating voltage	20...250V AC/DC	
Voltage drop	≤ 5V	
Repeatability	≤ 5%	
Hysteresis	≤ 10% typical	
Protection type	False pulse, transient noise, short circuit, and overload	
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 1, 2, 3, 4, 12, 13 IP67 (IEC 529) Nickel-plated brass barrel	
Housing material	Threaded nickel-plated brass barrel and plastic face	
Connections	Cable: 2 m (6.5 ft) length 3-conductor PVC Quick disconnect: 3-pin micro style	
Status indicator	Red: Output energized, 360° visibility	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock and Vibration	30 g, 10...55 Hz	

Correction Factors

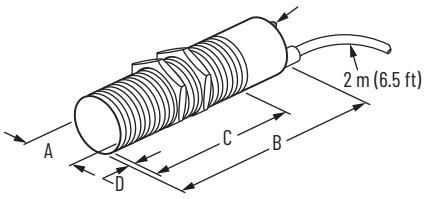
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.9
Brass	0.5
Aluminum	0.4
Copper	0.4

Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
					Cable Style	Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	30	872C-J2N12-A2	872C-J2N12-R3
	4 (0.16)	No			872C-K4N12-A2	872C-K4N12-R3
18 (0.71)	5 (0.2)	Yes			872C-J5N18-A2	872C-J5N18-R3
	8 (0.32)	No			872C-K8N18-A2	872C-K8N18-R3
30 (1.18)	10 (0.39)	Yes			872C-J10N30-A2	872C-J10N30-R3
	15 (0.59)	No			872C-K15N30-A2	872C-K15N30-R3
Recommended standard QD cordset: -2 = 2 m (6.5 ft)						889R-F3ECA-2

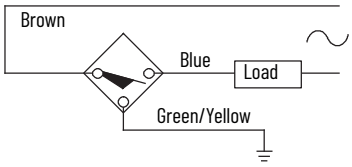
Approximate Dimensions

Cable Style



Wiring Diagrams

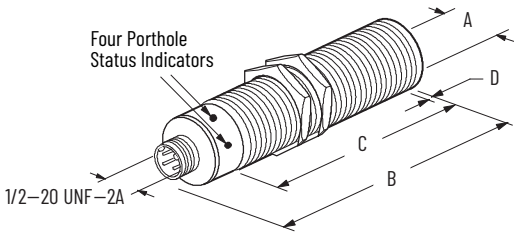
Normally Open



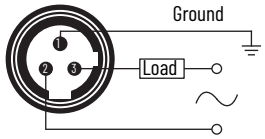
IMPORTANT Load can be switched to brown wire.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	70 (2.76)	60 (2.36)	–
	No			54 (2.13)	6 (0.24)
M18 x 1	Yes	18 (0.71)	60 (2.36)	50 (1.96)	–
	No			42 (1.65)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	60 (2.36)	50 (1.96)	–
	No			38 (1.5)	12 (0.47)

Micro QD Style



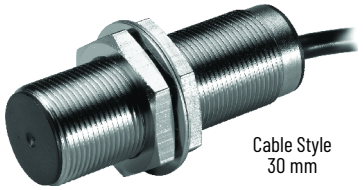
Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 2.

Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B	C	D
M12 x 1	Yes	12 (0.47)	75 (2.95)	45 (1.77)	–
	No			40 (1.57)	6 (0.24)
M18 x 1	Yes	18 (0.71)	80 (3.15)	60 (2.36)	–
	No			52 (2.05)	8 (0.31)
M30 x 1.5	Yes	30 (1.18)	80 (3.15)	50 (1.96)	–
	No			38 (1.5)	12 (0.47)

872C WorldProx 2-wire AC/DC Relay Output



Specifications

Attribute	30 mm
Load current	Switched power, max: 84 W or 900V A Switched current, max: 3 A SPDT Switched voltage, max: 28V DC or 300V AC Relay life: 20,000,000 operations (no load), 100,000 operations (full load)
Operating voltage	30...132V AC/DC
Repeatability	≤ 10% at constant temperature
Hysteresis	10% typical
Protection type	False pulse, transient noise, and reverse polarity
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 3R 4, 4X, 6, 6P, 12, 13, IP67 (IEC 529); Nickel-plated brass barrel
Housing material	Threaded nickel-plated brass barrel
Connections	Cable: 2 m (6.5 ft) length 5-conductor 22 AWG PVC cable
Status indicator	Red: Output energized, 360° visibility
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g, 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

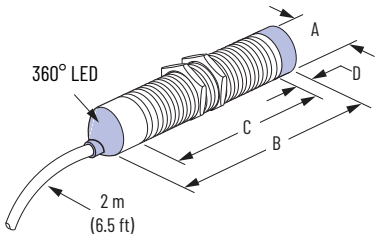
Target Material	Correction Factor
Steel	1.0
Stainless steel	0.7...0.8
Brass	0.4...0.5
Aluminum	0.3...0.4
Copper	0.2...0.3

Product Selection

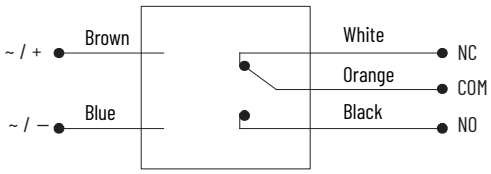
Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
30 mm	10 (0.39)	Yes	SPDT Relay	100	872C-B10BR30-E2
	15 (0.59)	No			872C-B15BR30-E2

Approximate Dimensions

Cable Style



Wiring Diagrams



Thread Size	Shielded	Dimensions [mm (in.)]			
		A	B (Max)	C (Min)	D (Max)
M30 x 1.5	Yes	30 (1.18)	61 (2.4)	57 (2.24)	–
	No		73 (2.87)		12.2 (0.48)

802PR 2-wire AC, High-output Rectangular Sensors

802PR AC Conduit Style

802PR AC Cable Style

802PR Mini QD Style

Specifications

Attribute	802PR Top Sensing and Side-sensing Limit Switch Style
Load current	≤ 1 A at 40 °C (104 °F) linearly de-rated to 0.5 A at 75 °C (167 °F)
Inrush current	≤ 10 A/1 s
Current consumption	25 mA, min
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
Protection type	False pulse, transient noise
Certifications	UL Listed, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 4X, 12, 13, IP65 (IEC529)
Housing material	Self-extinguishing glass-reinforced polyester body
Connection type	• Cable: 2.4 m (8 ft) or 3.7 m (12 ft) length, 2-conductor 16 AWG STO (oil-resistant thermoplastic) • Quick disconnect: 3-pin mini • Conduit opening or conduit coupler: 1/2…14 NPT internal thread with screw terminals (use 18…14 AWG wire)
Status indicator	Red: Output energized
Operating temperature	-25…+75 °C (-13…+167 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.8…0.85
Brass	0.5…0.55
Aluminum	0.45…0.5
Copper	0.4…0.45

Product Selection

Table 15 - Cable Style

Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Voltage Range	Output Configuration	Corrosion-resistant	Switching Frequency [Hz]	Cable Length [m (ft.)]	Cat. No.
Side	13 (0.51)	Yes	60...132V AC	Selectable (factory preset to N.O.)	No	20	2.5 (8)	802PR-LABM2-08
							3.6 (12)	802PR-LABM2-12
Top							2.5 (8)	802PR-LABR2-08
							3.6 (12)	802PR-LABR2-12
Side				Selectable (factory preset to N.C.)			2.5 (8)	802PR-LACM2-08
							3.6 (12)	802PR-LACM2-12
Top							2.5 (8)	802PR-LACR2-08
							3.6 (12)	802PR-LACR2-12
Side			102...132V AC	N.O.	No	16	2.5 (8)	802PR-LAAM1-08
							3.6 (12)	802PR-LAAM1-12
Top							2.5 (8)	802PR-LAAR1-08
							3.6 (12)	802PR-LAAR1-12
Side					Yes		2.5 (8)	802PR-XAAM1-08
							3.6 (12)	802PR-XAAM1-12
Top							2.5 (8)	802PR-XAAR1-08
							3.6 (12)	802PR-XAAR1-12

Table 16 - Mini QD Style

Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Voltage Range	Output Configuration	Switching Frequency [Hz]	Cat. No.
Side	13 (0.51)	Yes	60...132V AC	Selectable (factory preset to N.O.)	20	802PR-LABE2
Top						802PR-LABK2
Side				Selectable (factory preset to N.C.)		802PR-LACE2
Top						802PR-LACK2
Side			102...132V AC	N.O.	16	802PR-LAAE1
Top						802PR-LAAK1
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)						889N-F3AFC-6F

Table 17 - Conduit Style

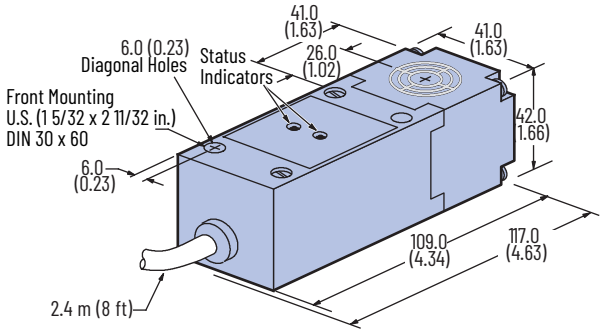
Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Voltage Range	Output Configuration	Corrosion-resistant	Switching Frequency [Hz]	Connection	Cat. No.
Side	13 (0.51)	Yes	60...132V AC	Selectable (factory preset to N.O.)	No	20	Conduit coupler	802PR-LABA2
							Threaded 1/2-14 NPT[1]	802PR-LABB2
Top							Conduit coupler	802PR-LABJ2
							Threaded 1/2-14 NPT[1]	802PR-LABH2
Side				Selectable (factory preset to N.C.)			Conduit coupler	802PR-LACA2
							Threaded 1/2-14 NPT[1]	802PR-LACB2
Top							Conduit coupler	802PR-LACJ2
							Threaded 1/2-14 NPT[1]	802PR-LACH2
Side			102...132V AC	N.O.	No	16	Conduit coupler	802PR-LAAA1
							Threaded 1/2-14 NPT[1]	802PR-LAAB1
Top							Conduit coupler	802PR-LAAJ1
							Threaded 1/2-14 NPT[1]	802PR-LAAH1
Side					Yes		Threaded 1/2-14 NPT[1]	802PR-XAAB1
Top								802PR-XAAH1

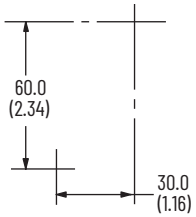
(1) To order ISO 20-1.5, add S6 to the end of the catalog number. Example: Cat. No. 802PR-LABB2 becomes Cat. No. 802PR-LABB2-S6.

Approximate Dimensions

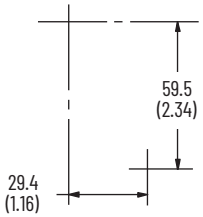
Cable Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.





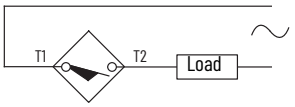
Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws



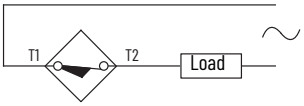
Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

Wiring Diagrams

Normally Open

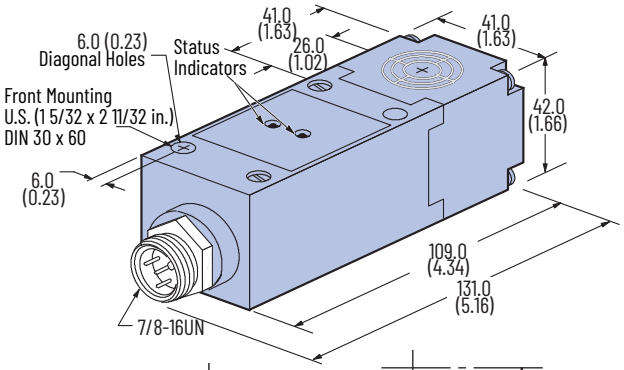


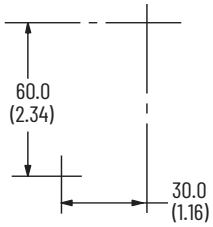
Wiring Diagrams



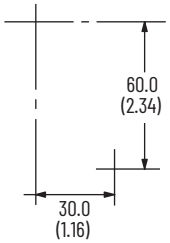
IMPORTANT Load can be switched to white lead.

Mini QD Style



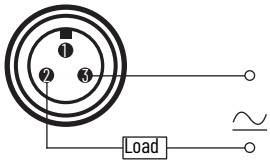


Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws



Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

Normally Open or Normally Closed



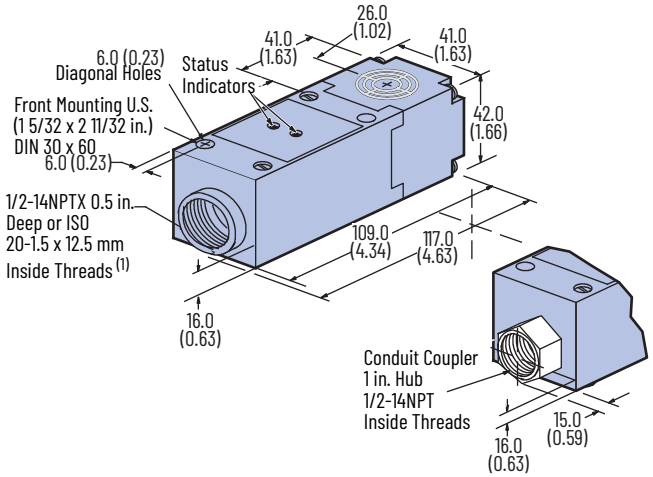
IMPORTANT Load can be switched to pin 3.

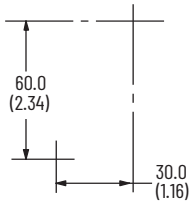
IMPORTANT
- Side sensing model heads can be turned in 90° increments to accommodate four side-sensing positions.
- Low voltage models have two status indicators.

Approximate Dimensions

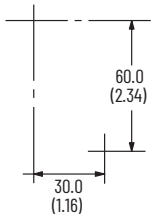
Conduit Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.





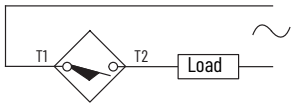
Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws



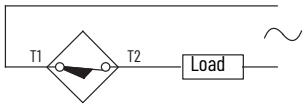
Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

Wiring Diagrams

Normally Open



Normally Closed



IMPORTANT Load can be switched to terminal 1.

(1) For ISO 20-1.5 x 12.5 mm inside threads, add -S6 to the catalog number. Example: Cat. No. 802PR-LABB2 becomes Cat. No. 802PR-LABB2-S6.

IMPORTANT
- Side sensing model heads can be turned in 90° increments to accommodate four side-sensing positions.
- Low voltage models have two status indicators.

802PR 2-wire AC Hazardous Location, High-output Rectangular Sensors

802PR 2-wire AC Hazardous Location Conduit Style

Specifications

Attribute	802PR Top Sensing and Side-sensing Limit Switch Style
Load current	≤ 1 A at 40 °C (104 °F) linearly derated to 0.5 A at 75 °C (167 °F)
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) Division 2 Class I: Groups A, B, C, and D; Class II: Groups F and G; Class III: All groups
Housing material	Self-extinguishing glass-reinforced polyester body
Connection type	Conduit coupler: 1/2-14NPT internal thread with screw terminals (use 18...14 AWG wire)
Status indicator	Red: Output energized
Operating temperature	-25...+75 °C (-13...+167 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.8...0.85
Brass	0.5...0.55
Aluminum	0.45...0.5
Copper	0.4...0.45

Product Selection

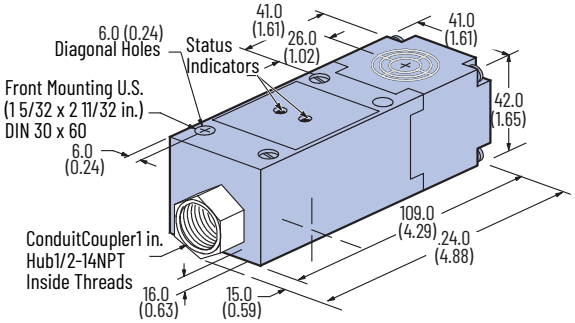
Table 18 - Conduit Style

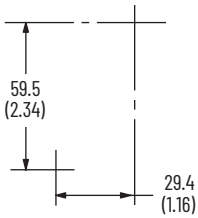
Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
Side	13 (0.51)	Yes	N.O.	16	802PR-LAAA3
Top					802PR-LAAJ3

Approximate Dimensions

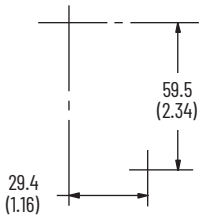
Conduit Style (1)

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.





Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws



Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38) Deep
(LB Version Only)

(1) Side sensing model heads can be turned in 90° increments to accommodate four side-sensing positions.

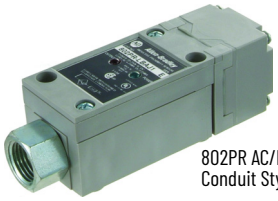
IMPORTANT The sensor output is designed and approved as Intrinsically Safe for use in Division 1, 2; Class I, II, III; Groups A, B, C, D, E, F, G hazardous location areas when used with a Cat. No. 937ZH-DPBN-1 or 937ZH-DPDP-2 Intrinsically Safe Zener Barrier. Installation must be in accordance with the National Electrical Code, ANSI/ISA RP12.6, or per other regulations by the authority having jurisdiction over the installation site as appropriate.

802PR 2-wire AC/DC Rectangular Sensors

802PR AC/DC Cable Style

802PR AC Micro
Quick Disconnect Style

802PR AC/DC Mini
Quick Disconnect Style



802PR AC/DC
Conduit Style

Specifications

Attribute	802PR Top Sensing and Side-sensing Limit Switch Style
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, CSA Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 4X, 12, 13, IP65 (IEC529)
Housing material	Self-extinguishing glass-reinforced polyester body
Connection type	• Cable: 2.4 m (8 ft) length, 2-conductor ToughLink™ • Quick disconnect: 3-pin micro style, 3-pin mini style • Conduit opening or conduit coupler: Internal thread with screw terminals (use 18…14 AWG wire)
Status indicator	• Green: Power • Red: Output energized (both on in SCP/overload)
Operating temperature	-25…+75 °C (-13…+167 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9
Brass	0.8
Aluminum	0.75
Copper	0.7

Product Selection

Table 19 - Cable Style

Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cable Length [m (ft)]	Corrosion-resistant	Cat. No.
Side	17 (0.67)	Yes	N.O.	20	2.5 (8)	Yes	802PR-XBAM1-08
						No	802PR-LBAM1-08
					3.6 (12)	Yes	802PR-XBAM1-12
						No	802PR-LBAM1-12
Top	17 (0.67)	Yes	N.O.	20	2.5 (8)	Yes	802PR-XBAR1-08
						No	802PR-LBAR1-08
					3.6 (12)	Yes	802PR-XBAR1-12
						No	802PR-LBAR1-12

Table 20 - Mini QD Style

Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
Side	17 (0.67)	Yes	N.O.	20	802PR-LBAE1
Top					802PR-LBAK1
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)					889N-F3AFC-6F

Table 21 - Micro QD Style

Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
Side	17 (0.67)	Yes	N.O.	20	802PR-LBAC1
Top					802PR-LBAF1
Recommended cordset: 2 m (6.5 ft) 3-pin AC micro					889R-F3ECA-2

Table 22 - Conduit Style

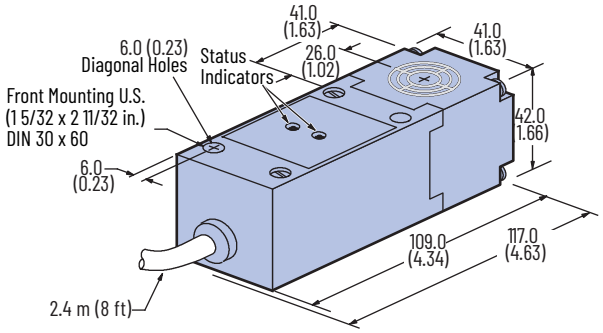
Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Corrosion-resistant	Connection	Cat. No.
Side	17 (0.67)	Yes	N.O.	20	Yes	Threaded 1/2-14 NPT (1)	802PR-XBAB1
					No		802PR-LBAB1
					No	Conduit coupler	802PR-LBAA1
Top	17 (0.67)	Yes	N.O.	20	Yes	Threaded 1/2-14 NPT (1)	802PR-XBAH1
					No		802PR-LBAH1
					No	Conduit coupler	802PR-LBAJ1

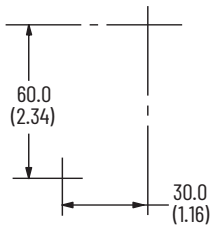
(1) To order ISO 20-1.5, add S6 to the end of the catalog number. Example: Cat. No. 802PR-LABB2 becomes Cat. No. 802PR-LABB2-S6.

Approximate Dimensions

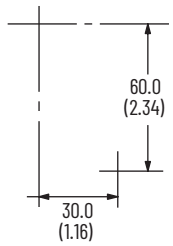
Cable Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



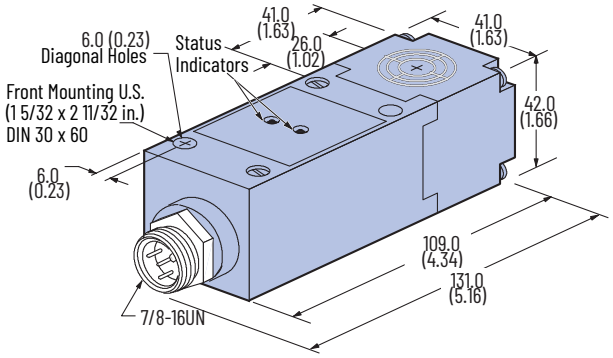


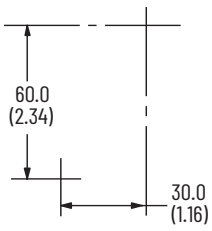
Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws



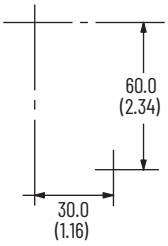
Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

Mini QD Style





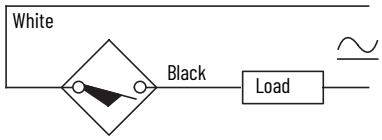
Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws



Rear Mounting Hole Pattern Front View
Two #10-2 Tapped Holes 9.5 (0.38) Deep
(LB Version Only)

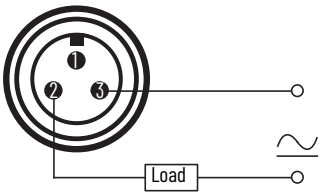
Wiring Diagrams

Normally Open



IMPORTANT Load can be switched to white lead.

Normally Open

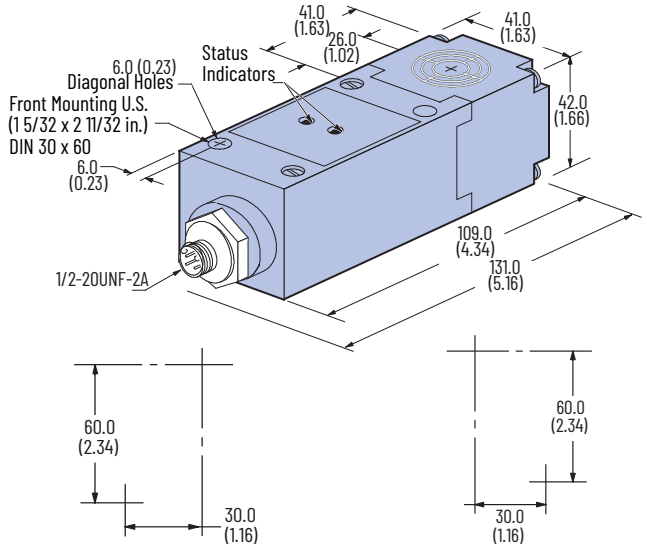


IMPORTANT Load can be switched to pin 3.

Approximate Dimensions

Micro Style

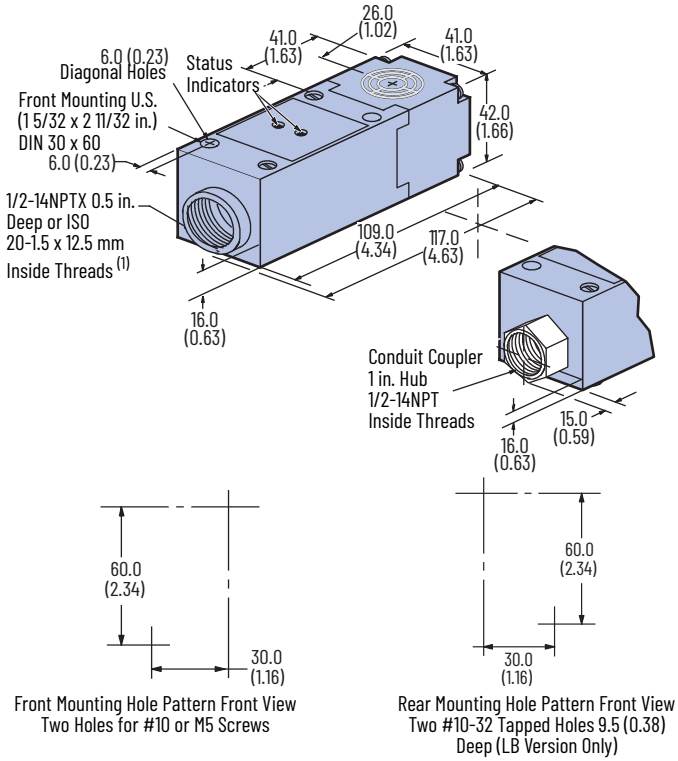
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws

Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

Conduit QD Style

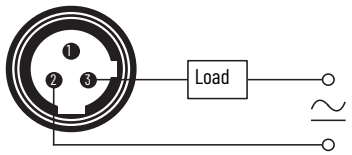


Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws

Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

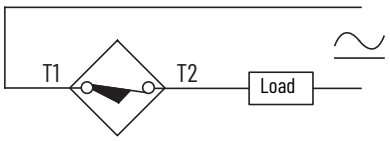
Wiring Diagrams

Normally Open



IMPORTANT Load can be switched to pin 2.

Normally Open

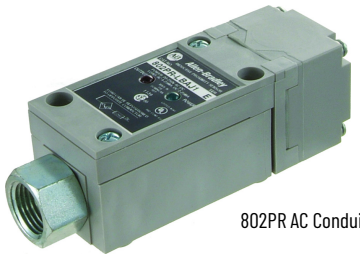


IMPORTANT Load can be switched to terminal 1.

(1) For ISO 20-1.5 x 12.5 mm inside threads, add -S6 to the catalog number. Example: Cat. No. 802PR-XBAB1 becomes Cat. No. 802PR-XBAB1-S6.

IMPORTANT Side sensing model heads can be turned in 90° increments to accommodate four side-sensing positions.

802PR 2-wire AC/DC Hazardous Location Rectangular Sensors



802PR AC Conduit Style

Specifications

Attribute	802PR Top Sensing and Side-sensing Limit Switch Style
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); Division 2 Class I: Groups A, B, C, and D; Class II: Groups F and G; Class III: All groups
Housing material	Self-extinguishing glass-reinforced polyester body
Connection type	Conduit Coupler: 1/2 - 14 NPT internal thread with screw terminals, use 18…14 AWG wire
Status indicator	• Green: Power • Red: Output energized (both on in SCP/overload)
Operating temperature	-25…+75 °C (-13…+167 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.9
Brass	0.8
Aluminum	0.75
Copper	0.7

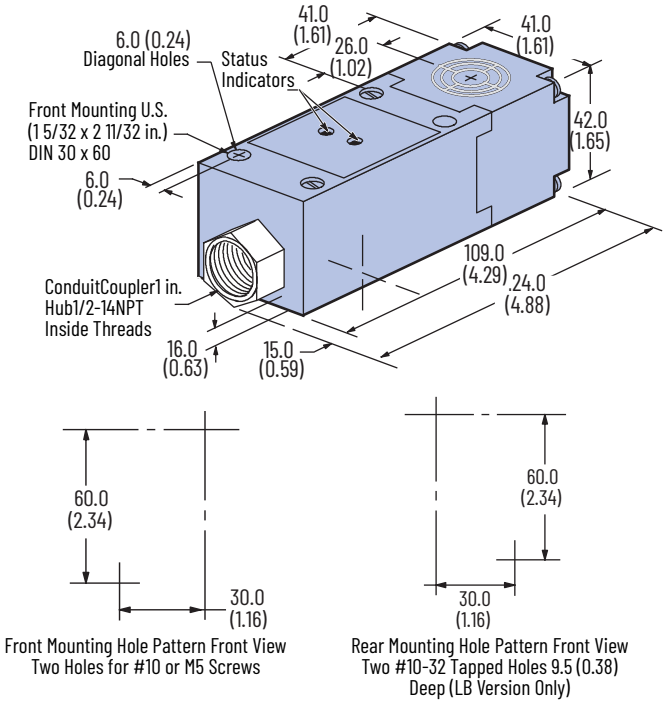
Product Selection

Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
					Conduit Style
Side	17 (0.67)	Yes	N.O.	20	802PR-LBAA3
Top					802PR-LBAJ3

Approximate Dimensions

Conduit Style[1]

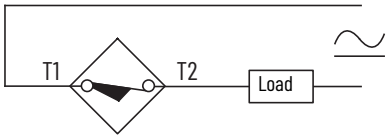
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



Front Mounting Hole Pattern Front View
Two Holes for #10 or M5 Screws

Rear Mounting Hole Pattern Front View
Two #10-32 Tapped Holes 9.5 (0.38)
Deep (LB Version Only)

Wiring Diagrams

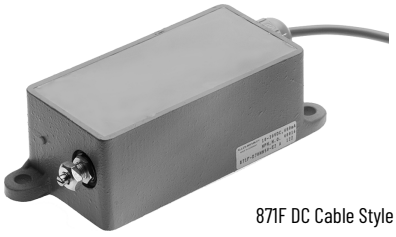


IMPORTANT Load can be switched to terminal 1.

(1) Side sensing model heads can be turned in 90° increments to accommodate four side-sensing positions.

IMPORTANT The sensor output is designed and approved as Intrinsically Safe for use in Division 1, 2; Class I, II, III; Groups A, B, C, D, E, F, G hazardous location areas when used with a Cat. No. 937ZH-DPBN-1 or 937ZH-DPDP-2 Intrinsically Safe Zener Barrier. Installation must be in accordance with the National Electrical Code, ANSI/ISA RP12.6, or per other regulations by the authority having jurisdiction over the installation site as appropriate.

871F 3-wire DC Rectangular Sensors



871F DC Cable Style

871F DC M12 Micro
Quick Disconnect Style

Specifications

Attribute	871F Block Style
Load current	≤ 400 mA
Load current, min	1 mA
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 2.4V
Repeatability	≤ 10%
Hysteresis	≤ 15% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 12, 13; IP67 (IEC529)
Housing material	Aluminum body
Connection type	• Cable: 2 m (6.5 ft) length, 3-conductor PVC • Quick disconnect: 4-pin M12 micro style
Status indicators	Orange: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 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

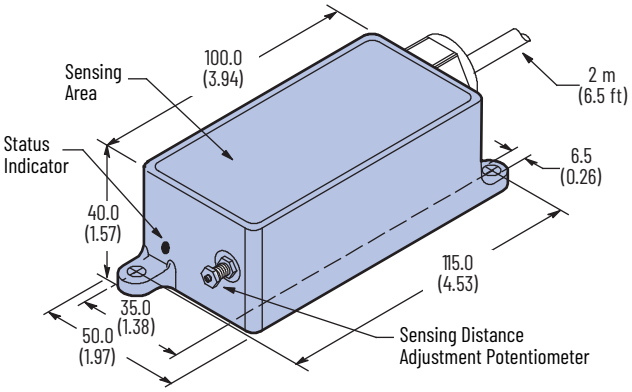
Product Selection

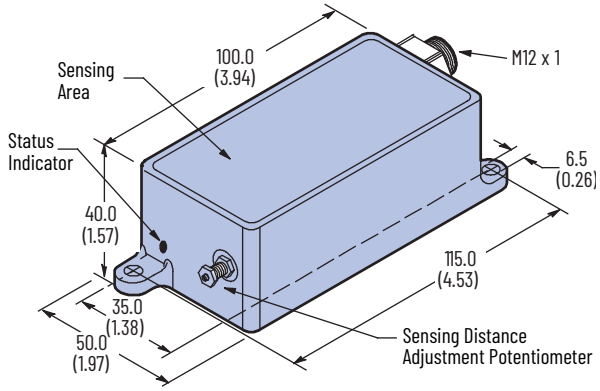
Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Cable Style	M12 Micro QD Style
50 (1.97)	70 (2.96)	No	N.O.	NPN	300	871F-D70NN50-E2	871F-D70NN50-D4
				PNP		871F-D70NP50-E2	871F-D70NP50-D4
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)							889D-F4AC-2

Approximate Dimensions

Cable Style

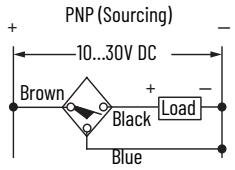
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

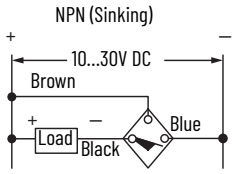


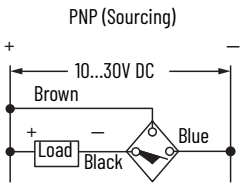


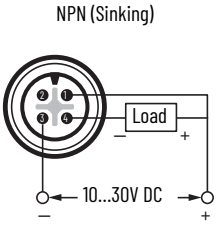
Wiring Diagrams

Normally Open









871F 4-wire DC Complementary Output Rectangular Sensors

871F DC Mini
Quick Disconnect Style

871F DC M12 Micro
Quick Disconnect Style

Specifications

Attribute	871F Flat Pack Style
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, CE Marked for all applicable all directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6, 6P, 12 and 13; IP67 (IEC529), 1200 psi (8270 kPa) washdown; M12 micro connector versions also meet IP69K (IEC529)
Connection type	• Quick disconnect: 4-pin mini, 4-pin M12 micro • Conduit opening: 1/2 - 14NPT thread, PG 13.5 thread
Status indicator	• Green: Power • Orange: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 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

Product Selection

Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.			
						Mini QD Style	M12 Micro QD Style	Conduit 1/2 NPT	Conduit PG13.5
83 (3.27)	50 (1.97) (1)	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	—	—

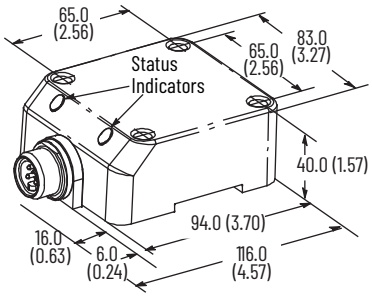
(1) Must be fully embedded in mild steel to achieve maximum sensing distance.

871F
Flat Pack

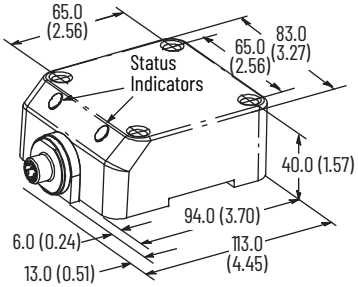
Approximate Dimensions

Mini QD Style

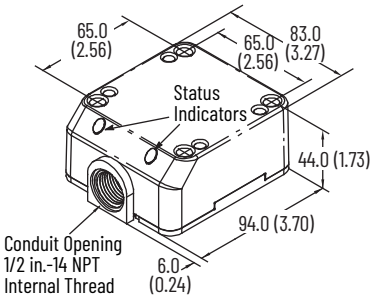
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



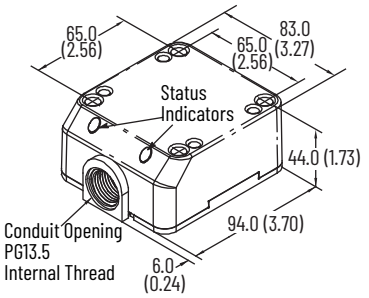
M12 Micro QD Style



Conduit Style 1/2 in. NPT



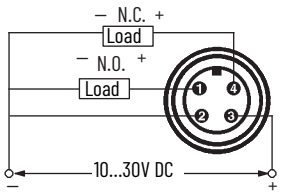
Conduit Style PG13.5



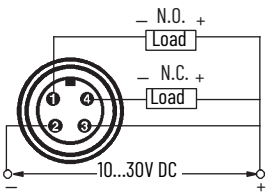
Wiring Diagrams

Complimentary Normally Open and Closed Outputs

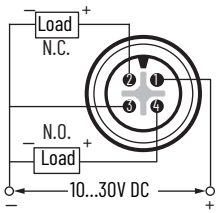
PNP (Sourcing)



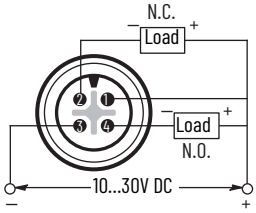
NPN (Sinking)



PNP (Sourcing)



NPN (Sinking)



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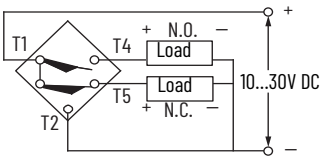

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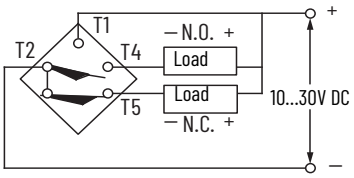
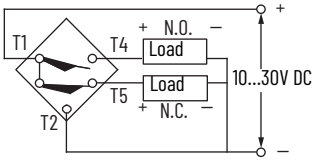
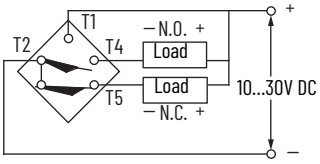


PNP (Sourcing)



NPN (Sinking)



871F 2-wire AC/DC Rectangular Sensors

871F AC/DC
Cable Style

871F DC Mini
Quick Disconnect Style

871F DC Micro
Quick Disconnect Style

Specifications

Attribute	871F Flat Pack Style
Load current, max	100 mA
Load current, min	5 mA
Leakage current	≤ 1.7 mA at 120V; ≤ 2 mA at 250V
Operating voltage	20...250V AC/DC
Voltage drop	≤ 10V
Repeatability	≤ 5%
Hysteresis	≤ 10% typical
Protection type	False pulse, transient noise, short circuit, and overload
Certifications	cULus Listed, CE Marked for all applicable all directives, and UKCA Marked for all applicable regulations
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 • Quick disconnect: 3-pin mini style, 3-pin micro style • Conduit opening: 1/2 - 14NPT thread, PG 13.5 thread
Status indicator	• Green: Power • Orange: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 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

Product Selection

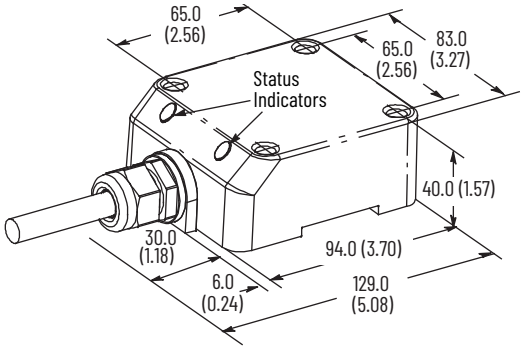
Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Config.	Switching Frequency [Hz]	Cat. No.				
					ToughLink Cable	Mini QD Style	Micro QD Style	Conduit 1/2 NPT	Conduit PG13.5
83 (3.27)	50 (1.97) (1)	Yes	N.O.	10	871F-R50N8O-C2	871F-R50N8O-N3	871F-R50N8O-R3	871F-R50N8O-T2	871F-R50N8O-Q2
	65 (2.56)	No			871F-K65N8O-C2	871F-K65N8O-N3	871F-K65N8O-R3	871F-K65N8O-T2	871F-K65N8O-Q2
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)						889N-F3AFC-6F	889R-F3ECA-2	—	—

(1) Must be fully embedded in mild steel to achieve maximum sensing distance.

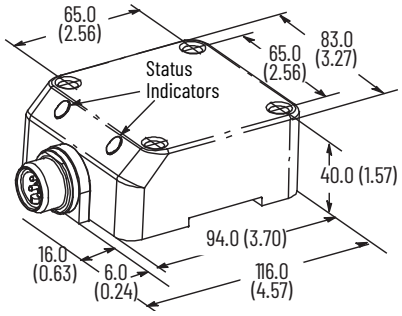
Approximate Dimensions

Cable Style

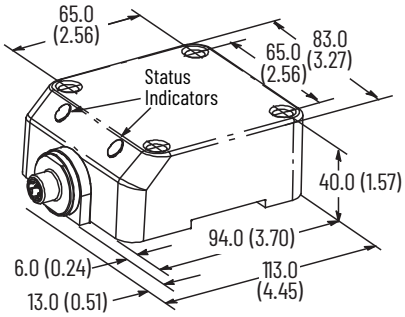
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



Mini Style

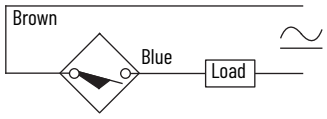


Micro QD Style



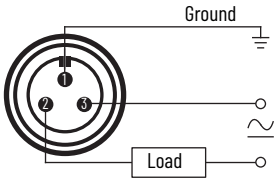
Wiring Diagrams

Normally Open

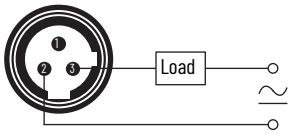


IMPORTANT Load can be switched to brown wire.

Normally Open



IMPORTANT Load can be switched to pin 3.

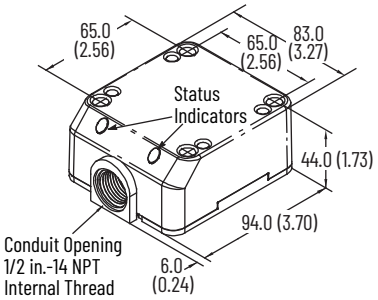


IMPORTANT Load can be switched to pin 2.

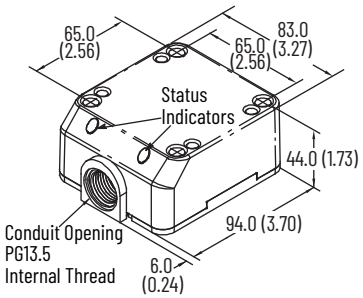
Approximate Dimensions

Conduit Style 1/2 in. NPT

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

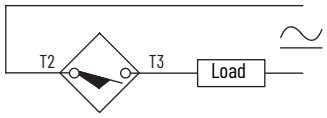


Conduit Style PG13.5



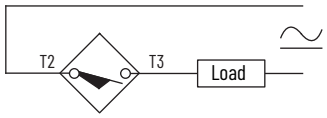
Wiring Diagrams

Normally Open



IMPORTANT Load can be switched to terminal 2.

Normally Open



IMPORTANT Load can be switched to terminal 2.

871F 3-wire DC Weld Field Immune Rectangular Sensors

871F DC Mini
Quick Disconnect Style

871F DC M12 Micro
Quick Disconnect Style

Specifications

Attribute	871F Flat Pack Style
Load current	≤ 200 mA
Load current, min	1 mA
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 2.5V
Repeatability	≤ 5%
Hysteresis	≤ 5% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload weld field immunity 1600 Gauss
Certifications	cULus Listed, CE Marked for all applicable all directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6, 6P, 12 and 13; IP67 (IEC529), 1200 psi (8270 kPa) washdown; M12 micro connector versions also meet IP69K (IEC529)
Housing material	Valox
Connection type	Quick disconnect: 4-pin mini style, 4-pin M12 micro style
Status indicator	• Green: Power • Orange: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	5 g (0.18 oz)
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

Product Selection

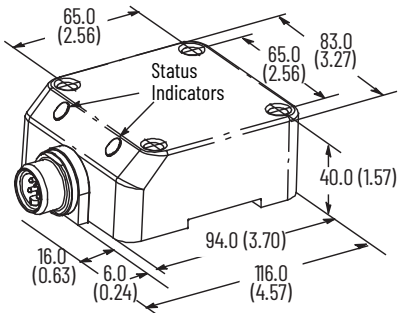
Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Mini QD Style	M12 Micro QD Style
83 (3.27)	40 (1.57) (1)	Yes	N.O. and N.C.	PNP	15	871F-PW40BP80-N4	871F-PW40BP80-D4
				NPN		871F-PW40BN80-N4	871F-PW40BN80-D4
	50 (1.97)	No		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

(1) Must be fully embedded in mild steel to achieve maximum sensing distance.

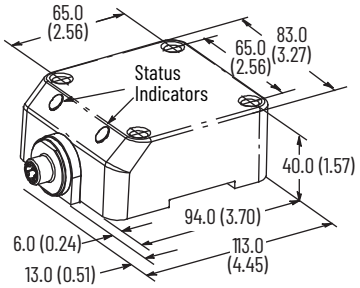
Approximate Dimensions

Mini QD Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

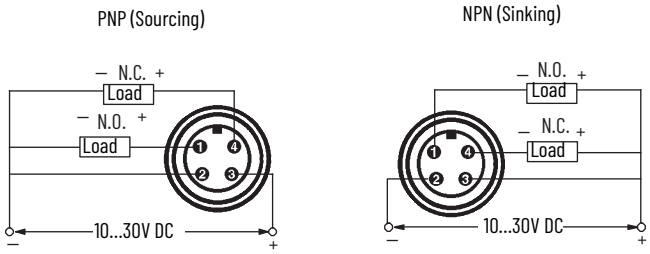


M12 Micro QD Style

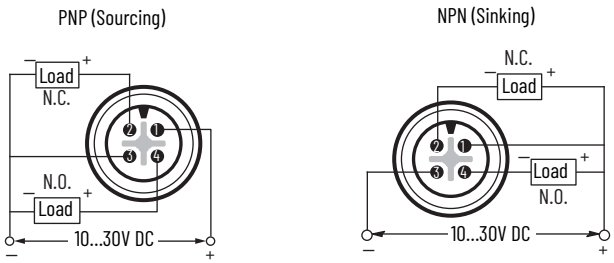


Wiring Diagrams

Complimentary Normally Open and Closed Outputs



Complimentary Normally Open and Closed Outputs



871F 2-wire AC/DC Weld Field Immune Rectangular Sensors

871F AC Micro
Quick Disconnect Style

Specifications

Attribute	871F Flat Pack Style
Load current	≤ 100 mA
Load current, min	5 mA
Leakage current	≤ 1.7 mA at 120V; ≤ 2 mA at 250V
Operating voltage	20…250V AC/DC
Voltage drop	≤ 10V
Repeatability	≤ 5%
Hysteresis	10% typical
Protection type	False pulse, transient noise, short circuit, and overload
Weld field immunity	Gauss
Certifications	cULus Listed, CE Marked for all applicable all directives, and UKCA Marked for all applicable regulations
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)
Housing material	Valox
Connection type	Quick disconnect: 3-pin micro style
Status indicator	• Green: Power • Red: Output energized
Operating temperature	-25…+70 °C (-13…+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factors

Target Material	Correction Factors	
	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

Product Selection

Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.
					Micro QD Style
83 (3.27)	40 (1.57) (1)	Yes	N.O.	10	871F-JW40N80-R3
	50 (1.97)	No			871F-KW50N80-R3
Recommended standard QD cordset: -2 = 2 m (6.5 ft)					889R-F3WEA-2

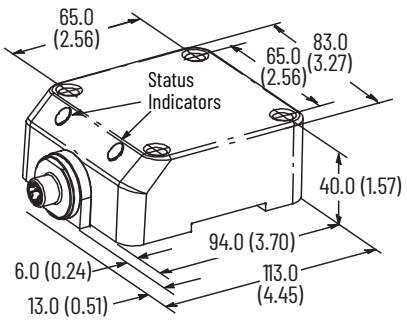
(1) Must be fully embedded in mild steel to achieve maximum sensing distance.

871F
Flat Pack

Approximate Dimensions

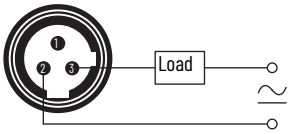
Micro QD Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



Wiring Diagrams

Normally Open



IMPORTANT Load can be switched to pin 2.

871F 2-wire AC/DC Weld Field Immune Rectangular Sensors

871F Mini and AC Micro Quick Disconnect Style

Specifications

Attribute	871F Puck Style
Load current	≤ 400 mA
Load current, min	3 mA
Inrush current (one cycle)	≤ 8 A
Leakage current	≤ 1.5 mA
Operating voltage	20…250V AC/DC
Voltage drop	≤ 5V
Repeatability	≤ 10%
Hysteresis	≤ 15% typical
Protection type	Short circuit, false pulse, and transient noise
Weld field immunity	20,000 A at 25.4 mm (1 in.)
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 4 and 13, IP67 (IEC529)
Housing material	Aluminum body, PTFE sensing area
Connection type	Quick disconnect: 3-pin mini style, 3-pin micro style
Status indicator	• Green: Power • Orange: Output energized
Operating temperature	-25…+70 °C (-13…+158 °F)
Shock	30 g (1.06 oz), 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

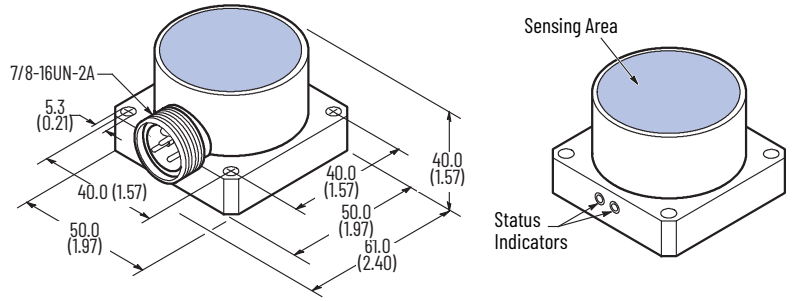
Product Selection

Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
					Mini QD Style	Micro QD Style
50 (1.97)	20 (0.79)	Yes	N.O.	15	871F-BW20N50-N3	871F-BW20N50-R3
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)					889N-F3AFC-6F	889R-F3WEA-2

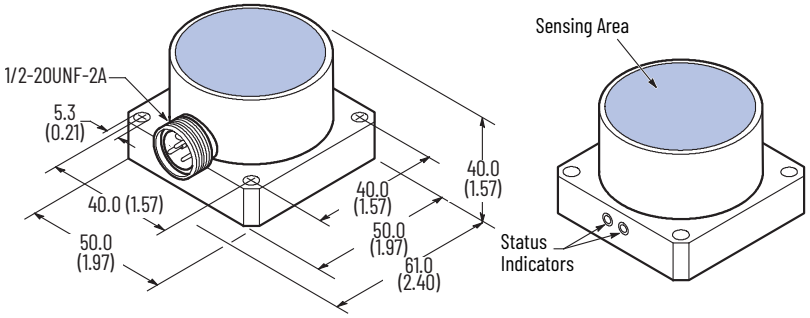
Approximate Dimensions

Mini QD Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

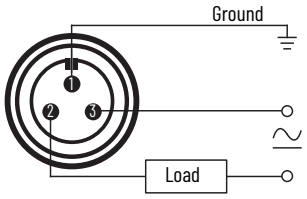


Micro QD Style



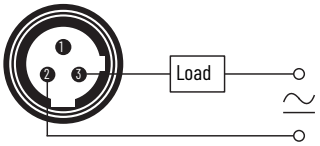
Wiring Diagrams

Normally Open



IMPORTANT Load can be switched to pin 3.

Normally Open



IMPORTANT Load can be switched to pin 2.

871FM Miniature Metal Flat Pack Sensors

871FM Cable Style
30 x 52 x 14 mm
(1.18 x 2.04 x 0.55 in.)

871FM Micro QD Pigtail Style
20 x 32 x 8 mm
(0.94 x 1.25 x 0.31 in.)

871FM Pico QD Pigtail Style
20 x 32 x 8 mm
(0.94 x 1.25 x 0.31 in.)

Specifications

Attribute	General-purpose	Weld Field Immune
Load current	≤ 50 mA at 12V, ≤ 100 mA for 20 x 8 x 32 and 30 x 14 x 52	
Leakage current	≤ 10 µA	
Operator voltage	10...30V	
Voltage drop	≤ 1.8V	
Switching frequency	≤ 200 Hz	≤ 50 Hz
Power-on delay (time delay before availability)	< 80 ms	
No-load supply current	≤ 30 mA	
Repeatability	≤ 5%	
Hysteresis	5% typical	
Protection type	False pulse on power, transient noise, reverse polarity, short circuit, and overload	
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	IP69K	IP67
Housing material	Stainless steel 303 with stainless-steel face	
Factor-1 equal sensing	Yes	
Connections	203.2 mm (8 in.) pigtail with 4-pin Micro QD or 4-pin Pico™ QD, 2 m (6.6 ft) PVC cable	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Storage Temperature	-40...+70 °C (-40...+158 °F)	
Operating Humidity	5...95% relative (noncondensing)	
Shock	30 g (1.06 oz) with 11 ms pulse duration	
Vibration	55 Hz, 1 mm amplitude	
IO-Link		
Protocol	IO-Link V1.1	
Interface type	IO-Link	
Mode	COM 2 (38.4 kBd)	
Cycle time	10.4 ms, min	
SIO (standard I/O)	Supported (pin 4 for either IO-Link or SIO)	

Status Indication

Green Indicator (Power)	Orange Indicator (Output)	Condition
Off	Off	Power off
On	Off	Powered on/no target
Off	On	Target present
Off	Flash at 2 Hz	Passed on point (margin zone)
Flash at 2 Hz	Off	Short circuit, fault
Flash at 2 Hz	Flash at 2 Hz; Reverse from green status indicator	Location Indication mode

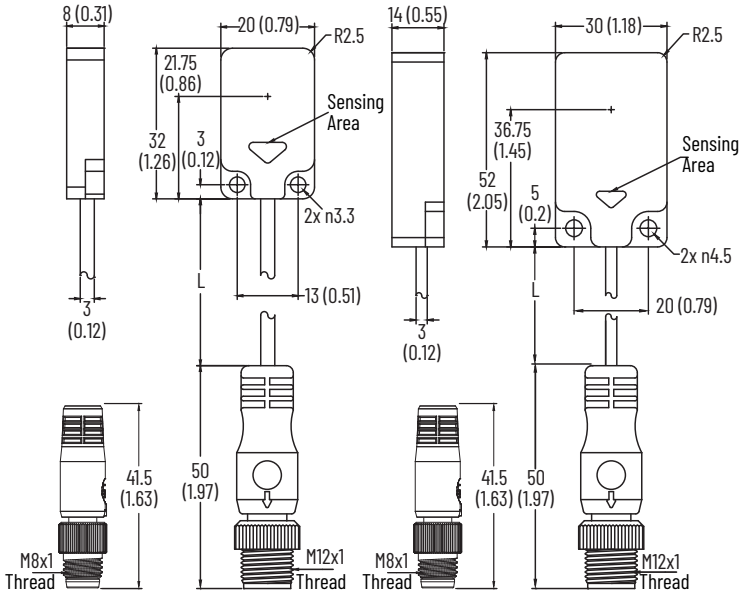
Product Selection

Housing Dimension WxHxD [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Weld Immune (1)	Connector Type	Cat. No. (2)
20 x 8 x 32 (0.78 x 0.31 x 1.25)	7 (0.27)	Yes	Complementary N.O/N.C., auto-detect NPN, or PNP on power-up	≤ 200	No	PVC pigtail, DC Micro QD, 4-pin	871FM-M7BA20-FD02
				≤ 200	No	PVC cable, 2 m	871FM-M7BA20-E2
				≤ 50	Yes - ToughCoat Finish™ weld slag coating	PVC pigtail, DC Micro QD, 4-pin, weld tube cable protection	871FM-MV7BA20-FD02X
30 x 14 x 52 (1.18 x 0.55 x 2.04)	10 (0.39)	Yes		≤ 200	No	PVC pigtail, DC Micro QD, 4-pin	871FM-M10BA30-FD02
				≤ 200	No	PVC cable, 2 m	871FM-M10BA30-E2
				≤ 50	Yes - ToughCoat Finish weld slag coating	PVC pigtail, DC Micro QD, 4-pin, weld tube cable protection	871FM-MV10BA30-FD02X
20 x 8 x 32 (0.78 x 0.31 x 1.25)	7	Yes		≤ 200	No	PVC pigtail, DC Pico QD, 4-pin	871FM-M7BA20-FP02
20 x 8 x 32 (0.78 x 0.31 x 1.25)	7	Yes		≤ 50	Yes - ToughCoat Finish weld slag coating	PVC pigtail, DC Pico QD, 4-pin	871FM-MV7BA20-FP02X
30 x 14 x 52 (1.18 x 0.55 x 2.04)	10	Yes		≤ 200	No	PVC pigtail, DC Pico QD, 4-pin	871FM-M10BA30-FP02
30 x 14 x 52 (1.18 x 0.55 x 2.04)	10	Yes		≤ 50	Yes - ToughCoat Finish weld slag coating	PVC pigtail, DC Pico QD, 4-pin	871FM-MV10BA30-FP02X

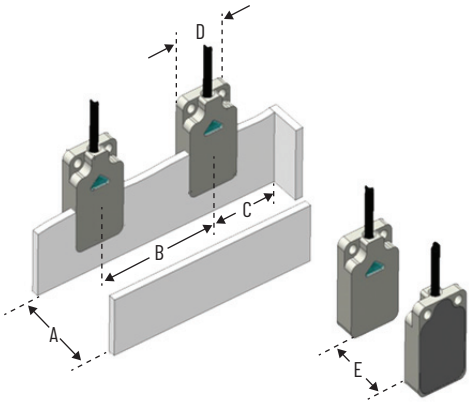
(1) For weld field immune units, the thickness of the weld slag coating on the sensor face [approximately 0.5 mm (0.02 in.)]reduces the nominal range
(2) All catalog numbers that are listed in this table are IO-Link enabled.

Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

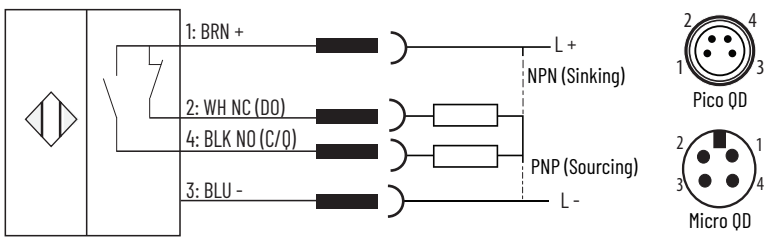


Mounting



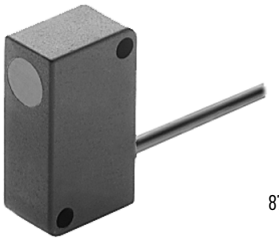
Sensor (WxLxH)	A	B	C	D	E
20 x 32 x 8 Shielded, 7 mm sensing	24 (0.94)	24 (0.94)	20 (0.79)	20 (0.79)	48 (1.89)
30 x 52 x 14 Shielded, 10 mm sensing	45 (1.77)	45 (0.79)	30 (1.18)	30 (1.18)	90 (3.54)

Wiring



Cable Material	Standard: PVC Weld tube: PUR
Cable Diameter	Standard: 3.05 mm (0.12 in.) Weld tube: 6 mm (0.24 in.)
Wire Gauge	26 AWG, 0.75 mm (0.03 in.), 4 conductor

871FM 3-wire DC Rectangular Sensors



871 FM DC Cable Style
28 x 16 x 11 mm

Specifications

Attribute	871FM Miniature Flat Pack Style (Plastic Housing)
Current consumption	< 11 mA
Load current	≤ 200 mA
Leakage current	≤ 100 µA
Operating voltage	10...30V DC
Voltage drop	≤ 1.8V
Repeatability	≤ 5%
Hysteresis	10% typical
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 4; IP67 (IEC 529)
Housing material	Plastic
Connection type	• Cable: 2 m (6.5 ft) length, 3-conductor PVC • Quick disconnect: 3-pin Pico style
Status indicator	Yellow: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm (0.039 in.) amplitude, 3 planes

Correction Factors

Target Material	Correction Factors
Steel	1.0
Stainless steel	0.85
Brass	0.55
Aluminum	0.5
Copper	0.45

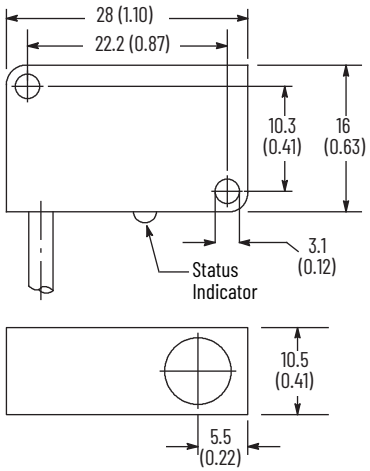
Product Selection

Housing Diameter [mm (in.)]	Sensing Direction	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
							Cable Style	Pico QD Style
28 x 16 x 11 (1.1 x 0.63 x 0.43)	Side	2 (0.08)	Yes	N.O.	PNP	600	871FM-D2NP11-E2	871FM-D2NP11-P3
				N.C.	PNP		871FM-D2CP11-E2	–
Recommended standard QD cordset: -2 = 2 m (6.5 ft)								889P-F3AB-2

Approximate Dimensions

Cable and Pico QD Style (28 x 16 x 11 mm)

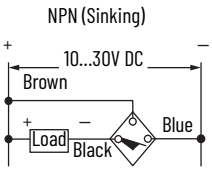
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

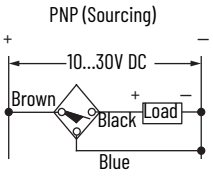


Wiring Diagrams

Cable Style (28 x 16 x 11 mm)

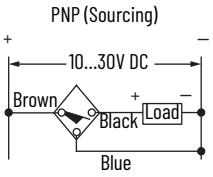
Normally Open





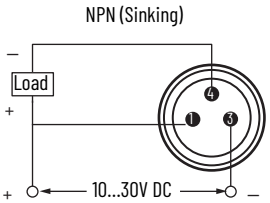
Pico QD Style (28 x 16 x 11 mm)

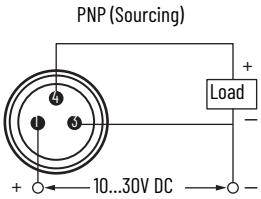
Normally Closed



Pico QD Style (28 x 16 x 11 mm)

Normally Open or Normally Closed





871FM 3-wire DC Rectangular Sensors

871FM DC Pico
MS Square

871FM DC Cable
MS Square

IO-Link

Specifications

Attribute	871FM Miniature Flat Pack Style (Metal Housing)
Certifications	UL Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Environmental	
Operating environment	IP67 (IEC 529)
Operating temperature	-25...+70 °C (-13...+158 °F)
Vibration	10...55 Hz, 1 mm amplitude, 3 planes
Shock	30 g (1.06 oz), 11 ms
Electrical	
Load current	≤ 200 mA
Leakage current	0.1 mA
Operating voltage	10...30V DC
Voltage drop	2.4V
Repeatability	10%
Hysteresis	12% typical
Protection type	False pulse, transient noise, reverse polarity, and short circuit
IO-Link	
Protocol	O-Link V1.0
Interface type	IO-Link
Mode	COM 2 (38.4 kBd)
Cycle time	10.4 ms, minimum
SIO (standard I/O)	Supported (pin 4 for either IO-Link or SIO)
Mechanical	
Housing material	Nickel-plated brass, polyester face
Status indicator (SIO mode)	Yellow: Output energized
Status indicator (IO-Link mode)	Steady yellow: Sensor in IO-Link mode
Connection type	Cable, Pico QD, or Pico with lead

Correction Factors

Sensor Type/Target Material (No Surrounding Metal)	M5 Square	M8 Square	
	Shielded	Shielded	Unshielded
Steel	1	1	1
Copper	0.6	0.45	0.27
Aluminum	0.6	0.5	0.36
Brass	0.7	0.6	0.45
Stainless steel 304	0.85	0.8	0.77

Switching Frequency

Head Size	Nominal Sensing Distance [mm (in.)]	Switching Frequency [Hz]
5 mm	0.8 (0.03)	5000
	1.5 (0.06)	3000
8 mm	2 (0.08)	
	3 (.12)	1000

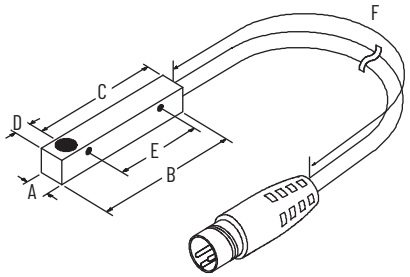
Product Selection

Housing Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.		
						Cable Style	Pico Style	Leaded Pico Style
5 (0.2)	0.8 (0.03)	Yes	N.O.	NPN	5000	871FM-M1NN5-E2	–	871FM-M1NN5-AP3
				PNP		871FM-M1NP5-E2	–	871FM-M1NP5-AP3
	1.5 (0.06)			NPN	3000	871FM-M2NN5-E2	–	871FM-M2NN5-AP3
				PNP		871FM-M2NP5- E2	–	871FM-M2NP5-AP3
8 (0.3)	2 (0.08)	Yes	N.O.	NPN	3000	871FM-M2NN8-E2	871FM-M2NN8-P3	–
				PNP		871FM-M2NP8- E2	871FM-M2NP8-P3	–
	3 (0.12)	No		NPN	1000	871FM-N3NN8-E2	871FM-N3NN8-P3	–
				PNP		871FM-N3NP8-E2	871FM-N3NP8-P3	–
Recommended standard QD cordset: -2 = 2 m (6.5 ft)							889P-F3AB-2	889P-F3AB-2

Approximate Dimensions

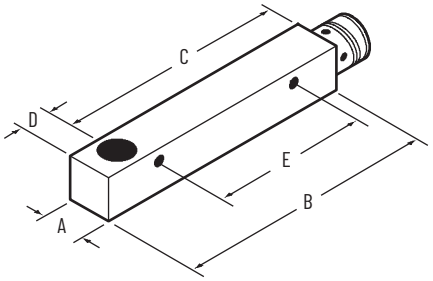
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

M5 and M8 Square Cable and Lead



Housing Size	Shielded	Dimensions [mm (in.)]					
		A	B	C	D	E	F (Lead Model)
M5	Yes	5 (0.197)	25 (0.984)	22 (0.866)	3 (0.118)	14 (0.551)	152.4 (6)
M8		8 (0.315)	40 (1.575)	35 (1.378)	5 (0.197)	20 (0.787)	152.4 (6)

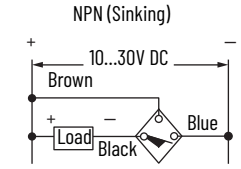
M8 Square 3-Pin Pico

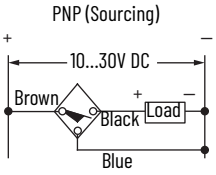


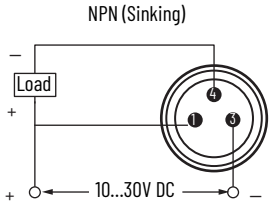
Housing Size	Shielded	Dimensions [mm (in.)]				
		A	B	C	D	E
M8	Yes	8 (0.315)	50 (1.969)	45 (1.772)	5 (0.197)	20 (0.787)

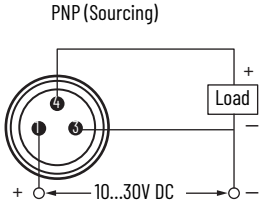
Wiring Diagrams

Normally Open — M5 and M8 Square Cable and Lead

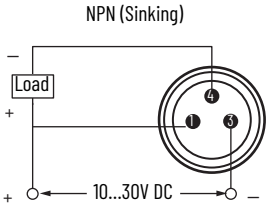


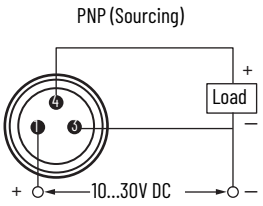






Normally Open — M8 Square 3-Pin Pico





871L and 872L 3-wire DC Rectangular Sensors

871L and 872L DC
Mini Quick Disconnect Style

871L and 872L DC
M12 Micro Quick Disconnect Style

871L and 872L DC
Conduit Style

Specifications

Attribute	871L Limit Switch Style	872L Limit Switch Style
Load current	≤ 400 mA	≤ 200 mA
Leakage current	≤ 10 µA	
Operating voltage	10...60V DC	10...30V DC
Voltage drop	≤ 2.4V	≤ 2.5V
Repeatability	≤ 5%	
Hysteresis	≤ 20% typical	
Protection type	False pulse, transient noise, reverse polarity, short circuit, and overload	
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 3, 4, 6, 12, 13; IP67 (IEC 529)	
Housing material	Polyloy	
Connection type	• Quick disconnect: 4-pin mini, 4-pin M12 micro • Conduit opening: 1/2-14 NPT internal thread with screw terminals	
Status indicators	• Green: Power (blinks in SCP/overload) • Orange: Output energized, • Red: Alignment indicator	• Green: Power (blinks in SCP/overload) • Orange: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g (1.06 oz), 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

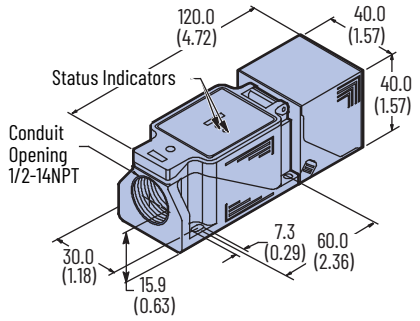
Product Selection

Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.		
						Conduit Style	Mini QD Style	M12 Micro QD Style
40 (1.57)	20 (0.79)	Yes	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)	No		NPN	70	871L-D40EN40-T3	871L-D40EN40-N4	871L-D40EN40-D4
				PNP		871L-D40EP40-T3	871L-D40EP40-N4	871L-D40EP40-D4
	20 (0.79)	Yes	Programmable 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)	No		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

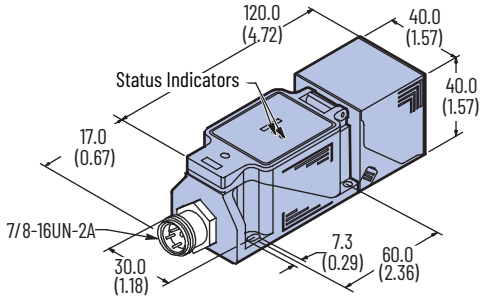
Approximate Dimensions

Conduit Style [1]

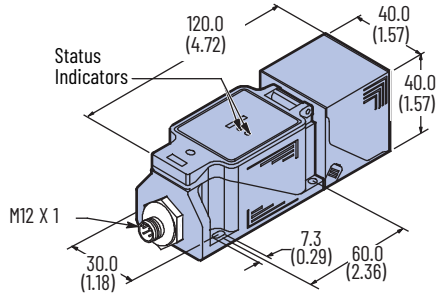
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



Mini QD Style [1]

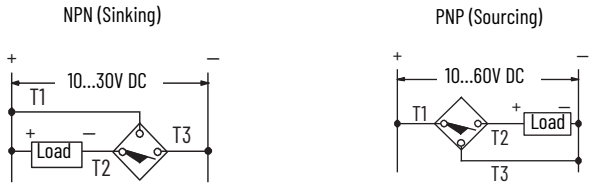


M12 Micro QD Style

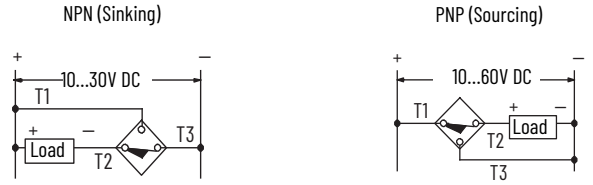


Wiring Diagrams

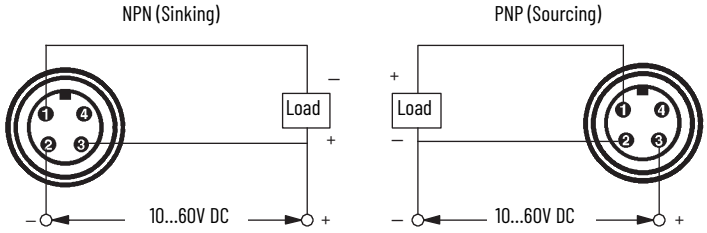
Normally Open



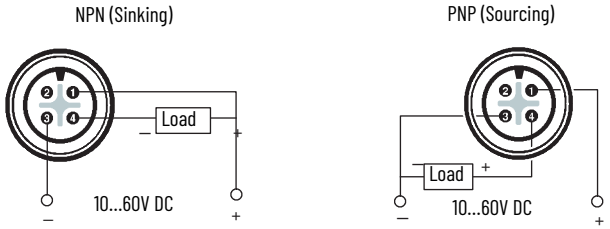
Normally Closed



Normally Open or Normally Closed



Normally Open or Normally Closed



(1) Head can be rotated in 22.5° increments to provide 16 side-sensing positions or rotated for top-sensing.

871L AC/DC and 872L AC 2-wire Rectangular Sensors

871L and 872L DC
Mini Quick Disconnect Style

871L and 872L DC
AC Micro Quick Disconnect Style

871L and 872L DC
Conduit Style

Specifications

Attribute	871L Limit Switch Style	872L Limit Switch Style
Load current	≤ 400 mA	≤ 500 mA
Load current, min	2 mA	
Inrush current (one cycle)	≤ 8 A	
Leakage current	≤ 2 mA	
Operating voltage	20...250V AC/DC	20...250V AC
Voltage drop	≤ 5V	
Repeatability	≤ 5%	
Hysteresis	≤ 20%	
Protection type	False pulse and transient noise	
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations	
Enclosure type rating	NEMA 3, 4, 6, 12, 13; IP65 (IEC 529)	
Housing material	Polyloy	
Connection type	• Quick disconnect: 3-pin mini style, 3-pin micro style • Conduit opening: 1/2-14 NPT internal thread with screw terminals	
Status indicators	• Green: Power (blinks in SCP/overload) • Orange: Output energized	
Operating temperature	-25...+70 °C (-13...+158 °F)	
Shock	30 g (1.06 oz), 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

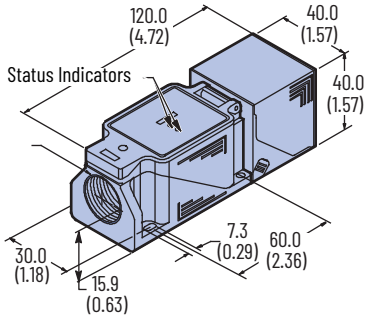
Product Selection

Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.		
					Conduit Style	Mini QD Style	AC Micro QD Style
40 (1.57)	20 (0.79)	Yes	Selectable N.O. or N.C.	15	871L-B20E40-T2	871L-B20E40-N3	871L-B20E40-R3
	40 (1.57)	No			871L-B40E40-T2	871L-B40E40-N3	871L-B40E40-R3
	20 (0.79)	Yes	Programmable N.O. or N.C.		872L-A20E40-T2	872L-A20E40-N3	872L-A20E40-R3
	40 (1.57)	No			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

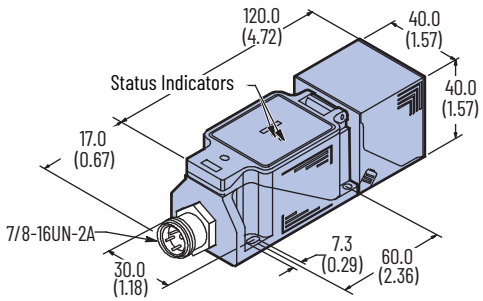
Approximate Dimensions

Conduit Style [1]

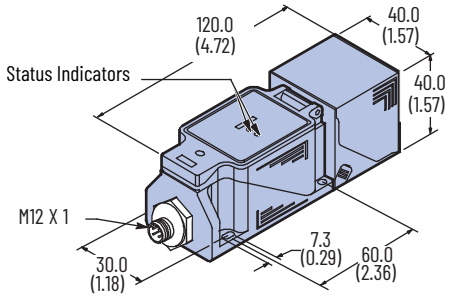
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



Mini QD Style [1]

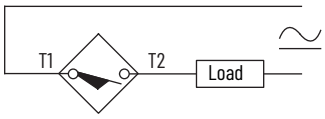


AC Micro QD Style

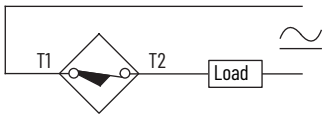


Wiring Diagrams

Normally Open

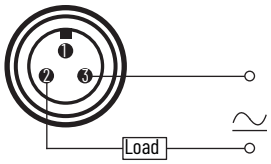


Normally Closed



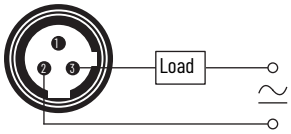
IMPORTANT Load can be switched to terminal 1.

Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 3.

Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 2.

(1) Head can be rotated in 22.5° increments to provide 16 side-sensing positions or rotated for top-sensing.

871P 2-wire AC Rectangular Sensors

871P AC Long Range
76 x 36 x 58 mm
Mini QD Style

Specifications

Attribute	871P Can Sensor
Load current, max	300 mA
Load current, min	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 at 300 mA
Repeatability	≤ 2%
Hysteresis	10% typical
Protection type	False pulse, transient noise, short circuit, and overload
Certifications	UL Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 3, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown
Connection type	3-pin mini style
Status indicator	Red: Output energized
Operating temperature	-20…+70 °C (0…160 °F)

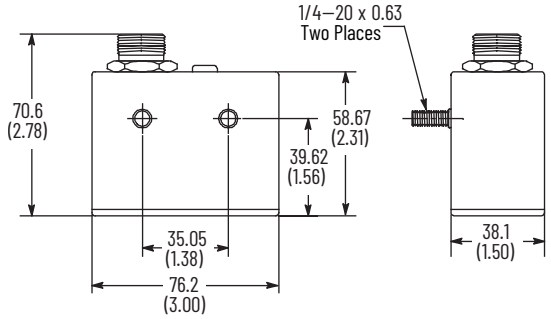
Product Selection

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 (1.15), Aluminum: 15 (0.6)	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

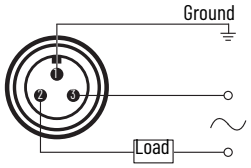
Approximate Dimensions

Long -Range Mini QD Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

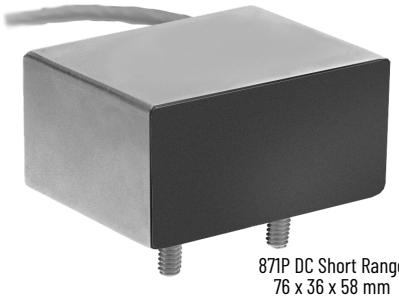


Wiring Diagrams



IMPORTANT Load can be switched to pin 2.

871P 4-wire DC Rectangular Sensors



871P DC Short Range
76 x 36 x 58 mm
Cable and 4-pin Mini
Quick-disconnect Style

Specifications

Attribute	871P Can Sensor
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%
Protection type	False pulse, transient noise, short circuit, overload, and reverse polarity
Enclosure type rating	NEMA 1, 3, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown
Connection type	• A2: 2 m (6.6 ft) shielded PVC jacketed cable, 4-wire, 22 AWG, 1/2 in. NPT • N4: 4-pin mini Quick disconnect
Status indicator	Red: Output energized
Operating temperature	-20...+70 °C (0...160 °F)
Housing material	Stainless steel, plastic face
Mounting	Two stainless-steel studs

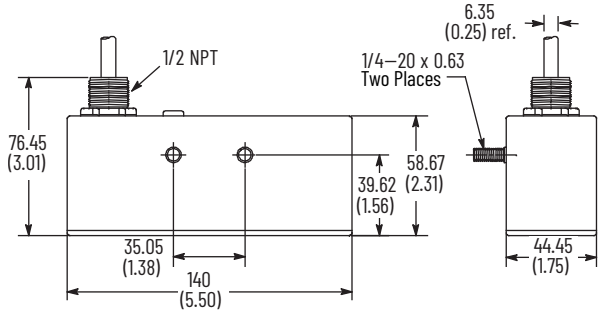
Product Selection

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 (0.5)	Yes	N.O.	NPN and PNP	35	–	871P-DC19NB76-N4
Long range	202...704	Steel: 29 (1.15), Aluminum: 15 (0.6)					871P-DC29NB140A2	871P-DC29NB140N4
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)								889N-F4AFC-6F

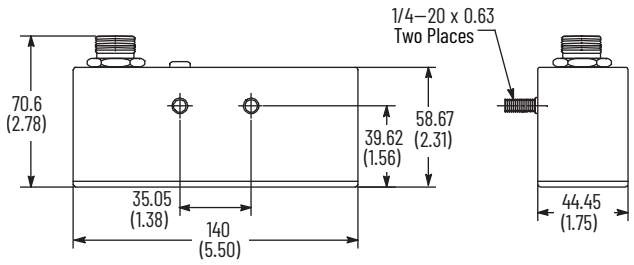
Approximate Dimensions

Long Range Cable Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

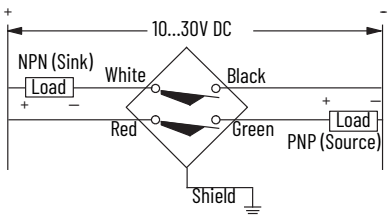


Long Range Mini QD Style

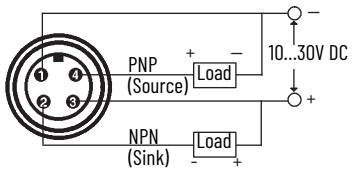


Wiring Diagrams

Cable Style



Mini QD Style



IMPORTANT Red and black wires must be connected for proper operation.

871P 4-wire DC Motion Rectangular Sensors

871L and 872L DC
Mini QD Style

4-pin Mini QD
4-pin M12 Micro QD

Specifications

Attribute	871P Can Sensor
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
Protection type	False pulse, transient noise, short circuit, overload, and reverse polarity
Enclosure type rating	NEMA 1, 3, 4, 4X, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown
Connection type	• A2: 2 m (6.6 ft) shielded PVC jacketed cable, 4-wire, 22 AWG, 1/2 in. NPT • N4: 4-pin mini quick disconnect • D4: 4-pin micro quick disconnect
Status indicator	• Red: Output energized • Dim blink: Cans moving • Bright steady: No motion
Sensitivity adjustment	Sensing range adjust
Operating temperature	-20...+70 °C (0...160 °F)
Housing material	Stainless steel, plastic face
Mounting	Two stainless-steel studs

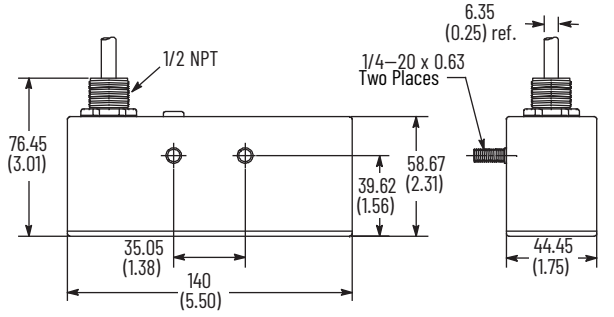
Product Selection

Container Size	Nominal Presence Sensing Distance [mm (in.)]	Nominal Motion Sensing Distance [mm (in.)]	Shielded	Output Configuration		Cat. No.		
						Cable Style	Mini QD Style	M12 Micro QD Style
202...704	Steel: 29 (1.15), Aluminum: 15 (0.6)	Steel: 19 (0.75), Aluminum: 13 (0.5)	Yes	N.O.	NPN and PNP	871P-DD29NB140A2	871P-DD29NB140N4	871P-DD29NB140D4
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)							889N-F4AFC-6F	889D-F4AC-2

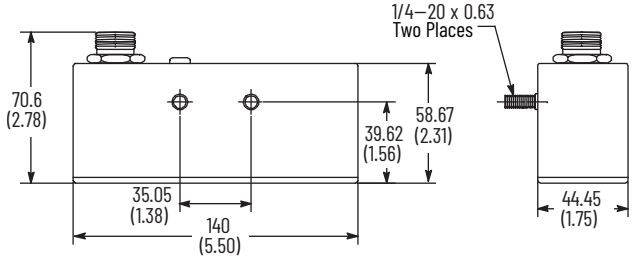
Approximate Dimensions

Cable Style

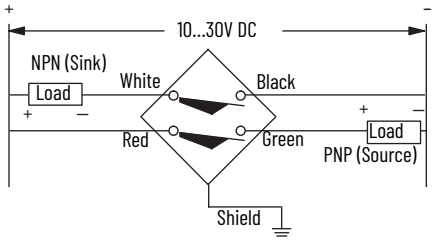
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



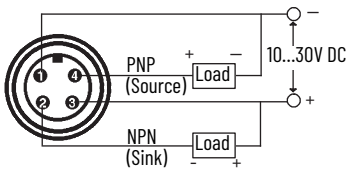
Mini and M12 Micro QD Style



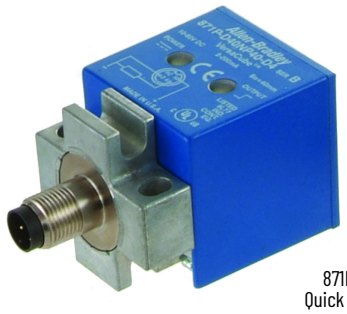
Wiring Diagrams



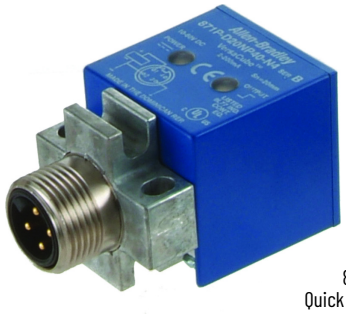
IMPORTANT Red and black wires must be connected for proper operation.



871P VersaCube 3-wire DC Rectangular Sensors



871P DC M12 Micro
Quick Disconnect Style



871P DC Mini
Quick Disconnect Style

Specifications

Attribute	871P VersaCube® (General-purpose, 3-wire)
Load current	≤ 200 mA
Leakage current	≤ 10 µA
Operating voltage	10…60V DC
Voltage drop	< 2.5V at 200 mA
Repeatability	≤ 5%
Hysteresis	5% typical
Protection type	False pulse, transient noise, short circuit, overload, and reverse polarity
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown; M12 micro connector versions also meet IP69K (IEC 529)
Housing material	• Body: Plastic • Base: Zinc
Connection type	Quick disconnect: 4-pin mini style, 4-pin M12 micro style
Status indicators	• Orange: Output energized • Green: Power
Operating temperature	-25…+70 °C (-13…+158 °F)
Shock	30 g (1.06 oz), 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

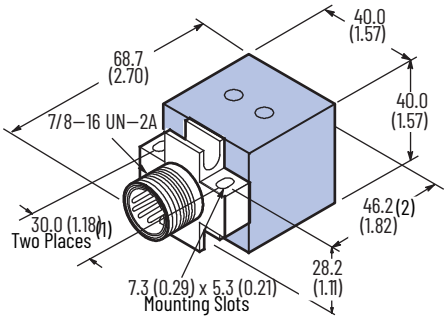
Head Size [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Mini QD Style	M12 Micro QD Style
40 (1.57)	20 (0.79)	Yes	N.O.	PNP	100	871P-D20NP40-N4	871P-D20NP40-D4
				NPN		871P-D20NN40-N4	871P-D20NN40-D4
			N.C.	PNP		871P-D20CP40-N4	871P-D20CP40-D4
				NPN		871P-D20CN40-N4	871P-D20CN40-D4
	40 (1.57)	No	N.O.	PNP		871P-D40NP40-N4(1)	871P-D40NP40-D4(1)
				NPN		871P-D40NN40-N4(1)	871P-D40NN40-D4(1)
			N.C.	PNP		871P-D40CP40-N4(1)	871P-D40CP40-D4(1)
				NPN		871P-D40CN40-N4(1)	871P-D40CN40-D4(1)
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)						889N-F4AFC-6F	889D-F4AC-2

(1) Proper operating distance for unshielded models is 0…33 mm (0…1.3 in.).

Approximate Dimensions

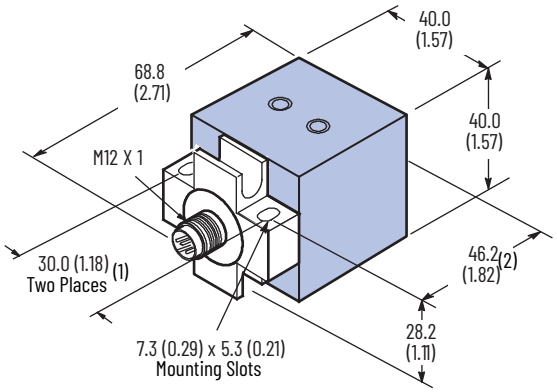
Mini QD Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



(1) With a retrofit adapter, the spacing between mounting holes becomes 20 (0.79).
(2) With a retrofit adapter, the distance from face to mounting holes becomes 60 (2.36).

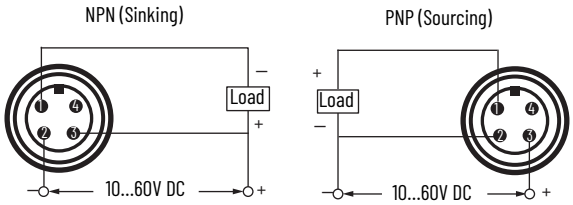
M12 Micro QD Style



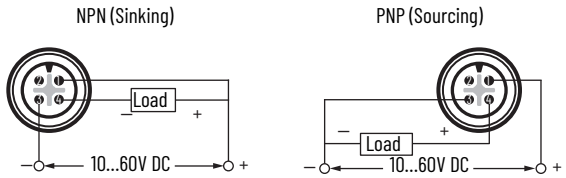
(1) With a retrofit adapter, the spacing between mounting holes becomes 20 (0.79).
(2) With a retrofit adapter, the distance from face to mounting holes becomes 60 (2.36).

Wiring Diagrams

Normally Open or Normally Closed

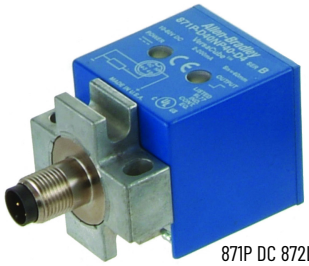


Normally Open or Normally Closed

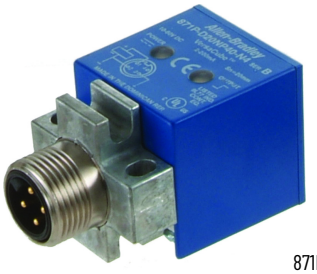


ATTENTION: Unit must be mounted to a grounded metal frame or grounded via field wiring lug per NEC requirements. Recommended grounding lug is included with the mounting kit (catalog number 871A-PKIT).

871P VersaCube 3-wire DC Rectangular Sensors



871P DC 872L DC M12 Micro
Quick Disconnect Style



871P DC Mini
Quick Disconnect Style

Specifications

Attribute	871P VersaCube (Weld Field Immune and ToughCoat Finish, 3-wire)
Load current	≤ 200 mA
Leakage current	≤ 10 µA
Operating voltage	10...60V DC
Voltage drop	< 2.5V at 200 mA
Repeatability	≤ 10% of effective operating distance
Hysteresis	12% typical
Protection type	False pulse, transient noise, short circuit, overload, and reverse polarity
Weld field immunity	1000 Gauss
Certifications	UL Listed, cUL Certified, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown; M12 micro connector versions also meet IP69K (IEC 529)
Housing material	Plastic body, zinc base
Connection type	Quick disconnect: 4-pin mini style, 4-pin M12 micro style
Status indicators	• Orange: Output energized • Green: Power
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factor

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 [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration		Switching Frequency [Hz]	Cat. No.	
						Mini QD Style	M12 Micro QD Style
40 (1.57)	15 (0.59)	Yes	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 (0.79)	Yes	N.O.	PNP	50	—	871P-DW20NP40-D4
	25 (0.98)	No	N.O.	PNP	50	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
	15 (0.59)	Yes	N.O.	PNP	50	—	871P-DV15NP40-D4[1]
	20 (0.79)	Yes				—	871P-DV20NP40-D4[1]
	25 (0.98)	No				—	871P-DV25NP40-D4[1]
Recommended standard QD cordset: -6F = 1.8 m (6 ft), -2 = 2 m (6.5 ft)						889N-F4AFC-6F	889D-F4AC-2

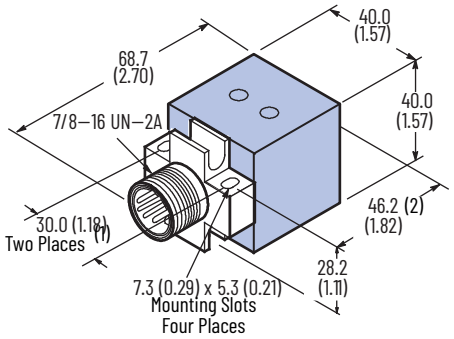
(1) Weld field immune only with ToughCoat Finish

IMPORTANT 871P VersaCube® sensors are offered with ToughCoat Finish on the sensor face. This finish is a proprietary epoxy-based material that resists the adhesion and accumulation of weld-slag particles, which helps improve and extend sensor performance.

Approximate Dimensions

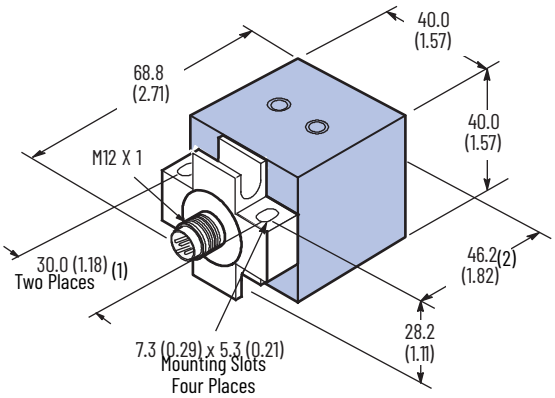
Mini QD Style

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



(1) With a retrofit adapter, the spacing between mounting holes becomes 20 (0.79).
(2) With a retrofit adapter, the distance from face to mounting holes becomes 60 (2.36).

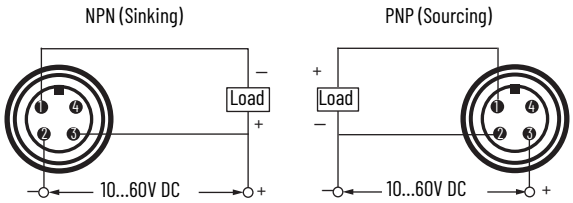
M12 Micro QD Style



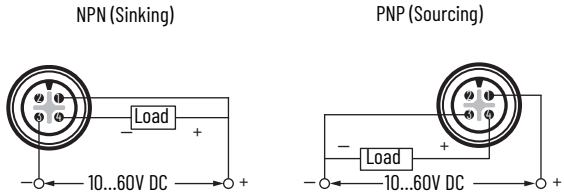
(1) With a retrofit adapter, the spacing between mounting holes becomes 20 (0.79).
(2) With a retrofit adapter, the distance from face to mounting holes becomes 60 (2.36).

Wiring Diagrams

Normally Open or Normally Closed



Normally Open or Normally Closed



ATTENTION: Unit must be mounted to a grounded metal frame or grounded via field wiring lug per NEC requirements. Recommended grounding lug is included with the mounting kit (catalog number 871A-PKIT).

871P VersaCube 4-wire DC Rectangular Sensors

871P DC M12 Micro
Quick Disconnect Style
(Standard Zinc Bracket and Plastic Base)

871P DC M12 Micro DC
Quick Disconnect Style
(Optional Stainless-steel Mounting L-Bracket)

871P DC M12 Micro DC
Quick Disconnect Style
(Standard Zinc Bracket and Heavy-duty Metal Base)

Specifications

Attribute	871P VersaCube (General-purpose, 4-wire)
Load current	≤ 200 mA from -25…+50 °C (-13…+122 °F) ≤ 100 mA from 50…70 °C (122…158 °F)
Leakage current	≤ 10 µA
Operating voltage	10…30V DC
Voltage drop	< 2.5V at 200 mA
Repeatability	≤ 10%
Hysteresis	10% typical
Protection type	False pulse, transient noise, short circuit, overload, and reverse polarity
Weld field immunity	1000 Gauss
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC 529), IP68, IP69k, 1200 psi (8270 kPa) washdown; Plastic body, zinc bracket, optional stainless-steel L-bracket
Factor-1 equal sensing	Yes
Connection type	Quick disconnect: 4-pin M12 micro style
Status indicators	• Power: Green • Output that is energized: Amber • Margin indication: Amber flashing (target within 80…100% of operating distance) • Short circuit or overload: Green and amber flashing
Operating temperature	-25…+70 °C (-13…+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Product Selection

Head Size [mm (in.)]	Weld Field Immune	Nominal Sensing Distance [mm (in.)]	Shielded	Output	M12 Micro QD Cat. No.		
					With Standard Zinc Mounting Bracket and Plastic Base	Mounting Bracket Not Included	With Standard Zinc Mounting Bracket and Heavy-duty Metal Base
40 (1.57)	Yes	20 (0.79)	Yes	PNP	871P-D20BP40-D4	871P-D20BP40X-D4	871P-DP20BP40-D4
				NPN	871P-D20BN40-D4	871P-D20BN40X-D4	—
	Yes	40 (1.57)	No	PNP	871P-D40BP40-D4	871P-D40BP40X-D4	871P-DP40BP40-D4
				NPN	871P-D40BN40-D4	871P-D40BN40X-D4	—
	Yes, with ToughCoat Finish	20 (0.79)	Yes	PNP	871P-DV20BP40-D4	871P-DV20BP40X-D4	871P-DPV20BP40-D4
		40 (1.57)	No	PNP	871P-DV40BP40-D4	871P-DV40BP40X-D4	871P-DPV40BP40-D4

IMPORTANT The 871P VersaCube sensor is offered with ToughCoat Finish on the sensor face. This finish is a proprietary epoxy-based material that resists the adhesion and accumulation of weld-slag particles, which improves and extends sensor performance.

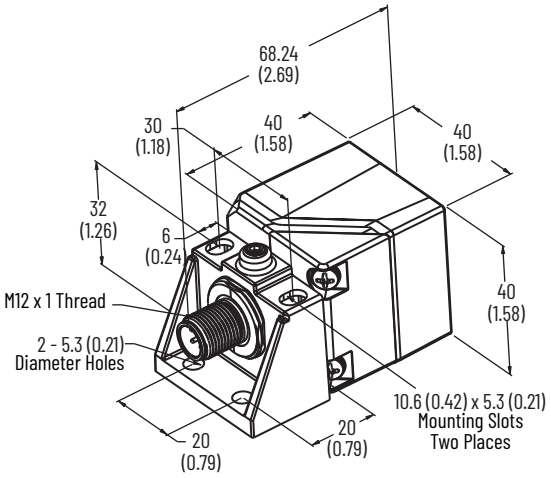
Table 23 - Mounting Accessories

Description	Cat. No.
Standard zinc mounting bracket	871A-PBR
Stainless steel mounting L-bracket and 22 mm plastic mounting nut	871A-BRS59
Plastic mounting nut, 22 mm	871T-N9

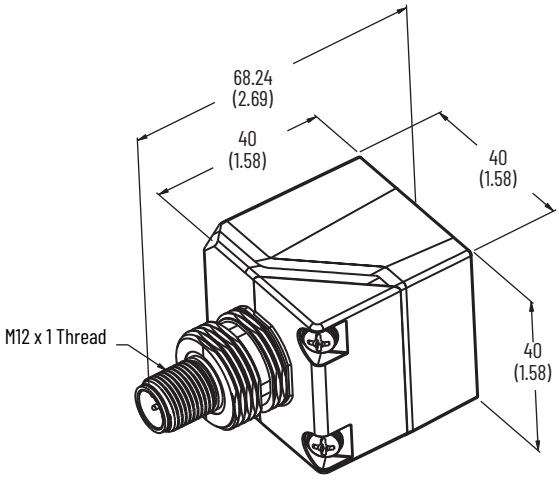
Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

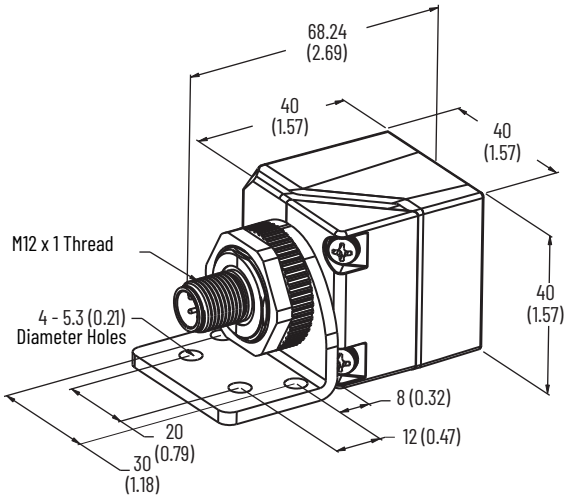
Zinc Bracket



No Bracket

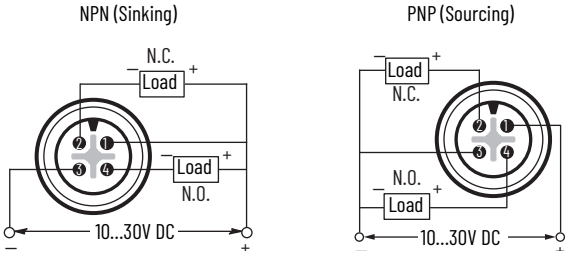


L Bracket

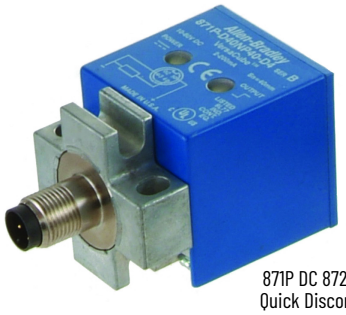


Wiring Diagrams - M12 Micro QD Style

Complimentary Normally Open and Normally Closed



871P VersaCube 2-wire AC/DC Rectangular Sensors



871P DC 872L AC Micro
Quick Disconnect Style

Specifications

Attribute	871P VersaCube (General-purpose, 2-wire)
Load current	2...100 mA
Inrush current	≤ 2 A
Leakage current	≤ 1.5 mA at 20V, ≤ 1.7 mA at 120V, ≤ 2 mA at 250V
Operating voltage	20...250V AC/DC
Voltage drop	< 10V
Repeatability	≤ 10% of effective operating distance
Hysteresis	12% typical
Protection type	False pulse, transient noise, short circuit, and overload
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 1, 2, 3, 4, 6, 6P, 12, 13; IP67 (IEC 529), 1200 psi (8270 kPa) washdown; micro connector versions also meet IP69K (IEC 529)
Housing material	Plastic body, zinc base
Connection type	Quick Disconnect: 3-pin mini style, 3-pin AC micro style
Status indicators	• Red: Output energized • Green: Power (short circuit if flashing)
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Correction Factor

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

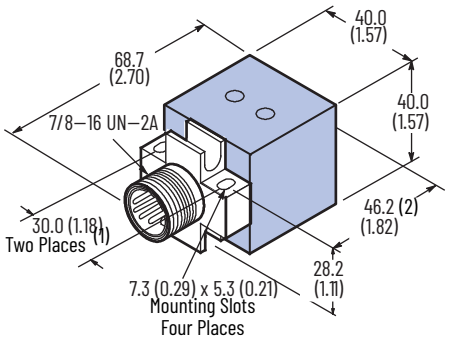
Head Size [mm (in.)]	Weld Field Immune	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Cat. No.	
						Mini QD Style	AC Micro QD Style
40 (1.57)	No	20 (0.79)	Yes	N.O.	30	871P-B20N40-N3	871P-B20N40-R3
				N.C.		871P-B20C40-N3	871P-B20C40-R3
		40 (1.57)	No	N.O.	20	871P-B40N40-N3(1)	871P-B40N40-R3(1)
				N.C.		871P-B40C40-N3(1)	871P-B40C40-R3(1)
	Yes	15 (0.59)	Yes	N.O.	30	871P-BW15N40-N3	871P-BW15N40-R3
				N.C.		871P-BW15C40-N3	871P-BW15C40-R3
		25 (0.98)	No	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

(1) Proper operating distance for unshielded models is 0...33 mm (0...1.3 in.).

Approximate Dimensions

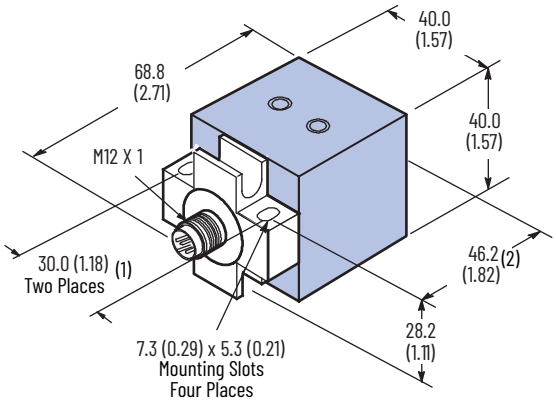
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

Mini QD Style



(1) With a retrofit adapter, the spacing between mounting holes becomes 20 (0.79).
(2) With a retrofit adapter, the distance from face to mounting holes becomes 60 (2.36).

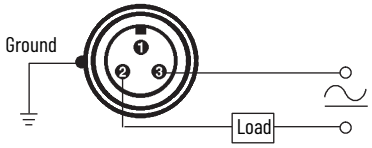
AC Micro QD Style



(1) With a retrofit adapter, the spacing between mounting holes becomes 20 (0.79).
(2) With a retrofit adapter, the distance from face to mounting holes becomes 60 (2.36).

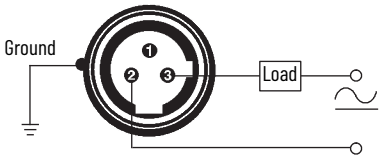
Wiring Diagrams

Normally Open or Normally Closed



IMPORTANT Load can be switched to pin 3.

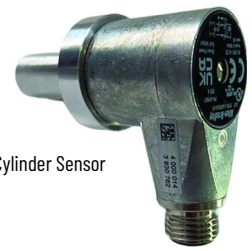
Normally Open or Normally Closed



IMPORTANT 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 included with the mounting kit (catalog number 871A-PKIT).

871D 2-wire AC/DC Cylinder Sensors



871D Cylinder Sensor

Specifications

Attribute	871D Cylinder Position Inductive Style
Outputs	Normally open
Load current	8...300 mA
Inrush current (one cycle)	<3 A (t < 20 ms)
Leakage current	<1.7 mA
Operating voltage	• 20...250V AC/DC • 20... 300 V DC
Voltage drop	≤7V
Switching frequency	20 Hz
Repeatability	5% typical
Hysteresis	15% typical
Protection type	Short circuit and reverse polarity
Weld field immunity	• 250 mT AC fields • 100 mT DC fields
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	IP67 (IEC 529)
Connection type	Quick Disconnect: 3-pin mini style, 3-pin micro style
Status indicator	• Green: Power • Red: Output • Red/Green: Short circuit/overload
Operating temperature	-25...+70 °C (-13...+158 °F)
Material	• Housing: Zinc • Probe Material: Aluminum

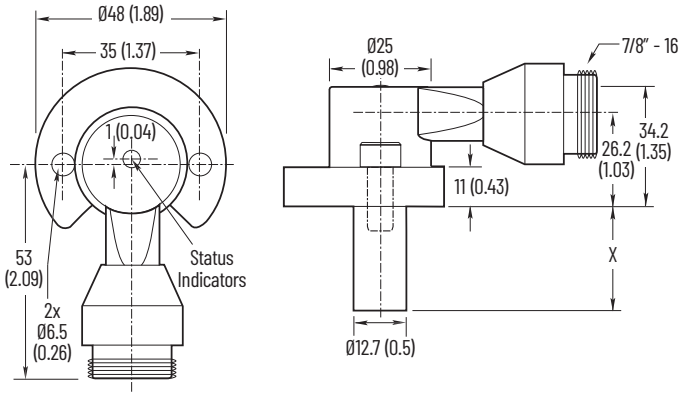
Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Probe Length [mm (in.)]	Cat. No.	
					Mini QD Style	Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O.	26.0 (1.025)	871D-LW2N260-N3	871D-LW2N260-R3
				31.7 (1.250)	871D-LW2N317-N3	871D-LW2N317-R3
				52.4 (2.062)	871D-LW2N524-N3	871D-LW2N524-R3
				73.0 (2.875)	871D-LW2N730-N3	–
				115.9 (4.560)	871D-LW2N1159-N3	–
Recommended standard QD cordset (-6F = 1.8 m [6 ft], -2 = 2 m [6.5 ft])					889N-F3AFC-6F	889R-F3ECA-2

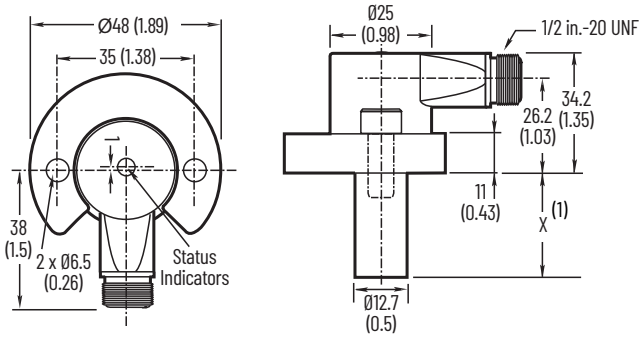
Approximate Dimensions

Dimensions are shown in mm (in.).

Mini QD Style



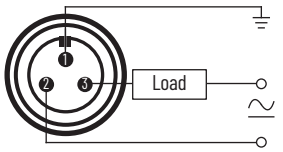
M12 Micro QD Style



Wiring Diagrams

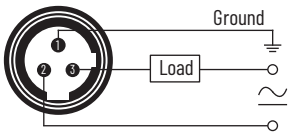
Mini QD Style

Normally Open



M12 Micro QD Style

Normally Open



(1) X = Probe length varies by catalog number. See Product Selection tab on rockwellautomation.com/en-us/products/hardware/allen-bradley/sensors-and-switches/presence-sensors/inductive-proximity-sensors/cylinder-inductive-proximity-sensors/871d-hydraulic-positioning.html.

IMPORTANT Units supplied with two, self-locking 1/4 in.-20 socket head cap screws. Recommended tightening torque: 16.95 N•m (150 in•lb).

871D 4-wire DC Cylinder Sensors

871D Cylinder Sensor

Specifications

Attribute	871D Cylinder Position Inductive Style
Outputs	Normally open
Load current, max	< 200 mA
Leakage current	≤ 100 µA
No-load supply current	≤ 35 mA
Operating voltage	10...30V DC
Voltage drop	≤ 2V DC
Switching frequency	30 Hz
Hysteresis	15% typical
Protection type	Reverse polarity and short circuit
Weld field immunity	250 mT AC fields, 100 mT DC fields
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	IP67 (IEC 529)
Connection type	Quick Disconnect: 4-pin M12 micro style
Status indicator	• Green: Power • Orange: Output
Operating temperature	-25...+70 °C (-13...+158 °F)
Pressure	3000 psi
Material	• Housing: Zinc • Probe: Aluminum

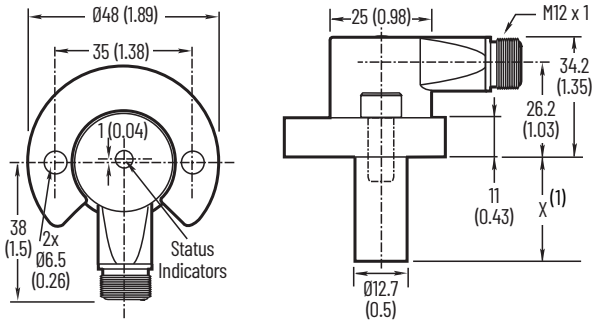
Product Selection

Barrel Diameter [mm (in.)]	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Probe Length [mm (in.)]	Cat. No.
					Micro QD Style
12 (0.47)	2 (0.08)	Yes	N.O. PNP/NPN	26.0 (1.025)	871D-MW2NP260-D4
				31.7 (1.250)	871D-MW2NP317-D4
				52.4 (2.062)	871D-MW2NP524-D4
				73.0 (2.875)	871D-MW2NP730-D4
Recommended standard QD cordset (-6F = 1.8 m [6 ft], -2 = 2 m [6.5 ft])					889D-F4AC-2

Approximate Dimensions

Dimensions are shown in mm (in.).

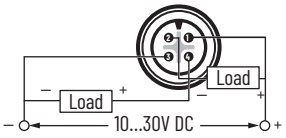
M12 Micro QD Style



Wiring Diagrams

M12 Micro QD Style

Normally Open



(1) X = Probe length varies by catalog number. See Product Selection tab on rockwellautomation.com/en-us/products/hardware/allen-bradley/sensors-and-switches/presence-sensors/inductive-proximity-sensors/cylinder-inductive-proximity-sensors/871d-hydraulic-positioning.html.

IMPORTANT Units supplied with two, self-locking 1/4 in.-20 socket head cap screws. Recommended tightening torque: 16.95 N•m (150 in•lb).

871D DC WorldClamp Cylinder Sensors

871D DC M12 Micro QD - Small Chicklet
100 mm, 165 mm, and 200 mm

871D DC M12 Micro QD - Large Chicklet
100 mm, 165 mm, and 200 mm

871D DC M12 Micro QD - Cylindrical Chicklet
100 mm

Specifications

Attribute	871D WorldClamp Cylinder Sensor (Power Clamp and Gripper Style)
Load current	150 mA, max
Leakage current	< 10 µA
Operating voltage	10...30V DC
Voltage drop	< 2.5V
Repeatability	< 2%
Hysteresis	5% typical
Protection type	False pulse, transient noise, short circuit, and overload
Weld field immunity	1600 Gauss
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	IP67
Connection type	4-pin M12 micro quick disconnect
Status indicator	• Green: Power • Orange: S1 output • Red: S2 output
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Product Selection

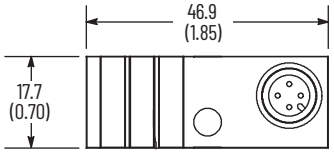
Barrel Diameter [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Lead Length [mm (in.)]	Chicklet Size	Cat. No.
2 (0.08)	Yes	2 N.O. PNP outputs	15	100 (3.94)	Large	871D-MW2GP100A-D4
					Small	871D-MW2GP100B-D4
					Cylindrical	871D-MW2GP100C-D4
				165 (6.5)	Large	871D-MW2GP165A-D4
					Small	871D-MW2GP165B-D4
				S1/S2: 200 (7.88)	Large	871D-MW2GP200A-D4
					Small	871D-MW2GP200B-D4
				S1: 40 (1.57)/ S2: 100 (3.94)	Large	871D-MW2GP40A-D4 (1)
					Small	871D-MW2GP40B-D4 (1)
Recommended cordset: 2 m (6.5 ft) 4-pin DC micro (straight)						889D-F4AC-2

(1) Special length of cable leads, one is 40 mm (1.57 in.) and the second is 100 mm (3.94).

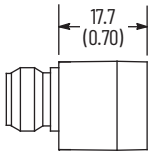
Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

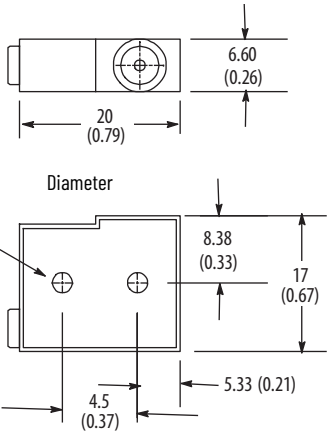
Front View



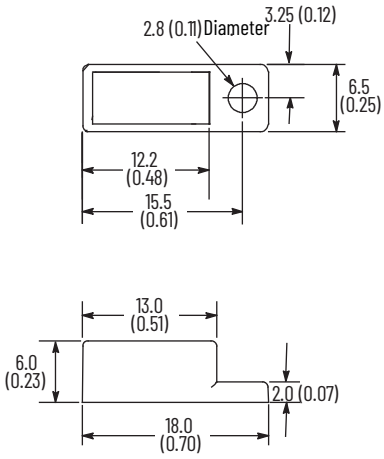
Side View



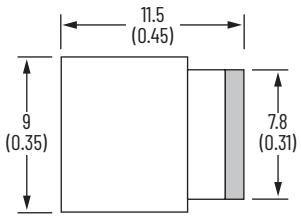
Large Chicklet



Small Chicklet



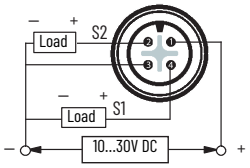
Cylindrical Chicklet



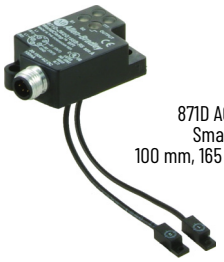
Wiring Diagrams

Normally Open

PNP (Sourcing)



871D AC/DC WorldClamp Cylinder Sensors



871D AC Micro QD -
Small Chicklet
100 mm, 165 mm, and 200 mm

871D AC Micro QD -
Large Chicklet
100 mm, 165 mm, and 200 mm

Specifications

Attribute	871D WorldClamp Cylinder Sensor (Power Clamp and Gripper Style)
Load current	100 mA, max
Inrush current	≤ 2 A (one cycle)
Leakage current	< 1.7 mA
Operating voltage	20...150V AC/DC
Voltage drop	< 10V
Repeatability	< 2%
Hysteresis	5% typical
Protection type	False pulse, transient noise, short circuit, and overload
Weld field immunity	1600 Gauss
Certifications	cULus Listed, CE Marked for all applicable directives, and UKCA Marked for all applicable regulations
Enclosure type rating	IP67
Connection type	5-pin AC micro quick disconnect
Status indicator	• Two green: power S1 and S2 • Orange: S1 output • Red: S2 output
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	30 g (1.06 oz), 11 ms
Vibration	55 Hz, 1 mm amplitude, 3 planes

Product Selection

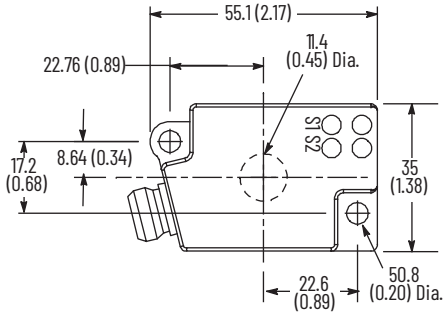
Sensor Type	Nominal Sensing Distance [mm (in.)]	Shielded	Output Configuration	Switching Frequency [Hz]	Lead Length [mm (in.)]	Chicklet Size	Cat. No.
Standard	2 (0.08)	Yes	2 N.O. Outputs	20	100 (3.94)	Large	871D-JW2G100A-R5
						Small	871D-JW2G100B-R5
					165 (6.5)	Large	871D-JW2G165A-R5
						Small	871D-JW2G165B-R5
					200 (7.88)	Large	871D-JW2G200A-R5
						Small	871D-JW2G200B-R5
					S1: 40 (1.57) S2: 100 (3.94)	Large	871D-JW2G40A-R5 (1)
						Small	871D-JW2G40B-R5 (1)
Recommended standard QD cordset: -2 = 2 m (6.5 ft)							889R-F5AEA-2

(1) Special length of cable leads, one is 40 mm (1.57 in.) and the second is 100 mm (3.94).

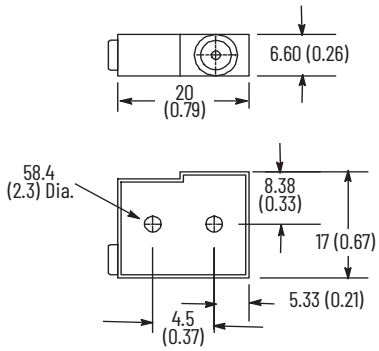
Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

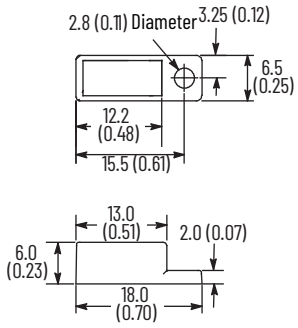
Front View



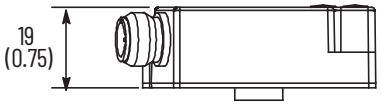
Large Chicklet



Small Chicklet

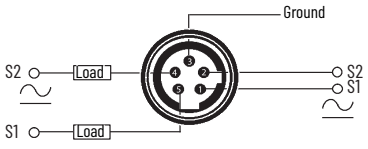


Side View



Wiring Diagrams

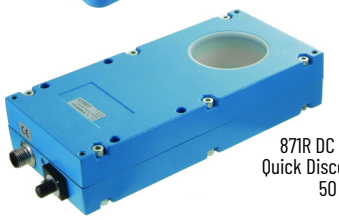
Normally Open



Notes:

871R 3-wire DC Ring Sensors

871R DC Cable Style
20 mm



871R DC M12 Micro
Quick Disconnect Style
50 mm

871R DC M12 Micro
Quick Disconnect Style
50 mm

Specifications

Attribute	871R Ring Style Sensor
Load current	≤ 200 mA
Leakage current	≤ 10 µA
Operating voltage	10...30V DC
Voltage drop	≤ 2.4V
Repeatability	≤ 2%
Hysteresis	10% typical
Protection type	Reverse polarity, transient noise, short circuit, overload, and false pulse
Certifications	CE Marked for all applicable directives and UKCA Marked for all applicable regulations
Enclosure type rating	NEMA 4, IP67 (IEC 529)
Connection type	• Cable: 2 m (6.6 ft.) length 3-conductor 26 AWG PVC • Quick disconnect: 4-pin M12 micro style
Status indicators	Red: Output energized
Operating temperature	-25...+70 °C (-13...+158 °F)
Shock	5 g (0.18 oz)
Vibration	10...55 Hz

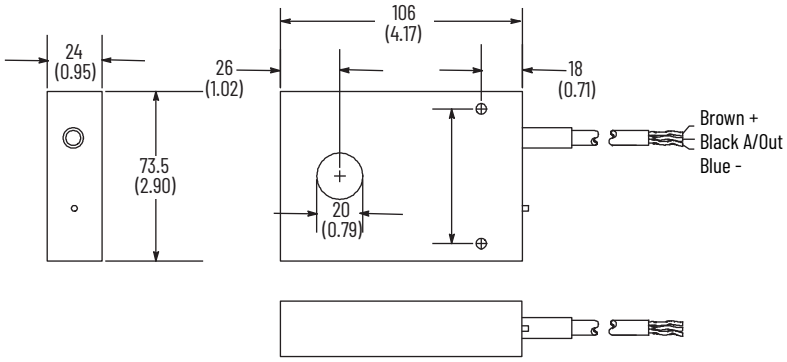
Product Selection

Ring Diameter [mm (in.)]	Minimum Ball Size [mm (in.)]	Output Configuration		Switching Frequency [Hz]	Cat. No.	
					Cable Style	M12 Micro QD Style
20 (0.79)	6 (0.24)	N.O.	PNP	1000	871R-D20NP73-E2	–
50 (1.97)	3 (0.12)	N.O. and N.C.	PNP	500	–	871R-D50NP90-D4
			NPN		–	871R-D50NN90-D4
100 (3.94)	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

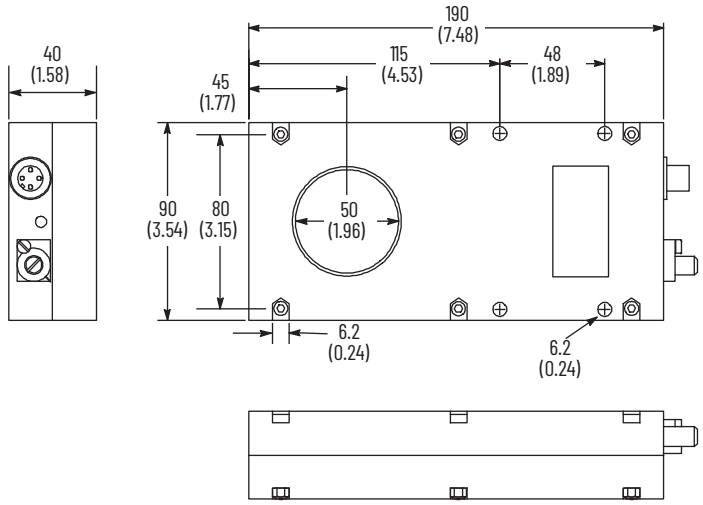
Approximate Dimensions

Cable Style (Cat. No. 871R-D20NP73-E2)

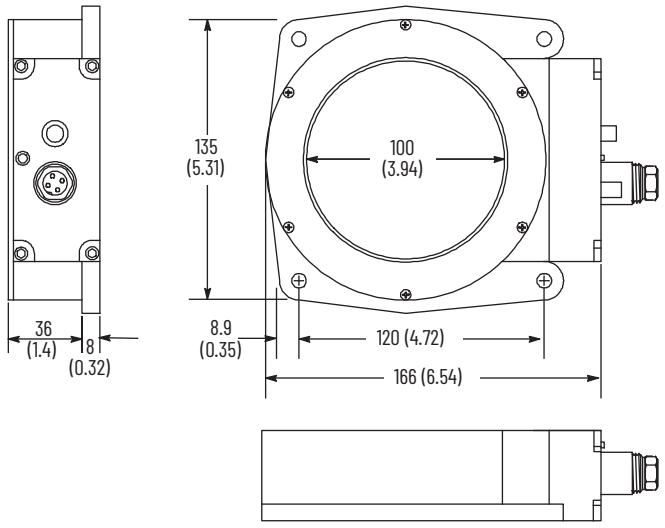
Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



M12 Micro QD Style (Cat. No. 871R-D50N90-D4 and 871R-D50NN90-D4)

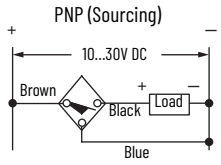


M12 Micro QD Style (Cat. No. 871R-D100NP120-D4 and 871R-D100NN120-D4)

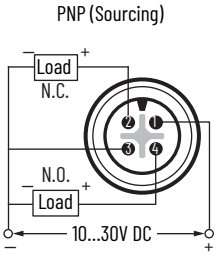


Wiring Diagrams

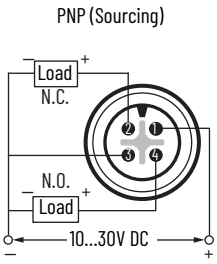
Normally Open



Complementary Normally Open and Normally Closed



Complementary Normally Open and Normally Closed



A large variety of accessories are available for use with our products for convenient mounting and application of proximity sensors.

Banking Screw Adapters

Banking screw adapters provide the flexibility to use inductive proximity sensors as mechanical stop switches. These banking screw adapters are designed for use only with shielded sensors. Each banking screw adapter 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.

IMPORTANT Models are available requiring more force to activate the switch, contact your local Rockwell Automation sales office or Allen-Bradley distributor for details.

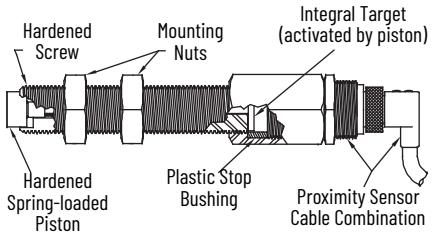
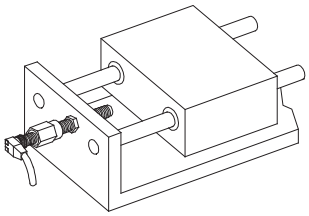


Table 24 - Sensors for use with Banking Screw Adapters

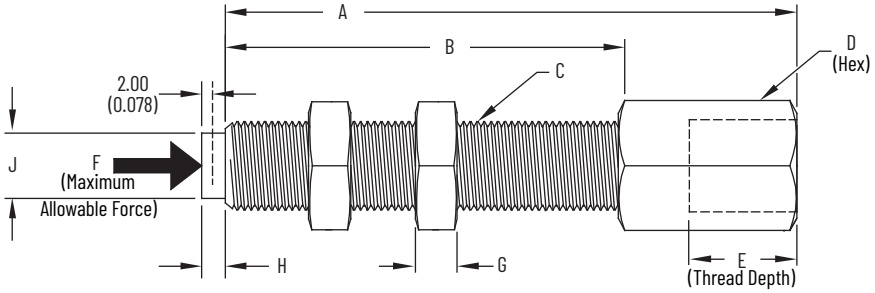
Proximity Tube Diameter [mm (in.)]	Sensing Distance [mm (in.)]	Specification	Cat. No.
8 (0.31)	1.5 (0.06)	10...30V DC, N.O., PNP, Micro QD	872C-DX15-D4
12 (0.47)	2 (0.08)		872C-DX34-D4
18 (0.71)	3 (0.12)		872C-DX33-D4
12 (0.47)	1 (0.04)	20...250V AC, N.O., Micro QD	872C-A2N12-R3
18 (0.71)	4 (0.16)		872C-A5N18-R3

Figure 64 - Typical Application



Approximate Dimensions

Not intended to be used for manufacturing purposes.

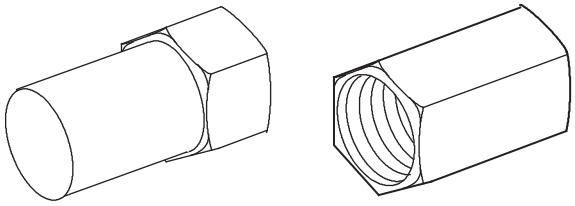


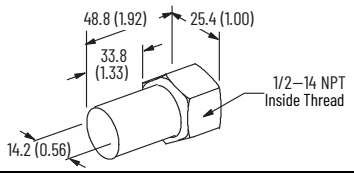
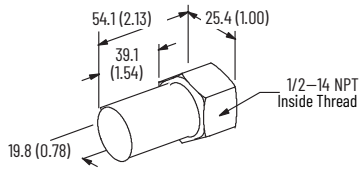
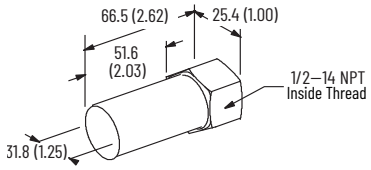
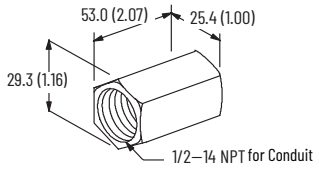
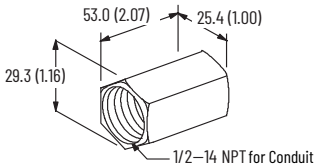
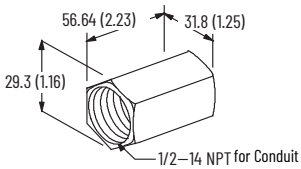
For Use With	Dimensions [mm (in.)]									Cat. No.
	A	B	C	D	E	F	G	H	J	
8 mm shielded sensors	57.2 (2.25)	25 (1)	M8 x 1	11 (0.43)	18.4 (0.72)	2000 N (450 lb)	5.08 (0.2)	2.93 (0.115)	5.84 (0.23)	871A-AK8-25
	82.6 (3.25)	50 (2)								871A-AK8-50
12 mm shielded sensors	57.2 (2.25)	25 (1)	M12 x 1	15.7 (0.62)	17.4 (0.67)	20,500 N (4608 lb)	6.35 (0.25)	4.22 (0.166)	9.40 (0.37)	871A-AK12-25
	82.6 (3.25)	50 (2)								871A-AK12-50
	108 (4.25)	75 (3)								871A-AK12-75
	133 (5.25)	100 (4)								871A-AK12-100
18 mm shielded sensors	57.2 (2.25)	25 (1)	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 (0.56)	871A-AK18-25
	82.6 (3.25)	50 (2)								871A-AK18-50
	108 (4.25)	75 (3)								871A-AK18-75
	133 (5.25)	100 (4)								871A-AK18-100

Conduit Adapters

Conduit adapters allow easy connection of most threaded-barrel models to a conduit line.

Figure 65 - 12 mm, 18 mm, and 30 mm



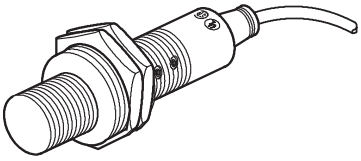
Proximity Tube Diameter [mm (in.)]	Thread Size	Approximate Dimensions [mm (in.)]	Cat. No.
12 (0.47)	M12 x 1		871C-N13
18 (0.71)	M18 x 1		871C-N19
30 (1.18)	M30 x 1.5		871C-N31
12 (0.47)	M12 x 1		871T-N5
18 (0.71)	M18 x 1		871T-N6
30 (1.18)	M30 x 1.5		871T-N7

Mounting Brackets

Tubular Proximity Sensors

Spring-return Style

Figure 66 - 8 mm, 12 mm, 18 mm, and 30 mm

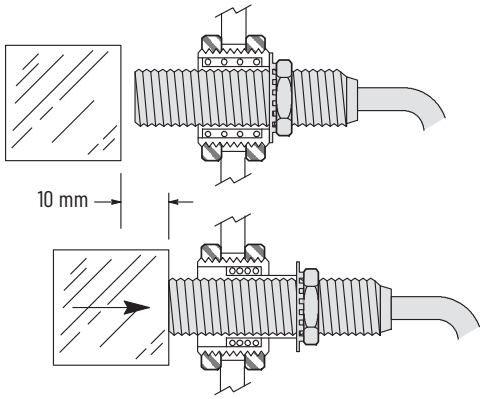


Spring return mounting brackets provide protection for the sensor if a target collision occurs. The bracket is designed to allow the sensor to retract axially when force is applied to its face, then to return to its original position when the force is removed. The bracket is threaded onto a tubular proximity sensor and locked into place by using the mounting nut that is provided with the sensor.

For protection against lateral collisions, the addition of a plastic deflecting cap is recommended (see Plastic Deflecting Caps for Tubular Proximity Sensors on page 158).

IMPORTANT Right angle mounting brackets are available for use with these spring return brackets (see Right-angle Style on page 154).

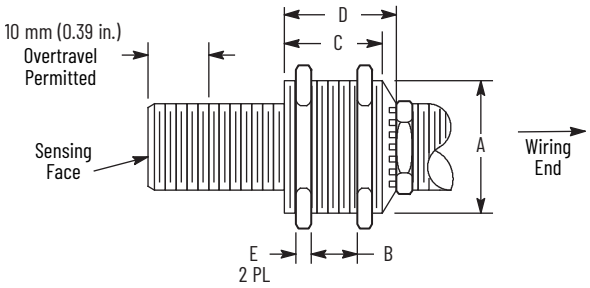
Figure 67 - Example



IMPORTANT

- Any overtravel greater than 10 mm (0.39 in.) or improper installation can damage the sensor and/or mount. Do not exceed the torque specifications that are listed (see Torque Charts on page 163) or the mounting sleeve distorts.
- Use one 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.

Table 25 - Approximate Dimensions [mm (in.)] (1)



Proximity Tube Diameter [mm (in.)]	Dimensions mm (in.)]						Cat. No.	
	Hole Diameter	A	B	C	D	E	Anodized Aluminum	Stainless Steel
8 (0.31)	15.9 (0.63)	M16 x 1.5	11 (0.43)	19 (0.75)	22 (0.87)	3.5 (0.14)	871A-BXN8	871A-BXS8
12 (0.47)	22.2 (0.88)	M22 x 1.5	11 (0.43)	19 (0.75)	22 (0.87)	4 (0.16)	871A-BXN12	871A-BXS12
12 (0.47)	17.9 (0.7)	M18 x 1	10 (0.4)	19 (0.75)	21.2 (0.84)	4 (0.16)	–	871A-BXS12-LP
18 (0.71)	31 (1.22)	M30 x 1.5	15 (0.59)	26 (1.02)	30 (1.18)	5 (0.2)	871A-BXN18	871A-BXS18
30 (1.18)	47.5 (1.87)	M47 x 1.5	25.4 (1)	35 (1.38)	37.9 (1.49)	5 (0.2)	871A-BXN30	871A-BXS30

(1) Not intended to be used for manufacturing purposes.

Quick-change Style

Quick-change sensor brackets allow you to install or remove shielded proximity sensors quickly and easily. Quick sensor change-out is achieved with one collet-style locknut, while maintaining the original sensing distance setup, and thus minimizes 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.

Figure 68 - 8 mm, 12 mm, 18 mm, and 30 mm

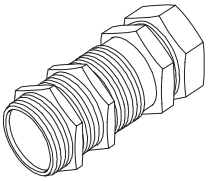


Figure 69 - Typical Application

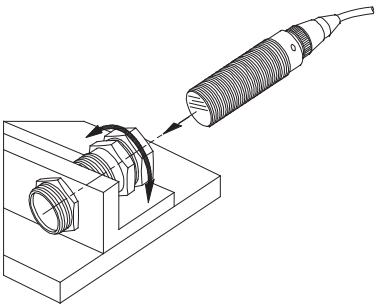
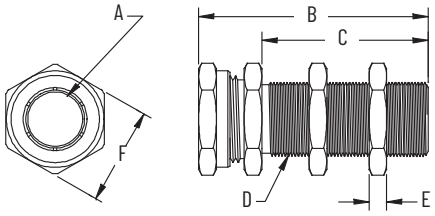


Table 26 - Approximate Dimensions [mm (in.)] (1)



Sensor Diameter [mm (in.)]	Dimensions [mm (in.)]						Cat. No.(2)
	A	B	C	D	E	F	
8 (0.31)	8 (0.31)	32 (1.25)	18 (0.71)	M12 x 1	3.05 (0.12)	17.4 (0.68)	871A-BQN8
		48 (1.89)	34 (1.34)				871A-BQN8-L
12 (0.47)	12 (0.47)	34 (1.34)	20 (0.79)	M16 x 1	3.30 (0.13)	22.2 (0.88)	871A-BQN12
		44 (1.73)	30 (1.18)				871A-BQN12-L
18 (0.71)	18 (0.71)	38 (1.5)	20 (0.79)	M24 x 1.5	5.08 (0.2)	30.2 (1.19)	871A-BQN18
		58 (2.28)	40 (1.57)				871A-BQN18-L
30 (1.18)	30 (1.18)	38 (1.5)	20 (0.79)	M36 x 1.5	5.84 (0.23)	41.3 (1.63)	871A-BQN30
		58 (2.28)	40 (1.57)				871A-BQN30-L

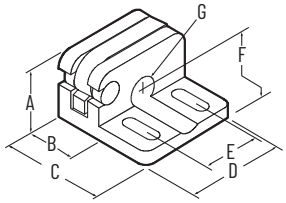
(1) Not intended to be used for manufacturing purposes.
(2) Each spring-return mounting bracket is supplied with two mounting nuts.

Snap-clamp Style

The snap-clamp style mounting bracket for tubular inductive proximity sensors provides simplified, tool-free installation for 12 mm and 18 mm barrel diameters. This plastic bracket allows fast, simple installation and removal of the sensor, and is ideal for general-purpose applications.

Figure 70 - 8 mm, 12 mm, 18 mm, and 30 mm

Table 27 - Approximate Dimensions [mm (in.)] (1)



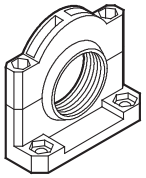
Sensor Diameter [mm (in.)]	Dimensions [mm (in.)]							Cat. No.
	A	B	C	D	E	F	G	
12 (0.47)	25.3 (0.99)	22.1 (0.87)	39.9 (1.57)	35.5 (1.4)	22 (0.87)	8.1 (0.32)	12 (0.47)	871A-SCBP12
18 (0.71)	30.5 (1.2)	22.9 (0.9)	42.9 (1.69)	39.6 (1.56)	26 (1.02)	11.2 (0.44)	18 (0.71)	871A-SCBP18

(1) Not intended to be used for manufacturing purposes.

Swivel/tilt Style

The swivel/tilt mounting bracket provides both axial and 10° tilt adjustment for our 18 mm and 30 mm tubular-style products.

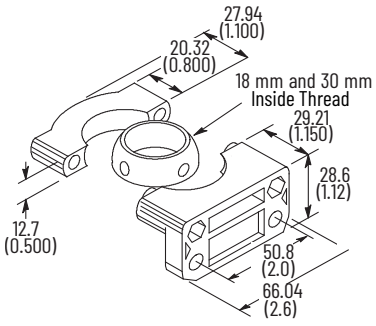
Figure 71 - 18 mm and 30 mm



Description	Cat. No.(1)
30 mm mounting bracket	60-2439
18 mm mounting bracket	60-2649

(1) Each swivel/tilt mounting bracket is supplied with two screws and two locking nuts.

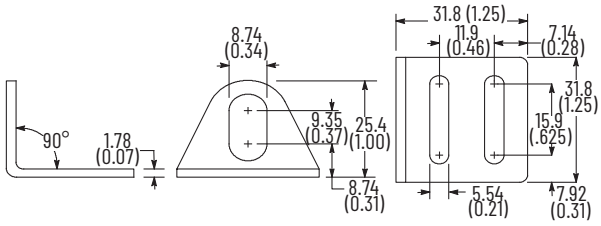
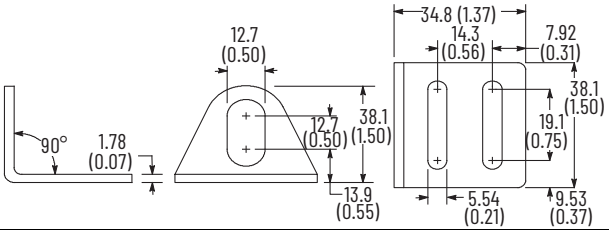
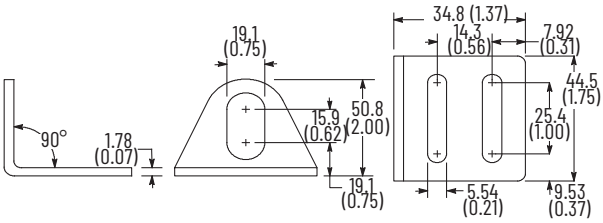
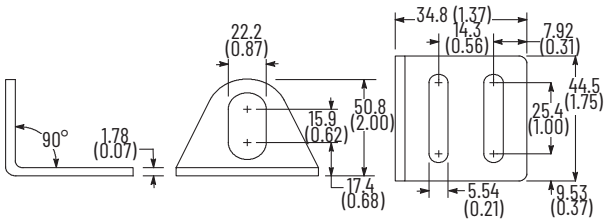
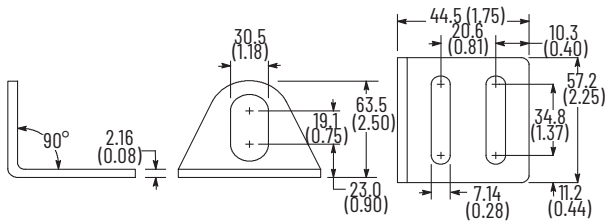
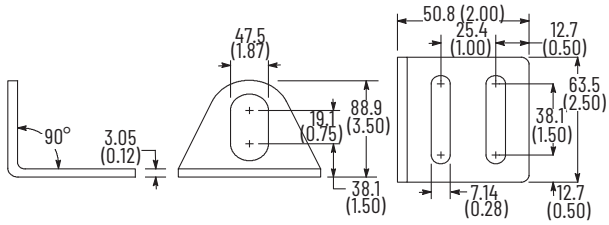
Table 28 - Approximate Dimensions in mm (in.) (1)



(1) Not intended to be used for manufacturing purposes.

Right-angle Style

Right-angle style brackets are designed for convenient mounting and adjustable positioning of tubular-style proximity sensors.

Proximity Tube Diameter [mm (in.)]	Approximate Dimensions [mm (in.)] (1)	Housing Material	Cat. No.
8 (0.31)		Zinc-plated steel	871A-BRN8
		Stainless steel	871A-BRS8
12 (0.47)		Zinc-plated steel	871A-BRN12
		Stainless steel	871A-BRS12
18 (0.71) (for use with Cat. No. 871A-BXN8 or 871A-BXS8 spring return brackets)		Zinc-plated steel	871A-BRN18
		Stainless steel	871A-BRS18
22 (0.87) (for use with Cat. No. 871A-BXN12 or 871A-BXS12 spring return brackets)		Zinc-plated steel	871A-BRN22
		Stainless steel	871A-BRS22
30 (1.18) (for use with Cat. No. 871A-BXN18 or 871A-BXS18 spring return brackets)		Zinc-plated steel	871A-BRN30
		Stainless steel	871A-BRS30
47 (1.85) (for use with Cat. No. 871A-BXN30 or 871A-BXS30 spring return brackets)		Zinc-plated steel	871A-BRN47
		Stainless steel	871A-BRS47

(1) Not intended to be used for manufacturing purposes.

Clamp Style

Our clamp style brackets are designed for convenient mounting and adjustable positioning of tubular-style proximity sensors. They include stainless-steel mounting hardware and chemical-resistant material for harsh environment

Figure 72 - 5 mm, 6.5 mm, 8 mm, 12 mm, 18 mm, 30 mm, and 34 mm

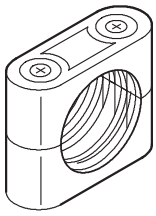
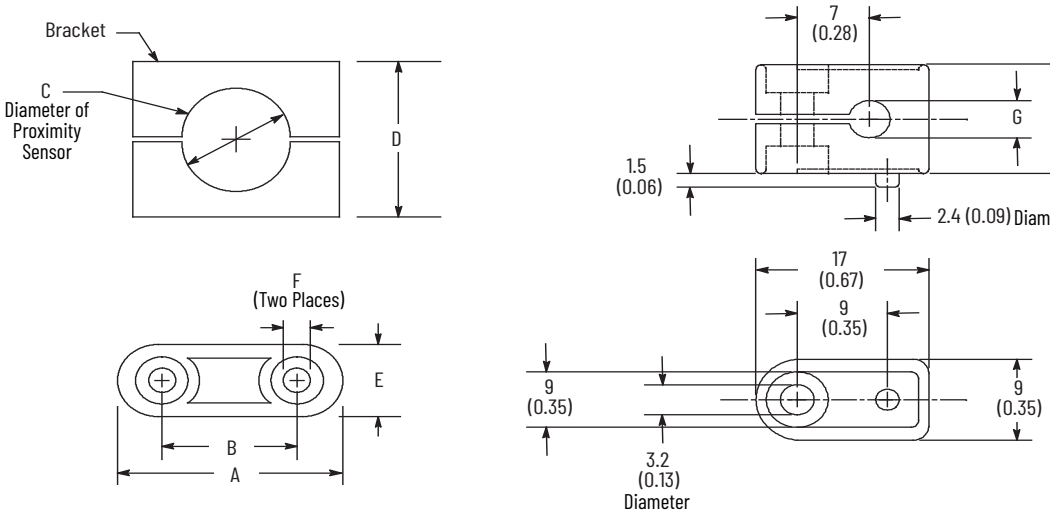


Table 29 - Approximate Dimensions [mm (in.)] (1)

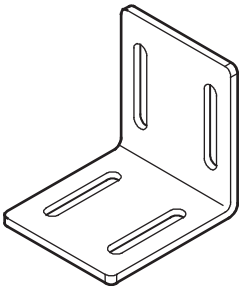


Sensor Diameter [mm (in.)]	Dimensions [mm (in.)]							Cat. No.
	A	B	C	D	E	F	G	
4 (0.16)	–	–	–	–	–	–	4 (0.16)	871A-BP4
5 (0.2)	–	–	–	–	–	–	5 (0.2)	871A-BP5
6.5 (0.26)	–	–	–	–	–	–	6.5 (0.26)	871A-BP7
8 (0.31)	29 (1.14)	18 (0.708)	8 (0.31)	18.3 (0.72)	11 (0.432)	4.4 (0.172)	–	871A-BP8
12 (0.47)	36 (1.42)	24 (0.944)	12 (0.47)		12 (0.472)		–	871A-BP12
18 (0.71)	45 (1.772)	32 (1.26)	18 (0.71)	29.4 (1.16)	13 (0.512)	5.4 (0.212)	–	871A-BP18
30 (1.18)	60 (2.4)	45 (1.772)	30 (1.18)	48.4 (1.91)	15.8 (0.624)	5.5 (0.218)	–	871A-BP30
34 (1.34)	65.8 (2.59)	50 (1.97)	34 (1.34)	48.3 (1.9)			–	871A-BP34

(1) Not intended to be used for manufacturing purposes.

Can Sensor Proximity Sensors

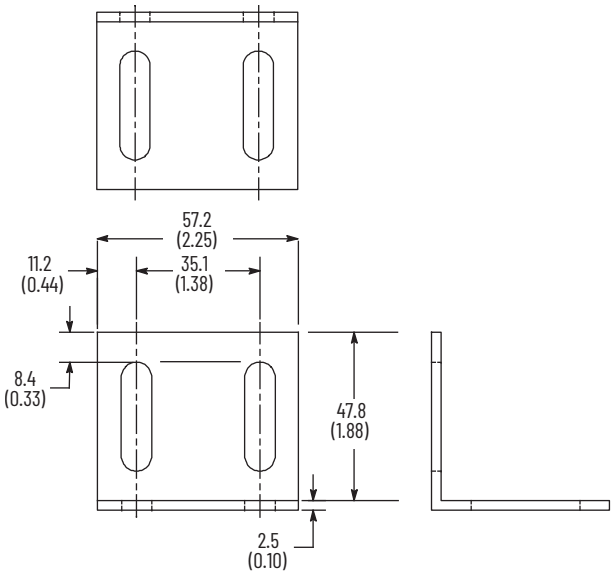
Figure 73 - Stainless-steel Mounting Bracket Assembly



Description	Cat. No.
Mounting bracket	871A-BR58

Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

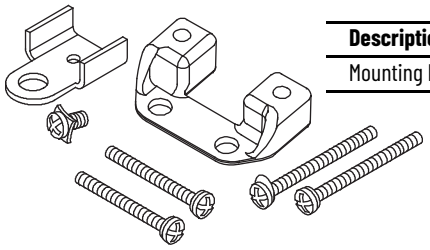


VersaCube Sensors

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 sensor to bolt in place of the existing 871P rectangular and similar competitive sensors. Mounting screws are also supplied. Additionally, a ground lug terminal and green color-coded binding screw are provided for grounding the VersaCube sensor in case the unit is not mounted to a grounded metal frame.

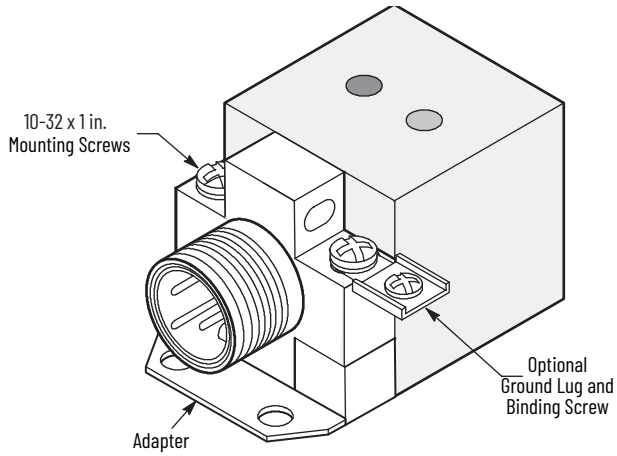
Kit includes:

- (1) Threaded mounting bracket
- (1) Through-hole mounting bracket
- (2) 10-32 x 1 in. mounting screw
- (2) 10-32 x 1.5 in. mounting screw
- (1) Ground terminal lug
- (1) Green color-coded binding screw



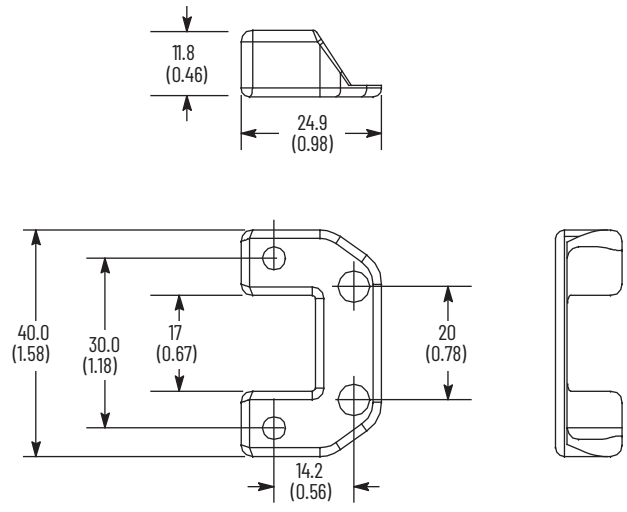
Description	Cat. No.
Mounting kit	871A-PKIT

Figure 74 - Typical Application



Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

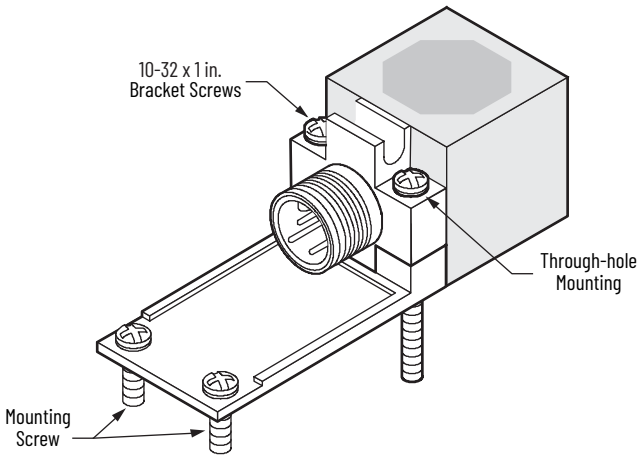


VersaCube Proximity Sensors (Limit Switch Style)

The limit switch style mounting bracket (catalog number 871A-PKITLS) has the same mounting pattern as the limit switch style proximity sensors. It provides excellent mounting stability and convenience when retrofitting a limit switch style proximity sensor with a VersaCube sensor.

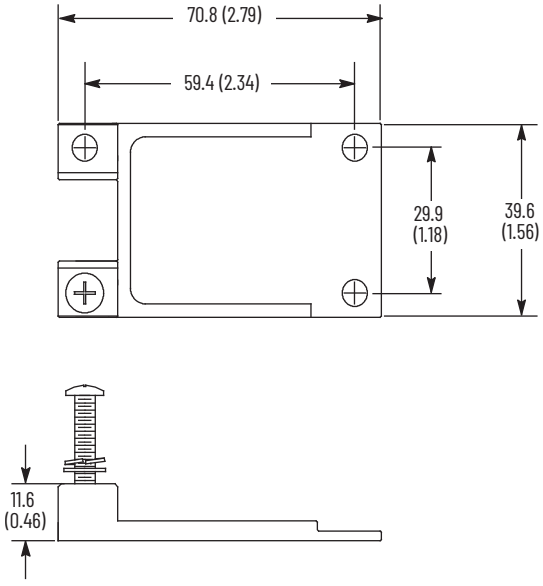
Description	Cat. No.
Mounting kit	871A-PKITLS

Figure 75 - Typical Application



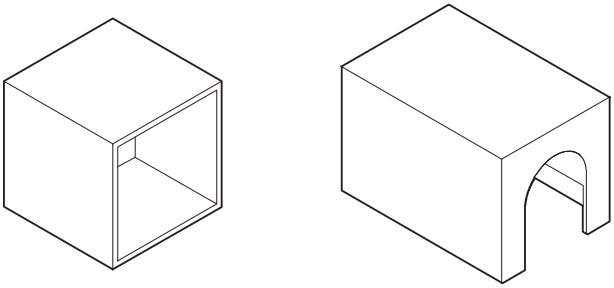
Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



PTFE Cover for VersaCube Sensor

These PTFE covers are designed to protect the VersaCube sensor from weld slag and other debris.



Description	Cat. No.
Short PTFE cover	871A-KCT40-F
Long PTFE cover	871A-KCT40-T

Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.

Figure 76 - Cat. No. 871A-KCT40-F

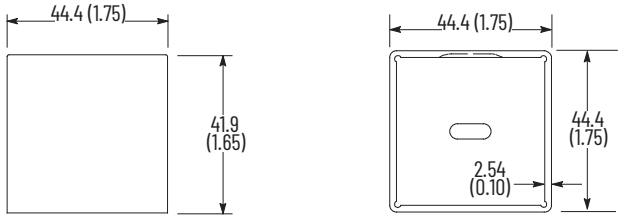
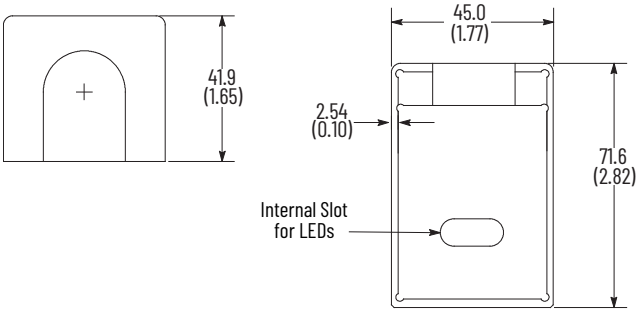


Figure 77 - Cat. No. 871A-KCT40-T

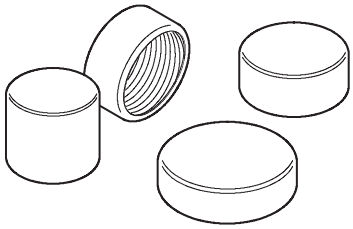


IMPORTANT Internal slot for light-emitting diode (LED) visibility.

PTFE End Caps for Tubular Proximity Sensors

PTFE end caps protect tubular proximity sensors from abrasion, corrosion, chemical exposure, weld slag, and other debris.

Figure 78 - 8 mm, 12 mm, 18 mm, and 30 mm



Approximate Dimensions

Not intended to be used for manufacturing purposes.

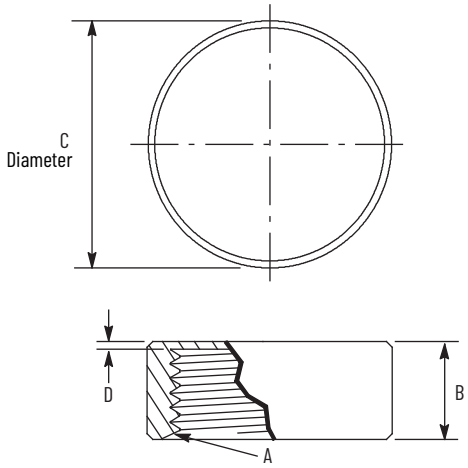


Table 30 - Shielded [mm (in.)]

Tube Diameter	A	B	C	D	Cat. No.
8 (0.31)	M8 x 1	5 (0.2)	10.8 (0.43)	0.50 (0.02)	871A-KT8
12 (0.47)	M12 x 1	8.9 (0.35)	14.8 (0.58)	0.89 (0.035)	871A-KT12
18 (0.71)	M18 x 1	8.8 (0.35)	24.4 (0.96)	1.27 (0.05)	871A-KT18
30 (1.18)	M30 x 1.5	10 (0.39)	38.1 (1.5)	2.03 (0.08)	871A-KT30

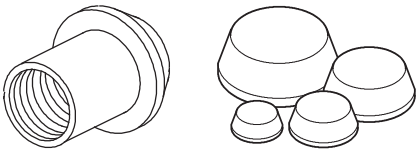
Table 31 - Unshielded [mm (in.)]

Tube Diameter	A	B	C	D	Cat. No.
8 (0.31)	M8 x 1	9.6 (0.38)	10.8 (0.43)	0.50 (0.02)	871A-KUT8
12 (0.47)	M12 x 1	15 (0.6)	14.8 (0.58)	0.89 (0.035)	871A-KUT12
18 (0.71)	M18 x 1	18.8 (0.7)	24.4 (0.96)	1.27 (0.05)	871A-KUT18
30 (1.18)	M30 x 1.5	23 (0.9)	38.1 (1.5)	2.03 (0.08)	871A-KUT30

Plastic Deflecting Caps for Tubular Proximity Sensors

Plastic deflecting caps are used with spring return brackets when lateral collisions might occur. The cap is threaded onto the front of the proximity sensor. The 30° slope allows the sensor and spring bracket to retract when a lateral collision occurs.

Figure 79 - 8 mm, 12 mm, 18 mm, and 30 mm



Approximate Dimensions

Not intended to be used for manufacturing purposes.

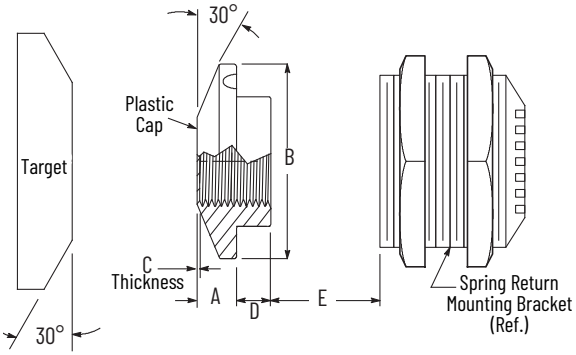


Table 32 - Shielded [mm (in.)]

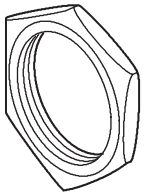
Tube Diameter	A	B	C	D	E	Cat. No.
8 (0.31)	5.1 (0.2)	15.1 (0.59)	0.25 (0.01)	–	10 (0.39)	871A-KP8
12 (0.47)	6.4 (0.25)	22.9 (0.9)	0.89 (0.04)			871A-KP12
18 (0.71)	8 (0.31)	31.4 (1.34)				871A-KP18
30 (1.18)		44.5 (1.75)			12.7 (0.5)	871A-KP30

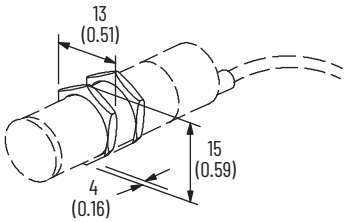
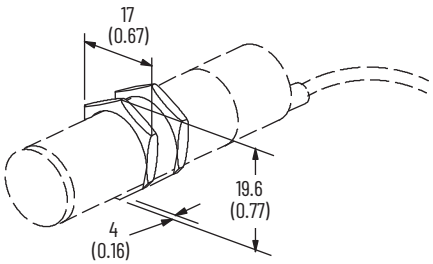
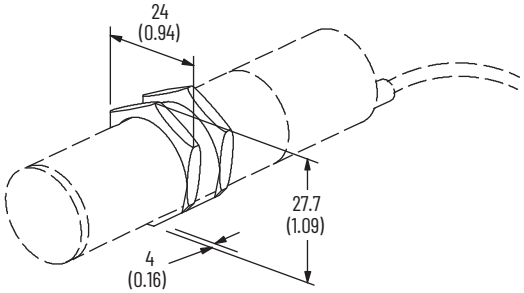
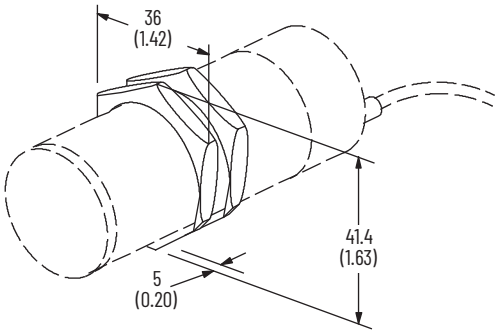
Table 33 - Unshielded [mm (in.)]

Tube Diameter	A	B	C	D	E	Cat. No.
8 (0.31)	5.1 (0.2)	15.1 (0.59)	0.25 (0.01)	9.51 (0.37)	10 (0.39)	871A-KUT8
12 (0.47)	6.4 (0.25)	22.9 (0.9)	0.89 (0.04)	17.3 (0.68)		871A-KUT12
18 (0.71)	8 (0.31)	31.4 (1.34)				871A-KUT18
30 (1.18)		44.5 (1.75)		20 (0.79)	12.7 (0.5)	871A-KUT30

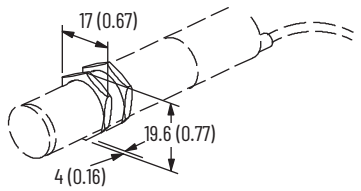
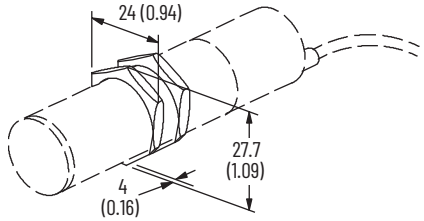
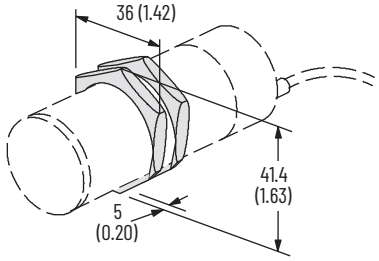
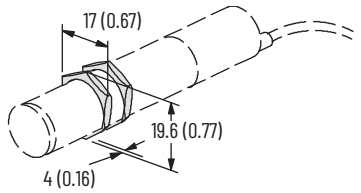
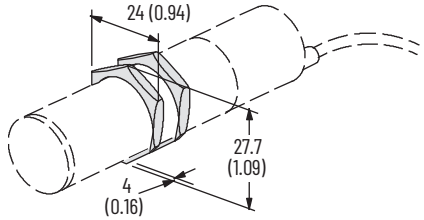
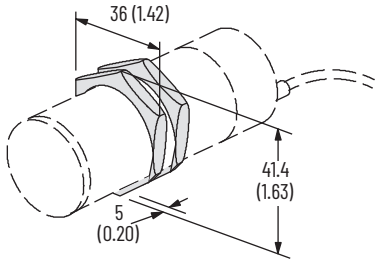
Mounting Nuts for Tubular Proximity Sensors

Figure 80 - 8 mm, 12 mm, 18 mm, and 30 mm



Material	Proximity Tube Diameter [mm (in.)]	Thread Size	Approximate Dimensions [mm (in.)]	Cat. No. (1)	
				Nickel-plated	PTFE-coated
Brass	8 (0.31)	M8 x 1		871C-N1	–
	12 (0.47)	M12 x 1		871C-N2	871A-NBT12
	18 (0.71)	M18 x 1		871C-N3	871A-NBT18
	30 (1.18)	M30 x 1.5		871C-N4	871A-NBT30

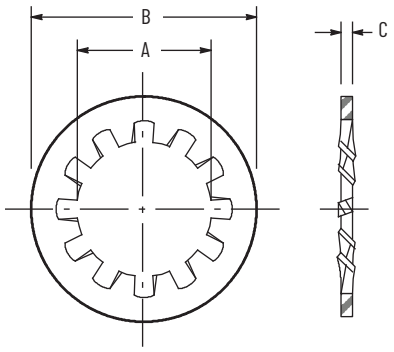
(1) Each catalog number includes two mounting nuts.

Material	Proximity Tube Diameter [mm (in.)]	Thread Size	Approximate Dimensions [mm (in.)]	Cat. No. (1)
Stainless steel	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	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

(1) Each catalog number includes two mounting nuts.

Lock Washers for Tubular Proximity Sensors

Figure 81 - 8 mm, 12 mm, 18 mm, and 30 mm



Nominal Washer Size [mm (in.)]	A		B		C		Cat. No. (1)
	Inside Diameter [mm (in.)]		Outside Diameter [mm (in.)]		Material Thickness [mm (in.)]		
8 (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 (0.047)	12.7 (0.5)	12.3 (0.48)	20.25 (0.8)	19.5 (0.77)	1 (0.04)	0.8 (0.03)	871A-LWN12
18 (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 (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

(1) Each catalog number includes two lock washers.

Spacer Kits

Spacer kits are available for use with 871D in-port tubular position sensors for nonstandard tubular probe lengths.

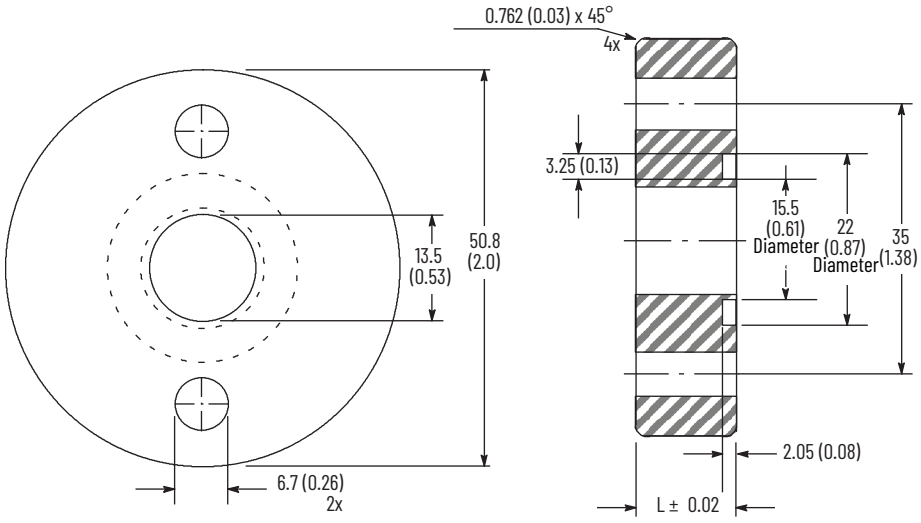
Example from the following table: Required sensor probe length is 101.6 mm (4 in.). Using sensor Cat. No. 871D-DW2NP1159-D4 and spacer Cat. No. 871A-S1427 results in a probe length of 101.5 mm (3.998 in.). Any difference between desired probe length and length that results from sensor and spacer combination must be carefully considered to achieve proper clearance in application.

Spacer Height [mm (in.)]	Sensor Cat. No. and Probe Length [mm (in.)]						Spacer Kit Cat. No. (1)
	871D-xxxxx260-xx	871D-xxxxx317-xx	871D-xxxxx524-xx	871D-xxxxx730-xx	871D-xxxxx959-xx	871D-xxxxx1159-xx	
	26 (1.025)	31.7 (1.25)	52.4 (2.062)	73 (2.875)	95.9 (3.775)	115.9 (4.56)	
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-S478
5.72 (0.225)	20.32 (0.8)	26.04 (1.025)	46.66 (1.837)	67.31 (2.65)	90.17 (3.55)	110.11 (4.335)	871A-S572
7.8 (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-S780
12.7 (0.5)	13.34 (0.525)	19.05 (0.75)	39.67 (1.562)	60.33 (2.375)	83.19 (3.275)	103.12 (4.06)	871A-S1270
14.27 (0.562)	11.76 (0.463)	17.48 (0.688)	38.10 (1.5)	58.75 (2.313)	81.61 (3.213)	101.55 (3.998)	871A-S1427
15.24 (0.6)	10.80 (0.425)	16.51 (0.65)	37.13 (1.462)	57.79 (2.275)	80.65 (3.175)	100.58 (3.96)	871A-S1524
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-S1737
18.09 (0.712)	7.95 (0.313)	13.67 (0.538)	34.29 (1.35)	54.94 (2.163)	77.80 (3.063)	97.74 (3.848)	871A-S1809
23.8 (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)	871A-S2380

(1) Each spacer kit contains: one spacer, one O-ring, and two appropriate length mounting bolts.

Approximate Dimensions

Dimensions in mm (in.). Not intended to be used for manufacturing purposes.



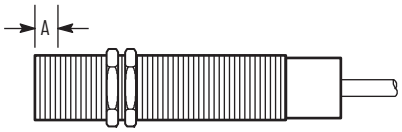
L = Spacer height as indicated in Spacer Kits on page 161.

Spring-loaded Brackets

Mounting Nut Torque [N•m (lb•in)] (1)	Sensor Nut Torque [N•m (lb•in)] (1)	Cat. No.
8.4 (75)	3.3 (30)	871A-BXN8
15.2 (136)	5.5 (50)	871A-BXN12
22 (195)	11.3 (100)	871A-BXN18

(1) For metal housing with the use of supplied hardware.

871C/872C Tubular Sensors



Diameter	Shielded	Length A			Remainder of Thread Length	
		[mm (in.)]	Torque [N•m (lb•in)] (1)	Turns	Torque [N•m (lb•in)] (1)	Turns
8 mm	Yes	4.6 (0.18)	1.7 (15)	1-1/2	2.8 (25)	1-1/2
12 mm	Yes	11.7 (0.46)	4 (35)	1/4	9.6 (85)	1/2
	No	5.6 (0.22)				
18 mm	Yes	13.7 (0.54)	11.3 (100)	1/3	19.8 (175)	1/2
	No	5.6 (0.22)				
30 mm	Yes/No	–	33.9 (300)	1/8	33.9 (300)	1/8

(1) For metal housing with the use of supplied hardware.

871T Tubular Sensors

Diameter	Shielded	Length A			Remainder of Thread Length	
		[mm (in.)]	Torque [N•m (lb•in)] (1)	Turns	Torque [N•m (lb•in)] (1)	Turns
12 mm	Yes	11.7 (0.46)	9 (80)	2/3	14.1 (125)	3/4
	No	5.6 (0.22)				
18 mm	Yes	13.7 (0.54)	19.8 (175)	1/2	28.3 (250)	2/3
	No	5.6 (0.22)				

(1) For metal housing with the use of supplied hardware.

871TM Tubular Sensors

Diameter	Shielded	Torque [N•m (lb•in)] (1)	Turns
12 mm	Yes	14.1 (125)	3/4
	No		
18 mm	Yes	28.3 (250)	2/3
	No		
30 mm	Yes	33.9 (300)	1/8
	No		

(1) For metal housing with the use of supplied hardware.

871Z Tubular Sensors

Diameter	Shielded	Torque [N•m (lb•in)] (1)	Turns
12 mm	Yes	9.6 (85)	1/2
	No		
18 mm	Yes	19.8 (175)	1/2
	No		
30 mm	Yes	33.9 (300)	1/8
	No		

(1) For metal housing with the use of supplied hardware.

Notes:

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Resource	Description
802PR Inductive Proximity Sensor Installation Instructions, publication 802PR-IN001	Provides information to install 802PR sensors.
871F Proximity Sensors Installation Instructions, publication 871F-IN001	Provides information to install 871F sensors.
871F 2-Wire AC/DC Proximity Sensors Installation Instructions, publication 871F-IN002	Provides information to install a 2-wire AC/DC 871F sensor.
871FM Inductive Sensors with IO-Link Interface, publication 871FM-UM001	Provides information to mount and install 871FM extended range sensors.
Miniature Metal Flat Pack Inductive Sensors with IO-Link User Manual, publication 871FM-UM002	Provides information to install, configure, and troubleshoot 871FM flat pack sensors.
871L AC/DC Limit Switch Style Inductive Proximity Sensor Installation Instructions, publication 871L-IN001	Provides information to install 871L AC/DC sensors.
871L DC Limit Switch Style Inductive Proximity Sensor Installation Instructions, publication 871L-IN002	Provides information to install 871L DC sensors.
871P DC Inductive Proximity Can Motion Sensor Installation Instructions, publication 871P-IN003	Provides information to install 871P sensors.
871P VersaCube Proximity Sensor Mounting and Wiring Instructions, publication 871P-IN002	Provides information to mount and wire 871P VersaCube® sensors.
871P VersaCube Proximity Sensor Installation Instructions, publication 871P-IN004	Provides information to install 871P VersaCube sensors.
871C Miniature Inductive Sensors with IO-Link Interface User Manual, publication 871C-UM001	Provides information to install, configure, and troubleshoot 871C sensors.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

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Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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