

Datasheet



Miniature self-contained photoelectric sensors in universal housing

- Easily fits (or retrofits) almost any mounting situation
- Exceptional optical performance, comparable to larger "MINI-style" or barrel sensors
- 10 to 30 V dc operation, with complementary (SPDT) NPN or PNP outputs, depending on model
- Bright LED operating status indicators are visible from 360°
- Rugged sealed housing, protected circuitry
- Models available with or without 18 mm threaded "nose"
- Less than 1 millisecond output response for excellent sensing repeatability
- Choose 2 m (6.5 ft) or 9 m (30 ft) cable or 150 mm (6 inch) Pico-style pigtail QD

To order the 9 m (30 ft) cable model, add suffix "W/30" to the cabled model number.

QD Models. For 4-pin integral Euro-style QD, add suffix "Q8" (e.g., QS186EQ8). For 4-pin integral Pico-style QD, add suffix "Q7" (for example, QS186EQ7). For 4-pin 150 mm (6 in) Euro-style pigtail, add suffix "Q5" (for example, QS186EQ5). For 4-pin 150 mm (6 in) Pico-style pigtail, add suffix "Q" (for example, QS186EQ).



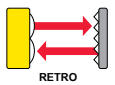
WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

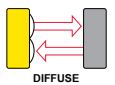
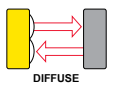
Opposed Mode	Model	Range	Output
Effective beam: 13 mm (0.5 inch) 	QS186EV (624 nm Visible Red)	20 m (66 ft)	N/A
	QS186E (940 nm Infrared)		N/A
	QS18VN6R		NPN
	QS18VP6R		PNP
Effective beam: 13 mm (0.5 inch) 	QS186EB (940 nm Infrared)	3 m (10 ft)	N/A
	QS18VN6RB		NPN
	QS18VP6RB		PNP

Polarized Retroreflective Mode	Model	Range	Output
630 nm Visible Red 	QS18VN6LP	3.5 m (12 ft)	NPN
	QS18VP6LP		PNP

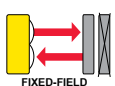


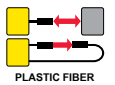
Retroreflective Mode	Model	Range	Output
628 nm Visible Red 	QS18VN6LV	6.5 m (21 ft)	NPN
	QS18VP6LV		PNP

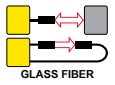
Convergent Mode	Model	Range	Output
630 nm Visible Red 	QS18VN6CV15	16 mm (0.63 in)	NPN
	QS18VP6CV15		PNP
	QS18VN6CV45	43 mm (1.7 in)	NPN
	QS18VP6CV45		PNP

Diffuse Mode	Model	Range	Output
940 nm Infrared 	QS18VN6D	450 mm (18 in)	NPN
	QS18VP6D		PNP
	QS18VN6DB (Diffuse, wide)		NPN
	QS18VP6DB (Diffuse, wide)		PNP

Divergent Mode	Model	Range	Output
940 nm Infrared 	QS18VN6W	100 mm (4 in)	NPN
	QS18VP6W		PNP

Fixed Field Mode	Model	Range	Output
660 nm Visible Red 	QS18VN6FF50	50 mm (2 in)	NPN
	QS18VP6FF50		PNP
	QS18VN6FF100	100 mm (4 in)	NPN
	QS18VP6FF100		PNP

Plastic Fiber Optic Mode	Model	Range	Output
660 nm Visible Red 	QS18VN6FP	Range varies by sensing mode and fiber optics used	NPN
	QS18VP6FP		PNP

Glass Fiber Optic Mode	Model	Range	Output
940 nm Infrared 	QS18VN6F	Range varies by sensing mode and fiber optics used	NPN
	QS18VP6F		PNP

Specifications

Supply Voltage

- 10 to 30 V dc (10% maximum ripple) at less than 25 mA, exclusive of load;
- Protected against reverse polarity and transient voltages

Repeatability

- Opposed Mode: 100 microseconds
- FF Mode: 160 microseconds
- All others: 150 microseconds

Adjustments

- Glass Fiber Optic, Plastic Fiber Optic, Convergent, Diffuse, and Retroreflective mode models (only): Single-turn sensitivity (Gain) adjustment potentiometer

Indicators

- 2 LED indicators on sensor top:
- Green solid: Power on
- Amber solid: Light sensed
- Green flashing: Output overloaded
- Amber flashing: Marginal excess gain (1 to 1.5x excess gain)
- Prior to date code 0223, the output indicator was red.

Construction

- ABS housing
- 3 mm mounting hardware included

Connections

- 2 m (6.5 ft) 4-wire PVC cable, 9 m (30 ft) 4-wire PVC cable, 4-pin Pico-style or Euro-style QD, 4-pin Pico-style or Euro-style 150 mm (6 in) pigtail QD, depending on model

Output Configuration

- Solid-state complementary (SPDT): NPN or PNP (current sinking or sourcing), depending on model;
- Rating: 100 mA maximum each output at 25 °C
- Off-state Leakage Current (FF Mode): less than 200 μ A @ 30V dc
- Off-state Leakage Current (All others): less than 50 μ A @ 30V dc
- ON-state Saturation Voltage: less than 1 V @ 10 mA; less than 1.5 V @ 100 mA
- Protected against false pulse on power-up and continuous overload or short circuit of outputs

Output Response

- Opposed Mode: 750 microseconds ON; 375 microseconds OFF
- FF Mode: 850 microseconds ON/OFF
- All others: 600 microseconds ON/OFF
- NOTE: 100 millisecond delay on power-up; outputs do not conduct during this time

Environmental

- IEC IP67; NEMA 6

Operating Conditions

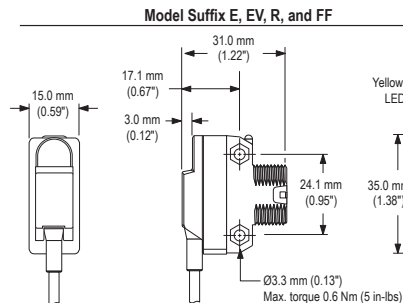
- Temperature: -20 °C to 70 °C (-4 °F to 158 °F)
- Relative Humidity: 90% @ 50 °C (non-condensing)

Certifications

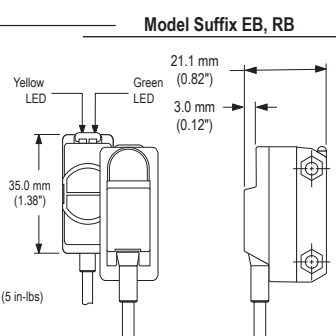


Dimensions and Features

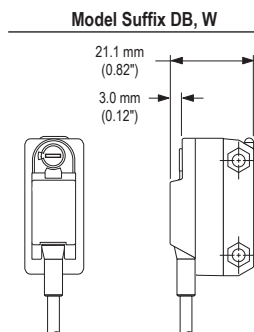
Models E, EV, R, and FF



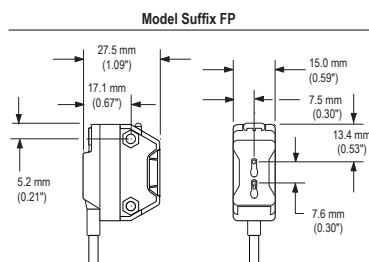
Models EB and RB



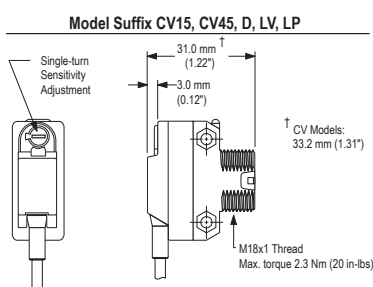
Models DB and W



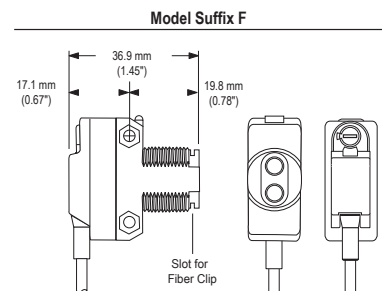
Models FP

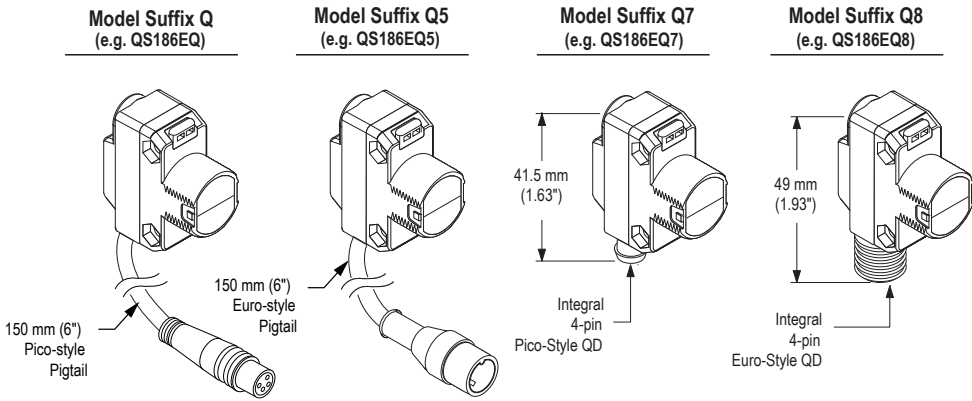


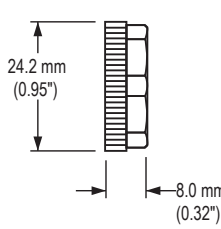
Models CV15, CV45, D, LV, and LP



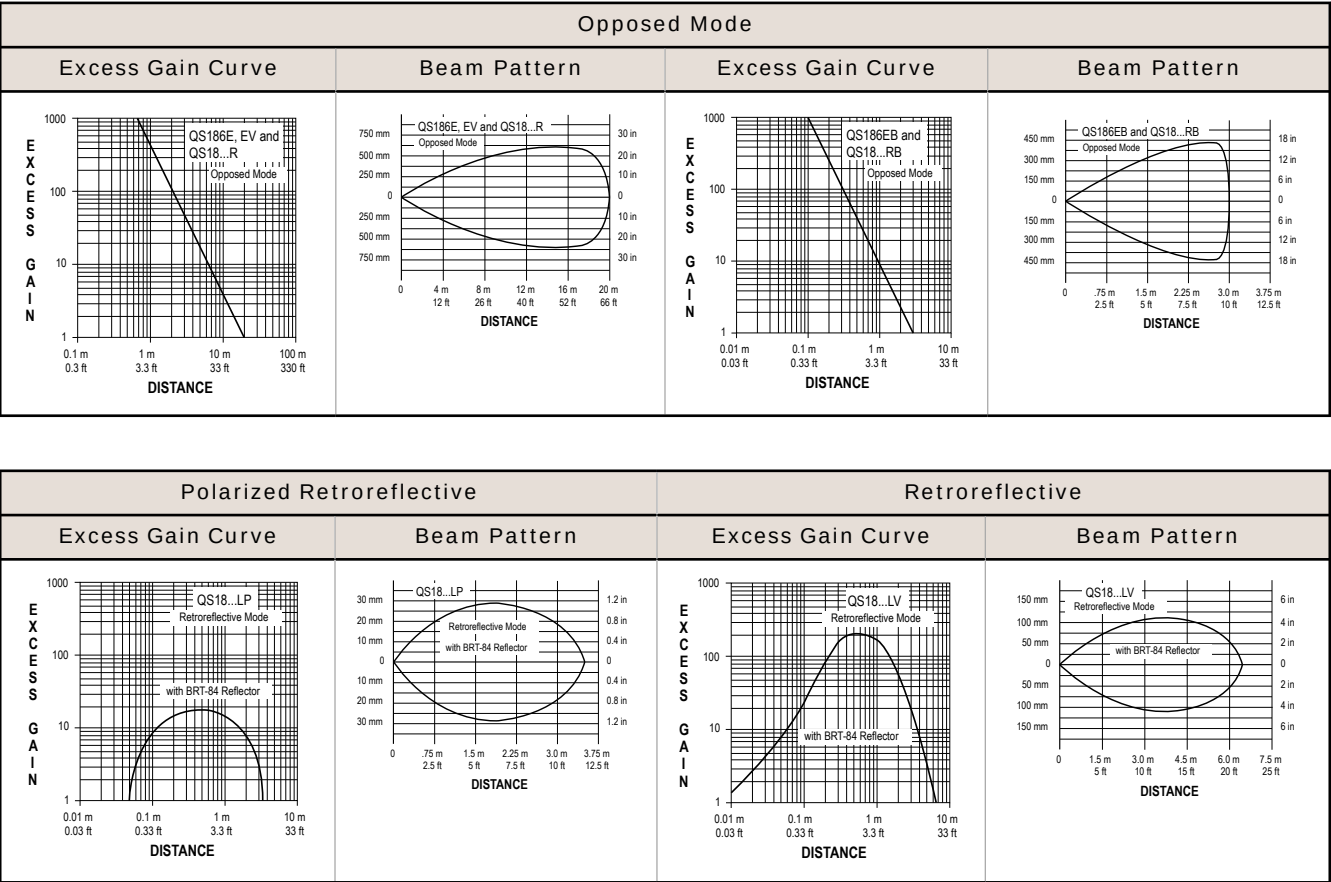
Models F





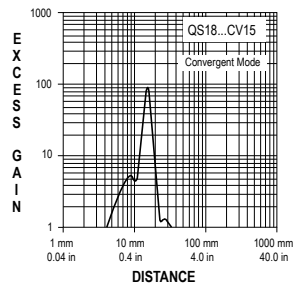
M18 x 1 Jam Nut		Packing List
	M3 hardware packet contents: 2 - M3 x 0.5 x 20 mm stainless steel screw 2 - M3 x 0.5 stainless steel hex nut 2 - M3 stainless steel washer	Sensor M18 x 1 jam nut M3 hardware packet Installation sheet, p/n 63687

Performance Curves

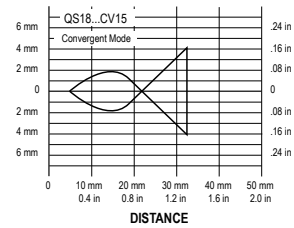


Convergent (Performance is based on a 90 % reflectance white test card.)

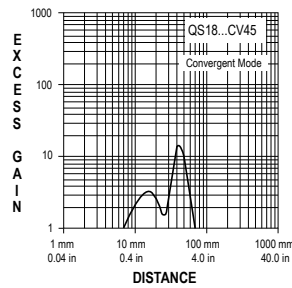
Excess Gain Curve



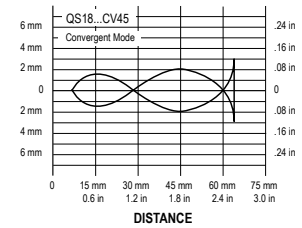
Beam Pattern



Excess Gain Curve

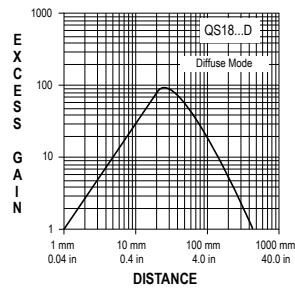


Beam Pattern

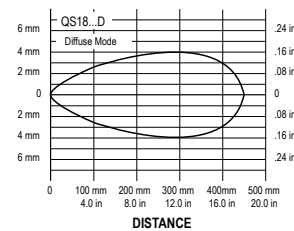


Diffuse (Performance is based on a 90 % reflectance white test card.)

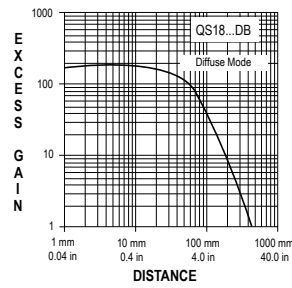
Excess Gain Curve



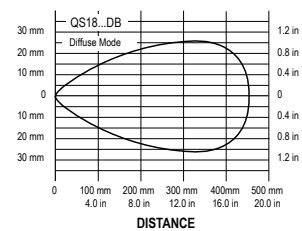
Beam Pattern



Excess Gain Curve

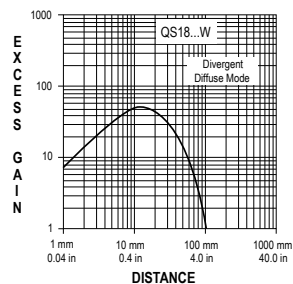


Beam Pattern

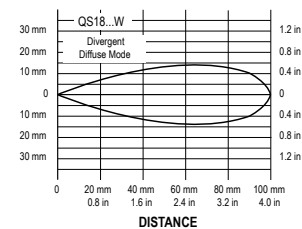


Divergent (Performance is based on a 90 % reflectance white test card.)

Excess Gain Curve

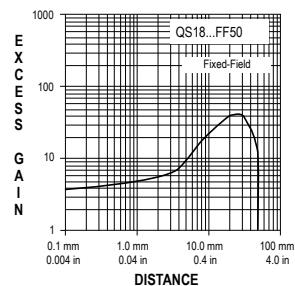


Beam Pattern



Fixed Field - 50 mm

Excess Gain Curve

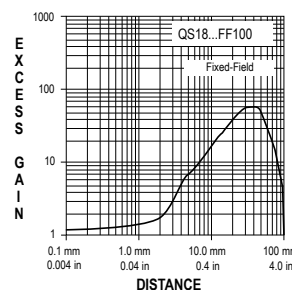


Spot Sizes

At 25 mm: 7.5 × 5.7 mm
At 50 mm: 6.3 × 4.9 mm

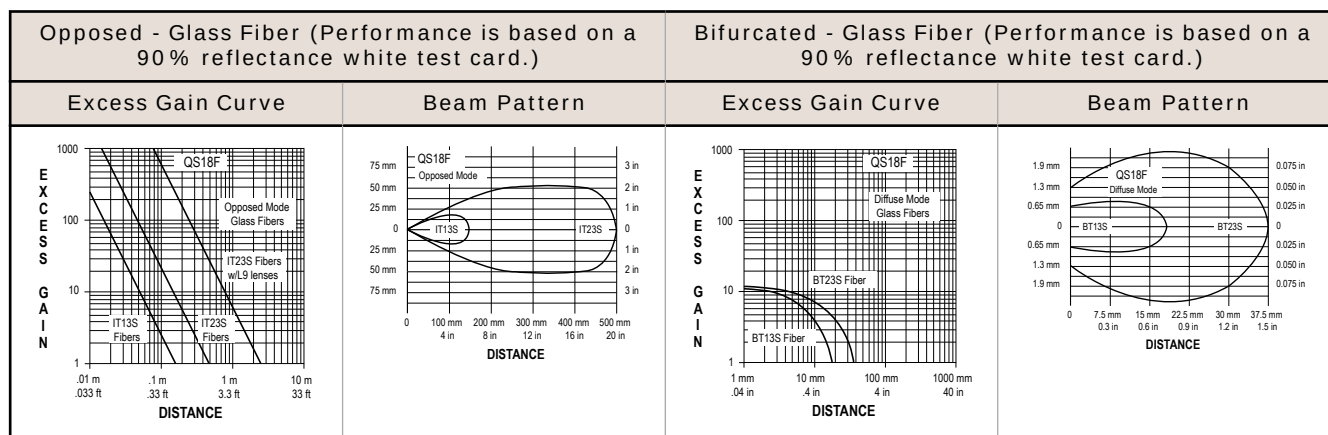
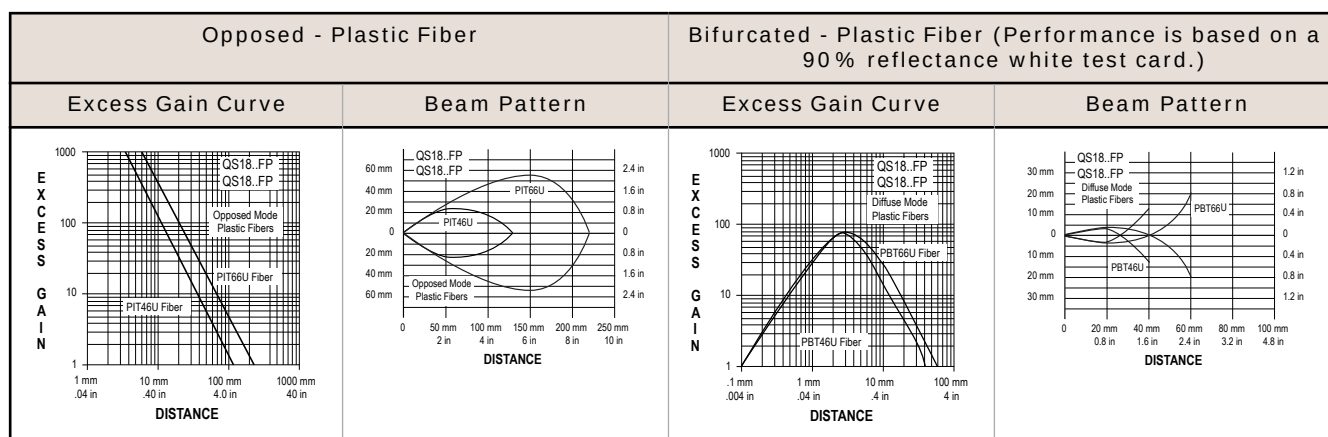
Fixed Field - 100 mm

Excess Gain Curve

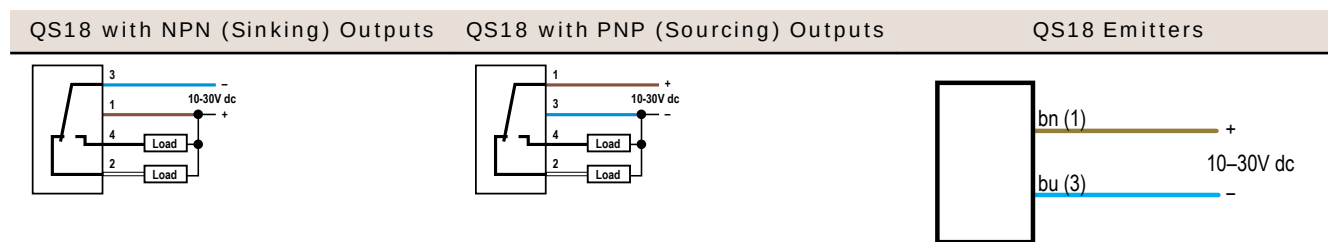


Spot Sizes

At 50 mm: 6.1 × 4.6 mm
At 100 mm: 2.9 × 2.9 mm



Wiring Diagrams



Installing Fibers

Cutting Unterminated Plastic Fibers QS18V..6FP

Unterminated plastic fibers are designed to be cut by the user to the length required for the application.

To facilitate cutting, a Banner model PFC-1 cutting device is supplied with the fiber. Cut the fiber as follows:

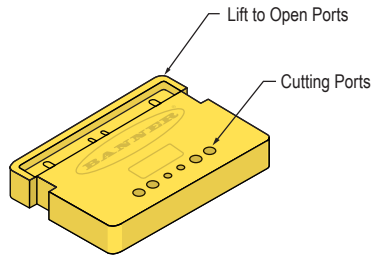


Figure 1. PFC-1 Cutting Device

Use small ports for fiber sizes:

- 0.25 mm (0.01 inches)
- 0.5 mm (0.02 inches)

Use large ports for fiber sizes:

- 0.75 mm (0.03 inches)
- 1.0 mm (0.04 inches)
- 1.5 mm (0.06 inches)

1. Locate the control end of the fiber (the unfinished end).
2. Determine the length of fiber required for the application. If using a bifurcated fiber, separate the two halves of the fiber at least 51 mm (2 inches) beyond the fiber cutting location.
3. Lift the top (blade) of the cutter to open the cutting ports.
4. Insert one of the control ends through one of the cutting ports on the cutter so that the excess fiber protrudes from the back of the cutter.
5. Double-check the fiber length, and close the cutter until the fiber is cut.
6. Using a different cutting port, cut the second control end to the required length.



NOTE: To ensure a clean cut each time, do not use a cutting port more than once.

7. Gently wipe the cut ends of the fiber with a clean, dry cloth to remove any contamination. Do not use solvents or abrasives on any exposed optical fiber.

Installing Plastic Fibers QS18V..6FP

Follow these steps to install the plastic fibers.

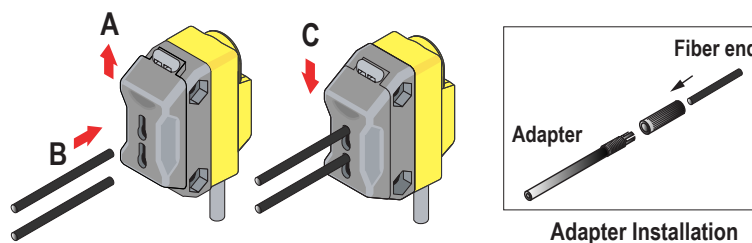


Figure 2. Installing Plastic Fibers

1. Slide the fiber gripper up to unlock it (A).
2. If using 0.25 mm or 0.5 mm core fibers, slide the plastic fiber adapters onto the fibers, flush with the fiber ends.
3. Carefully insert the prepared plastic fiber ends into the ports (B) as far as possible without applying extra force.
4. Slide the fiber gripper down to lock the fibers in place (C).

Installing Glass Fibers QS18V..6F

Follow these steps to install the glass fibers.

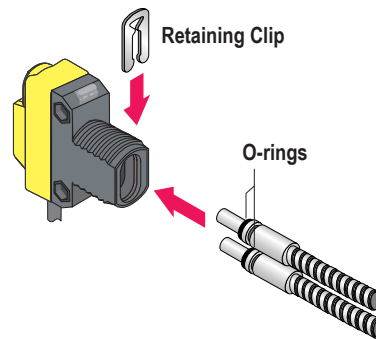


Figure 3. Installing Glass Fibers

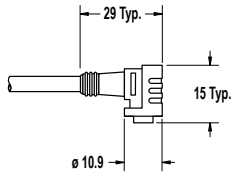
1. Slide the supplied o-ring on the sensor end of the fibers, as shown.
2. Press the fiber ends firmly into the ports located on the front of the sensor.
3. Slide the supplied u-shaped retaining clip into the slot in the sensor's barrel until the clip snaps into place.

Accessories

Cordsets

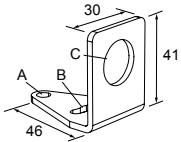
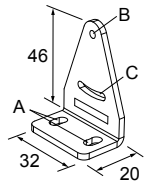
4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
MQDC-406	1.83 m (6 ft)	Straight		
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)			
MQDC-406RA	1.83 m (6 ft)	Right-Angle		1 = Brown 2 = White 3 = Blue 4 = Black
MQDC-415RA	4.57 m (15 ft)			
MQDC-430RA	9.14 m (30 ft)			
MQDC-450RA	15.2 m (50 ft)			

4-Pin Snap-on M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
PKG4-2	2.00 m (6.56 ft)	Straight		1 = Brown 2 = White 3 = Blue 4 = Black

4-Pin Snap-on M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
PKW4Z-2	2.00 m (6.56 ft)	Right-Angle		

WORLD-BEAM QS18 Brackets

All measurements are in millimeters.

SMB18A - Right-angle mounting bracket with a curved slot for versatile orientation 12-ga. stainless steel 18 mm sensor mounting hole - Clearance for M4 (#8) hardware  Hole center spacing: A to B = 24.2 Hole size: A = $\varnothing$ 4.6, B = 17.0 $\times$ 4.6, C = $\varnothing$ 18.5	SMB312S Stainless steel 2-axis, side-mount bracket  A = 4.3 $\times$ 7.5, B = diam. 3, C = 3 $\times$ 15.3
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Retroreflective Targets

See the Accessories section of your current Banner Engineering Corp catalog for complete information. NOTE: Polarized sensors require corner cube type retroreflective targets only.

Plastic and Glass Fiber Optics

See the Accessories section of your current Banner Engineering Corp catalog for a list of plastic and glass fiber optic cables.

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