WORLD-BEAM QS18

Datasheet



Miniature self-contained photoelectric sensors in universal housing

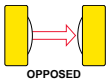
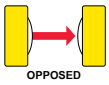
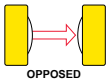
- Easily fits (or retrofits) almost any mounting situation
- Exceptional optical performance, comparable to larger “MINI-style” or barrel sensors
- 10 to 30 V dc operation, with complementary (SPDT) NPN or PNP outputs, depending on model
- Bright LED operating status indicators are visible from 360°
- 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.

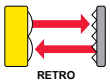
QD Models. For 4-pin integral Euro-style QD, add suffix “Q8” (e.g., QS186EQ8). For 4-pin integral Pico-style QD, add suffix “Q7” (for example, QS186EQ7). For 4-pin 150 mm (6 in) Euro-style pigtail, add suffix “Q5” (for example, QS186EQ5). For 4-pin 150 mm (6 in) Pico-style pigtail, add suffix “Q” (for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

WARNING: Not To Be Used for Personnel Protection

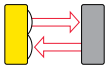
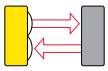
Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized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

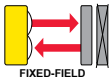
Polarized Retroreflective Mode	Model	Range	Output
630 nm Visible Red 	QS18VN6LP	3.5 m (12 ft)	NPN
	QS18VP6LP		PNP

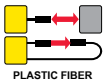
Retroreflective Mode	Model	Range	Output
628 nm Visible Red  	QS18VN6LV	6.5 m (21 ft)	NPN
	QS18VP6LV		PNP

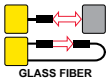
Convergent Mode	Model	Range	Output
630 nm Visible Red  	QS18VN6CV15	16 mm (0.63 in)	NPN
	QS18VP6CV15		PNP
	QS18VN6CV45	43 mm (1.7 in)	NPN
	QS18VP6CV45		PNP

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 µA @ 30V dc
Off-state Leakage Current (All others): less than 50 µA @ 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

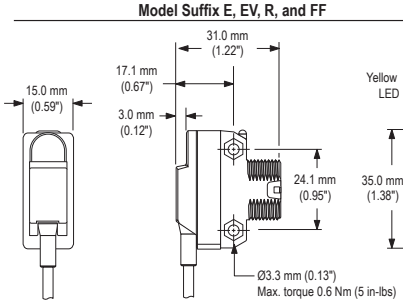
Environmental
IEC IP67; NEMA 6

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

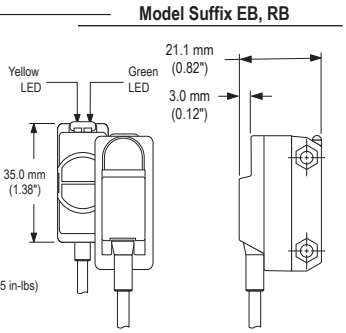
Certifications

Dimensions and Features

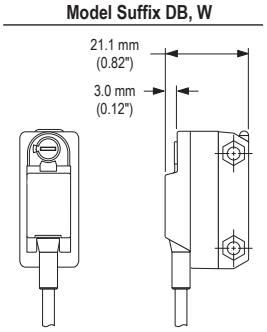
Models E, EV, R, and FF



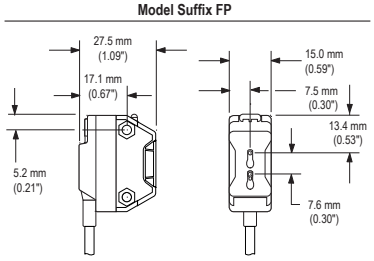
Models EB and RB



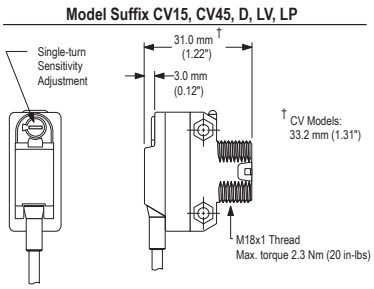
Models DB and W



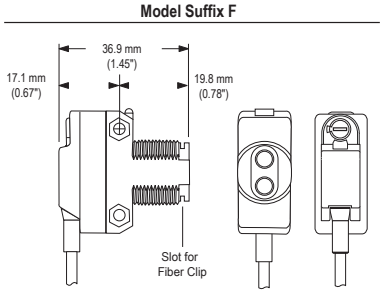
Models FP

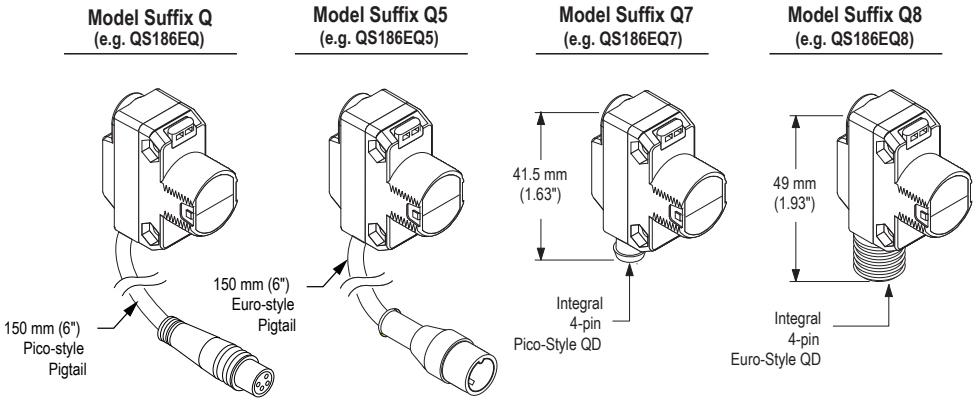


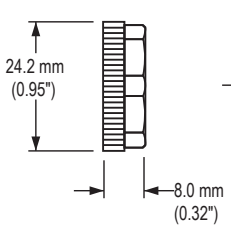
Models CV15, CV45, D, LV, and LP



Models F

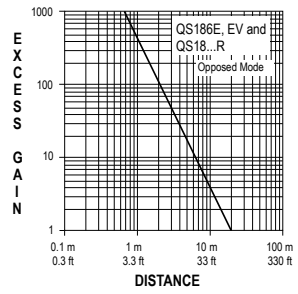
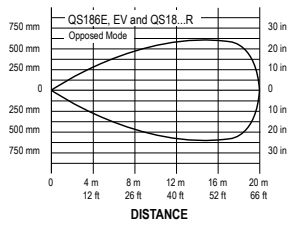
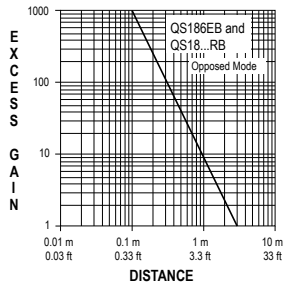
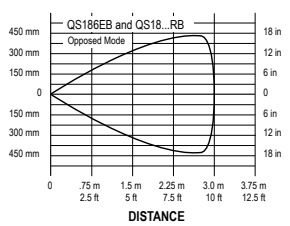




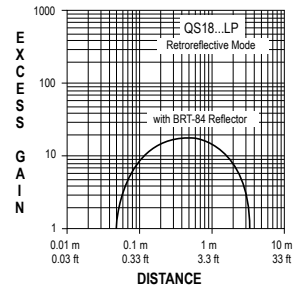
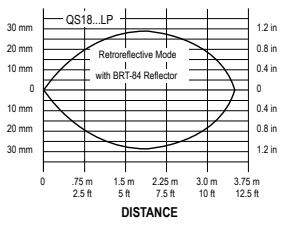
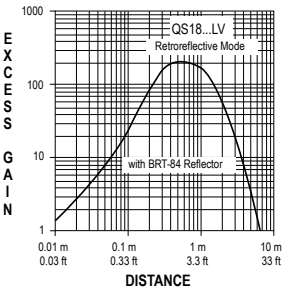
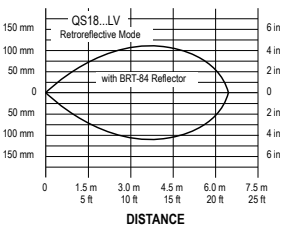
M18 x 1 Jam Nut		Packing List
	M3 hardware packet contents:	Sensor
	2 - M3 x 0.5 x 20 mm stainless steel screw	M18 x 1 jam nut
	2 - M3 x 0.5 stainless steel hex nut	M3 hardware packet
	2 - M3 stainless steel washer	Installation sheet, p/n 63687

Performance Curves

Opposed Mode

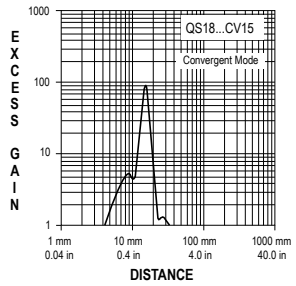
Excess Gain Curve	Beam Pattern	Excess Gain Curve	Beam Pattern
			

Polarized Retroreflective / Retroreflective

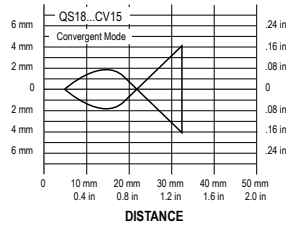
Excess Gain Curve	Beam Pattern	Excess Gain Curve	Beam Pattern
			

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

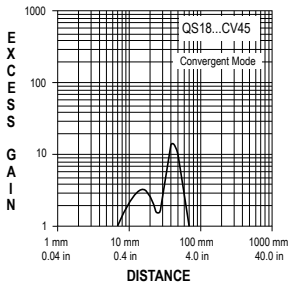
Excess Gain Curve



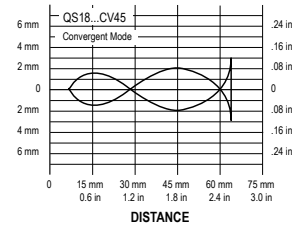
Beam Pattern



Excess Gain Curve

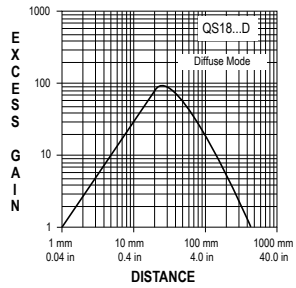


Beam Pattern

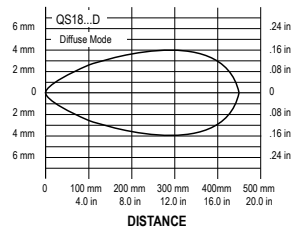


Diffuse (Performance is based on a 90% reflectance white test card.)

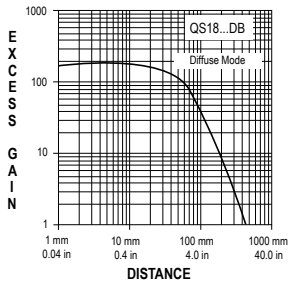
Excess Gain Curve



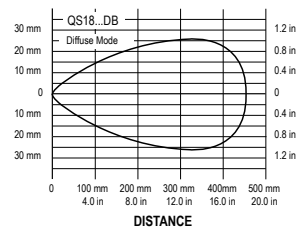
Beam Pattern



Excess Gain Curve

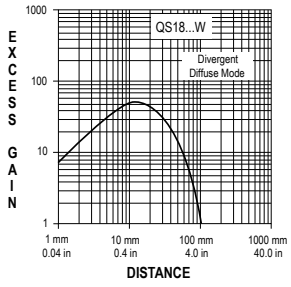


Beam Pattern

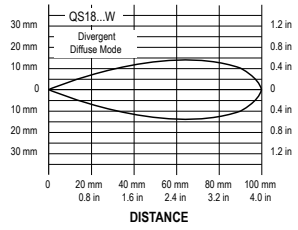


Divergent (Performance is based on a 90% reflectance white test card.)

Excess Gain Curve

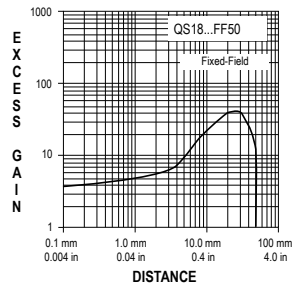


Beam Pattern



Fixed Field - 50 mm

Excess Gain Curve

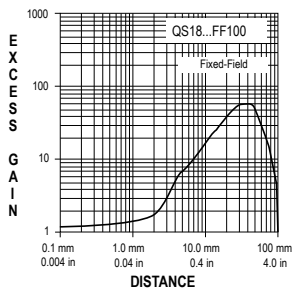


Spot Sizes

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

Fixed Field - 100 mm

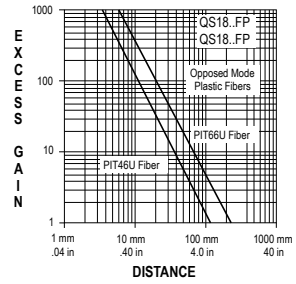
Excess Gain Curve

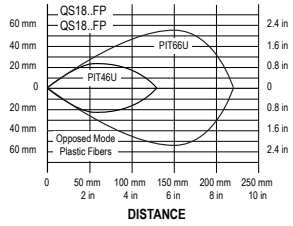


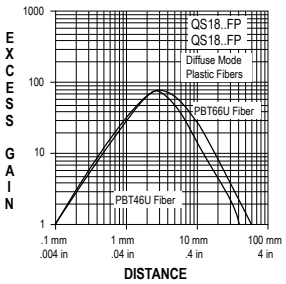
Spot Sizes

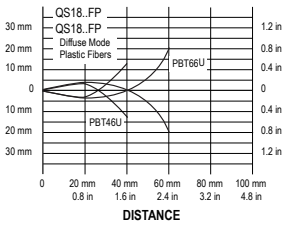
At 50 mm: 6.1 × 4.6 mm
At 100 mm: 2.9 × 2.9 mm

Opposed - Plastic Fiber		Bifurcated - Plastic Fiber (Performance is based on a 90% reflectance white test card.)	
Excess Gain Curve	Beam Pattern	Excess Gain Curve	Beam Pattern

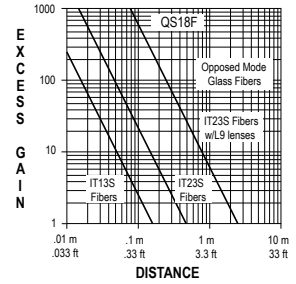


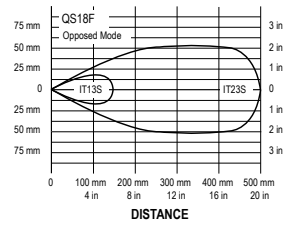


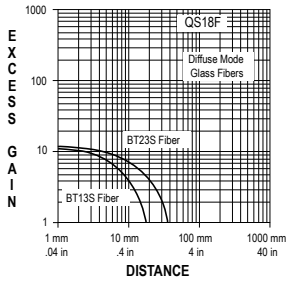


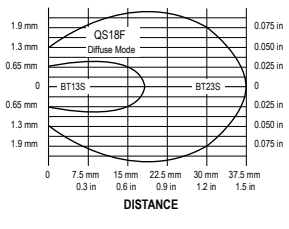


Opposed - Glass Fiber (Performance is based on a 90% reflectance white test card.)		Bifurcated - Glass Fiber (Performance is based on a 90% reflectance white test card.)	
Excess Gain Curve	Beam Pattern	Excess Gain Curve	Beam Pattern



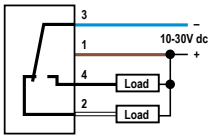


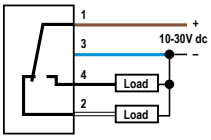


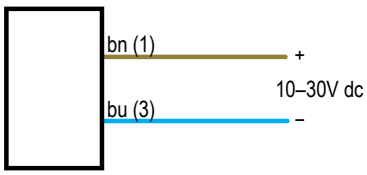


Wiring Diagrams

QS18 with NPN (Sinking) Outputs	QS18 with PNP (Sourcing) Outputs	QS18 Emitters







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:

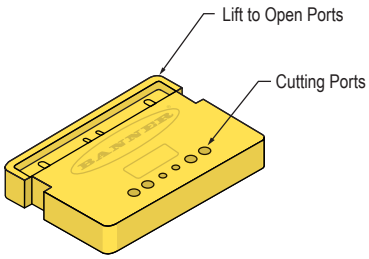


Figure 1. PFC-1 Cutting Device

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.

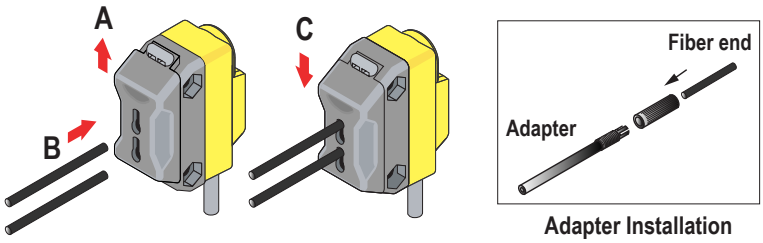


Figure 2. Installing Plastic Fibers

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.

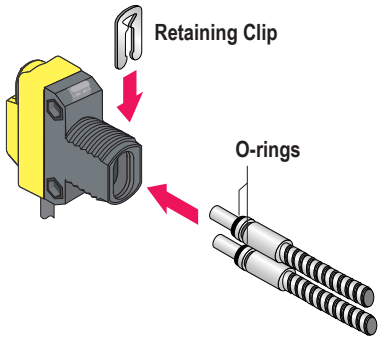
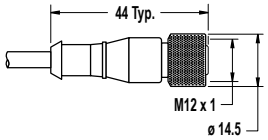
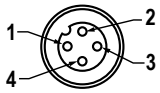
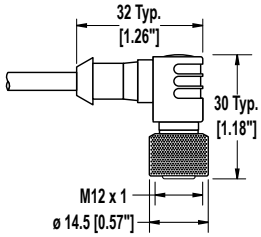


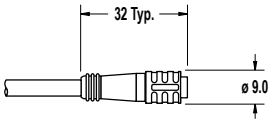
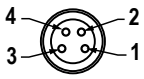
Figure 3. Installing Glass Fibers

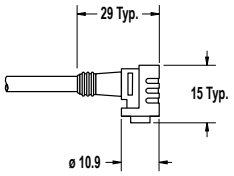
1. Slide the supplied o-ring on the sensor end of the fibers, as shown.
2. Press the fiber ends firmly into the ports located on the front of the sensor.
3. Slide the supplied u-shaped retaining clip into the slot in the sensor's barrel until the clip snaps into place.

Accessories

Cordsets

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
MQDC-406	1.83 m (6 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black
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		
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

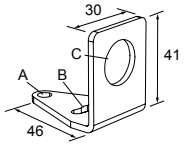
4-Pin Snap-on M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
PKW4Z-2	2.00 m (6.56 ft)	Right-Angle		

WORLD-BEAM QS18 Brackets

All measurements are in millimeters.

SMB18A

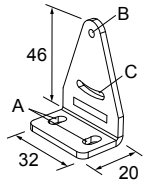
- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel
- 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware



Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17.0 × 4.6, C = ø 18.5

SMB312S

- Stainless steel 2-axis, side-mount bracket



A = 4.3 x 7.5, B = diam. 3, C = 3 x 15.3

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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