WORLD-BEAM® QS18

Miniature self-contained photoelectric sensors in universal housing
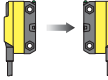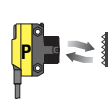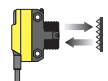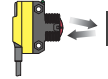
Features

- Easily fits (or retrofits) almost any mounting situation
- Exceptional optical performance, comparable to larger "MINI-style" or barrel sensors
- 10 to 30V 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') or 9 m (30') cable or 150 mm (6") Pico-style pigtail QD

Models

Sensing Mode		Model*	Range	Output
Opposed	940 nm Infrared	QS186E	20 m (66')	N/A
	Effective Beam: 13 mm (0.5")	QS18VN6R		NPN
		QS18VP6R		PNP
	940 nm Infrared	QS186EB	3 m (10')	N/A
	Effective Beam: 13 mm (0.5")	QS18VN6RB		NPN
		QS18VP6RB		PNP
Polarized Retro	660 nm Visible Red	QS18VN6LP	3.5 m (12')	NPN
		QS18VP6LP		PNP
Retro	660 nm Visible Red	QS18VN6LV	6.5 m (21')	NPN
		QS18VP6LV		PNP
Convergent	660 nm Visible Red	QS18VN6CV15	16 mm (0.63')	NPN
		QS18VP6CV15		PNP
		QS18VN6CV45	43 mm (1.7")	NPN
		QS18VP6CV45		PNP

Sensing Mode		Model*	Range	Output
Diffuse	940 nm Infrared	QS18VN6D	450 mm (18")	NPN
		QS18VP6D		PNP
		QS18VN6DB	450 mm (18")	NPN
		QS18VP6DB		PNP
Divergent	940 nm Infrared	QS18VN6W	100 mm (4")	NPN
		QS18VP6W		PNP
Fixed-Field	660 nm Visible Red	QS18VN6FF50	50 mm (2")	NPN
		QS18VP6FF50		PNP
		QS18VN6FF100	100 mm (4")	NPN
		QS18VP6FF100		PNP
Plastic Fiber Optic	660 nm Visible Red	QS18VN6FP	Range varies by sensing mode and fiber optics used	NPN
		QS18VP6FP		PNP
Glass Fiber Optic	940 nm Infrared	QS18VN6F	Range varies by sensing mode and fiber optics used	NPN
		QS18VP6F		PNP

* Only standard 2m (6.5') cable models are listed. For 9 m (30') cable, add suffix "**W/30**" to the model number (e.g., **QS186E W/30**).
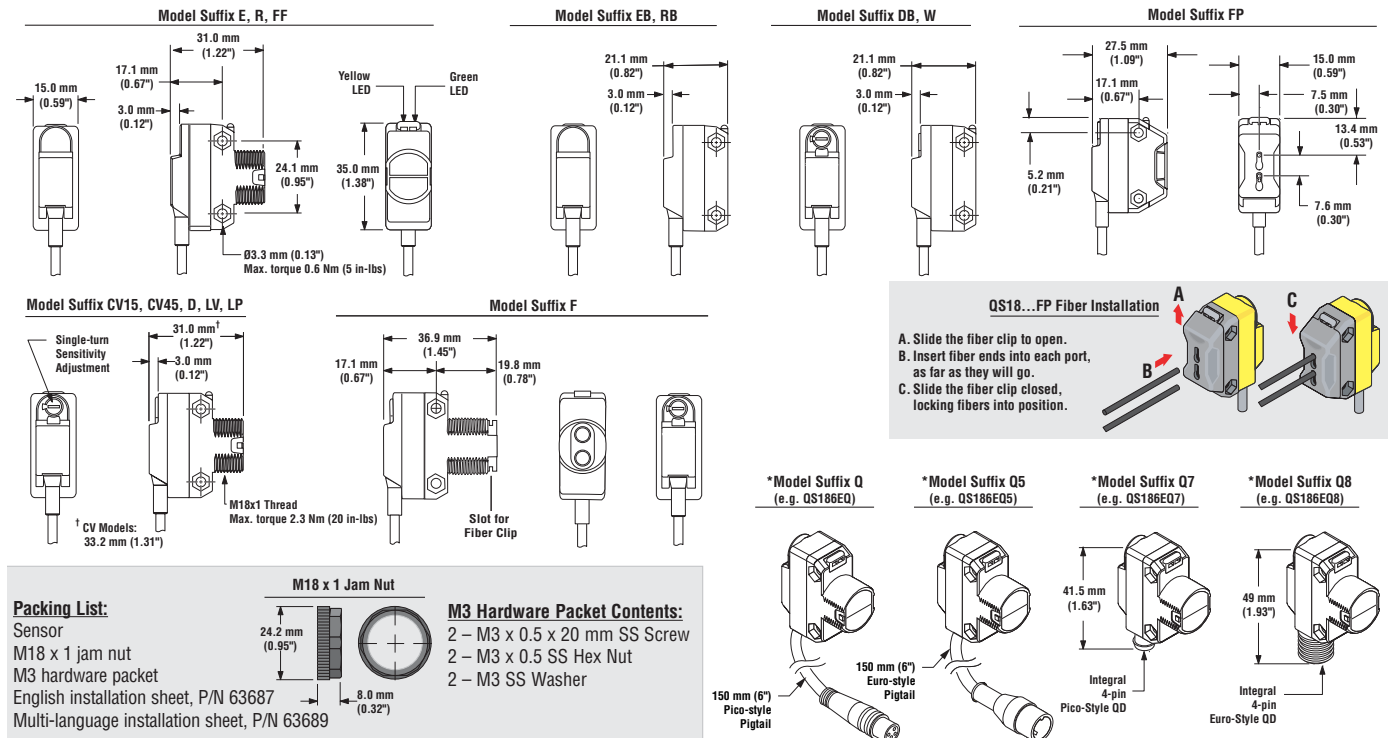
QD models:
- For 4-pin integral Euro-style QD, add suffix "Q8" (e.g., **QS186EQ8**).
- For 4-pin integral Pico-style QD, add suffix "Q7" (e.g., **QS186EQ7**).
- For 4-pin 150 mm (6") Euro-style pigtail, add suffix "Q5" (e.g., **QS186EQ5**).
- For 4-pin 150 mm (6") Pico-style pigtail, add suffix "Q" (e.g., **QS186EQ**).
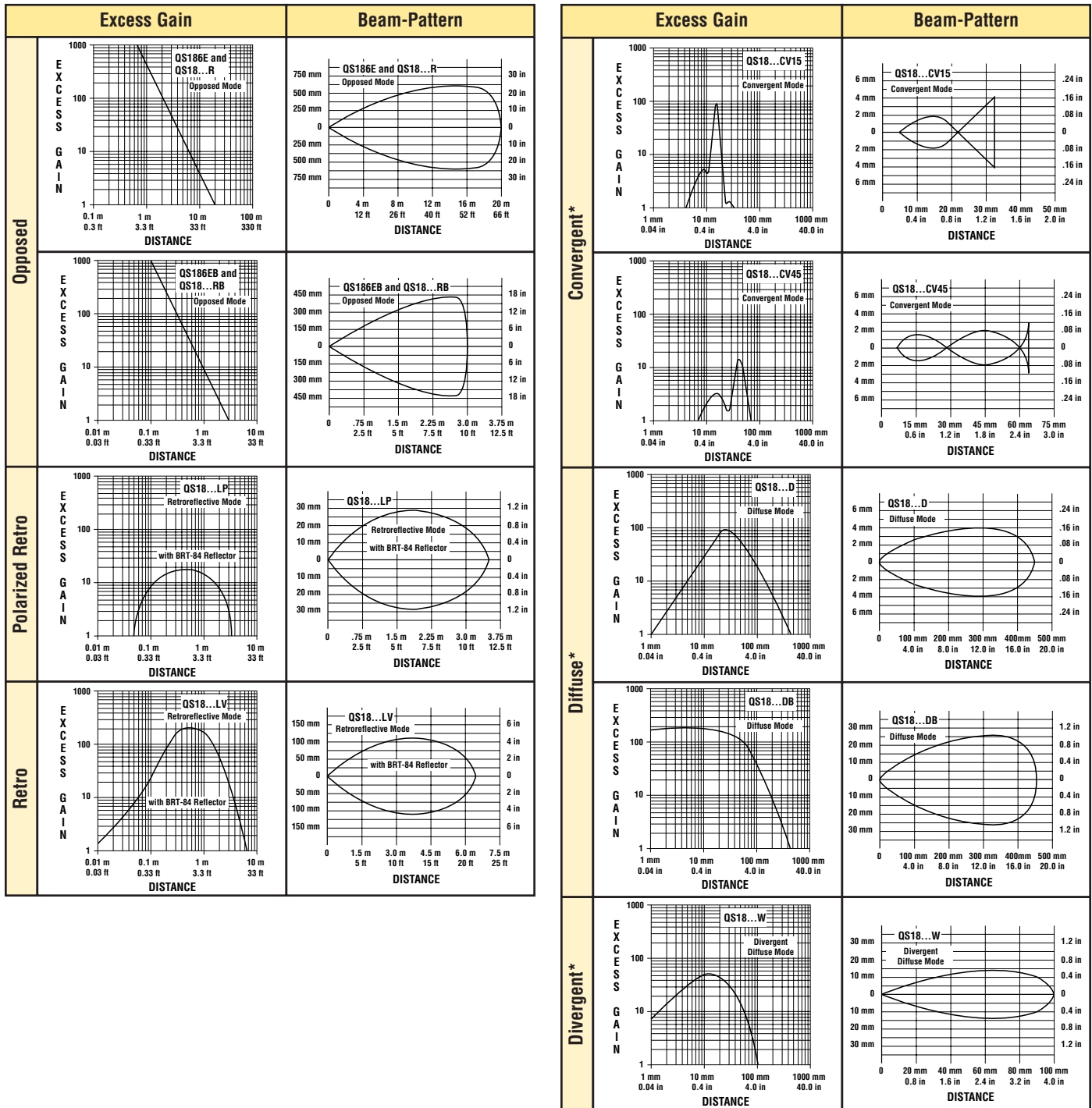
WORLD-BEAM® QS18

Specifications

Supply Voltage	10 to 30V dc (10% maximum ripple) at less than 25 mA, exclusive of load; Protected against reverse polarity and transient voltages
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 **All others:** less than 50 µA @ 30V dc **ON-state saturation voltage:** less than 1V @ 10 mA; less than 1.5V @ 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
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 **Green steady:** Power ON **Green flashing:** Output overloaded **Yellow* steady:** Light sensed **Yellow* flashing:** Marginal excess gain (1.0 to 1.5x excess gain) ***NOTE: Prior to date code 0223, the output indicator was red.**
Construction	ABS housing, rated IEC IP67; NEMA 6 3 mm mounting hardware included
Connections	2 m (6.5') 4-wire PVC cable 4-pin Pico-style QD 4-pin Euro-style QD 9 m (30') 4-wire PVC cable 4-pin Pico-style 150 mm (6") pigtail QD 4-pin Euro-style 150 mm (6") pigtail QD
Operating Conditions	**Temperature:** -20° to +70° C (-4° to + 158° F) **Relative Humidity:** 90% @ 50° C (non-condensing)
Certifications	CE c℟Lus

Dimensions and Features

Model Suffix E, R, FF

Model Suffix EB, RB

Model Suffix DB, W

Model Suffix FP

Model Suffix CV15, CV45, D, LV, LP

Model Suffix F

QS18...FP Fiber Installation

A. Slide the fiber clip to open.
B. Insert fiber ends into each port, as far as they will go.
C. Slide the fiber clip closed, locking fibers into position.

Packing List:
Sensor
M18 x 1 jam nut
M3 hardware packet
English installation sheet, P/N 63687
Multi-language installation sheet, P/N 63689

M18 x 1 Jam Nut

M3 Hardware Packet Contents:
2 – M3 x 0.5 x 20 mm SS Screw
2 – M3 x 0.5 SS Hex Nut
2 – M3 SS Washer

*Model Suffix Q (e.g. QS186EQ)

*Model Suffix Q5 (e.g. QS186EQ5)

*Model Suffix Q7 (e.g. QS186EQ7)

*Model Suffix Q8 (e.g. QS186EQ8)

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Performance Curves

Opposed

Excess Gain	Beam-Pattern

QS186E and QS18…R — Opposed Mode

QS186EB and QS18…RB — Opposed Mode

Polarized Retro

QS18…LP — Retroreflective Mode with BRT-84 Reflector

Retro

QS18…LV — Retroreflective Mode with BRT-84 Reflector

Convergent*

QS18…CV15 — Convergent Mode

QS18…CV45 — Convergent Mode

Diffuse*

QS18…D — Diffuse Mode

QS18…DB — Diffuse Mode

Divergent*

QS18…W — Divergent Diffuse Mode

*Performance based on 90% reflectance white test card

WORLD-BEAM® QS18

Performance Curves, continued

	Excess Gain	Beam-Pattern
Fixed Field – 50 mm	QS18…FF50 Fixed-Field chart	N/A
Fixed Field – 100 mm	QS18…FF100 Fixed-Field chart	N/A

	Excess Gain	Beam-Pattern
Opposed Plastic Fibers	QS18..FP / QS18..FP — Opposed Mode Plastic Fibers, PIT66U Fiber, PIT46U Fiber	QS18..FP / QS18..FP — PIT66U, PIT46U, Opposed Mode Plastic Fibers
Bifurcated Plastic Fibers*	QS18..FP / QS18..FP — Diffuse Mode Plastic Fibers, PBT66U Fiber, PBT46U Fiber	QS18..FP / QS18..FP — Diffuse Mode Plastic Fibers, PBT66U, PBT46U
Opposed Glass Fibers*	QS18F — Opposed Mode Glass Fibers, IT23S Fibers w/L9 lenses, IT13S Fibers, IT23S Fibers	QS18F Opposed Mode, IT13S, IT23S
Bifurcated Glass Fibers*	QS18F — Diffuse Mode Glass Fibers, BT23S Fiber, BT13S Fiber	QS18F Diffuse Mode, BT13S, BT23S

*Performance based on 90% reflectance white test card

Hookups

QS18 Sensors with NPN (Sinking) Outputs

bu (3)
bn (1)   10-30V dc − +
bk (4)   Load
wh (2)   Load
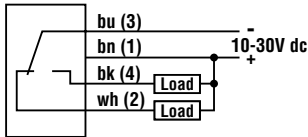
QS18 Sensors with PNP (Sourcing) Outputs

bn (1)
bu (3)   10-30V dc + −
bk (4)   Load
wh (2)   Load
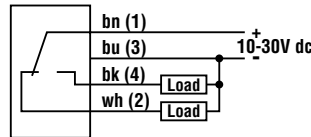
4-Pin Pico-Style Pin-out (Cable Connector Shown)

Black Wire ─ White Wire
Blue Wire ─ Brown Wire
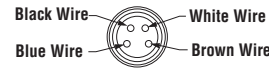
4-Pin Euro-Style Pin-out (Cable Connector Shown)

wh (2)
(1) bn
(4) bk
bu (3)

QS18 Emitters

bn   +
      10-30V dc
bu   −
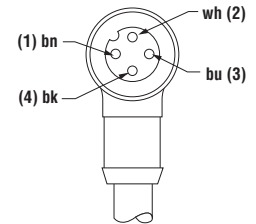
Installing Fibers

Unterminated Plastic Fiber Cutting Procedure
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:

1) Locate the "control end" of the fiber (the unfinished end). Determine the length of fiber required for the application. If using a bifurcated fiber, separate the two halves of the fiber at least 2" beyond the fiber cutting location. Lift the top (blade) of the cutter to open the cutting ports. Insert one of the control ends through one of the cutting ports on the PFC-1 cutter so that the excess fiber protrudes from the back of the cutter.

2) Double-check the fiber length, and close the cutter until the fiber is cut. Using a different cutting port, cut the second control end to the required length. **To ensure a clean cut each time, do not use a cutting port more than once.**

3) 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.**

Plastic Fiber Installation
A) Unlock the fiber gripper as shown in Figure 2. If 0.25 mm or 0.5 mm core fibers are being used, slide the small fiber adapters onto the fibers, flush with the fiber ends.

B) Gently insert the prepared plastic fiber ends into the ports, as far as they will go.

C) Slide the fiber gripper back to lock, as shown in Figure 2.

Glass Fiber Installation
A) Install the O-ring (supplied with the fiber) on each end, as shown in the drawing.

B) While pressing the fiber ends firmly into the portson the front of the sensor, slide the U-shaped retaining clip (supplied with the sensor) into the slot in the sensor's barrel, until it snaps into place.
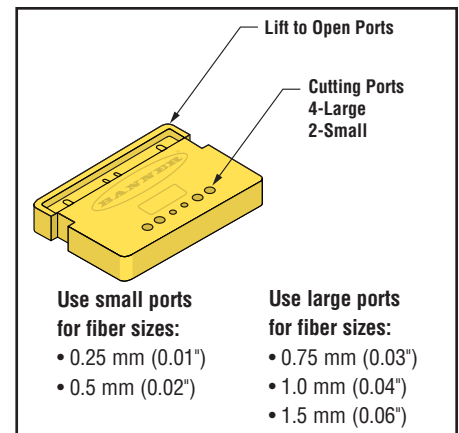
Lift to Open Ports

Cutting Ports
4-Large
2-Small

Use small ports for fiber sizes:	Use large ports for fiber sizes:
• 0.25 mm (0.01")	• 0.75 mm (0.03")
• 0.5 mm (0.02")	• 1.0 mm (0.04")
	• 1.5 mm (0.06")

Figure 1. PFC-1 plastic fiber cutter (supplied with fiber)
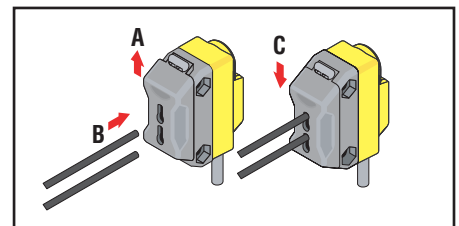
A   C
B
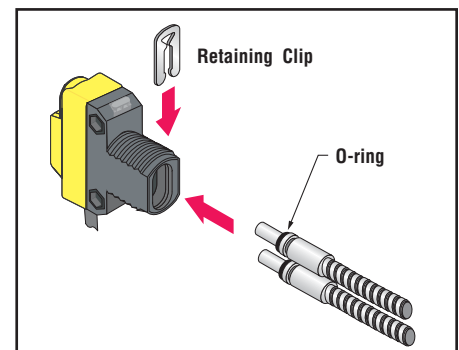
Figure 2. Installing plastic fibers

Retaining Clip

O-ring

Figure 3. Installing glass fibers

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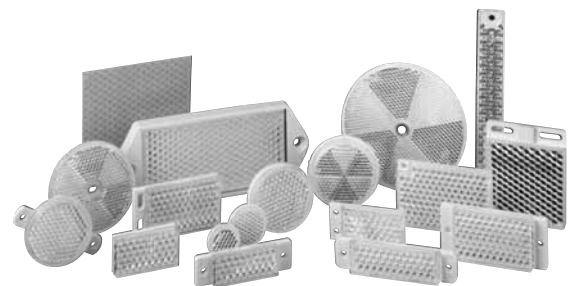
Euro-Style Quick-Disconnect Cables

Style	Model	Length	Dimensions
4-Pin Straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5') 5 m (15') 9 m (30')	ø 15 mm (0.6") 44 mm max. (1.7") M12 x 1
4-Pin Right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5') 5 m (15') 9 m (30')	38 mm max. (1.5") 38 mm max. (1.5") M12 x 1 ø 15 mm (0.6")

Pico-Style Quick-Disconnect Cables

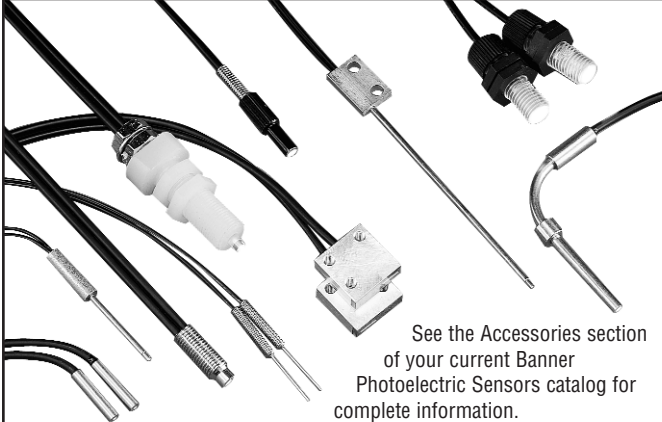| Style	Model	Length	Dimensions
4-Pin Straight	PKG4-2	2 m (6.5')	ø 10 mm max. (0.4") 28 mm max. (1.1")
4-Pin Right-angle	PKW4-2	2 m (6.5')	27.9 mm (1.10") 14.6 mm (0.57") ø 8.3 mm (0.33")

Retroreflective Targets

See the Accessories section of your current Banner Photoelectric Sensors 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 Photoelectric Sensors catalog for complete information.

WORLD-BEAM QS18 Mounting Brackets

SMB18A	• 12-gauge, stainless steel • Right-angle mounting bracket	SMB312S	• Stainless steel 2-axis, side-mounting bracket

SMB18A:

* Use 4 mm (#8) screws to mount bracket. Drill screw holes 24.2 mm (0.95") apart.

30°
30 mm (1.2")
R 24.2 mm (0.95")
ø 4.6 mm* (0.18")
4.6 mm* (0.18")
7.6 mm (0.30")
18.5 mm (0.73")
25.4 mm (1.00")
41 mm (1.6")
46 mm (1.8")

Refer to your current Banner Photoelectrics catalog for more mounting bracket options

SMB312S:

R 24.1 mm (0.95")
R 5.1 mm (0.20")
15° (2)
31.8 mm (1.25")
20°
ø 3.05 mm (0.120")
ø 3.05 mm Slot (0.120")
R 3.1 mm (0.12") (2)
90°
20.1 mm (0.79")
2.5 mm (0.10")
45.5 mm (1.79")
20.3 mm (0.80")
10° (TYP)
4.32 mm (0.170") Slot (2)

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6 P/N 63908 rev. G

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WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.

P/N 63908 rev. G