



# QS18 Series Sensor Product Manual

Original Instructions

p/n: 197052 Rev. H

12-Aug-25

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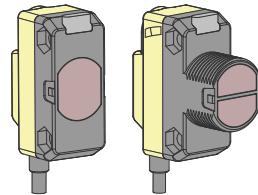
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# Chapter 1

## Features

Miniature self-contained photoelectric sensor in a universal housing

- Easily fits (or retrofits) almost any mounting situation
- Exceptional optical performance, comparable to larger “MINI-style” or barrel sensors
- 10 V DC 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), 9 m (30 ft), or 150 mm (6 in) cable with a M8 quick disconnect connector



### WARNING:



- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

## Models

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

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

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

Model	Convergent Mode	Range	Output
QS18VN6CV15	630 nm Visible red	16 mm (0.63 in)	NPN
QS18VP6CV15			PNP

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Model	Convergent Mode	Range	Output
QS18VN6CV45		43 mm (1.7 in)	NPN
QS18VP6CV45			PNP

Model	Diffuse Mode	Range	Output
QS18VN6D	940 nm Infrared	450 mm (18 in)	NPN
QS18VP6D		600 mm (24 in)	PNP
QS18VN6DL	630 nm Visible red	250 mm (10 in)	NPN
QS18VP6DL		450 mm (18 in)	PNP
QS18VN6DVS	Infrared	250 mm (10 in)	NPN
QS18VP6DVS		450 mm (18 in)	PNP
QS18VN6DB (Wide)	Infrared	250 mm (10 in)	NPN
QS18VP6DB (Wide)		450 mm (18 in)	PNP

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

Model	Fixed Field Mode	Range	Output
QS18VN6FF50	630 nm Visible red	50 mm (2 in)	NPN
QS18VP6FF50		100 mm (4 in)	PNP
QS18VN6FF100		125 mm (5 in)	NPN
QS18VP6FF100		150 mm (6 in)	PNP
QS18VP6FF125			NPN
QS18VN6FF150			PNP
QS18VP6FF150			

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

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

- To order the 4-pin M12 integral quick disconnect model, add the suffix "Q8" to the model number. For example, QS186EQ8.
- To order the 4-pin M8 integral quick disconnect model, add the suffix "Q7" to the model number. For example, QS186EQ7.
- To order the 150 mm (6 in) PVC cable model with a 4-pin M12 quick disconnect, add the suffix "Q5" to the model number. For example, QS186EQ5.
- To order the 150 mm (6 in) PVC cable model with a 4-pin M8 quick disconnect, add the suffix "Q" to the model number. For example, QS186EQ.
- Models with a quick disconnect require a mating cordset.

## Specifications

### Supply Voltage

10 V DC to 30 V DC (10% maximum ripple) at less than 25

mA, exclusive of load  
Protected against reverse polarity and transient voltages

#### Light Source

Glass Fiber Optic, Opposed and Diffuse mode models:  
Infrared, 940 nm  
Plastic Fiber Optic, Retroreflective, Convergent models:  
Visible red, 660 nm  
Fixed-Field and DVS models: Visible red, 630 nm

#### Adjustments

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

#### Indicators

Two LED indicators on the sensor top  
Green: Power on  
Amber: Light sensed  
Amber flashing: Marginal excess gain (1 to 1.5 times excess  
gain)

#### 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 M8 or M12 QD; or 150 mm (6 in) cable with a 4-pin M8 or  
M12 QD, depending on the model

#### Repeatability

Opposed Mode: 100 microseconds  
DVS, DL and FF Modes: 90 microseconds  
All Other Modes: 150 microseconds

#### 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  
DVS, DL and FF Modes ON-state Saturation Voltage: less  
than 1.5 V at 10 mA; less than 3 V at 100 mA  
All Other Modes: ON-state Saturation Voltage: less than 1 V  
at 10 mA; less than 1.5 V at 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  
DVS, FF, and DL Modes: 850 microseconds ON/OFF  
All Other Modes: 600 microseconds ON/OFF  
100-millisecond delay on power-up; outputs do not conduct  
during this time

**NOTE:** For performance specifications of the FF50 and FF100 models built prior to date code 17090, refer  
to document p/n [63908](#).

## FCC Part 15 Class A for Unintentional Radiators

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

## Industry Canada ICES-003(A)

This device complies with CAN ICES-3 (A)/NMB-3(A). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

#### Environmental

IEC IP67; NEMA 6

#### Operating Conditions

-20 °C to +70 °C (-4 °F to +158 °F)  
95% at +50 °C maximum relative humidity (non-condensing)

#### Vibration and Mechanical Shock

#### Required Overcurrent Protection



**WARNING:** Electrical connections must  
be made by qualified personnel in  
accordance with local and national  
electrical codes and regulations.

Overcurrent protection is required to be provided by end  
product application per the supplied table.

Overcurrent protection may be provided with external fusing  
or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go  
to [www.bannerengineering.com](#).

Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	2.0	30	0.5

#### Certifications



Banner Engineering BV  
Park Lane, Culliganlaan 2F bus 3  
1831 Diegem, BELGIUM

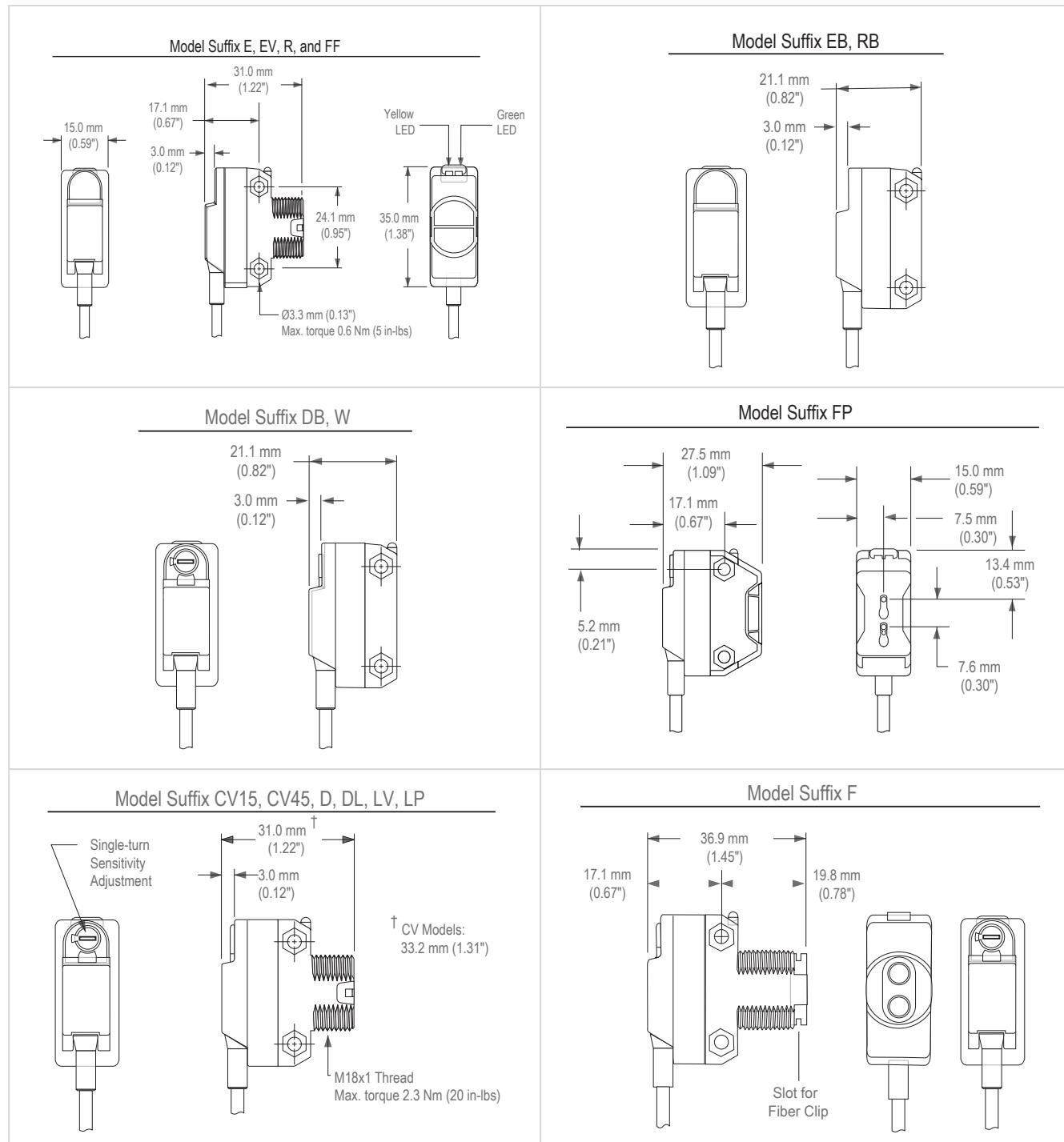


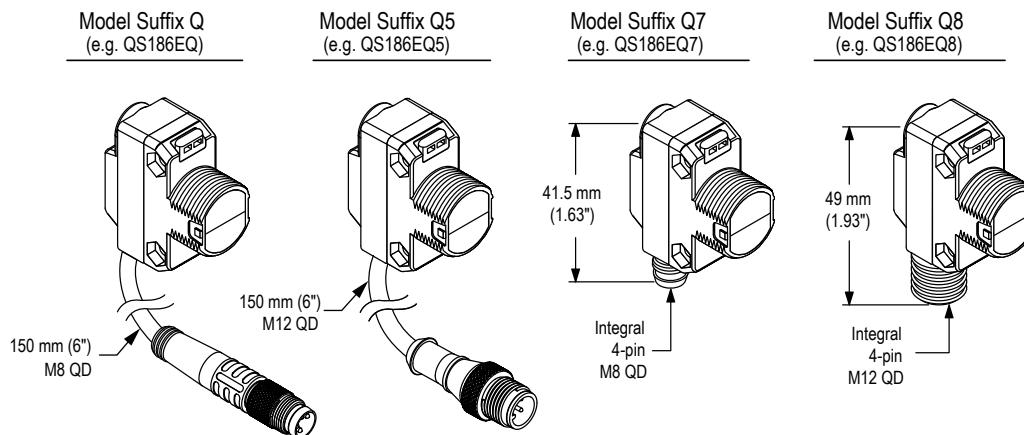
Turck Banner LTD Blenheim House  
Blenheim Court  
Wickford, Essex SS11 8YT  
GREAT BRITAIN



Cet appareil est conforme à la norme NMB-3(A). Le fonctionnement est soumis aux deux conditions suivantes : (1) ce dispositif ne peut pas occasionner d'interférences, et (2) il doit tolérer toute interférence, y compris celles susceptibles de provoquer un fonctionnement non souhaité du dispositif.

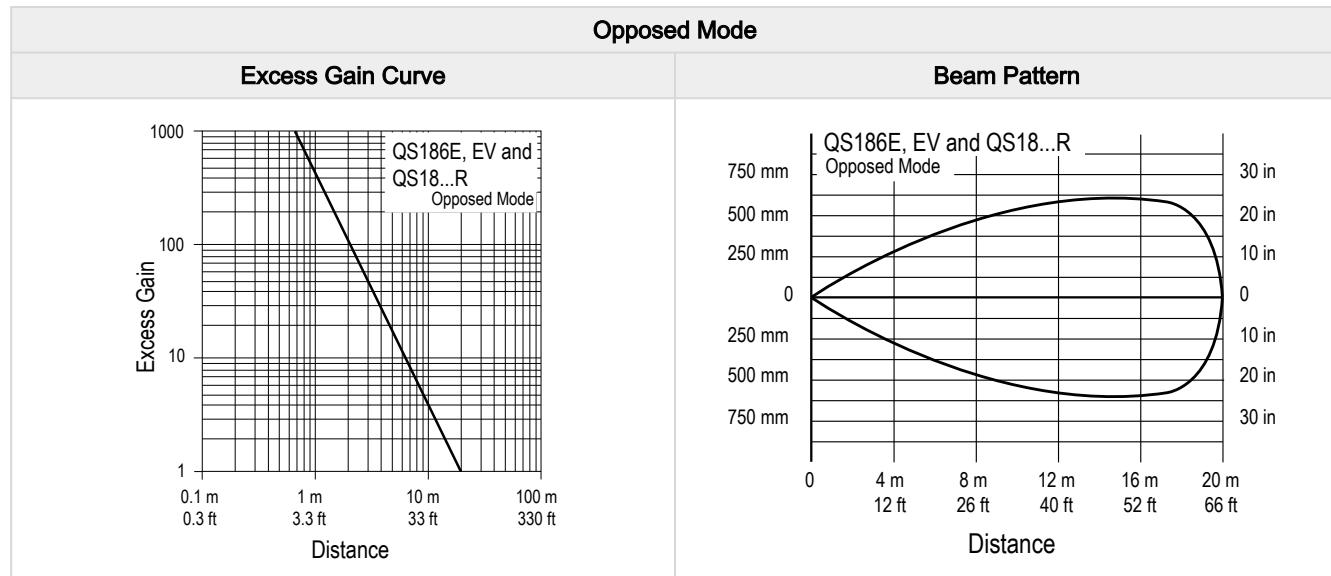
## Dimensions





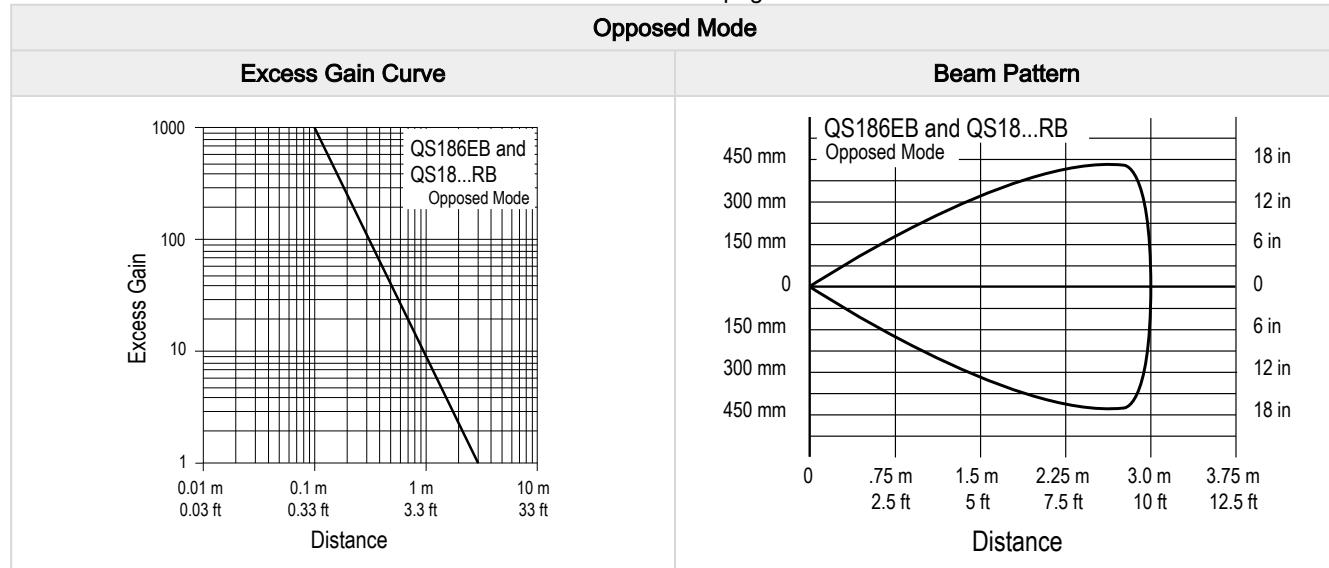
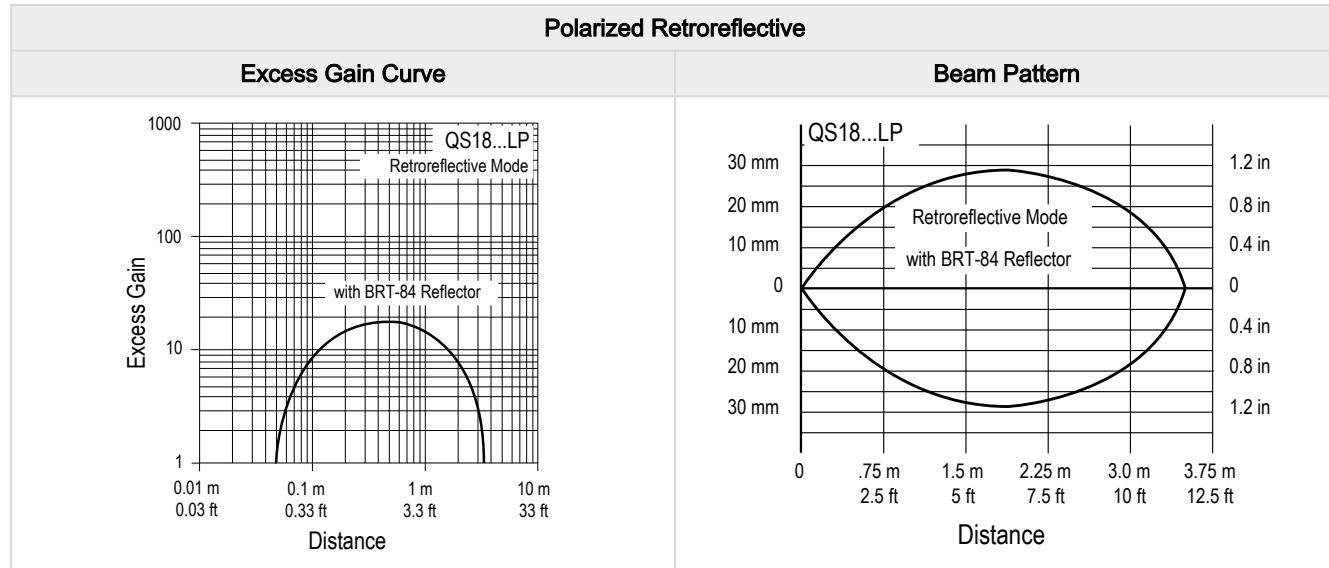
<b>M18 x 1 Jam Nut</b> 	<b>M3 hardware packet contents:</b> <ul style="list-style-type: none"> <li>• 2 - M3 x 0.5 x 20 mm stainless steel screw</li> <li>• 2 - M3 x 0.5 stainless steel hex nut</li> <li>• 2 - M3 stainless steel washer</li> </ul>	<b>Packing list:</b> <ul style="list-style-type: none"> <li>• Sensor</li> <li>• M18 x 1 jam nut</li> <li>• M3 hardware packet</li> <li>• Quick Start Guide, p/n 63687</li> </ul>
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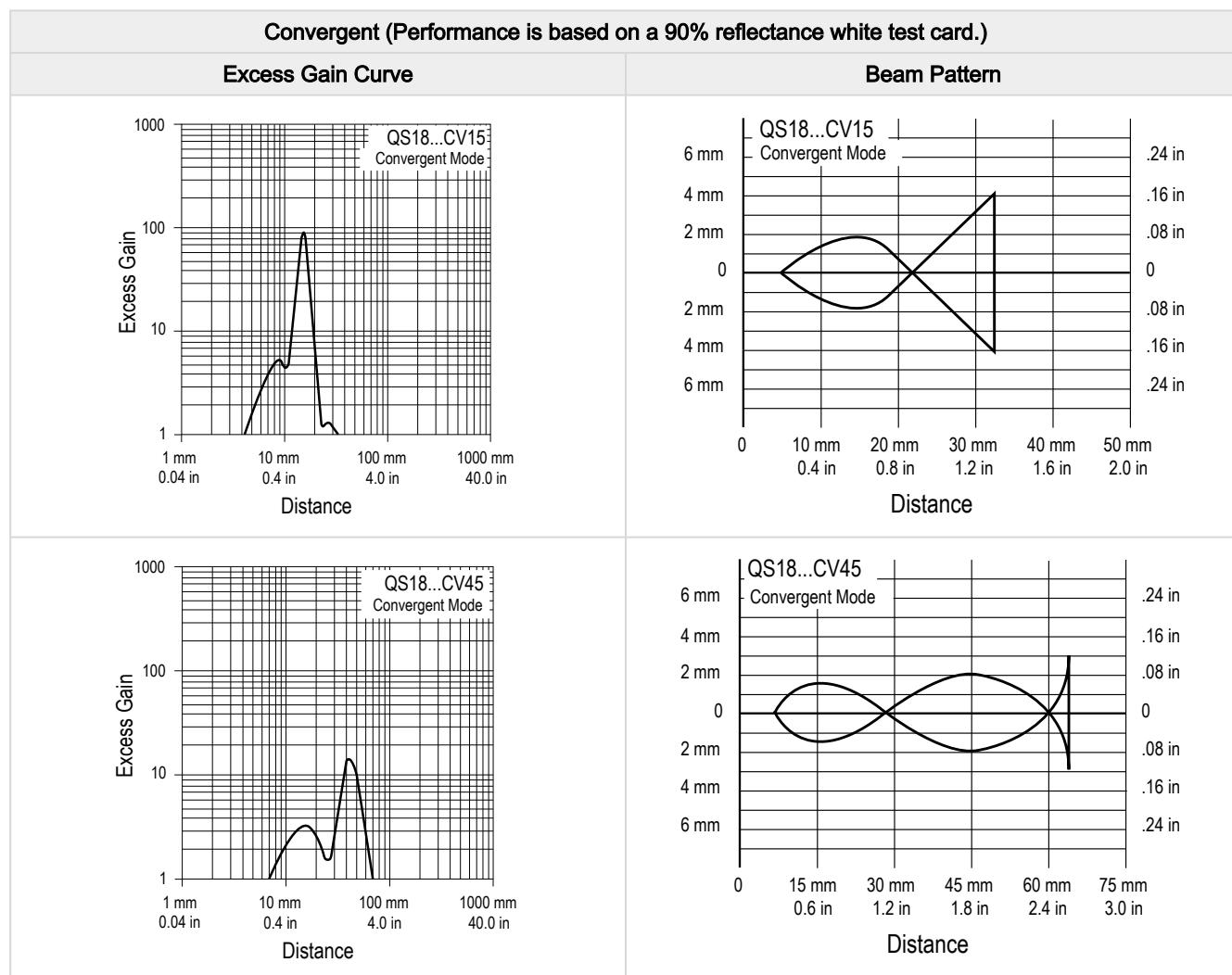
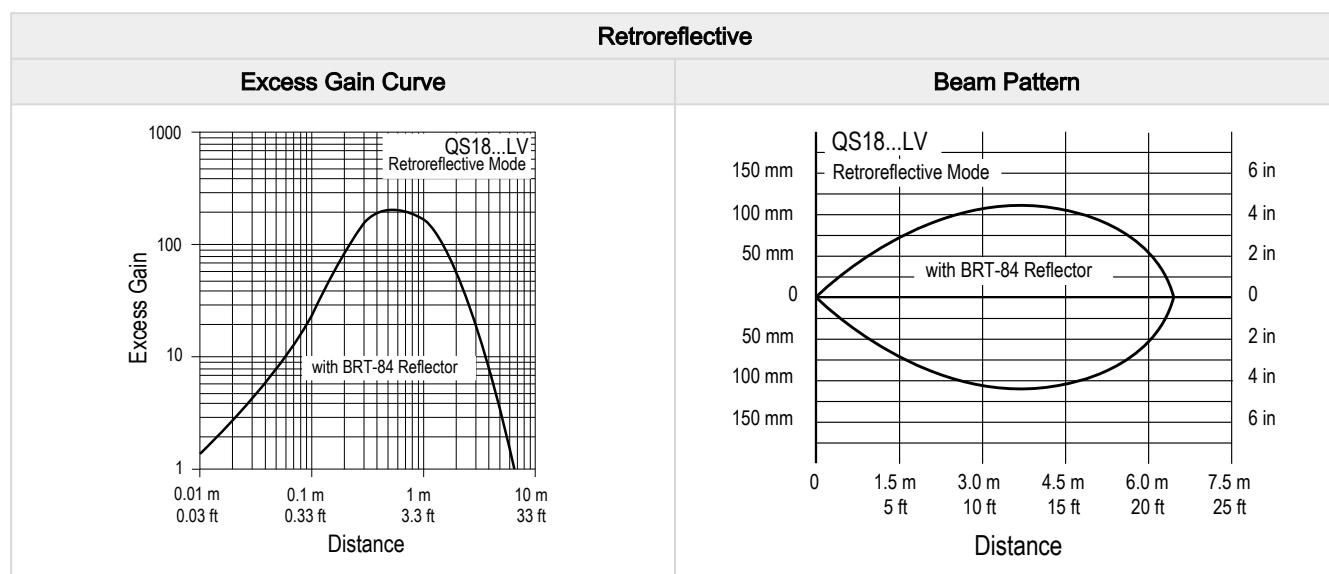
## Performance Curves

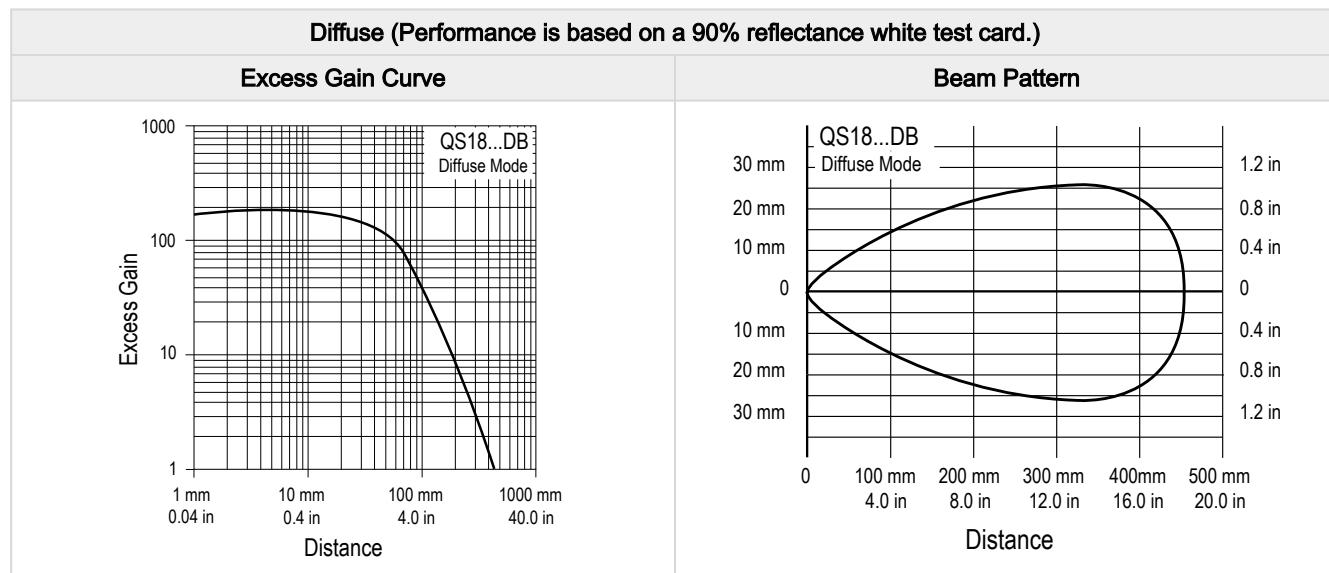
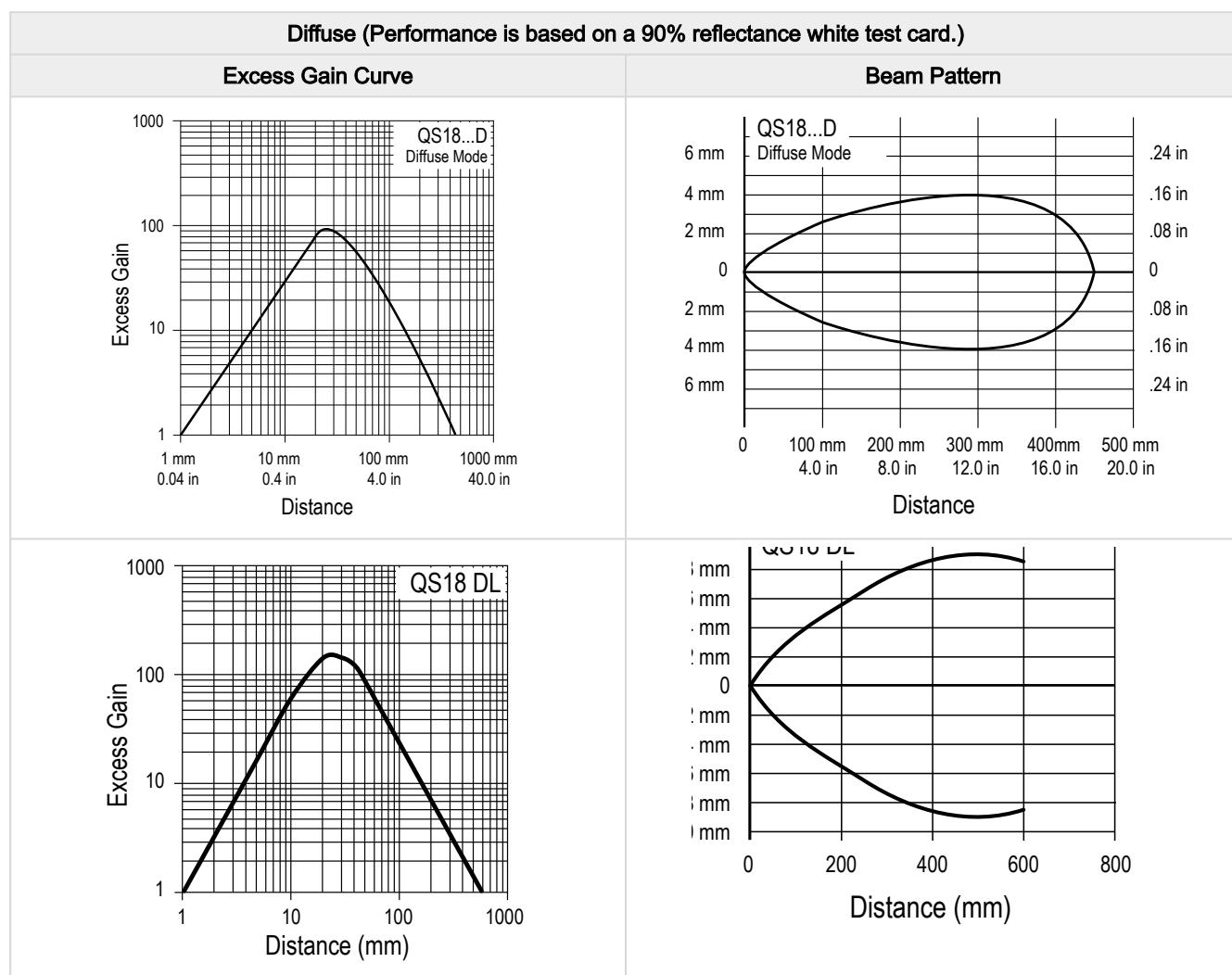


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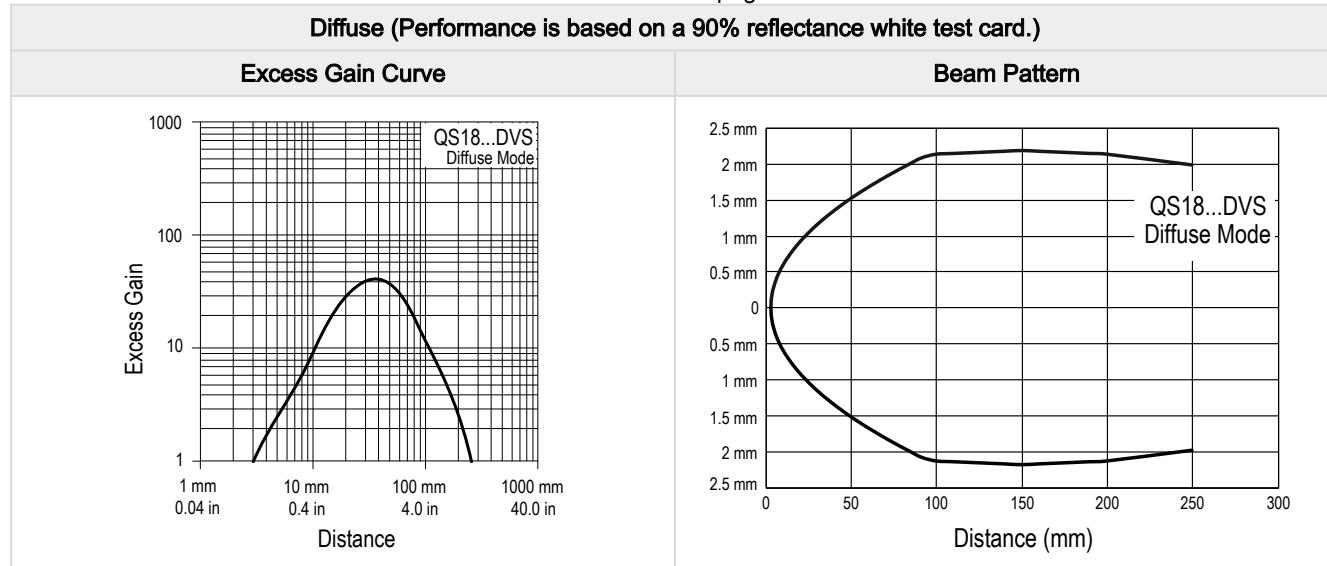
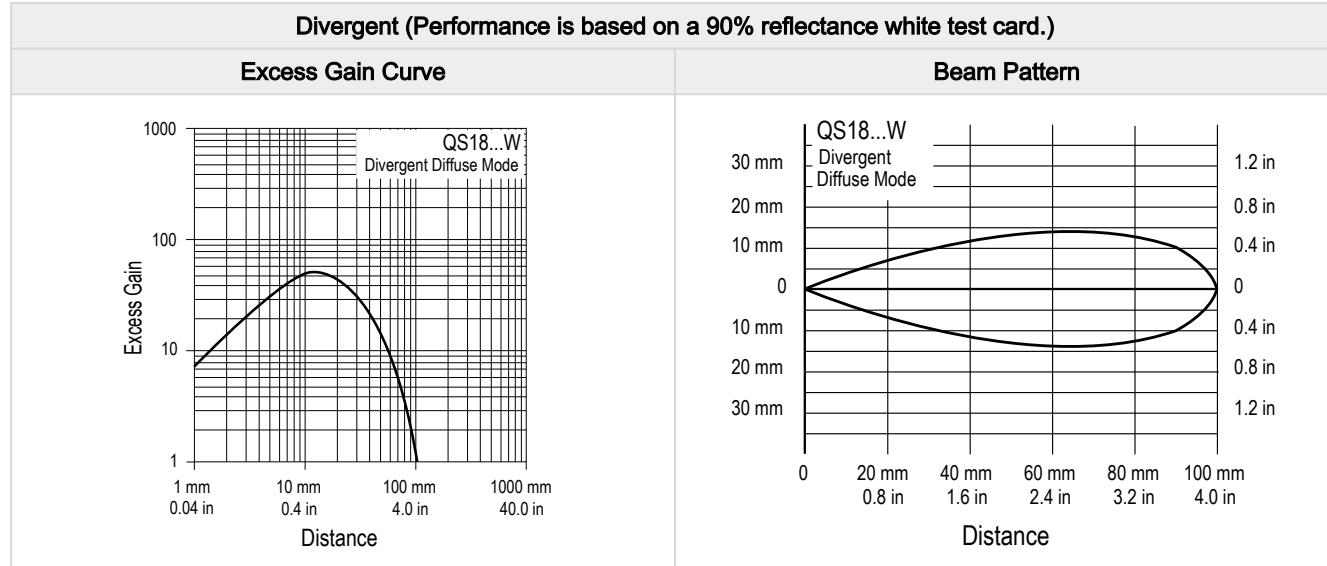
**Opposed Mode****Polarized Retroreflective**



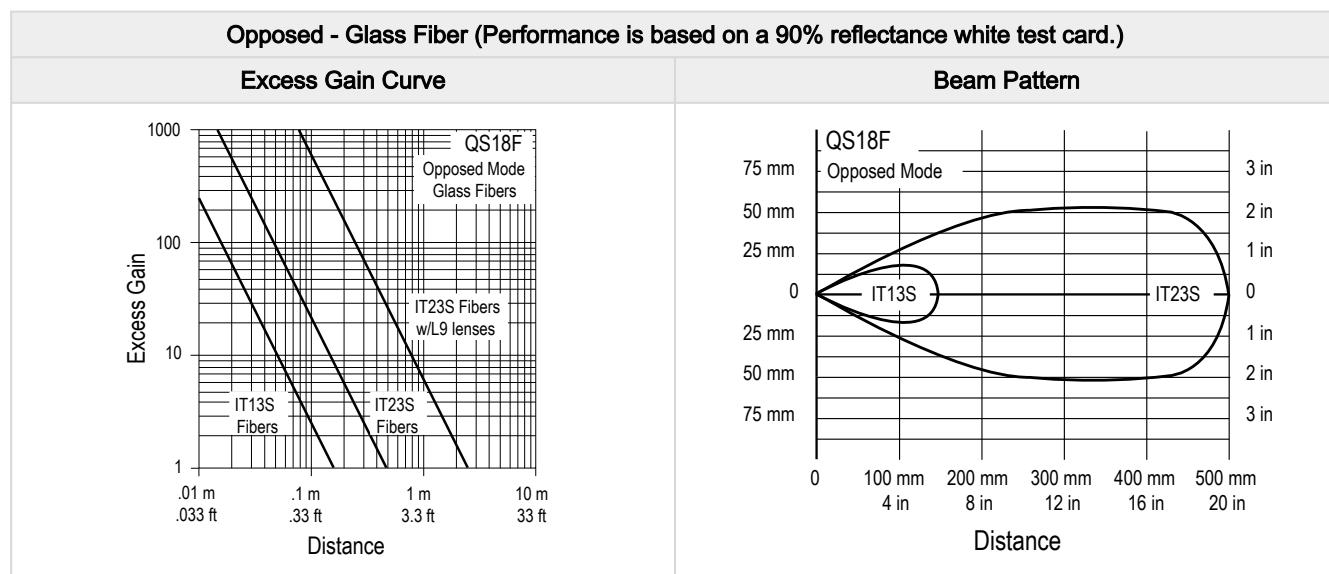
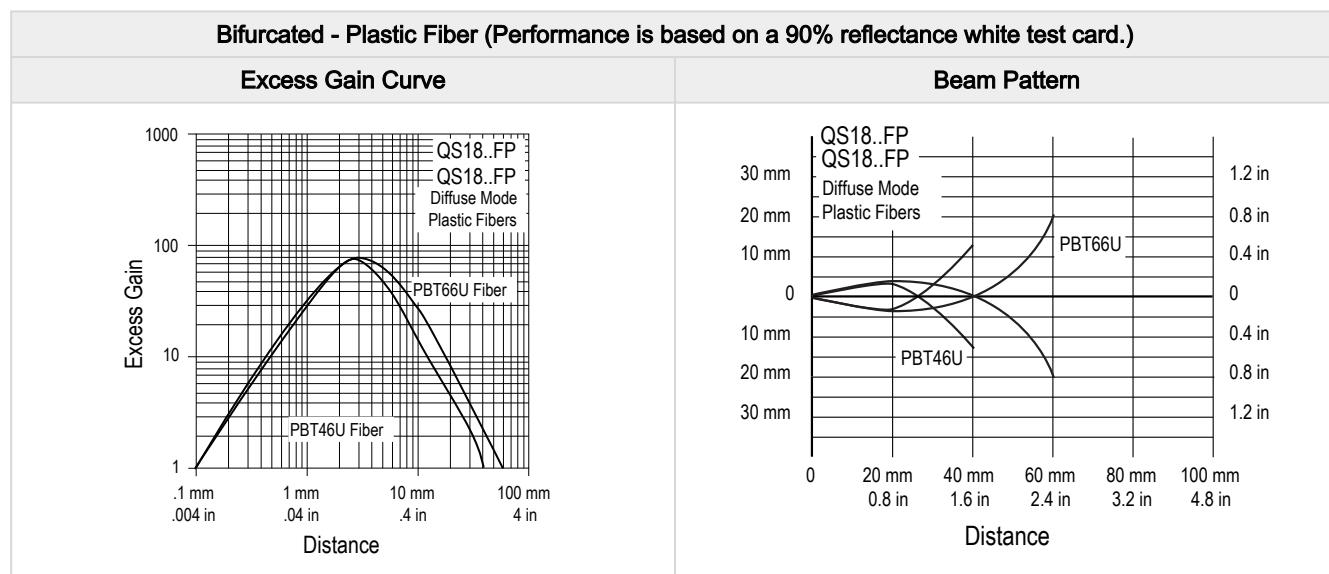
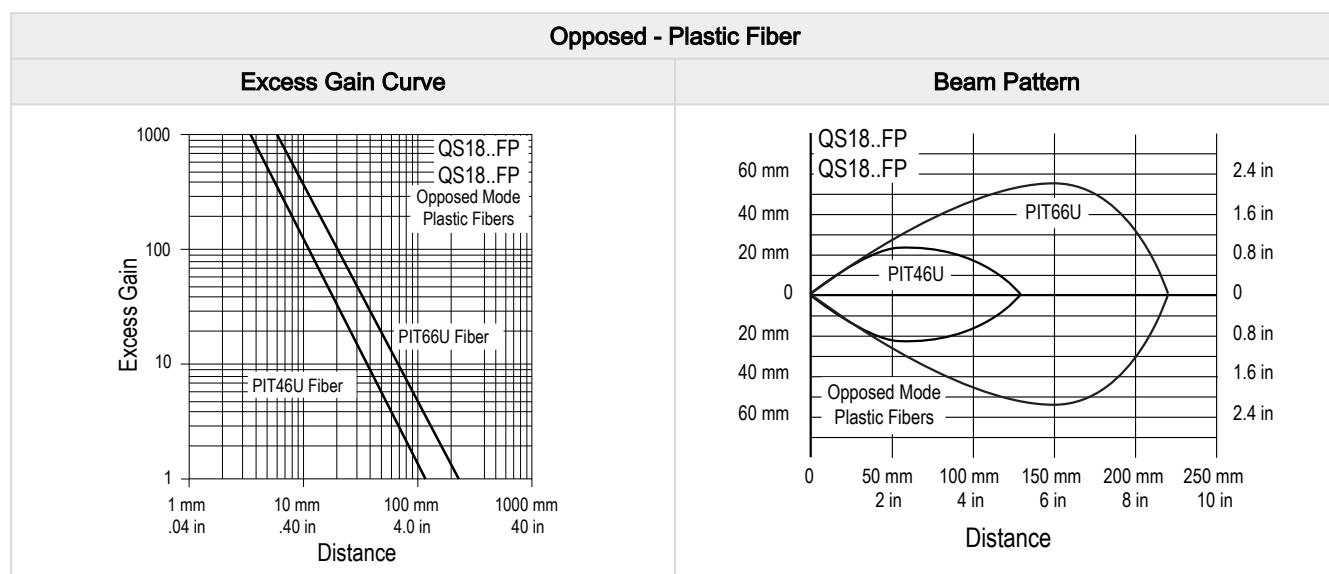


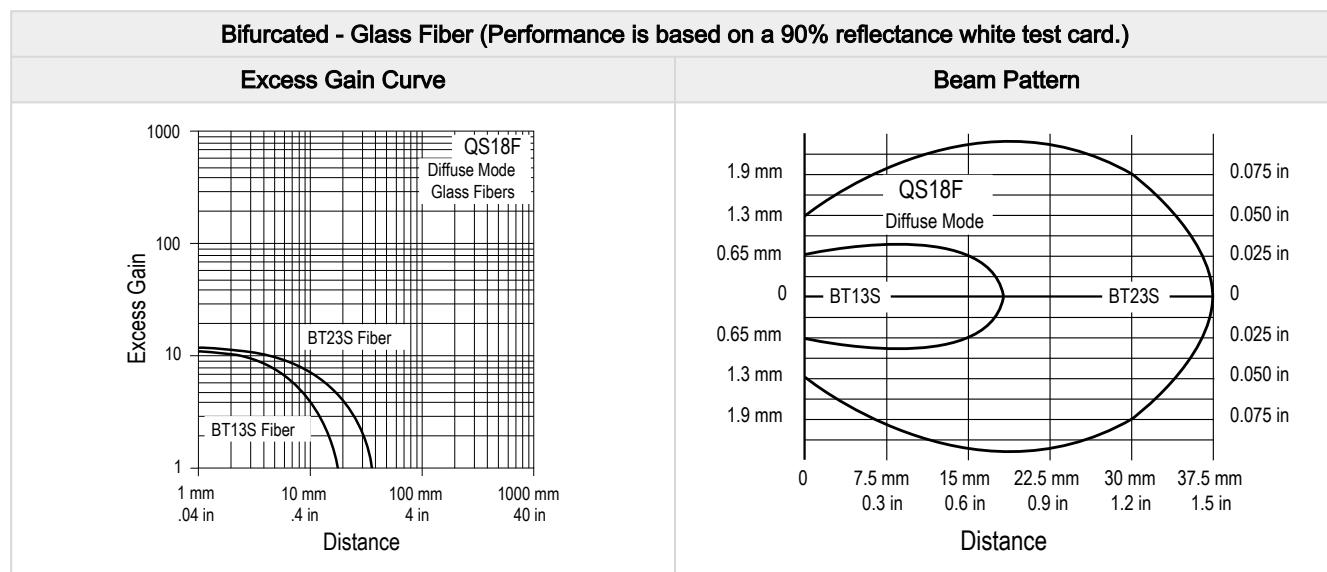
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**Diffuse (Performance is based on a 90% reflectance white test card.)****Divergent (Performance is based on a 90% reflectance white test card.)****Fixed Field**

Excess Gain Curve (50 mm)	Excess Gain Curve (100 mm)	Excess Gain Curve (150 mm)	Spot Sizes
<p>QS18_FF50</p>	<p>QS18_FF100</p>	<p>QS18_FF150</p>	<p><b>50 mm Models:</b> At 25 mm: 8 x 5.5 mm At 50 mm: 6 x 5 mm</p> <p><b>100 mm Models</b> At 50 mm: 6 x 4 mm At 100 mm: 3 x 3 mm</p> <p><b>150 mm Models</b> At 75 mm: 5 x 3.5 mm At 150 mm: 6 x 6 mm</p>



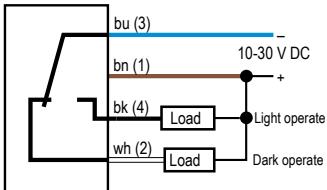
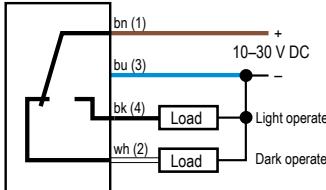
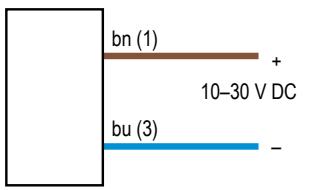


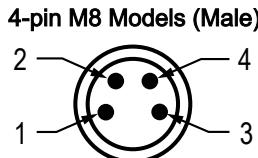
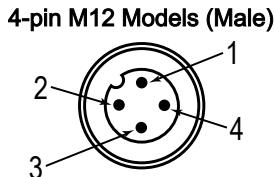
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## Chapter 2 Installation Instructions

### Wiring Diagrams

QS18 with NPN Outputs	QS18 with PNP Outputs	QS18 Emitters
		



1 = Brown  
 2 = White  
 3 = Blue  
 4 = Black

In dark operate (DO) mode, the output is ON when the target returns less light to the sensor than the configured target and OFF when the sensor detects more light than the configured/taught target.

In light operate (LO) mode, the output is ON when the target returns the same or more light to the sensor and OFF when the sensor detects less light than the configured/taught target.

In **opposed and retroreflective sensing modes**, light operate is active when the beam is unblocked and dark operate is active when the beam is blocked.

In **diffuse and fixed field sensing modes**, light operate is active when the target is present and dark operate is active when the target is absent.

### Installing Fibers

#### Cutting Unterminated Plastic Fibers

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:

##### *PFC-1 Cutting Device*

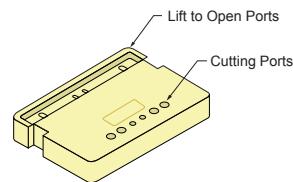
Use small ports for fiber sizes:

- 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).



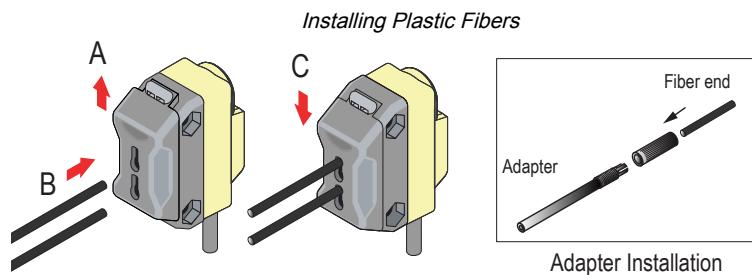
2. Determine the length of fiber required for the application. If using a bifurcated fiber, separate the two halves of the fiber at least 51 mm (2 inches) beyond the fiber-cutting location.
3. Lift the top (blade) of the cutter to open the cutting ports.
4. Insert one of the control ends through one 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.

## Install the Plastic Fibers

Follow these steps to install the plastic fibers.

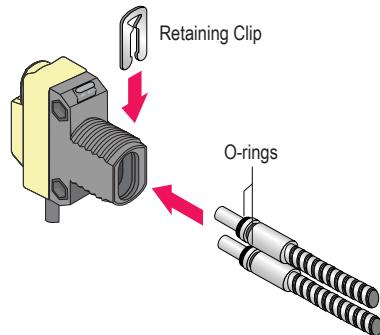


1. Slide the fiber gripper up to unlock it (A).
2. If using 0.25 mm or 0.5 mm core fibers, slide the plastic fiber adapters onto the fibers, flush with the fiber ends.
3. Carefully insert the prepared plastic fiber ends into the ports (B) as far as possible without applying extra force.
4. Slide the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

## Install the Glass Fibers

Follow these steps to install the glass fibers.

*Installing the glass fibers in a QS18 sensor*



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.

## Mount the Device

1. If a bracket is needed, mount the device onto the bracket.

2. Mount the device (or the device and the bracket) to the machine or equipment at the desired location. Do not tighten the mounting screws at this time.
3. Check the device alignment.
4. Tighten the mounting screws to secure the device (or the device and the bracket) in the aligned position.

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## Chapter 3 Operating Instructions

### Sensor Sensitivity Adjustment

After the sensor and retroreflector have been properly installed, the sensor is ready to be adjusted to ensure detection of the desired object. Sensor sensitivity is adjusted with the single turn adjuster.

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## Chapter 4

## QS18 Accessories

## Cordsets

4-pin Single-Ended M12 Female Cordsets				
Model	Length	Dimensions (mm)	Pinout (Female)	
BC-M12F4-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
BC-M12F4-22-2	2 m (6.56 ft)			
BC-M12F4-22-5	5 m (16.4 ft)			
BC-M12F4-22-8	8 m (26.25 ft)			
BC-M12F4-22-10	10 m (30.81 ft)			
BC-M12F4-22-15	15 m (49.2 ft)			
BC-M12F4-22-20	20 m (65.61 ft)			
BC-M12F4-22-25	25 m (82.02 ft)			
BC-M12F4-22-30	30 m (98.42 ft)			

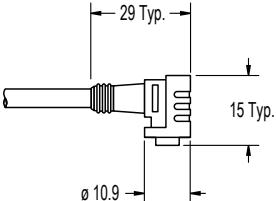
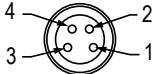
4-pin Single-Ended M12 Female Right-Angle Cordsets				
Model	Length	Dimensions (mm)	Pinout (Female)	
BC-M12F4A-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
BC-M12F4A-22-2	2 m (6.56 ft)			
BC-M12F4A-22-5	5 m (16.4 ft)			
BC-M12F4A-22-8	8 m (26.25 ft)			
BC-M12F4A-22-10	10 m (30.81 ft)			
BC-M12F4A-22-15	15 m (49.2 ft)			

4-Pin Single-Ended Snap-on M8 Female Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
PKG4-2	2.03 m (6.66 ft)	Straight		

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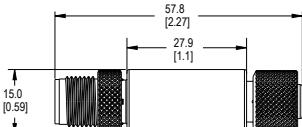
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## 4-Pin Single-Ended Snap-on M8 Female Cordsets

Model	Length	Style	Dimensions	Pinout (Female)
PKW4Z-2	2 m (6.56 ft)	Right-Angle		

## Sensor Status Indicators

## S15L Series In-Line Sensor Status Indicator

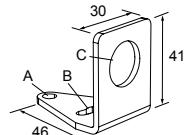
Model	Input Type	LED Color	Dimensions	Female	Male	Wiring
S15LGYPQ	PNP					1 = Brown, 10 to 30 V DC 2 = White
S15LGYNQ	NPN	Power ON = Green Input Active = Yellow				3 = Blue, DC common 4 = Black, Sensor Input

## QS18 Brackets

## 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

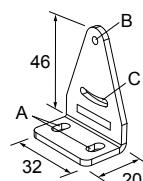
**Hole center spacing:** A to B = 24.2  
**Hole size:** A = Ø 4.6, B = 17.0 × 4.6, C = Ø 18.5



## SMB312S

- Stainless steel 2-axis, side-mount bracket

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



All measurements are in millimeters.

## Retroreflective Targets

Go to [www.bannerengineering.com](http://www.bannerengineering.com) for complete information.

**NOTE:** Polarized sensors require corner cube-type retroreflective targets only.

### Plastic and Glass Fiber Optics

Go to [www.bannerengineering.com](http://www.bannerengineering.com) for a list of plastic and glass fiber optic cables.

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## Chapter 5 Product Support and Maintenance

### Clean Sensor with Compressed Air Then Isopropyl Alcohol

Handle the sensor with care during installation and operation. Sensor windows soiled by fingerprints, dust, water, oil, etc. create stray light that may degrade the peak performance of the sensor.

Blow dust from the sensor using filtered, compressed air. If the sensor is still dirty, gently wipe the sensor with a dry optical cloth. If the dry optical cloth does not remove all residue, use 70% isopropyl alcohol on a clean optical cloth, then dry with a clean dry optical cloth and blow with filtered, compressed air. Do not use any other chemicals for cleaning.

### Repairs

Contact Banner Engineering for troubleshooting of this device. **Do not attempt any repairs to this Banner device; it contains no field-replaceable parts or components.** If the device, device part, or device component is determined to be defective by a Banner Applications Engineer, they will advise you of Banner's RMA (Return Merchandise Authorization) procedure.

**IMPORTANT:** If instructed to return the device, pack it with care. Damage that occurs in return shipping is not covered by warranty.

### Contact Us

Banner Engineering Corp. | 9714 Tenth Avenue North | Plymouth, MN 55441, USA | Phone: +1 888 373 6767

For worldwide locations and local representatives, visit [www.bannerengineering.com](http://www.bannerengineering.com).

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