



QS18E Clear Object Detection Product Manual

Original Instructions

p/n: 194469 Rev. D

18-Aug-25

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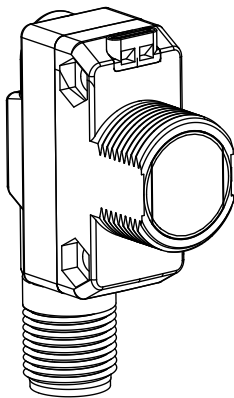
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Chapter 1 Features

Expert™ Coaxial Polarized Retroreflective Sensor for Clear Object Detection



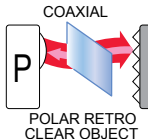
- Reliably detects clear, translucent, or opaque objects — including PET, glass containers, and transparent films
- Coaxial optics enable reliable detection of targets to the face of the sensor with no dead zone
- "Clear Tracking" automatic compensation algorithm provides long and reliable operation by compensating for dust build-up and ambient temperature changes
- Fast response speed with low jitter for high-speed bottling and packaging applications
- Bright, visible red light spot makes alignment easy
- 3 user-selectable thresholds optimize performance to the type of object being detected
- Easy configuration of sensor by remote teach input or tactile push button
- Convenient mounting options available for 18 mm barrel or side mount
- Bright indicator LEDs show operating status from 360°
- IP67 rated ABS housing
- Dedicated PNP or NPN output with matching remote input wire

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

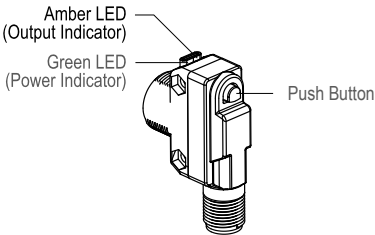
Models	Mode	Range	Output	Connector
QS18EN6XLPC		0 to 1.3 m (0 to 4.2 ft) on BRT-40X19A	NPN	2 m cable (6.5 ft)
QS18EP6XLPC		0 to 2.0 m (0 to 6.5 ft) on BRT-51X51BM	PNP	
		0 to 3.0 m (0 to 9.8 ft) on BRT-92X92C		

The standard 2 m (6.5 ft) cable models are listed.

- To order the 9 m (30 ft) cable models, add the suffix "W/30" to the cabled model number (for example QS18EN6XLPC W/30)
- To order the 4 pin M12 integral connector, add the suffix "Q8" (for example QS18EN6LPCQ8)
- To order the 4 pin M12 150 mm (6 inch) cable, add the suffix "Q5" (for example QS18EN6LPCQ5)
- To order a 4 pin M8 integral connector, add the suffix "Q7" (for example QS18EN6LPCQ7)
- To order a 4 pin M8 150 mm (6 inch) cable, add the suffix "Q" (for example QS18EN6XLPCQ)

Overview

The Banner QS18 sensor is a high-performance clear object detection sensor. The polarized coaxial optical design ensures reliable detection of transparent, translucent, and opaque targets at any distance between the sensor and the reflector. Low contrast sensing applications include PET bottles, glass containers, and shrink wrap. The sensor can also detect optical surfaces such as LCD panels with built-in polarizing films, solar panels, and semiconductor wafers.



Indicators (Two LEDs: One Green, One Amber)

Sensor Condition (Run Mode)	Green LED	Amber LED
Output OFF	ON	OFF
Output ON	ON	ON
Notification — Sensor needs to be reconfigured for reliable detection	Flashing at 5 Hz	ON/OFF
Notification — Push button has been locked out	Flashes 4 times and returns to solid on	ON/OFF

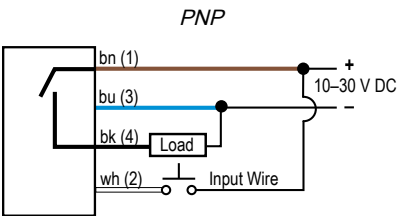
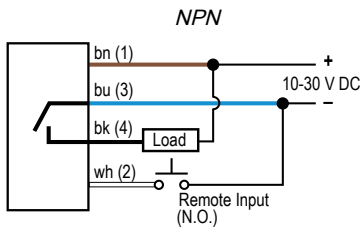
Installing and Mounting the Sensor for Low Contrast Applications

Reliable transparent object detection depends on the sensor always detecting the object as "dark state" and the reflector as the "light state". Using a recommended reflector, and proper orientation of the sensor to the reflector, is key to good clear object detection. Optimize the reliable detection of transparent and clear objects by applying the following steps when mounting the sensor and selecting a retroreflective target.

1. If a bracket is needed, mount the sensor onto the bracket.
2. Mount the sensor (or the sensor and the bracket) to the equipment at the desired location. Do not tighten at this time.
3. Align the sensor's light spot to the middle of the retroreflector.
4. Mount the retroreflector perpendicular to the sensor optical axis ($\pm 5^\circ$).
5. Tighten the screws to secure the sensor (or the sensor and the bracket) to the aligned position.

Mounting Considerations for Opaque Objects with Mirror-Like Surfaces—To minimize the potential for reflections from mirror-like objects affecting the sensor, it is best to side-mount the sensor.

Wiring Diagrams



- Key
1. Brown
 2. White
 3. Blue
 4. Black

Specifications

- Supply Voltage**
10 V to 30 V DC (10% maximum ripple)
- Supply Current (Exclusive of Load Current)**
< 25 mA at 15 V
< 40 mA at 24 V
- Repeatability**
100 μ s

- Supply Protection Circuitry**
Protected against reverse polarity and transient voltages
- Output Protection Circuitry**
Protected against false pulse on power-up and continuous overload or short-circuit of output

Output Configuration

Current sourcing (PNP) or current sinking (NPN), depending on model; Light- or dark-operate selectable; Selectable 30 ms output OFF-delay

Rating: 100 mA max

Off-state leakage current: < 50 μ A at 30 V

ON-state saturation voltage: < 1.5 V at 10 mA; < 3 V 100 mA

Output Response Time

Note: Momentary delay on power-up; output does not conduct during this time

400 μ s ON/OFF

Construction

ABS housing, PMMA window

Emitter LED

Visible red, 625 nm

Indicators

Two LEDs (1 green, 1 amber)

Green solid: Indicates power applied and sensor ready

Green flashing: Indicates sensor operating in marginal state, in need of reconfiguration

Amber solid: Indicates output conducting

Connections

PVC-jacketed 4-conductor 2 m (6.5 ft) or 9 m (30 ft) unterminated cable, or 4-pin M12 or 4-pin M8 quick-disconnect (QD), either integral or 150 mm (6 in) cable, are available. Quick-disconnect cordsets are ordered separately.

Mounting Torque

Nose mount: 18 mm mounting nut, 20 lbf-in (2.3 N·m)

Side mount: Two M3 screws, 5 lbf-in (0.6 N·m)

Operating Conditions

Temperature: -40 °C to +70 °C (-40 °F to +158 °F)

Relative Humidity: 90% at +50 °C (non-condensing)

Environmental

IEC IP67

Application Notes

If the push button does not appear to be responsive, perform the push button enable procedure

Factory Default Settings

Setting	Factory Default
Sensing Mode	Dark Set
Output Logic	Dark Operate
Offset Percent	16%
Push Button	Unlocked
Auto Compensation	Disabled
OFF Delay	Disabled

Certifications



Banner Engineering BV
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1831 Diegem, BELGIUM



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



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

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.

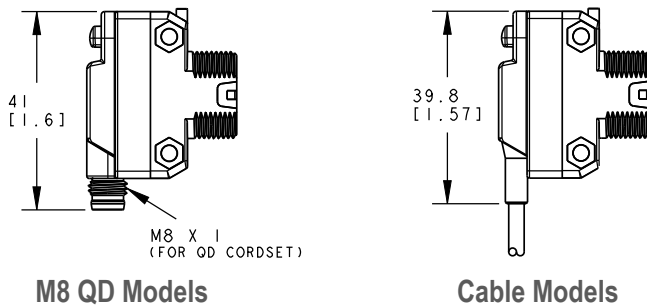
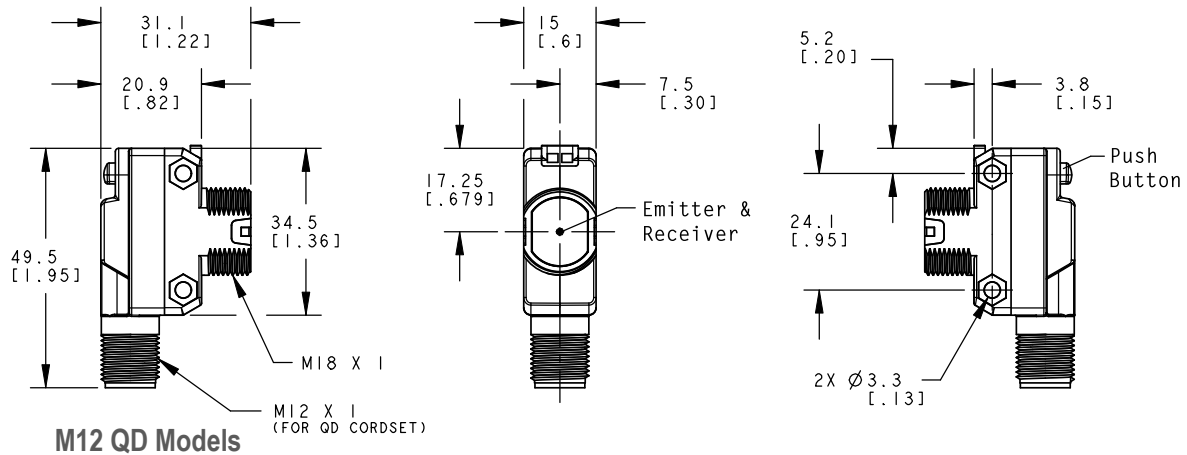
(Part 15.21) Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Industry Canada ICES-003(A)

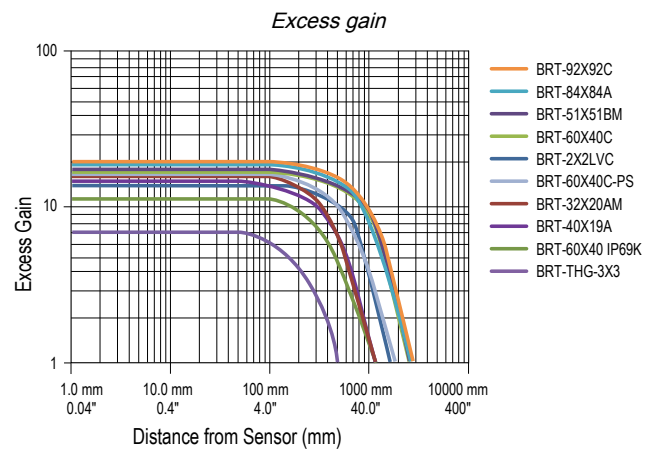
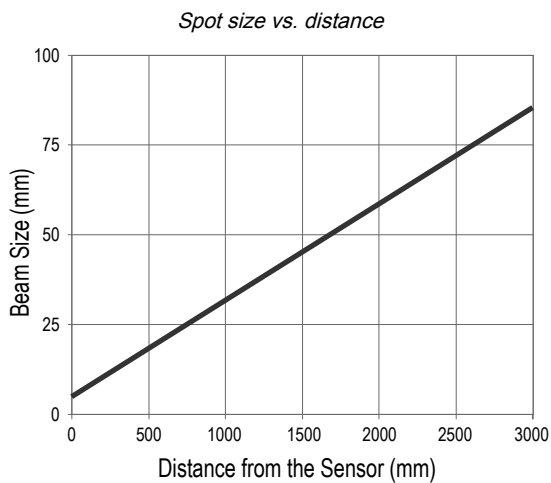
This device complies with CAN ICES-3 (A)/NMB-3(A). Operation is subject to the following two conditions: 1) This device may not cause harmful interference; and 2) This device must accept any interference received, including interference that may cause undesired operation.

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



Performance Curves



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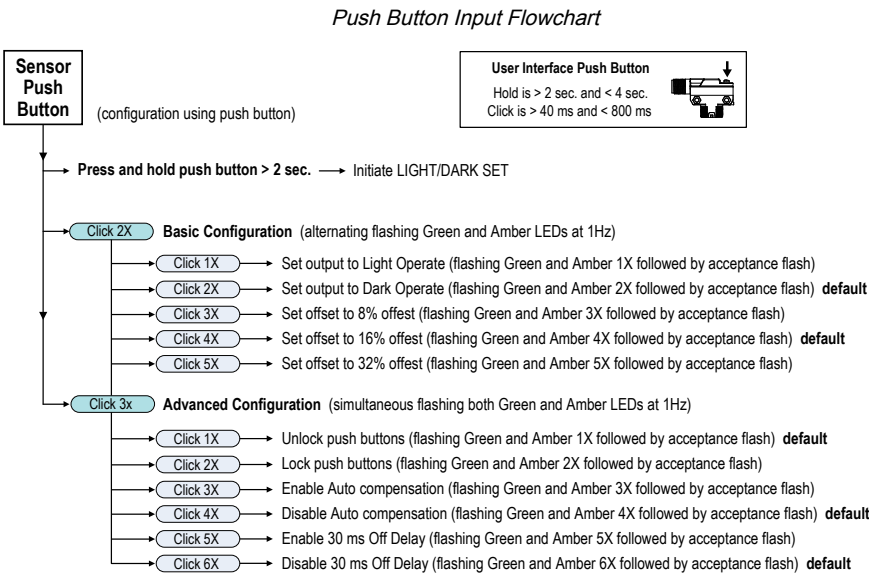
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Chapter 2 Sensor Configuration

Sensor configuration can be implemented with the push button or the remote program wire. Configuration options include two sensing modes: Light Set and Dark Set. Configuration options include the features shown in Push Button Input Flowchart and Remote Input Flowchart.

Push Button Configuration

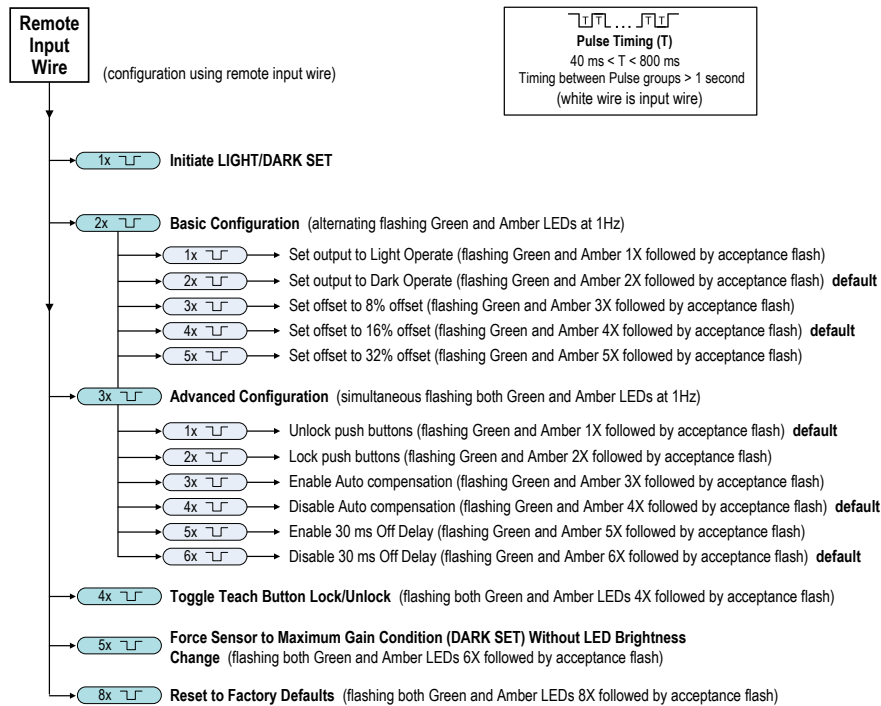
Use the push button to configure the sensor. Click the push button according to Push Button Input Flowchart. After a configuration has been selected the sensor flashes both the green and amber LED to show which configuration was selected followed by a rapid flashing of both the green and amber LED in unison to show acknowledgement and acceptance of the configuration.



Remote Input Configuration

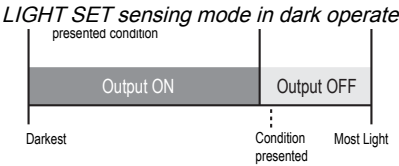
Enabling the remote input wire is done using IO-Link. Use the remote input function to configure the sensor remotely. Connect the white wire of the sensor as shown in the wiring diagram. Pulse the remote line according to the Remote Input Flowchart. After a configuration has been selected, both the green and amber LEDs will flash to show which configuration was selected, followed by a rapid flashing of both the green and amber LED in unison to show acknowledgement and acceptance of the configuration.

Remote Input Flowchart



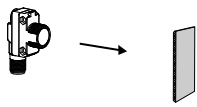
Light Set

Use Light SET for low contrast applications. Use either the push button or remote input wire procedure to configure the sensor.



Example Applications For Offset Percentages	
8%	Recommended for very low contrast applications with stable environmental conditions.
16%	Recommended for most clear object detection applications in typical machine industrial environments.
32%	Recommended for high contrast detections such as brown or green bottles, or opaque objects. This setting tolerates environmental challenges such as vibrations and dust build-up.

1. Prepare the sensor.

Method	Action		Result
Push Button	Clear the light path to the reflector.		
Remote Line	Clear the light path to the reflector.		

2. Access Light Set mode and set the sensing condition.

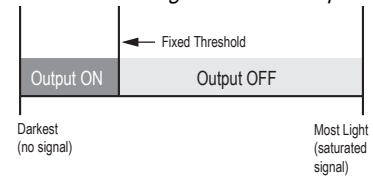
Method	Action		Result
Push Button	Press and hold the push button 2 to 4 seconds.		LIGHT SET Configuration Accepted Green LED Indicator: Flashes 3 times. Green and Amber LED Indicators: Acceptance Flash - both LEDs flash 5 times rapidly in unison. The sensor returns to Run mode with the new settings.
Remote Line	Single-pulse the remote line.		

Dark Set

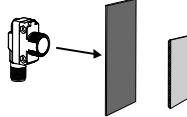
Dark SET (maximum operating range) is the factory default setting and provides maximum sensing range, ease of alignment, and reliable detection of opaque objects. Dark Set provides a fixed threshold whenever the sensor is taught an obstructed view.

NOTE: The sensor's light spot is made brighter for 60 seconds to assist in aligning the sensor to the reflector. This is particularly useful for long range applications.

DARK SET sensing mode in dark operate



1. Prepare the sensor.

Method	Action		Result
Push Button	Block the light path to the reflector.		
Remote Line	Block the light path to the reflector.		

2. Access Dark Set mode and set the sensing condition.

Method	Action		Result
Push Button	Press and hold the push button 2 to 4 seconds.		DARK SET Configuration Accepted Green and Amber LED Indicators: Flash 2 times. Green and Amber LED Indicators: Acceptance flash - both LEDs flash 5 times rapidly in unison. The sensor returns to Run mode with the new settings.
Remote Line	Single-pulse the remote line.		

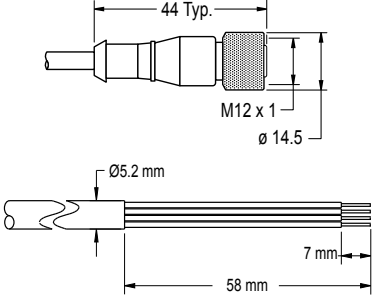
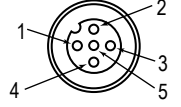
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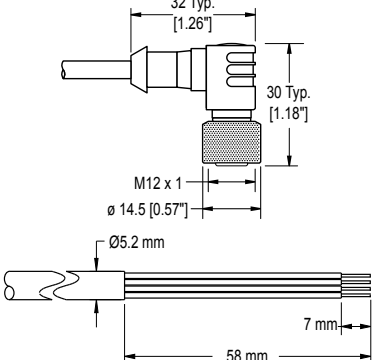
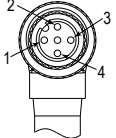
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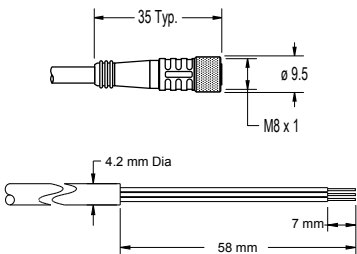
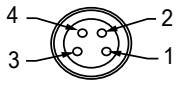
Chapter 3 Accessories

Cordsets

Use the M12 cordsets with the QS18 models with an M12 quick disconnect connector. Use the M8 cordsets with the QS18 models with an M8 QD.

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)			

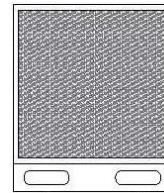
4-pin Single-Ended M12 Female Right-Angle Cordsets				
Model	Length	Dimensions (mm)	Pinout (Female)	
BC-M12F4A-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
BC-M12F4A-22-2	2 m (6.56 ft)			
BC-M12F4A-22-5	5 m (16.4 ft)			
BC-M12F4A-22-8	8 m (26.25 ft)			
BC-M12F4A-22-10	10 m (30.81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

4-pin Single-Ended M8 Female Cordsets				
Model	Length	Dimensions (mm)	Pinout (Female)	
BC-M8F4-24-0.5	0.5 m (1.64 ft)			1 = Brown 2 = White 3 = Blue 4 = Black
BC-M8F4-24-1	1 m (3.28 ft)			
BC-M8F4-24-2	2 m (6.56 ft)			
BC-M8F4-24-5	5 m (16.4 ft)			
BC-M8F4-24-8	8 m (26.25 ft)			
BC-M8F4-24-10	10 m (30.81 ft)			

Retroreflectors

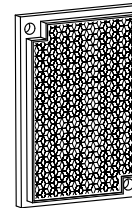
BRT-51X51BM

- Square, acrylic target
- Reflectivity Factor: 1.5
- Temperature:
- Micro-prism geometry
- Optional brackets are available
- Approximate size: 51 mm × 51 mm



BRT-60X40C

- Rectangular, acrylic target
- Reflectivity Factor: 1.4
- Temperature:
- Optional brackets are available
- Approximate size: 40 mm × 60 mm



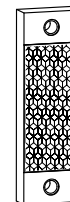
BRT-92X92C

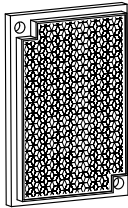
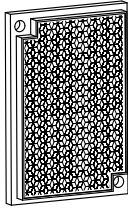
- Square, acrylic target
- Reflectivity Factor: 3.0
- Temperature:
- Optional brackets are available
- Approximate size: 92 mm × 92 mm



BRT-40X19A

- Rectangular, acrylic target
- Reflectivity Factor: 1.3
- Temperature:
- Approximate size: 19 mm × 60 mm overall; 19 mm × 40 mm reflector

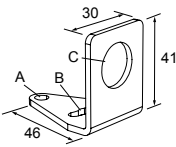
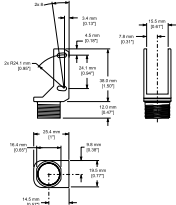


BRT-60X40IP69K - Rectangular, acrylic target (color is amber) - Reflectivity Factor: 0.7 - Temperature: −20 °C to +140 °C (−4 °F to +284 °F) - Chemically resistant - IP69K washdown rated - Optional brackets are available - Approximate size: 40 mm × 60 mm	
BRT-60X40C-PS - Rectangular, polystyrene target - Reflectivity Factor: 1.1 - Temperature: - Optional brackets are available - Chemically compatible with hydrogen peroxide - Yellow back - Approximate size: 40 mm × 60 mm	

2-inch retroreflective tape, 2.5 m (100 in)

Model	Reflectivity Factor	Maximum Temperature	Size
BRT-THG-2-100	0.7	+60 °C (+140 °F)	50 mm (2 in) wide, 2.5 m (100 in) long

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 	SMBQS18Y - Die-cast bracket for 18 mm holes - Includes metal hex nut and lock washer - Allows ± 8° for cabled sensors Hole size: A = ø 15.3 
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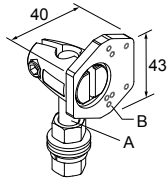
Continued from page 12

SMBQ4X..

- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts are available
- Side mounting of some sensors with the 3 mm screws included with the sensor

B = 7 × M3 × 0.5

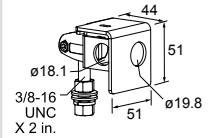
Bolt thread (A): 3/8 - 16 × 2¼ in for SMBQ4XFA; M10 - 1.5 × 50 for SMBQ4XFAM10; n/a; no bolt included. Mounts directly to 12 mm (½ in) rods for SMBQ4XFMA1

**SMB18AFA..**

- Protective, swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- Mounting hole for 18 mm sensors

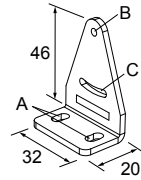
Hole size: B = ø 18.1**Bolt Thread (A):**

SMB18AFA = 3/8 - 16 × 2 in
SMB18AFAM10 = M10 - 1.5 × 50

**SMB312S**

- Stainless steel 2-axis, side-mount bracket

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



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Chapter 4

Product Support and Maintenance

Contact Us

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For worldwide locations and local representatives, visit www.bannerengineering.com.

Banner Engineering Corp Limited Warranty

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