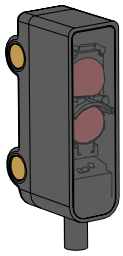
Q2X Polarized Retroreflective and Opposed Mode Sensors with Visible Red LED

Datasheet

Miniature sensors featuring extended range and background suppression mode

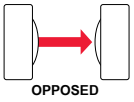


- Miniature 8 mm (0.31 in) wide sensor for installation in the smallest of spaces
- Exceptional optical performance with long detection range
- Emitter/receiver pair with large spot for easy alignment
- Polarized retroreflective models for one sided installation with a retroreflective target
- Emitter/receiver and polarized retroreflective models ideal for detecting dark and shiny targets
- Bright visible red LED for easy alignment of sensor
- Many connection types and output configurations available by model number

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

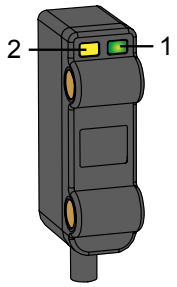
Sensing Mode	Models [1]	Sensing Range	Connection	Output Type
 Polarized Retro-reflective, Visible red, 645 nm	Q2XAPLPF-2M	Maximum 3300 mm using BRT-60X40C reflector	2 m (6.5 ft) unterminated 3-wire PVC-jacketed cable	1 PNP Light Operate (LO)
	Q2XANLPF-2M			1 NPN LO
	Q2XABLPF-Q		150 mm (6 in) PVC cable with a 4-pin M8 male quick-disconnect connector	Bipolar LO
Opposed Emitter; Visible red, 645 nm	Q2XNAE-2M	Maximum 3000 mm	2 m (6.5 ft) unterminated 2-wire PVC-jacketed cable	N/A
	Q2XNAE-Q		150 mm (6 in) PVC cable with a 4-pin M8 male quick-disconnect connector	N/A
 Opposed Receiver	Q2XAPR-2M		2 m (6.5 ft) unterminated 3-wire PVC-jacketed cable	1 PNP LO
	Q2XANR-2M		2 m (6.5 ft) unterminated 3-wire PVC-jacketed cable	1 NPN LO
	Q2XABR-Q		150 mm (6 in) PVC cable with a 4-pin M8 male quick-disconnect connector	Bipolar LO

[1]
- To order Dark Operate (DO) models, replace "**AP**", "**AN**", or "**AB**" with "**RP**", "**RN**", or "**RB**", respectively.
- To order PNP or NPN models with a 150 mm (6 in) PVC cable and a 3-pin M8 male quick disconnect, replace "**-2M**" with "**-Q3**".
- To order Bipolar models with a 150 mm (6 in) PVC cable and a 4-pin M12 male quick disconnect, replace "**-Q**" with "**-Q5**".

Overview

The Q2X opposed and polarized retroreflective sensors offer excellent sensing performance in a miniature plastic housing which are easily integrated into tight spaces. The brass inserts provide stable mounting points, and the bright indicators provide user feedback of the sensor status.

Figure 1. Sensor features



1. Green: Power Indicator
2. Yellow: Light Sensed Indicator (Flashes for Marginal Conditions)

Installation

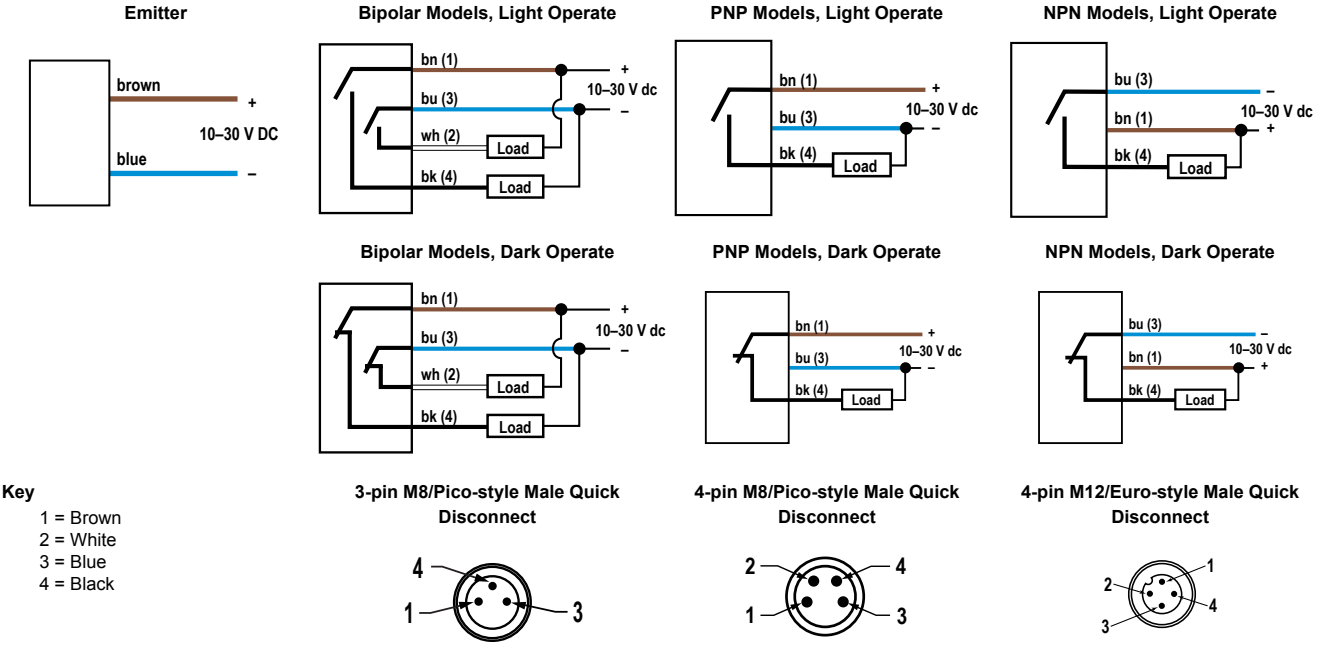
Mount the Device

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.

Wiring

Cabled wiring diagrams are shown. Quick disconnect wiring diagrams are functionally identical.

CAUTION: Observe proper ESD precautions (grounding) when connecting quick disconnect models.



Key

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

3-pin M8/Pico-style Male Quick Disconnect

4-pin M8/Pico-style Male Quick Disconnect

4-pin M12/Euro-style Male Quick Disconnect

Specifications

Supply Voltage
10 V DC to 30 V DC (10% maximum ripple within specified limits) at less than 16 mA, exclusive of load

Sensing Beam
Visible red LED, 645 nm

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
Bipolar (1 NPN and 1 PNP) solid-state output or single output (PNP or NPN), light operate (LO) or dark operate (DO), depending on model
Rating: 50 mA total output current
Off-state leakage current: < 10 µA at 30 V DC
ON-state saturation voltage: < 2 V at 50 mA
Protected against output short-circuit, continuous overload, and false pulse on power-up

Output Response
Polarized Retroreflective models: 600 µs, OFF to ON and ON to OFF
Opposed Receiver models: 1 ms ON, 0.6 ms OFF

Repeatability
Polarized Retroreflective models: 144 µs
Opposed Receiver models: 133 µs

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 (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

Indicators
Polarized Retroreflective and Opposed Receiver:
2 LED indicators on sensor top:
Green solid: Power on
Amber solid: Light sensed
Amber flashing: Marginal sensing condition
Opposed Emitter:
Green solid: Power on

Construction
PC/ABS housing, acrylic lens cover; PVC cable, acetal adjustment potentiometer

Environmental Rating
IP67

Connections
2 m (6.5 ft) unterminated 2-wire PVC-jacketed cable, 2 m (6.5 ft) unterminated 3-wire PVC-jacketed cable,150 mm (6 in) PVC cable with a 3-pin M8 male quick-disconnect connector, 150 mm (6 in) PVC cable with a 4-pin M8 male quick-disconnect connector, or 150 mm (6 in) PVC cable with a 4-pin M12 male quick-disconnect connector, depending on model.

Operating Conditions
95% at +50 °C maximum relative humidity (non-condensing)
Temperature: –25 °C to +50 °C (–13 °F to +122 °F)

Certifications

c UL us LISTED Industrial Control Equipment 3TJJ

Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise. Maximum torque 0.9 Nm (8 in-lbf).

Figure 2. Polarized Retroreflective Models

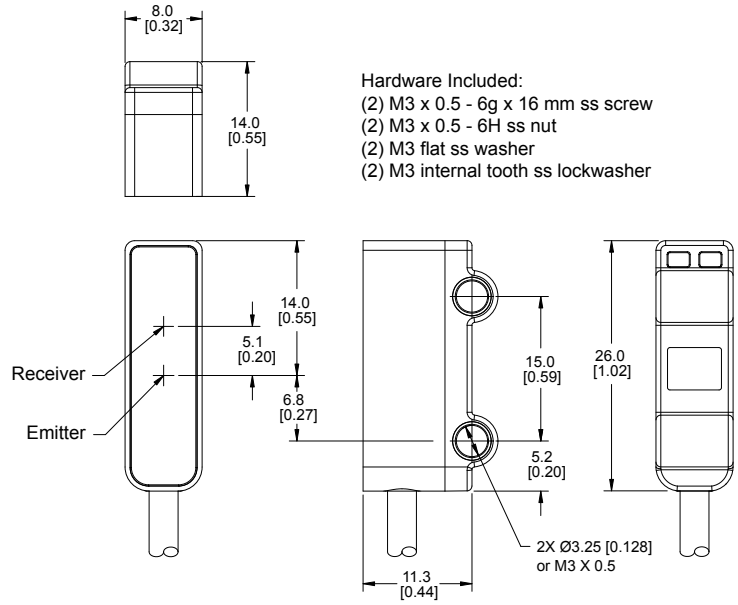
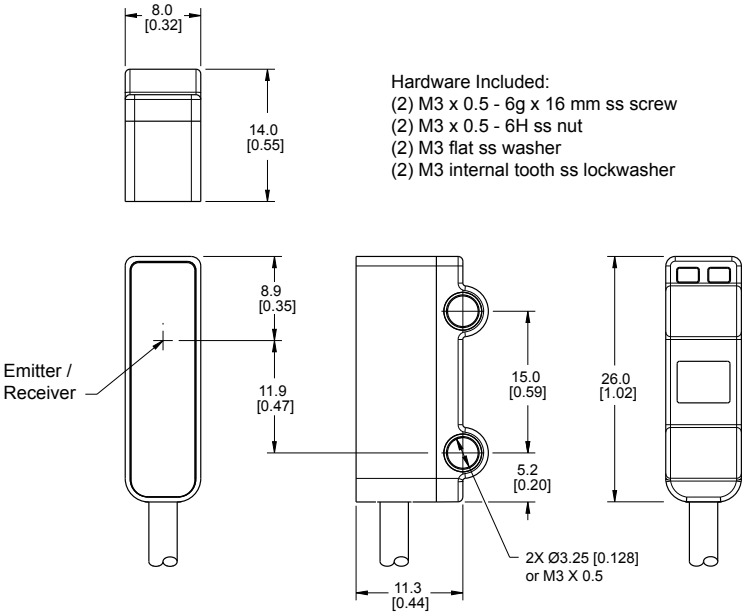


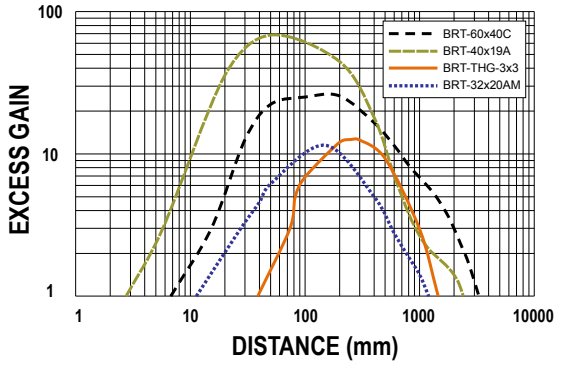
Figure 3. Opposed Models



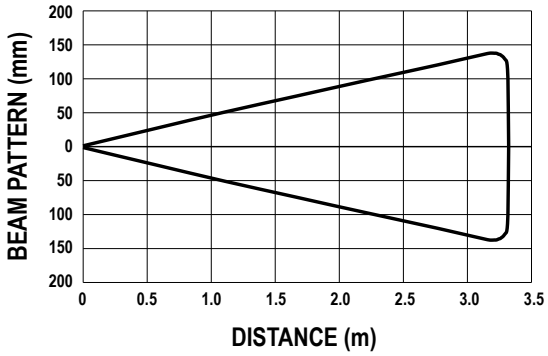
Performance Curves

Polarized Retroreflective Models

Excess Gain

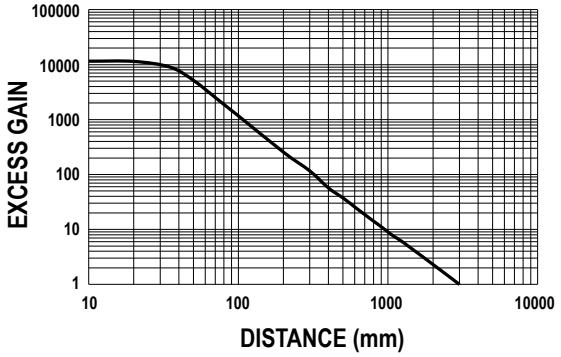


Beam Pattern

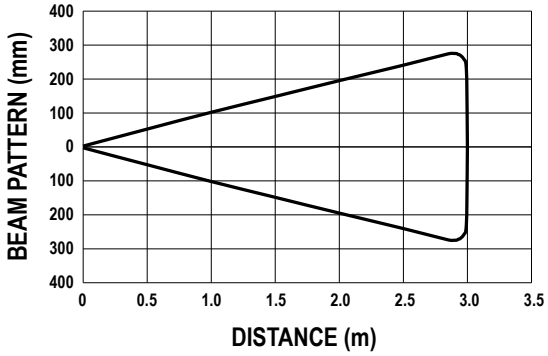


Emitter/Receiver Models (Effective Beam size: 4.3 mm)

Excess Gain



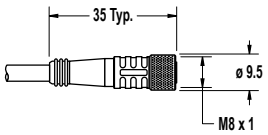
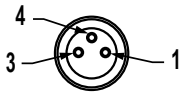
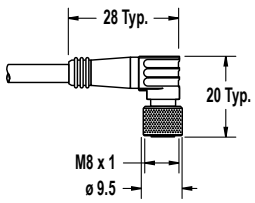
Beam Pattern

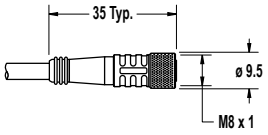
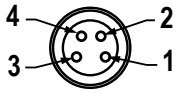
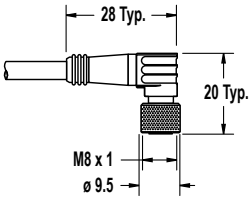
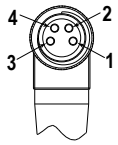


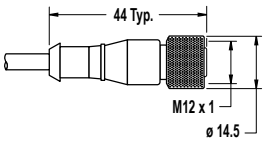
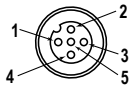
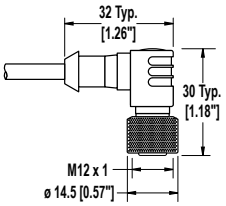
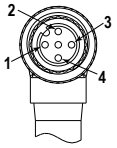
Accessories

Cordsets

3-pin Threaded M8 Cordsets—Single Ended

Model	Length	Style	Dimensions	Pinout (Female)
PKG3M-2	2.035 m (6.68 ft)	Straight		 1 = Brown 3 = Blue 4 = Black
PKG3M-5	5.035 m (16.51 ft)			
PKG3M-7	7.035 m (23.08 ft)			
PKG3M-9	9.035 m (29.64 ft)			
PKG3M-10	10.035 m (32.92 ft)			
PKW3M-2	2 m (6.56 ft)	Right-Angle		
PKW3M-5	5 m (16.40 ft)			
PKW3M-9	9 m (29.53 ft)			

4-Pin Threaded M8 Cordsets—Single Ended					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
PKG4M-2	2.04 m (6.68 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black
PKG4M-5	5 m (16.4 ft)				
PKG4M-9	9.04 m (29.6 ft)				
PKW4M-2	2 m (6.56 ft)	Right Angle			
PKW4M-5	5 m (16.4 ft)				
PKW4M-9	9 m (29.5 ft)				

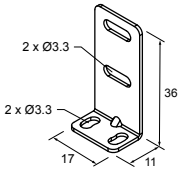
4-Pin Threaded M12 Cordsets—Single Ended					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56 ft)	Right-Angle			
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

Brackets

All measurements are listed in millimeters, unless noted otherwise.

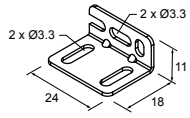
SMBQ2XA

- Vertical L-shaped bracket
- 20-ga stainless steel



SMBQ2XB

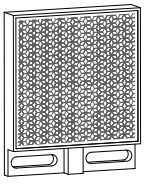
- Rear L-shaped bracket
- 20-ga stainless steel



Reflectors

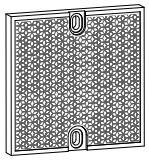
BRT-2X2

- Square, acrylic target
- Reflectivity factor: 1.0
- Max. temperature: +50 °C (+122 °F)
- Optional brackets are available
- Approximate size: 51 mm × 51 mm



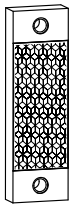
BRT-84X84A

- Square, acrylic target
- Reflectivity Factor: 2.0
- Temperature: –20 °C to +60 °C (–4 °F to +140 °F)
- Approximate size: 84 mm × 84 mm



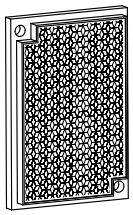
BRT-40X19A

- Rectangular, acrylic target
- Reflectivity Factor: 1.3
- Temperature: –20 °C to +60 °C (–4 °F to +140 °F)
- Approximate size: 19 mm × 60 mm overall; 19 mm × 40 mm reflector



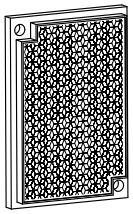
BRT-60X40C

- Rectangular, acrylic target
- Reflectivity Factor: 1.4
- Temperature: –20 °C to +60 °C (–4 °F to +140 °F)
- Optional brackets are available
- Approximate size: 40 mm × 60 mm



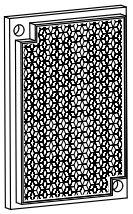
BRT-60X40IP69K

- 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



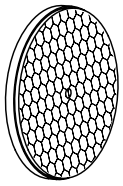
BRT-60X40AF

- Rectangular, acrylic target
- Reflectivity Factor: 1.4
- Temperature: –20 °C to +60 °C (–4 °F to +140 °F)
- Anti-fogging coating for use around steam
- Optional brackets are available
- Approximate size: 40 mm × 60 mm



BRT-84

- Round, acrylic target
- Reflectivity Factor: 1.4
- Temperature: –20 °C to +60 °C (–4 °F to +140 °F)
- Optional brackets are available
- Size: 84 mm diameter
- Mounting Hole: 4.5 mm diameter



Retroreflective Tape

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

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