WORLD-BEAM® Q12

Miniature self-contained photoelectric sensors in universal housing

Standard Model

Chemical-Resistant Model

Features

- Bright, visible red (640 nm) light source
- 10 to 30V dc operation
- Solid-state, bipolar outputs: one current sourcing (PNP) and one current sinking (NPN)
- Light Operate (L.O.) or Dark Operate (D.O.), depending on model
- Models available with PFA chemical-resistant jacket for use in harsh environments (see page 2).
- Standard models available with 4-wire, 2 m (6.5') or 9 m (30') cable or 150 mm (6") pigtail with Pico-style M8 threaded connector
- Compact 8 mm (0.31") housing mounts almost anywhere
- Crosstalk-avoidance circuitry for multiple-sensor applications
- LED status indicators for Power ON, Output Overload, Signal Received, and Marginal Signal

Standard Models

Sensing Mode		Model*	Range	Output
Opposed	640 nm Visible Red Effective Beam: 5.7 mm (0.22")	Q126E	2 m (6.5')	N/A
		Q12AB6R		Bipolar L.O.
		Q12RB6R		Bipolar D.O.
Polarized Retro	640 nm Visible Red	Q12AB6LP	1 m† (40")	Bipolar L.O.
		Q12RB6LP		Bipolar D.O.
Retro	640 nm Visible Red	Q12AB6LV	1.5 m† (59")	Bipolar L.O.
		Q12RB6LV		Bipolar D.O.

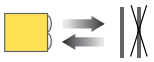
Sensing Mode		Model*	Range	Output
Fixed-Field	Performance based on use of 90% reflectance white test card. 640 nm Visible Red	Q12AB6FF15	15 mm (0.6") cutoff; 10 mm (0.4") focus	Bipolar L.O.
		Q12RB6FF15		Bipolar D.O.
		Q12AB6FF30	30 mm (1.2") cutoff; 16 mm (0.63") focus	Bipolar L.O.
		Q12RB6FF30		Bipolar D.O.
		Q12AB6FF50	50 mm (2") cutoff; 16 mm (0.63") focus	Bipolar L.O.
		Q12RB6FF50		Bipolar D.O.

*Only standard 2 m (6.5') cable models are listed. For 9 m (30') cable, add suffix "**W/30**" to the model number (e.g., **Q126E W/30**).
QD models: For 4-pin 150 mm (6") pigtail with threaded Pico-style M8 connector, add suffix "**Q**" (e.g. **Q126EQ**).
†Retroreflective range is specified using one model **BRT-60X40C** retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) used.

WARNING . . . Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death.
This product 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. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.

Chemical-Resistant Models

Sensing Mode		Model*	Range	Output
Opposed	640 nm Visible Red Effective Beam: 5.7 mm (0.22") 	**Q126ECR**	1.5 m (4.9')	N/A
		Q12AB6RCR		Bipolar L.O.
		Q12RB6RCR		Bipolar D.O.
Fixed-Field	**Performance based on use of 90% reflectance white test card.**			
	640 nm Visible Red 	**Q12AB6FF15CR**	13 mm (0.5") cutoff; 8 mm (0.3") focus	Bipolar L.O.
		Q12RB6FF15CR		Bipolar D.O.
		Q12AB6FF30CR	28 mm (1.1") cutoff; 14 mm (0.6") focus	Bipolar L.O.
		Q12RB6FF30CR		Bipolar D.O.
		Q12AB6FF50CR	48 mm (1.9") cutoff; 14 mm (0.6") focus	Bipolar L.O.
		Q12RB6FF50CR		Bipolar D.O.

*Only standard 2 m (6.5') cables are available for chemical-resistant models.

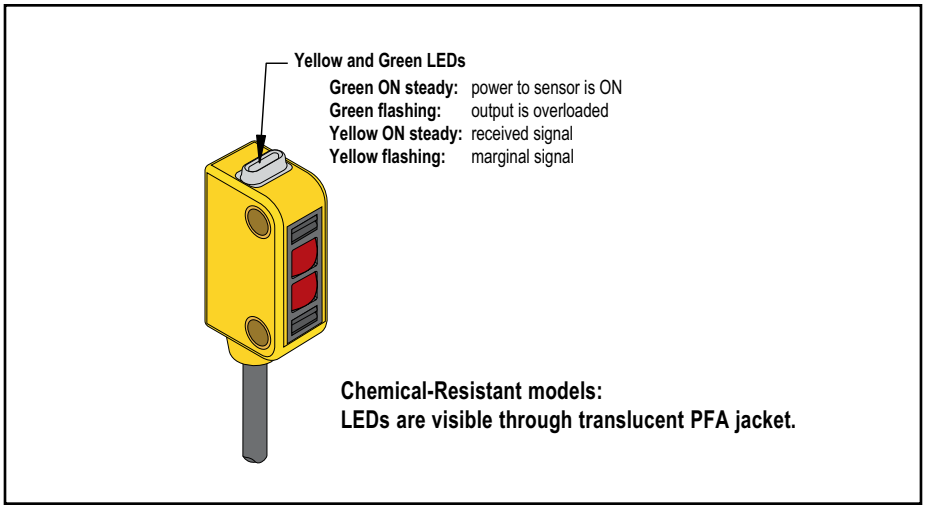


Figure 1. Features

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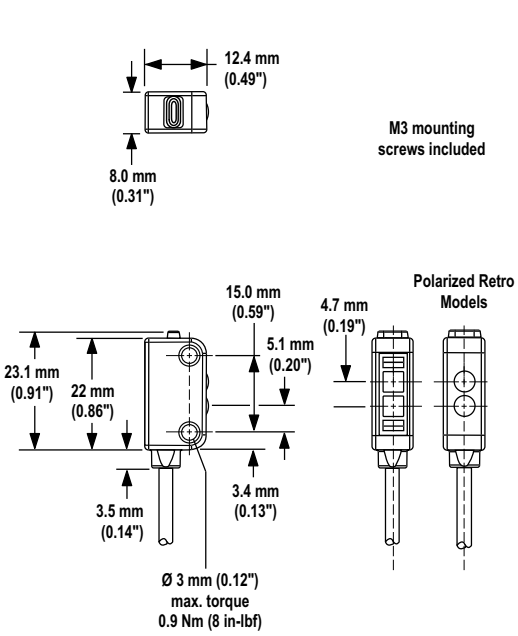
Specifications

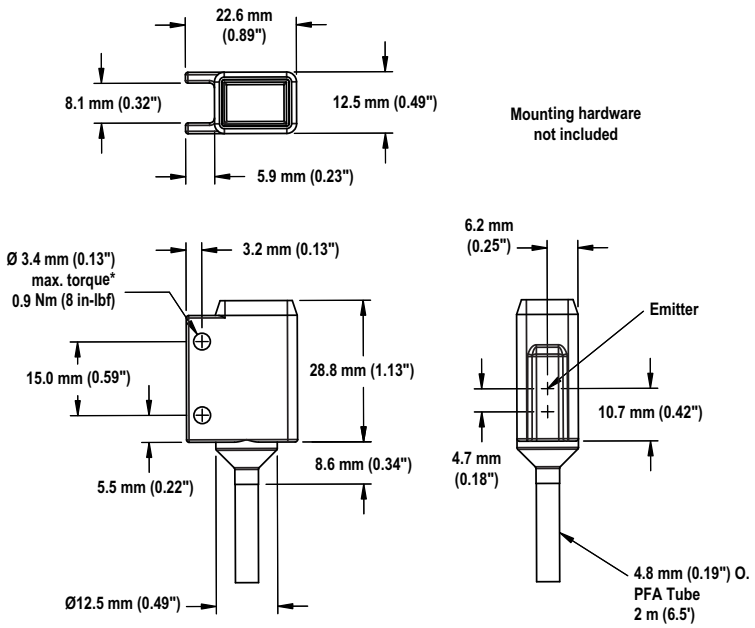
Sensing Beam	640 nm visible red
Supply Voltage and Current	10 to 30V dc (10% max. ripple) @ 20 mA max current
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Bipolar (1 NPN and 1 PNP) solid-state, L.O. or D.O. depending on model
Output Ratings	50 mA total across both outputs with overload and short circuit protection **OFF-state leakage current:** **ON-state saturation voltage:** **NPN:** 200 µA **NPN:** 1.25V @ 50 mA **PNP:** 10 µA **PNP:** 1.45V @ 50 mA
Output Protection Circuitry	Protected against false pulse on power-up, short-circuit protected
Output Response Time	**Opposed Mode:** 1.3 ms ON; 900 µs OFF **All Other Modes:** 700 µs ON/OFF NOTE: 120 ms delay on power-up; outputs do not conduct during this time.
Repeatability	175 microseconds
Switching Frequency	**Opposed Mode:** 385 Hz **All Other Modes:** 715 Hz
Indicators	One Yellow and one Green LED (see Figure 1)
Construction	**Polarized Retro Models:** Thermoplastic elastomer housing with glass lens **All Other Standard Models:** Thermoplastic elastomer housing with polycarbonate lens **Chemical-Resistant Models:** Housing encased in PFA jacket; cable encased in 3/16" O.D. PFA tubing
Environmental Rating	IEC IP67
Connections	**Standard Models:** 2 m (6.5') or 9 m (30') attached PVC cable, or 150 mm (6") pigtail with M8 threaded connection **Chemical-Resistant Models:** 2 m (6.5') cable encased in 3/16" O.D. PFA tubing
Operating Conditions	**Operating temperature:** -20° to +55° C (-4° to +131° F) **Storage temperature:** -30° to +75° C (-22° to +167° F) **Relative humidity:** 90% max @ +50° C (+122° F) non-condensing
Certifications	CE c UL us

Dimensions

Standard Models

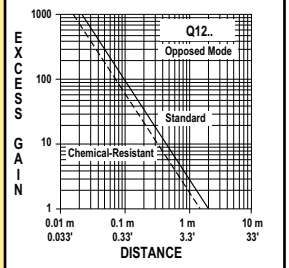
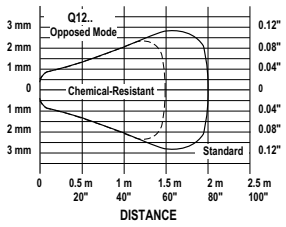
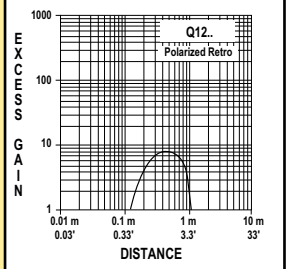
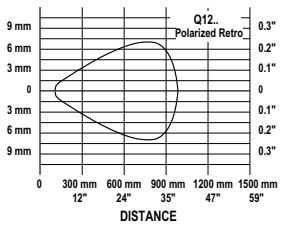
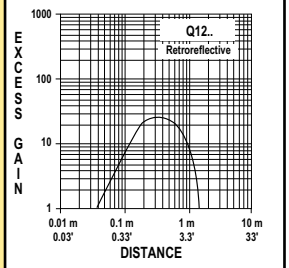
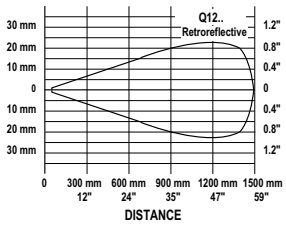


Chemical-Resistant Models



* When mounting by running a screw through both flanges without support between the flanges, the max. torque applied should be 0.1 Nm (1 in-lbf).

Performance Curves

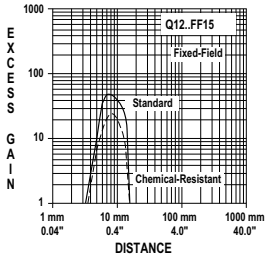
	Excess Gain	Beam Pattern
Opposed		
Polarized Retro††		
Retro††		

††Performance based on use of a model **BRT-60X40C** retroreflector.

Excess Gain

Performance based on use of 90% reflectance white test card.†

Fixed-Field – 15 mm

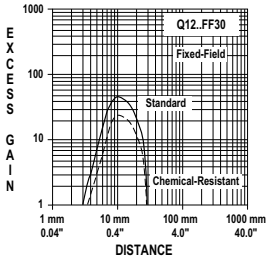


Standard Models:
Ø 0.4 mm spot size @ 10 mm focus
Ø 1.5 mm spot size @ 15 mm cutoff

Chemical-Resistant Models:
Ø 0.4 mm spot size @ 8 mm focus
Ø 1.5 mm spot size @ 13 mm cutoff

† **Using 18% gray test card:** cutoff distance will be 95% of value shown.
† **Using 6% black test card:** cutoff distance will be 90% of value shown.

Fixed-Field – 30 mm

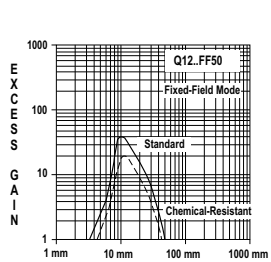


Standard Models:
Ø 0.5 mm spot size @ 16 mm focus
Ø 3.0 mm spot size @ 30 mm cutoff

Chemical-Resistant Models:
Ø 0.5 mm spot size @ 14 mm focus
Ø 3.0 mm spot size @ 28 mm cutoff

† **Using 18% gray test card:** cutoff distance will be 90% of value shown.
† **Using 6% black test card:** cutoff distance will be 80% of value shown.

Fixed-Field – 50 mm



Standard Models:
Ø 0.5 mm spot size @ 16 mm focus
Ø 6.5 mm spot size @ 50 mm cutoff

† **Using 18% gray test card:** cutoff distance will be 80% of value shown.
† **Using 6% black test card:** cutoff distance will be 60% of value shown.

Chemical-Resistant Models:
Ø 0.5 mm spot size @ 14 mm focus
Ø 6.5 mm spot size @ 48 mm cutoff

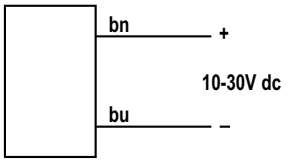
† **Using 18% gray test card:** cutoff distance will be 70% of value shown.
† **Using 6% black test card:** cutoff distance will be 50% of value shown.

Focus and spot sizes are typical.

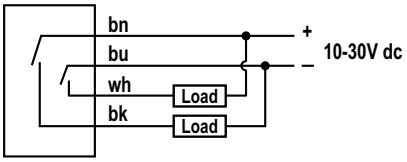
Legend:
—— Standard models
- - - Chemical-resistant models

Hookups

Emitters



Other Models

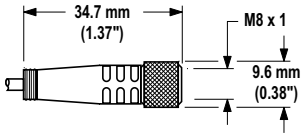
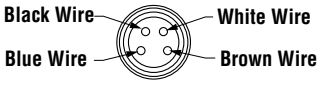


Hookups for QD models are functionally identical. (Emitters have no connection to bk and wh.)

NOTE: Please observe proper ESD precautions (grounding) when connecting QD models.

Accessories

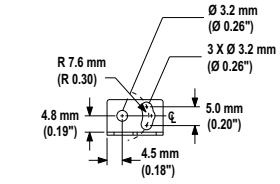
Quick-Disconnect Cables

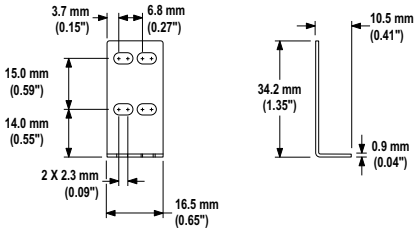
Style	Model	Length	Dimensions	Pinout
4-pin Pico-style straight with M8 threads	**PKG4M-2** **PKG4M-9**	2 m (6.5') 9 m (30')		

Brackets

SMBQ12T

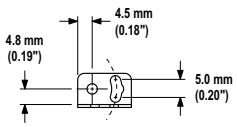
- Right-angle bracket for use with standard Q12 models
- 300 series stainless steel, 20 gauge

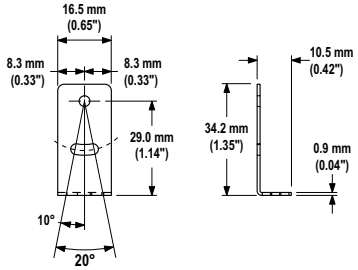




SMBQ12A

- Adjustable right-angle bracket for use with standard Q12 models
- 300 series stainless steel, 20 gauge





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Apertures

Opposed-mode Q12 sensors (standard models only) may be fitted with apertures to narrow or shape the sensor's effective beam to more closely match the size or profile of the objects being sensed. A common example is the use of "line" (or "slot") type apertures to sense thread.

NOTE: The use of apertures will reduce the sensing range (see table below).

Model APQ12-.5 Shown

Model APQ12-.5H Shown

Model APQ12-.5V Shown

Model APQ12-4S Shown

Model	Description		Reduced Sensor Range (Two Apertures Used)
APQ12-.5	Circular hole	0.5 mm (0.02") diameter – 10 each	60 mm (2.4")
APQ12-1		1 mm (0.04") diameter – 10 each	190 mm (7.5")
APQ12-1.5		1.5 mm (0.06") diameter – 10 each	400 mm (15.7")
APQ12-2		2 mm (0.08") diameter – 10 each	725 mm (28.5")
APQ12-.5H	Horizontal slot	0.5 mm (0.02") – 10 each	350 mm (13.8")
APQ12-1H		1 mm (0.04") – 10 each	725 mm (28.5")
APQ12-.5V	Vertical slot	0.5 mm (0.02") – 10 each	450 mm (17.7")
APQ12-1V		1 mm (0.04") – 10 each	900 mm (35.4")
APQ12-4S	Protective jacket	4 mm (0.16") square – 10 each	2000 mm (78.7")
APKQ12	Kit containing two of each aperture above – 18 total		—

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