# 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 (1200 psi washdown rated) 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<br>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. |

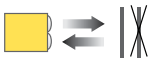
| Sensing Mode | | Model* | Range | Output |
|---|---|---|---|---|
| Fixed-Field | Performance based on use of 90% reflectance white test card.<br>640 nm Visible Red | Q12AB6FF15 | 15 mm (0.6") cutoff; 10 mm (0.4") focus | Bipolar L.O. |
| | | Q12RB6FF15 | | Bipolar D.O. |
| | | Q12AB6FF30 | 30 mm (1.2") 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<br>Effective Beam: 5.7 mm (0.22")<br>  | **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<br>  | **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.

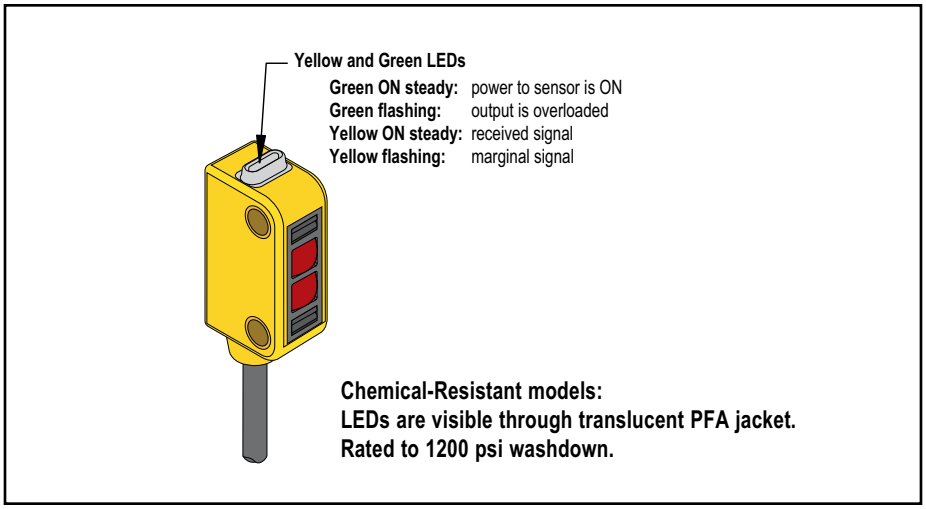



**Figure 1. Features**



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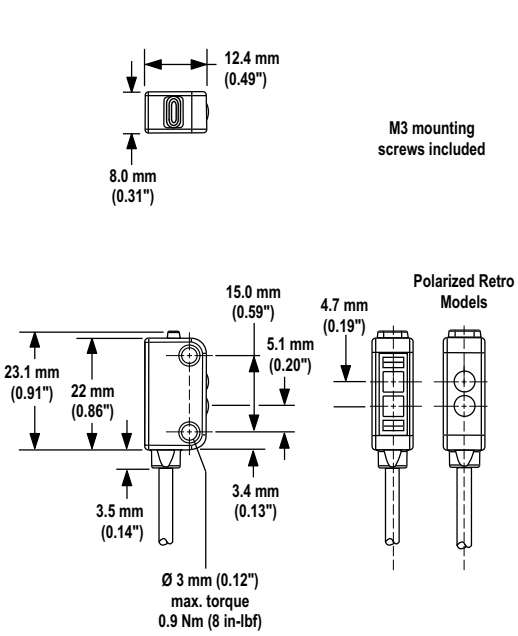
## Specifications

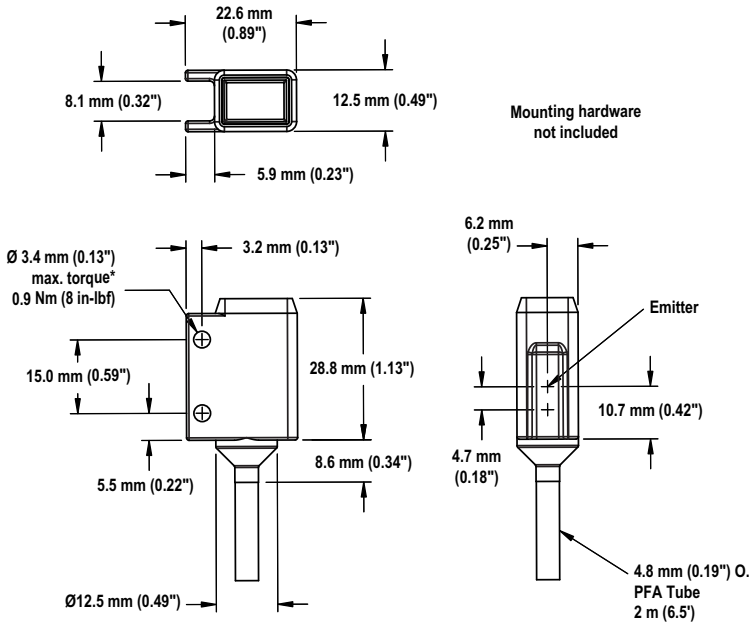
| | |
|---|---|
| **Sensing Beam** | 640 nm visible red |
| **Supply Voltage and Current** | 10 to 30V dc (10% max. ripple) @ 20 mA max current |
| **Supply Protection Circuitry** | Protected against reverse polarity and transient voltages |
| **Output Configuration** | Bipolar (1 NPN and 1 PNP) solid-state, L.O. or D.O. depending on model |
| **Output Ratings** | 50 mA total across both outputs with overload and short circuit protection<br>**OFF-state leakage current:** **ON-state saturation voltage:**<br>**NPN:** 200 µA **NPN:** 1.25V @ 50 mA<br>**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<br>**All Other Modes:** 700 µs ON/OFF<br>NOTE: 120 ms delay on power-up; outputs do not conduct during this time. |
| **Repeatability** | 175 microseconds |
| **Switching Frequency** | **Opposed Mode:** 385 Hz<br>**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<br>**All Other Standard Models:** Thermoplastic elastomer housing with polycarbonate lens<br>**Chemical-Resistant Models:** Housing encased in PFA jacket; cable encased in 3/16" O.D. PFA tubing |
| **Environmental Rating** | **Standard Models:** IEC IP67<br>**Chemical-Resistant Models:** IEC IP67 and 1200 PSI Washdown NEMA ICS 5, Annex F-2002 |
| **Connections** | **Standard Models:** 2 m (6.5') or 9 m (30') attached PVC cable, or 150 mm (6") pigtail with M8 threaded connection<br>**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)<br>**Storage temperature:** -30° to +75° C (-22° to +167° F)<br>**Relative humidity:** 90% max @ +50° C (+122° F) non-condensing |
| **Certifications** | CE c UL us |

## Dimensions

### Standard Models

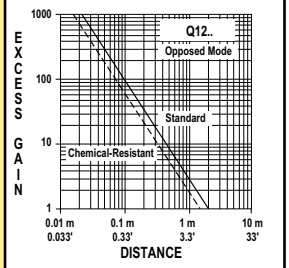
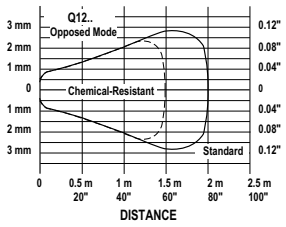
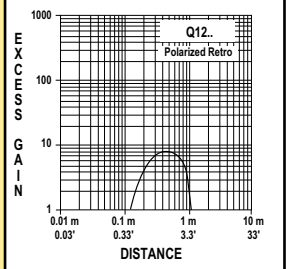
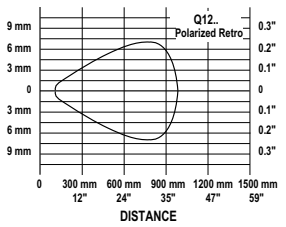
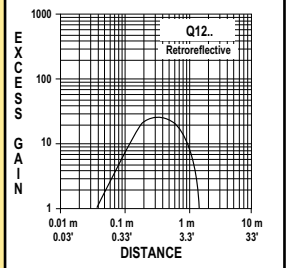
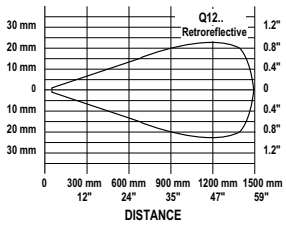



### Chemical-Resistant Models




* 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

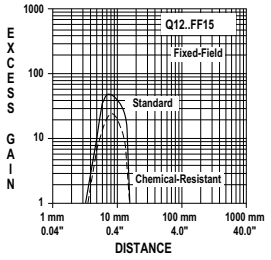
| | Excess Gain | Beam Pattern |
|---|---|---|
| **Opposed** |  |  |
| **Polarized Retro††** |  |  |
| **Retro††** |  |  |

††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**

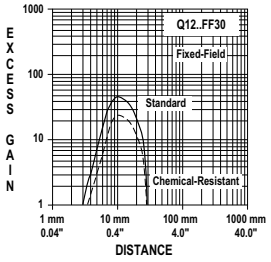



**Standard Models:**
**Ø 0.4 mm spot size @ 10 mm focus**
**Ø 1.5 mm spot size @ 15 mm cutoff**

**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**

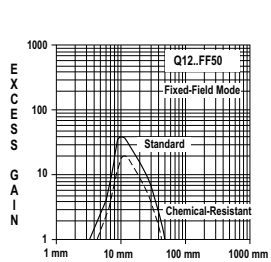



**Standard Models:**
**Ø 0.5 mm spot size @ 16 mm focus**
**Ø 3.0 mm spot size @ 30 mm cutoff**

**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.

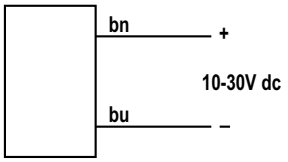
Focus and spot sizes are typical.

**Legend:**

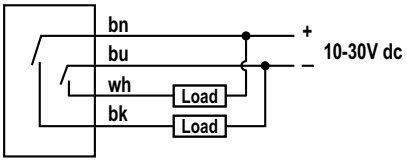
—— Standard models
- - - Chemical-resistant models

## Hookups

### Emitters




### Other Models

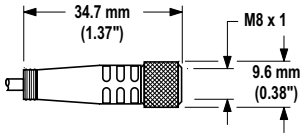
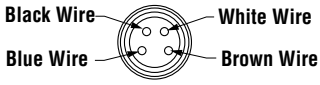



**Cabled hookups only are shown. Hookups for QD models are functionally identical. (Emitters have no connection to bk and wh.)**

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

## Accessories

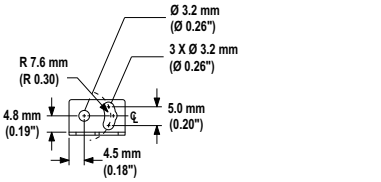
### Quick-Disconnect Cables

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

## Brackets

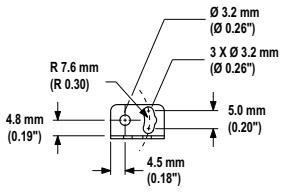
**SMBQ12T**

- 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




## 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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