

## Features



- Photoelectric sensors in a compact, rugged, sealed, over-molded plastic housing
- Standard 3 mm threaded mounting holes on 25.4 mm (1") spacing
- Advanced ASIC design for excellent noise immunity and cross-talk avoidance
- Threaded metal M8 connector on Pico-style quick-disconnect models
- 10 to 30V dc operation with complementary solid-state outputs (1 normally open, 1 normally closed); PNP (sourcing) or NPN (sinking), depending on model
- Complete offering of mounting brackets and apertures available
- Crosstalk prevention filters available for visible red opposed mode pairs

## Models

	Sensing Mode	Model*	Range	Output**		Sensing Mode	Model*	Range	Output**	
Opposed	624 nm Visible Red	Q20E	10 m (33')	N/A		Diffuse-mode performance based on use of 90% reflectance white test card.				
	Effective Beam: 10 mm (0.4")	Q20PR		PNP		800 mm (32")		Q20PDL	800 mm (32")	PNP
		Q20NR		NPN						NPN
	850 nm Infrared	Q20EL	15 m (49')	N/A		1500 mm (59")		Q20NDL	1500 mm (59")	PNP
	Effective Beam: 10 mm (0.4")	Q20PRL		PNP						NPN
		Q20NRL		NPN		NPN				
Polarized Retro	660 nm Visible Red	Q20PLP	4 m' (13')	PNP		Q20NDXL	250 mm (10")	PNP		
		Q20NLP		NPN					NPN	
Retro	660 nm Visible Red	Q20PLV	6 m' (20')	PNP		Q20PD	250 mm (10")	PNP		
		Q20NLV		NPN					NPN	

\* 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., Q20E W/30).

**QD models:**

- For 4-pin Pico-style (threaded) integral QD, add suffix "Q7" (e.g., Q20EQ7).
- For 4-pin Pico-style (threaded) 150 mm (6") pigtail QD, add suffix "Q" (e.g., Q20EQ).
- For 4-pin Euro-style 150 mm (6") pigtail QD, add suffix "Q5" (e.g., Q20EQ5).
- For 150 mm (6") PUR pigtail cable with 4-pin threaded Euro-style QD connector, add "QPMA" to the model number (e.g., Q20EQPMA)

<sup>†</sup> Range is specified using a model BRT-84 reflector.

\*\*Available with Health or Alarm Mode output; contact factory for details.

### WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their 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.

# WORLD-BEAM® Q20 Series Sensors

## Overview

Banner's Q20 family of sensors offers a full complement of sensing modes, with the excellent performance expected of much larger sensors. Their compact plastic housings feature overmolded construction for superior robustness and sealing. Their popular rectangular design is easy to mount into tight spaces; integral threaded mounting holes eliminate the need for separate mounting nuts.

The single-turn Gain potentiometer on most models and bright Signal LED (positioned on top of the housing for 360° visibility) provide easy alignment and configuration for reliable sensing (see Figure 1).

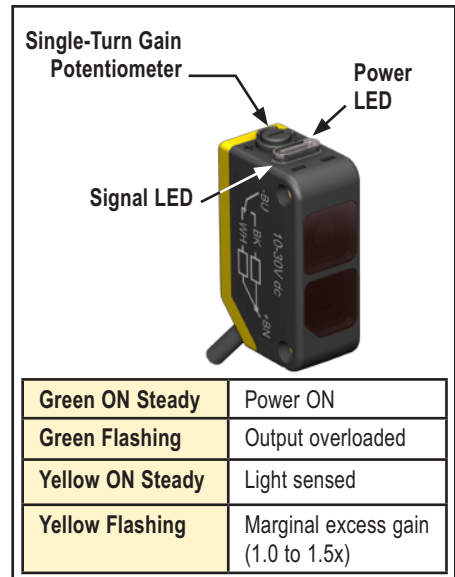



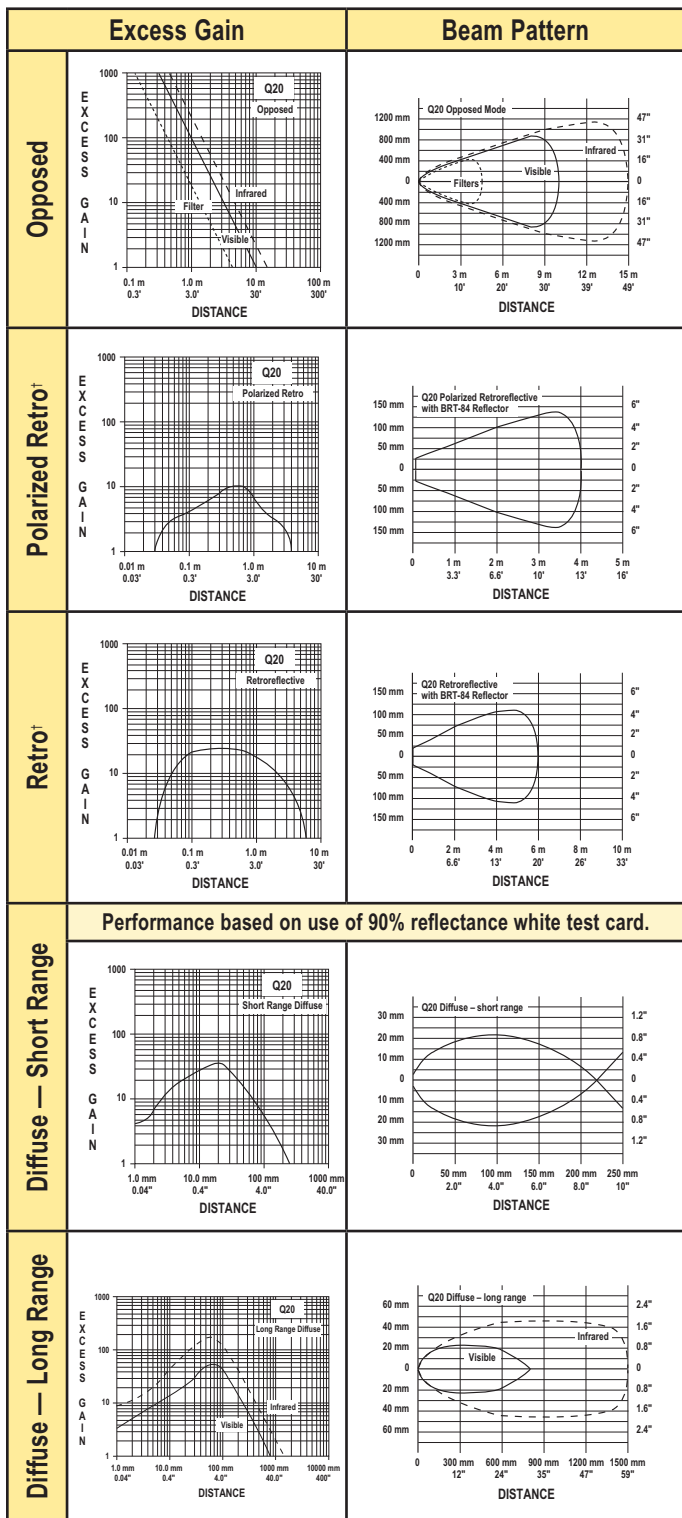
Figure 1. Features

## Specifications

<b>Supply Voltage</b>	10 to 30V dc (10% maximum ripple) at less than 18 mA, exclusive of load
<b>Supply Protection Circuitry</b>	Protected against reverse polarity and transient voltages
<b>Output Configuration</b>	100 mA with short circuit protection <b>OFF-state leakage current:</b> NPN: < 200 $\mu$ A sinking    PNP: < 20 $\mu$ A sourcing <b>ON-state saturation voltage:</b> NPN: < 1.6V @ 100 mA    PNP: < 3.0V @ 100 mA
<b>Output Response Time</b>	<b>Opposed Mode:</b> 1 millisecond ON/600 microseconds OFF <b>All others:</b> 800 microseconds ON/OFF NOTE: 100 millisecond delay on power-up; outputs do not conduct during this time
<b>Repeatability</b>	<b>Opposed Mode:</b> 140 microseconds <b>All others:</b> 155 microseconds
<b>Adjustments</b>	<b>Diffuse, Retroreflective, and Polarized Retroreflective models (only):</b> Single-turn Sensitivity (Gain) adjustment potentiometer
<b>Indicators</b>	Two LED Indicators: Power (green) and Signal (yellow) <b>Green ON Steady:</b> Power ON <b>Yellow ON steady:</b> Light sensed <b>Green flashing:</b> Output overloaded <b>Yellow flashing:</b> Marginal excess gain (1 to 1.5X)
<b>Construction</b>	<b>Housing:</b> ABS <b>Lenses:</b> PMMA <b>Gain Adjuster:</b> PBT
<b>Connections</b>	2 m (6.5') or 9 m (30') 4-wire PVC cable, 150 mm (6") pigtail with 4-pin threaded Pico-style (Q) or Euro-style (Q5) connector, or 4-pin integral threaded Pico-style connector (Q7), depending on model
<b>Operating Conditions</b>	<b>Temperature:</b> -20° to +60° C (-4° to +140° F) <b>Relative Humidity:</b> 95% @ 50° C (non-condensing)
<b>Environmental Rating</b>	IEC IP67 (NEMA 6) and 1200 PSI washdown NEMA ICS 5, Annex F-2002
<b>Vibration and Mechanical Shock</b>	All models meet Mil. Std. 202F requirements method 201A (vibration: 10 to 60 Hz max., double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2; 30G 11 ms duration, half sine wave
<b>Application Notes</b>	Opposed mode sensor spacing can be reduced by alternating emitters and receivers or by applying cross talk filters (visible red models only).
<b>Certifications</b>	

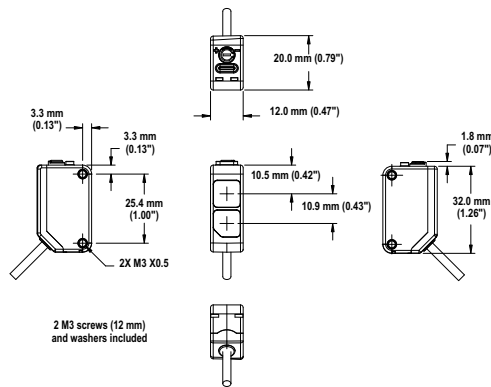
# WORLD-BEAM® Q20 Series Sensors

## Performance Curves

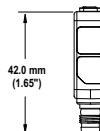


## Dimensions

### Cabled and Pigtail QD Models

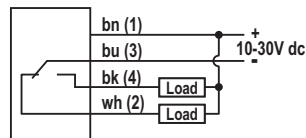


### Integral QD Models

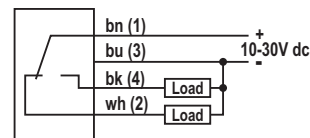


## Hookups

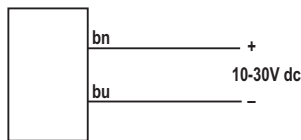
### NPN (Sinking) Outputs



### PNP (Sourcing) Outputs

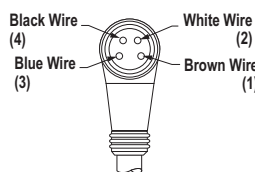


### Emitters

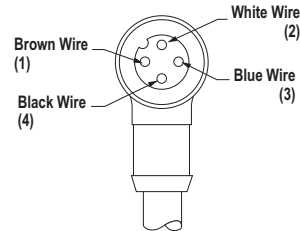


Cabled hookups only are shown. QD hookups are functionally identical.

### 4-Pin Pico-Style Pinout (Cable Connector Shown)



### 4-Pin Euro-Style Pinout (Cable Connector Shown)



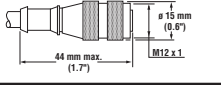
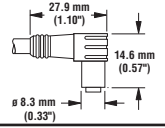
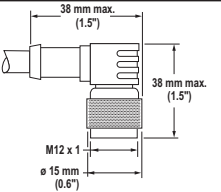
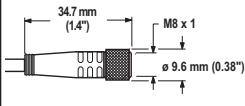
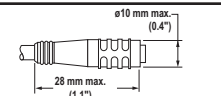
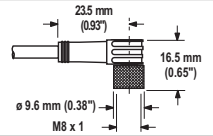
†Performance based on use of a model BRT-84 retroreflector.

See the Accessories section of your current Banner Sensors catalog or [www.bannerengineering.com](http://www.bannerengineering.com) for complete information.



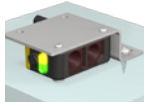
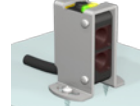
NOTE: Polarized sensors require corner cube type retroreflective targets only.

# WORLD-BEAM® Q20 Series Sensors

## Quick-Disconnect (QD) Cordsets

Style	Model	Length	Dimensions	Style	Model	Length	Dimensions
4-pin Euro-style Straight	<b>MQDC-406</b> <b>MQDC-415</b> <b>MQDC-430</b>	2 m (6.5') 5 m (15') 9 m (30')		4-pin Pico-style Right-angle	<b>PKW4Z-2</b>	2 m (6.5')	
4-pin Euro-style Right-angle	<b>MQDC-406RA</b> <b>MQDC-415RA</b> <b>MQDC-430RA</b>	2 m (6.5') 5 m (15') 9 m (30')		4-pin Threaded Pico-style Straight	<b>PKG4M-2</b> <b>PKG4M-9</b>	2 m (6.5') 9 m (30')	
4-pin Pico-style Straight	<b>PKG4-2</b>	2 m (6.5')		4-pin Threaded Pico-style Right-angle	<b>PKW4M-2</b> <b>PKW4M-9</b>	2 m (6.5') 9 m (30')	

## Mounting Brackets

<b>SMBQ20L</b>	<ul style="list-style-type: none"> <li>• Sensor vertical base mount</li> <li>• +/- 5° tip, +/- 7° swivel</li> <li>• Stainless steel</li> </ul>		<b>SMBQ20LV</b>	<ul style="list-style-type: none"> <li>• Sensor vertical back mount</li> <li>• +/- 10° tip</li> <li>• Stainless steel</li> </ul>	
<b>SMBQ20H</b>	<ul style="list-style-type: none"> <li>• Sensor horizontal flange mount</li> <li>• +/- 10° swivel</li> <li>• Stainless steel</li> </ul>		<b>SMBQ20U</b>	<ul style="list-style-type: none"> <li>• Sensor vertical base mount with protection</li> <li>• +/- 22.5° swivel</li> <li>• Stainless steel</li> </ul>	

Refer to your current Banner Sensors catalog for more mounting bracket options. Bracket dimensions can be found at [www.bannerengineering.com](http://www.bannerengineering.com).



## Cross Talk Prevention Filters (visible red models only)

Model*	Description	Reduced Sensor Range E/R (two apertures used)
<b>PFQ20-H</b>	Stainless steel (natural color)	4.5 m (14.67')
<b>PFQ20-V</b>	Stainless steel (colorized black)	

7.5 mm (0.3") dia.

\* The "H" and "V" in the model numbers refer to the polarization of the filter material. Since they are visually identical, the "H" models have been left the natural stainless steel and the "V" models have been colored black.

## Apertures

Model	Description	Reduced Sensor Range E/R (two apertures used)	Reduced Sensor Range EL/RL (two apertures used)
<b>APQ20-0.5</b>	Circular Hole 	0.5 mm (0.02") dia.	0.10 m (0.33')
<b>APQ20-1</b>		1 mm (0.04") dia.	0.35 m (1.14')
<b>APQ20-2</b>		2 mm (0.08") dia.	1.5 m (4.9')
<b>APQ20-0.5V</b>	Vertical Slot 	0.5 mm (0.02")	1.27 m (4.1')
<b>APQ20-1V</b>		1 mm (0.04")	2.6 m (8.5')
<b>APQ20-2V</b>		2 mm (0.08")	4.8 m (15.7')
<b>APK-Q20</b>	Kit	Includes two of each type.	

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**WARRANTY:** Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.