Q20-2 Polarized Retroreflective Sensors with Visible Red LED

Features

Universal rectangular housing ideal for global manufacturing with best-in-class optical to mechanical alignment (patent pending).



- Polarized retroreflective photoelectric sensor in a compact, rugged, sealed plastic housing
- Standard 3 mm threaded mounting holes on 25.4 mm (1 in) spacing
- Polarized retroreflective models for one-sided installation with a retroreflective target are ideal for detecting dark and shiny targets
- Best-in-class optical to mechanical alignment for consistent lock & load mounting with visible red LEDs for simple and precise alignment

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

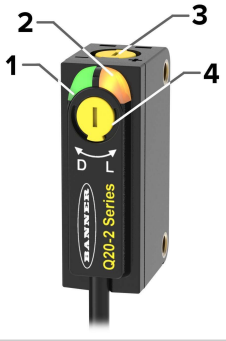
Sensing Mode	Models	Sensing Range	Connection	Output Type	Operating Mode
Polarized Retroreflective Visible red, 645 nm	Q20-2PLP-2M	5000 mm (196.9 in) using BRT 92x92C reflector	2 m (6.5 ft) unterminated 3-wire PVC-jacketed cable	PNP	LO/DO selectable via switch
	Q20-2NLP-2M			NPN	
	Q20-2VPLP-2M		2 m (6.5 ft) unterminated 4-wire PVC-jacketed cable	PNP	Complementary
	Q20-2VNLP-2M			NPN	

For other configurations, contact Banner Engineering. To order models with a 150 mm (6 in) PVC-jacketed cable and a 3-pin M8 male quick disconnect (3-wire models), replace "**2M**" with "**Q3**". To order models with a 150 mm (6 in) PVC-jacketed cable and a 4-pin M8 male quick disconnect (3-wire models), replace "**2M**" with "**Q**". To order models with a 150 mm (6 in) PVC-jacketed cable and a 4-pin M12 male quick disconnect (3- or 4-wire models), replace "**2M**" with "**Q5**".

Overview

The Q20-2 polarized retroreflective sensors offer excellent sensing performance in a compact plastic housing that is easily integrated into tight spaces.

Threaded brass inserts provide stable mounting points, and the bright indicators provide user feedback of the sensor status. The single-turn gain potentiometer, LO/DO switch, and bright indicator LEDs provide easy alignment and configuration for reliable sensing.



1. Green: Power Indicator
2. Amber: Light Sensed Indicator (flashes for marginal conditions)
3. Single-turn Gain Potentiometer (some models)
4. Light Operate/Dark Operate Switch (some models)

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.

Original Instructions
26-Feb-25

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227993
p/n: 227993 Rev. D

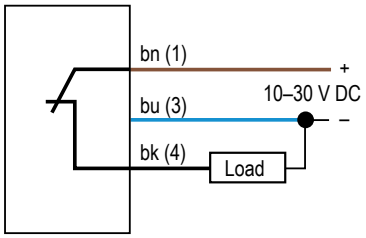
ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Q20-2 Wiring

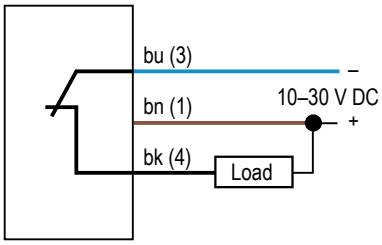
Cabled wiring diagrams are shown.Quick disconnect wiring diagrams are functionally identical.

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

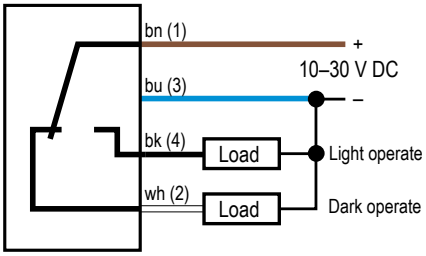
PNP Models with Switchable Operating Mode
Default mode: Dark Operate



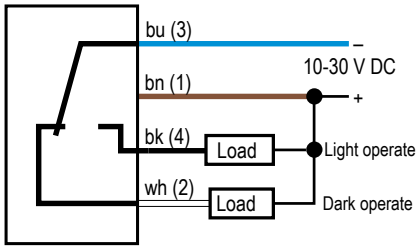
NPN Models with Switchable Operating Mode
Default mode: Dark Operate



Complementary Models, PNP Output

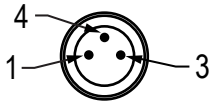


Complementary Models, NPN Output



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

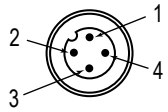
3-pin M8 Male Quick Disconnect



4-pin M8 Male Quick Disconnect



4-pin M12 Male Quick Disconnect



In dark operate (DO) mode, the output is ON when the target returns less light to the sensor than the configured target and OFF when the sensor detects more light than the configured/taught target.

In light operate (LO) mode, the output is ON when the target returns the same or more light to the sensor and OFF when the sensor detects less light than the configured/taught target.

In **retroreflective** sensing modes, light operate is active when the beam is unblocked and dark operate is active when the beam is blocked.

Specifications

Supply Voltage
10 V DC to 30 V DC (10% maximum ripple within specified limits) at less than 20 mA, exclusive of load

Sensing Beam
Visible red LED, 645 nm

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
Single output type (PNP or NPN), light operate (LO), dark operate (DO), or complementary (one light operate and one dark operate), depending on model

Rating: 100 mA total output current

Off-state leakage current: < 10 µA at 30 V DC

ON-state saturation voltage: PNP: < 3 V at 100 mA; NPN: < 3 V at 100 mA

Protected against output short-circuit, continuous overload, and false pulse on power-up

Output Response
600 µs, OFF to ON and ON to OFF

Repeatability
144 µs

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Indicators

Two LED indicators on sensor top:

Green solid: Power on

Amber solid: Light sensed

Amber flashing: Marginal sensing condition

Construction

ABS housing, acrylic lens cover; PVC cable, PBT gain adjuster, PBT LO/DO switch

Connections

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

Environmental Rating

IP67

Operating Conditions

Temperature: –25 °C to +70 °C (–13 °F to +158 °F)

95% at +70 °C maximum relative humidity (non-condensing)

Certifications

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

Industrial Control Equipment

3TJJ

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	1.0	30	0.5

FCC Part 15 Class B for Unintentional Radiators

(Part 15.105(b)) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(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(B)

This device complies with CAN ICES-3 (B)/NMB-3(B). 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(B). 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.

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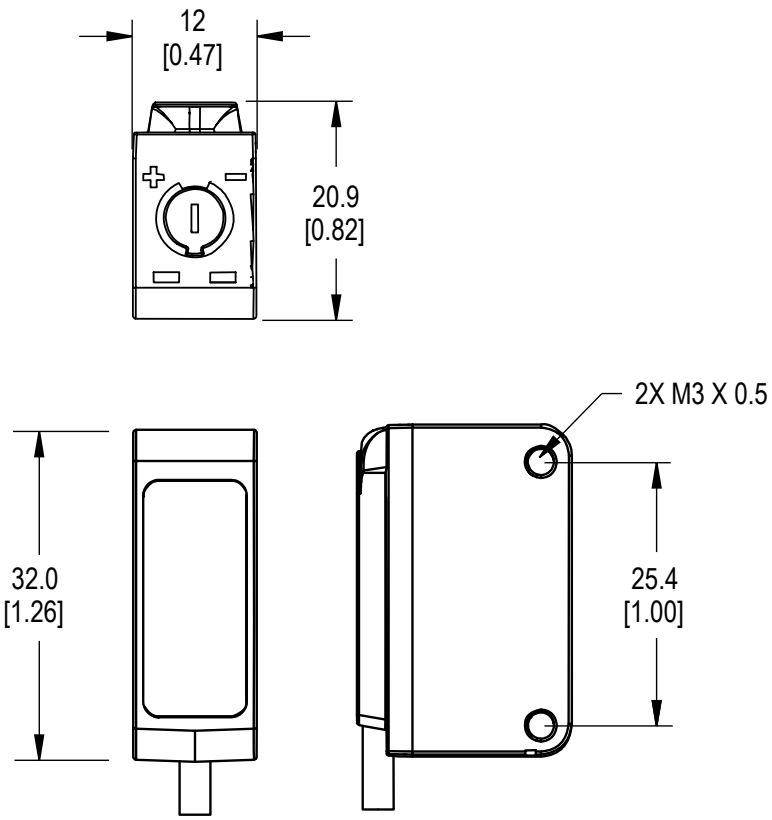
Dimensions

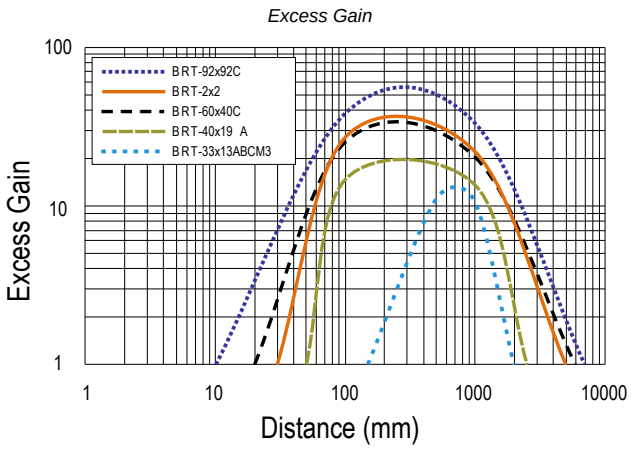
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

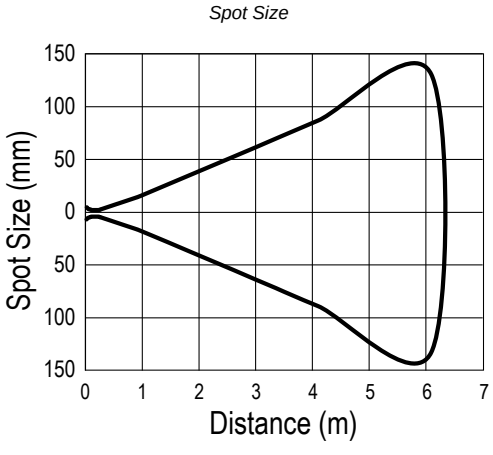


Maximum mounting screw torque: 0.56 Nm (5 in-lbs)

Two M3 screws (12 mm) and washers are included.

Performance Curves





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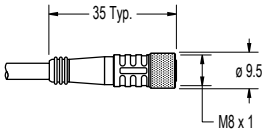
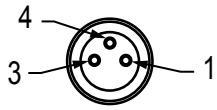
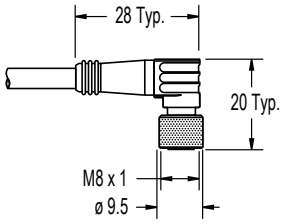
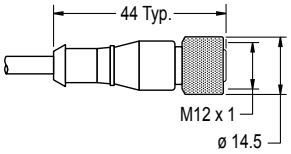
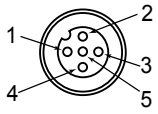
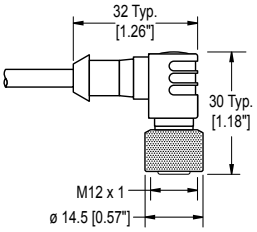
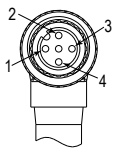
Accessories

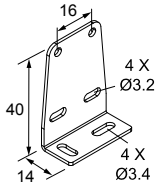
Cordsets

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)			

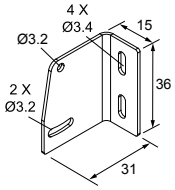
4-Pin Threaded M12 Cordsets—Single Ended					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56 ft)	Right-Angle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

Mounting Brackets

SMBQ20L
- Sensor vertical base mount
- ±5° tip, ±7° swivel
- Stainless steel



SMBQ20LV
- Sensor vertical back mount
- ±10° tip
- Stainless steel



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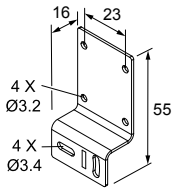
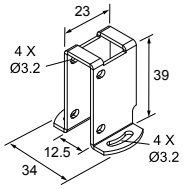
SMBQ20H

- Sensor horizontal flange mount
- ±10° swivel
- Stainless steel



SMBQ20U

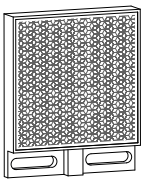
- Sensor vertical base mount with protection
- ±22.5° swivel
- Stainless steel



Reflectors

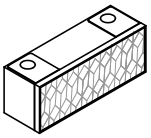
BRT-2X2

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



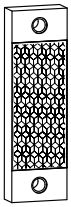
BRT-33X13ABCM3

- Rectangular, acrylic target
- Reflectivity Factor: 1.3
- Temperature:
- Optional brackets are available
- Approximate size: 33 mm × 13 mm
- Threaded M3 mounting holes



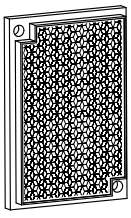
BRT-40X19A

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



BRT-60X40C

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



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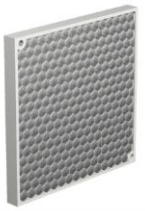
BRT-92X92C

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



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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