

Quick Start Guide

Expert™ Coaxial Polarized Retroreflective Sensor for Clear Object Detection

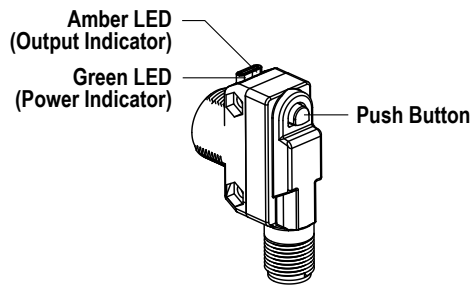
This guide is designed to help you set up and install the QS18 Clear Object Detection. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the Instruction Manual at www.bannerengineering.com. Search for p/n 194469 to view the Instruction Manual. Use of this document assumes familiarity with pertinent industry standards and practices.



WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel **protection**. Doing so could lead to serious injury or death. This device 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.

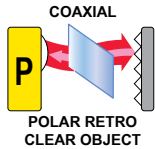
Overview



The Banner QS18 sensor is a high performance clear object detection sensor. The polarized coaxial optical design ensures reliable detection of transparent, translucent, and opaque targets at any distance between the sensor and the reflector. Low contrast sensing applications include PET bottles, glass containers, and shrink wrap. The sensor can also be used to detect optical surfaces such as: LCD panels with built in polarizing films, solar panels, and semiconductor wafers.

Indicators (Two LEDs: One Green, One Amber)		
Sensor Condition (Run Mode)	Green LED	Amber LED
Output OFF	ON	OFF
Output ON	ON	ON
Notification — Sensor needs to be reconfigured for reliable detection	Flashing at 5 Hz	ON/OFF
Notification — Push button has been locked out	Flashes 4 times and returns to solid on	ON/OFF

Models

Models	Mode	Range	Output	Connector ¹
QS18EN6XLPC	 <p>COAXIAL P POLAR RETRO CLEAR OBJECT</p>	0 to 1.3 m (0 to 4.2 ft) on BRT-40X19A	NPN	2 m cable (6.5 ft)
QS18EP6XLPC		0 to 2.0 m (0 to 6.5 ft) on BRT-51X51BM 0 to 3.0 m (0 to 9.8 ft) on BRT-92X92C	PNP	

¹ The standard 2 m (6.5 ft) cable models are listed.

- To order the 9 m (30 ft) cable models, add the suffix "W/30" to the cabled model number (for example QS18EN6XLPCW/30)
- To order the 4 pin Euro M12 integral connector, add the suffix "Q8" (for example QS18EN6LPCQ8)
- To order the 4 pin Euro M12 150 mm (6 inch) cable, add the suffix "Q5" (for example QS18EN6LPCQ5)
- To order a 4 pin Pico M8 integral connector, add the suffix "Q7" (for example QS18EN6LPCQ7)
- To order a 4 pin Pico M8 150 mm (6 inch) cable, add the suffix "Q" (for example QS18EN6XLPCQ)



Installing and Mounting the Sensor for Low Contrast Applications

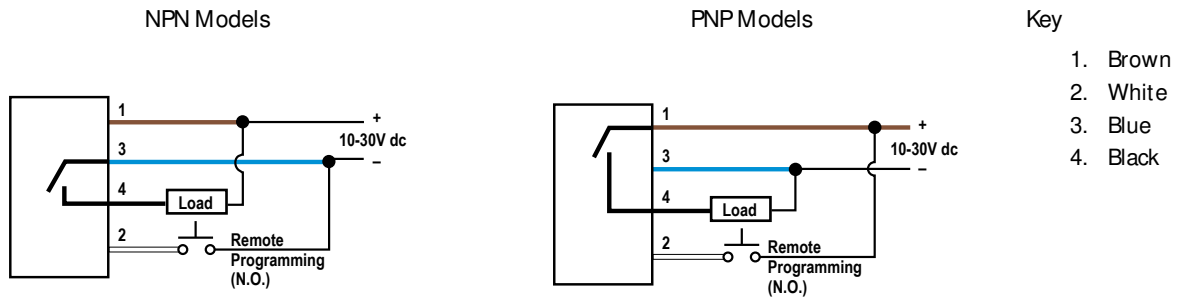
Reliable transparent object detection depends on the sensor always detecting the object as "dark state" and the reflector as the "light state". Using a recommended reflector, and proper orientation of the sensor to the reflector, is key to good clear object detection. Optimize the reliable detection of transparent and clear objects by applying the following steps when mounting the sensor and selecting a retroreflective target.

1. If a bracket is needed, mount the sensor onto the bracket.
2. Mount the sensor (or the sensor and the bracket) to the equipment at the desired location. Do not tighten at this time.
3. Align the sensor's light spot to the middle of the retroreflector.
4. Mount the retroreflector perpendicular to the sensor optical axis ($\pm 5^\circ$).
5. Tighten the screws to secure the sensor (or the sensor and the bracket) to the aligned position.

Mounting Considerations for Opaque Objects with Mirror Like Surfaces

To minimize the potential for reflections from mirror like objects affecting the sensor, it is best to side mount the sensor.

Wiring Diagrams



Sensor Configuration

Sensor configuration can be implemented with the push button or the remote program wire. Configuration options include two sensing modes: LIGHT SET and DARK SET. For configuration using the push button see [Figure 1](#) on page 2. For configuration using the remote program wire, please refer to the Instruction Manual at <http://www.bannerengineering.com>. Search for p/n 194469 to view the Instruction Manual.

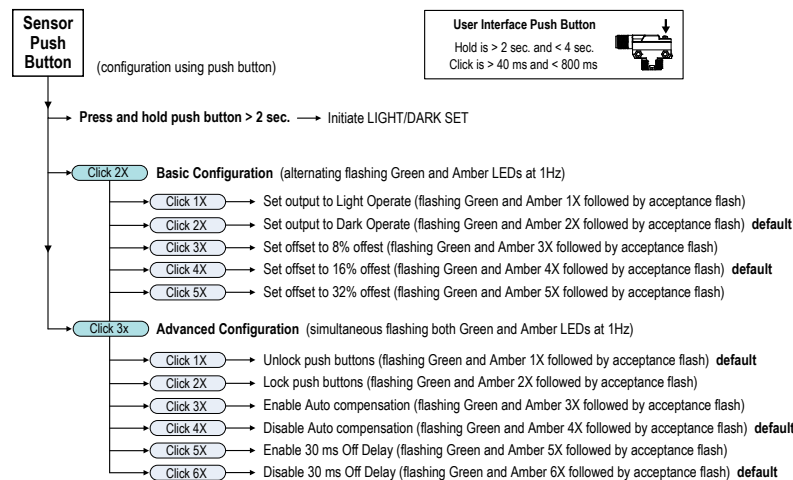


Figure 1. Push Button Input Flowchart

Light Set

Use Light SET for low contrast applications. Use either the push button or remote input wire procedure to configure the sensor.

Example Applications For Offset Percentages	
8%	Recommended for very low contrast applications with stable environmental conditions.
16%	Recommended for most clear object detection applications in typical machine industrial environments.
32%	Recommended for high contrast detections such as brown or green bottles, or opaque objects. This setting tolerates environmental challenges such as vibrations and dust build-up.

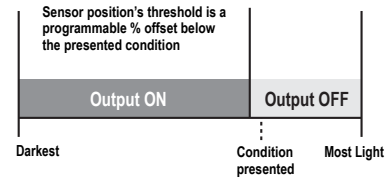
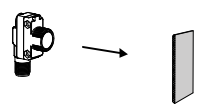



Figure 2. LIGHT SET sensing mode in dark operate

Table 1: LIGHT SET Push Button Configuration

Setup	Action	Result
Clear the light path to the reflector. 	Press and hold the push button 2 to 4 seconds. 	<p>LIGHT SET Configuration Accepted Green LED Indicator: Flashes 3 times. Green and Amber LED Indicators: Acceptance flash - both LEDs flash 5 times rapidly in unison.</p> <p>The sensor returns to Run mode with the new settings.</p> <p>LIGHT SET Configuration Not Accepted If there is not enough return signal, the sensor will perform in DARK SET indicated by the green and amber LED indicators flashing in unison 2 times followed by the green and amber LED indicators flashing rapidly in unison 5 times.</p>

Dark Set

Dark SET (maximum operating range) is the factory default setting and provides maximum sensing range, ease of alignment, and reliable detection of opaque objects. Dark Set provides a fixed threshold whenever the sensor is taught an obstructed view.



Note: The sensor's light spot is made brighter for 60 seconds to assist in aligning the sensor to the reflector. This is particularly useful for long range applications.

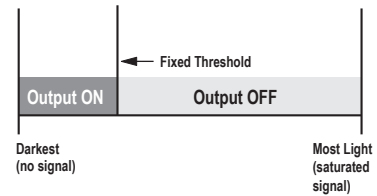
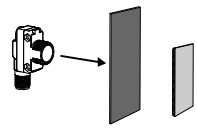



Figure 3. DARK SET sensing mode in dark operate

Table 2: DARK SET Push Button Configuration

Setup	Action	Result
Block the light path to the reflector. 	Press and hold the push button 2 to 4 seconds. 	<p>DARK SET Configuration Accepted Green and Amber LED Indicators: Flash 2 times. Green and Amber LED Indicators: Acceptance flash - both LEDs flash 5 times rapidly in unison.</p> <p>The sensor returns to Run mode with the new settings.</p> <p>DARK SET Configuration Not Accepted If there is too much return signal, the sensor will perform in LIGHT SET indicated by the green LED indicator flashing 3 times followed by the green and amber LED indicators flashing rapidly in unison 5 times.</p>

Specifications

Supply Voltage

10 V to 30 V dc (10% maximum ripple)

Supply Current (Exclusive of Load Current)

< 25 mA at 15 V
< 40 mA at 24 V

Repeatability

100 μs

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Output Protection Circuitry

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

Output Configuration

Current sourcing (PNP) or current sinking (NPN), depending on model; Light- or dark-operate selectable; Selectable 30 ms output OFF-delay
Rating: 100 mA max

Off-state leakage current: < 50 μA at 30 V

ON-state saturation voltage: < 1.5 V at 10 mA; < 3 V 100 mA

Output Response Time

Note: Momentary delay on power-up; output does not conduct during this time
400 μs ON/OFF

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

Emitter LED

Visible red, 625 nm

Indicators

Two LEDs (1 green, 1 amber)

Green solid: Indicates power applied and sensor ready

Green flashing: Indicates sensor operating in marginal state, in need of reconfiguration

Amber solid: Indicates output conducting

Factory Default Settings

Setting	Factory Default
Sensing Mode	Dark Set
Output Logic	Dark Operate
Offset Percent	16%
Push Button	Unlocked
Auto Compensation	Disabled
OFF Delay	Disabled

Mounting Torque

Nose mount: 18 mm mounting nut, 20 lbf-in (2.3 N-m)

Side mount: Two M3 screws, 5 lbf-in (0.6 N-m)

Construction

ABShousing, PMMA window

Connections

PVC-jacketed 4-conductor 2 m (6.5 ft) or 9 m (30 ft) unterminated cable, or 4-pin Euro-style or 4-pin Pico-style quick-disconnect (QD), either integral or 150 mm (6 in) pigtail, are available. QD cordsets are ordered separately.

Operating Conditions

Temperature: -40 °C to +70 °C (-40 °F to +158 °F)

Relative Humidity: 90% at +50 °C (non-condensing)

Environmental

IEC IP67

Application Notes

If the push button does not appear to be responsive, perform the push button enable procedure

Certifications



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