QS18E Clear Object Detection Quick Start Guide

Features

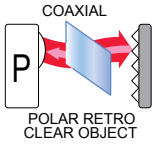
Expert™ Coaxial Polarized Retroreflective Sensor for Clear Object Detection

This guide is designed to help you set up and install the QS18E Clear Object Detector. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the Product Manual at www.bannerengineering.com. Search for part number 194469 to view the Product Manual. Use of this document assumes familiarity with pertinent industry standards and practices.

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.

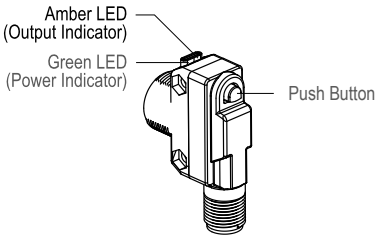
Models

Models	Mode	Range	Output	Connector
QS18EN6XLPC		0 to 1.3 m (0 to 4.2 ft) on BRT-40X19A 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	NPN	2 m (6.5 ft) cable
QS18EP6XLPC			PNP	

- The 9 m (30 ft) cable models (adding the suffix "W/30" to the cabled model number, for example QS18EN6XLPC W/30) are no longer available for order but are covered by the contents of this document.
- To order the 4-pin M12 male quick disconnect (QD) connector model, add the suffix "Q8" (for example QS18EN6LPCQ8)
- To order the 150 mm (6 inch) cable with a 4-pin M12 male QD model, add the suffix "Q5" (for example QS18EN6LPCQ5)
- To order the 4-pin M8 male QD model, add the suffix "Q7" (for example QS18EN6LPCQ7)
- To order the 150 mm (6 inch) cable with a 4-pin M8 male QD model, add the suffix "Q" (for example QS18EN6XLPCQ)

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 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

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.

Original Instructions
19-May-26

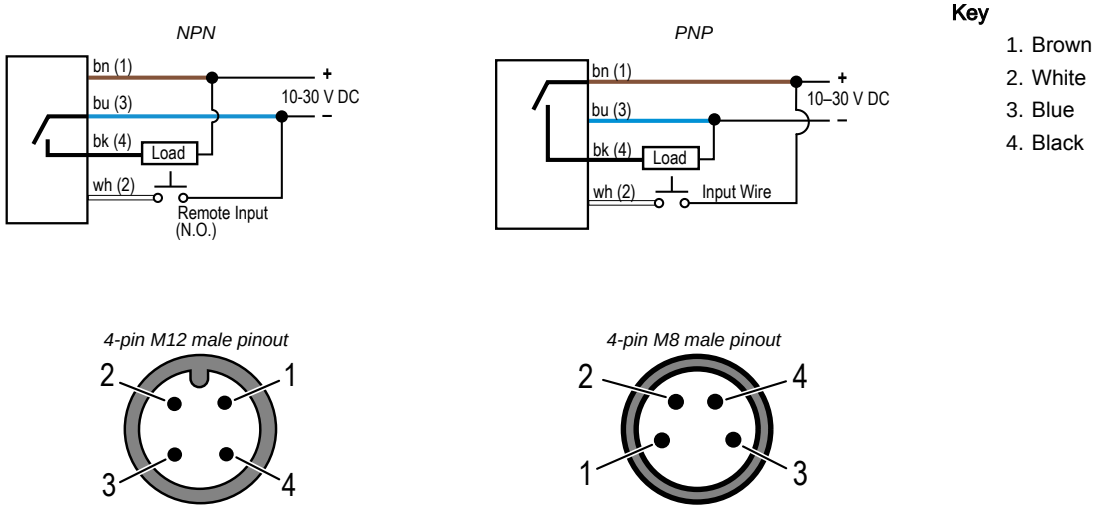
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195502
p/n: 195502 Rev C

3. Align the sensor's light spot to the middle of the retroreflector.
4. Mount the retroreflector perpendicular to the sensor optical axis (± 5°).
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.

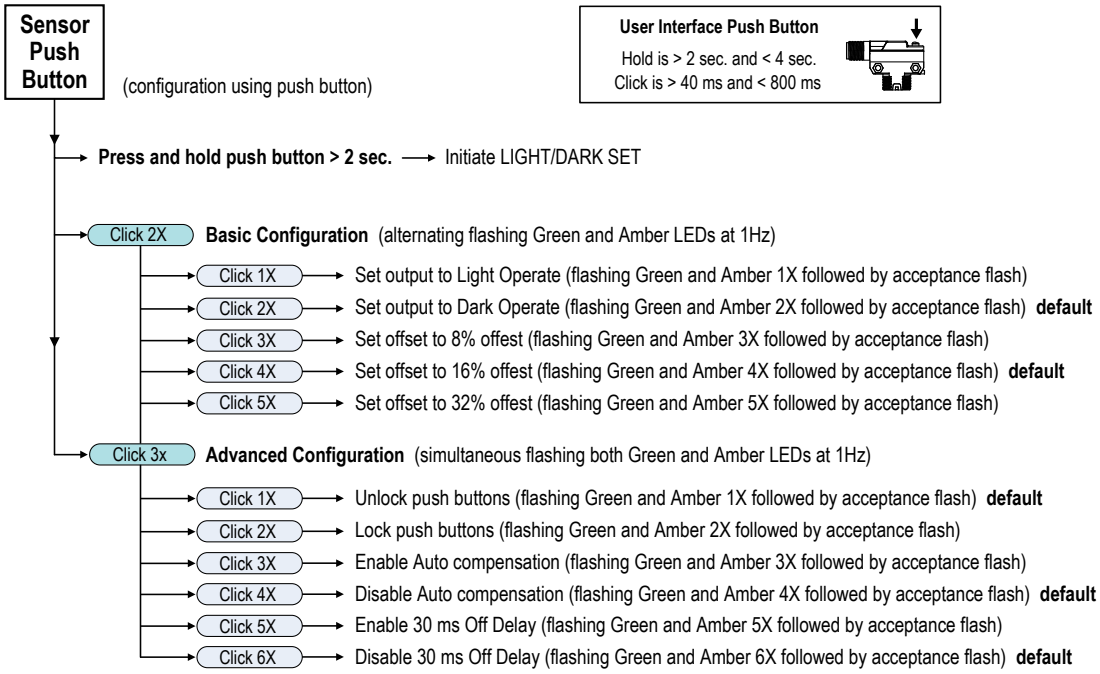
Wiring



QS18E COD 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 Push Button Input Flowchart. 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.

Push Button Input Flowchart

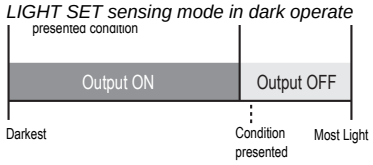


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Light Set

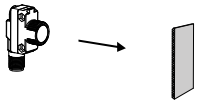
Use Light SET for low contrast applications. Use either the push button or remote input wire procedure to configure the sensor.

LIGHT SET sensing mode in dark operate



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.

LIGHT SET Push Button Configuration

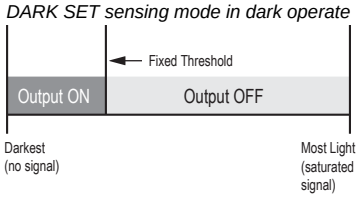
Setup	Action	Result
Clear the light path to the reflector. 	Press and hold the push button 2 to 4 seconds. 	**LIGHT SET Configuration Accepted** **Green LED Indicator:**Flashes 3 times.**Green and Amber LED Indicators:**Acceptance flash - both LEDs flash 5 times rapidly in unison. The sensor returns to Run mode with the new settings. **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.

Dark Set

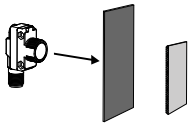
Dark SET (maximum operating range) is the factory default setting and provides maximum sensing range, ease of alignment, and reliable detection of opaque objects. Dark Set provides a fixed threshold whenever the sensor is taught an obstructed view.

> **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.

DARK SET sensing mode in dark operate



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. 	**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. The sensor returns to Run mode with the new settings. **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.

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

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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

Construction
ABS housing, PMMA window

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

Connections
PVC-jacketed 4-conductor 2 m (6.5 ft) or 9 m (30 ft) unterminated cable, or 4-pin M12 or 4-pin M8 quick-disconnect (QD), either integral or 150 mm (6 in) cable, are available. Quick-disconnect cordsets are ordered separately.

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)

Operating Conditions
Temperature: –40 °C to +70 °C (–40 °F to +158 °F)

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

Environmental
IEC IP67

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

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

Certifications
Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

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

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	2.0	30	0.5

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