QS18E Expert Sensor with IO-Link Quick Start Guide

Features

Expert Sensor with IO-Link

This guide is designed to help you set up and install the WORLD-BEAM QS18E Expert Sensor with IO-Link. For complete information on programming, performance, troubleshooting, dimensions, and accessories, please refer to the Product Manual at www.bannerengineering.com. Search for part number 196872 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

Polarized retroreflective sensing mode models

Models	Range	Output	Connection
QS18EK6LPQ5	3.5 m (12 ft) (with the use of a BRT-84 reflector)	IO-Link push/pull output and multi-function input/output	150 mm (6 in) PVC cable with a 4-pin M12 quick disconnect (QD)
QS18EK6LPQ7			4-pin M8 QD
QS18EK6LPQ8			4-pin M12 quick disconnect

Diffuse (infrared) sensing mode models

Models	Range	Output	Connection
QS18EK6DQ5	800 mm (31.5 in) (based on 90% reflectance white test card)	IO-Link push/pull output and multi-function input/output	150 mm (6 in) PVC cable model with a 4-pin M12 QD
QS18EK6DQ7			4-pin M8 QD
QS18EK6DQ8			4-pin M12 QD

Diffuse (visible red) sensing mode models

Models	Range	Output	Connection
QS18EK6DVQ	600 mm (23.6 in) (based on 90% reflectance white test card)	IO-Link push/pull output and multi-function input/output	150 mm (6 in) PVC cable with a 4-pin M8 QD
QS18EK6DVQ5			150 mm (6 in) PVC cable model with a 4-pin M12 QD
QS18EK6DVQ7			4-pin M8 QD
QS18EK6DVQ8			4-pin M12 QD

Convergent sensing mode models

Models	Range	Output	Connection
QS18EK6CV15Q5	16 mm (0.65 in) (based on 90% reflectance white test card)	IO-Link push/pull output and multi-function input/output	150 mm (6 in) PVC cable model with a 4-pin M12 QD
QS18EK6CV15Q7			4-pin M8 QD

Plastic fiber optic mode models

Models	Range	Output	Connection
QS18EK6FPQ	Varies by mode and fiber optics used	IO-Link push/pull output and multi-function input/output	150 mm (6 in) PVC cable with a 4-pin M8 QD
QS18EK6FPQ5			150 mm (6 in) PVC cable model with a 4-pin M12 QD
QS18EK6FPQ7			4-pin M8 QD

Models with a quick disconnect require a mating cordset.

For a list of discontinued models, see Discontinued Models.

Original Instructions
19-May-26

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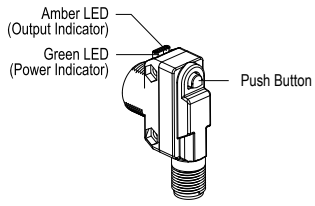
196871
p/n: 196871 Rev E

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

Overview



The Banner QS18E sensor is a high-performance photoelectric sensor with IO-Link and configurable multifunction input/output. For opposed-mode models, the receiver has a configurable multifunction input/output and the emitter has a configurable multifunction input.

Opposed-Mode Emitter

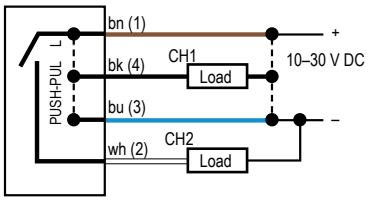
Sensor Condition	Green LED	Amber LED
Power On	ON	OFF
Notification—Push button has been locked out	Flashes four times and returns to solid On after button press	OFF

Self-Contained Models and Opposed-Mode Receivers

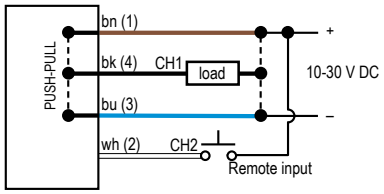
Sensor Condition (Run Mode)	Green LED	Amber LED
Output OFF	ON	OFF
Output ON	ON	ON
Self-Contained Models Notification—Sensor needs to be reconfigured for reliable detection ***Opposed-Mode Models*** Notification—Sensor needs to be reconfigured for reliable detection OR The emitter is set to High Power, and the receiver is saturated. Set the emitter to Low Power.	Flashing	ON/OFF
Notification—Push button has been locked out	Flashes four times and returns to solid On after button press	ON/OFF

Wiring

Channel 1 = IO-Link, Channel 2 = PNP Output (factory default)



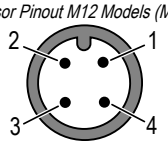
Channel 1 = IO-Link, Channel 2 = PNP Remote Input



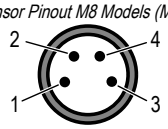
Key

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

Sensor Pinout M12 Models (Male)



Sensor Pinout M8 Models (Male)



NOTE: NPN/PNP and Remote Input configurations are programmable using IO-Link.

NOTE: Enable the remote input wire function using IO-Link. The default for the remote input wire function is Detection Output.

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.

Sensor Configuration

Configure the sensor using the TEACH or SET methods to define the sensing limits. Use the setup procedure to enable a 30 ms OFF-delay or to change the Light/Dark Operate setting. Sensing limit configuration options include:

- Two-Point Static TEACH: One switching threshold, determined by two taught conditions
- Dynamic TEACH: One switching threshold, determined by multiple sampled conditions
- Window SET: A sensing window, centered around a single sensing condition
- Light SET and Dark SET: One switching threshold, offset from a single sensing condition

The sensor's output is disabled during all TEACH and SET procedures, and is enabled upon return to Run mode.

Following any TEACH or SET procedure other than Two-Point Static TEACH, the Output ON condition (Light or Dark Operate setting) remains as it was last configured. To change that setting, or the OFF-delay setting, see the Input Flowchart.

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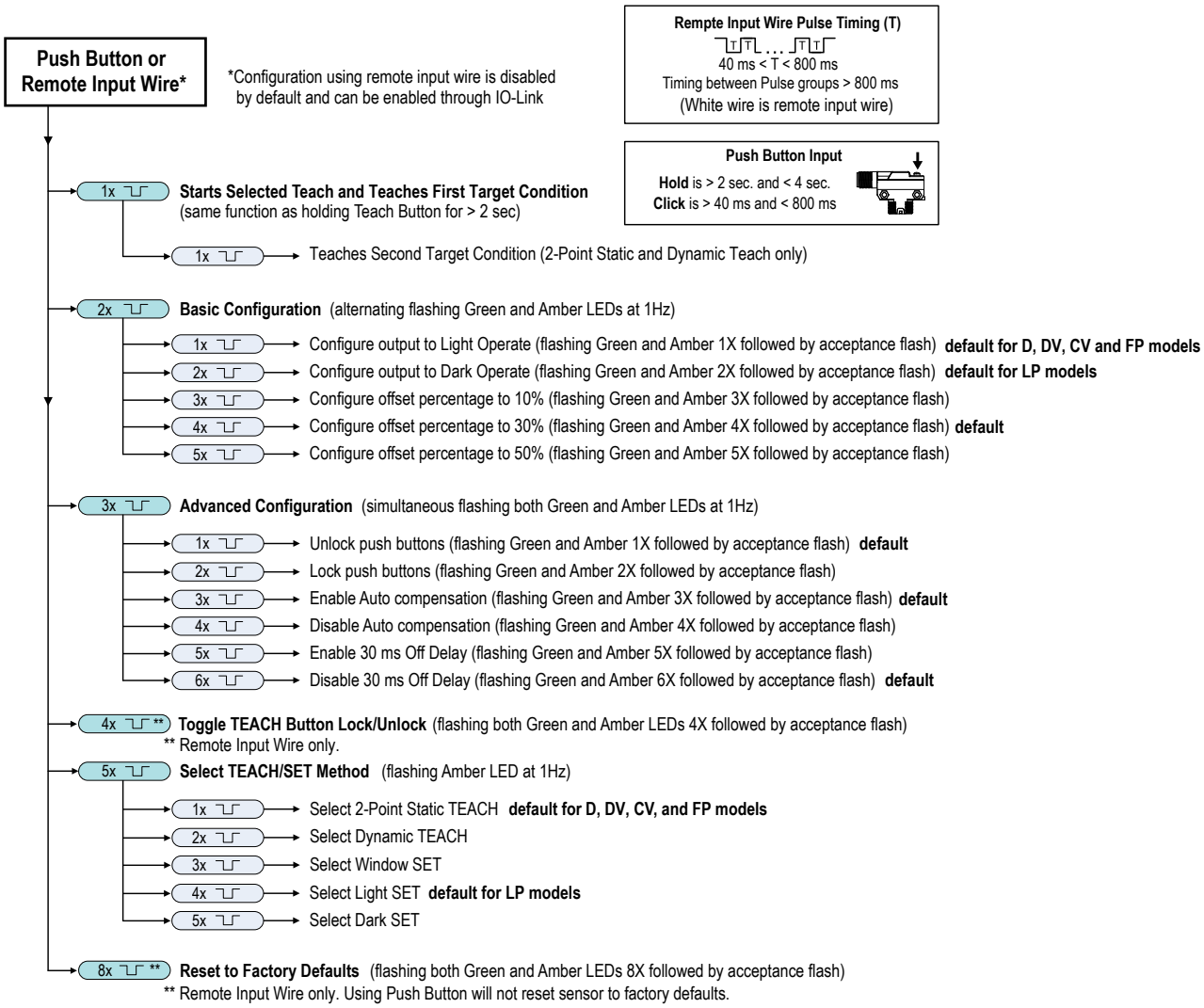
Push Button Configuration. Use the push button to configure the sensor. Click the push button according to the Input Flowchart.

Remote Input Configuration. The remote input wire is disabled by default. Enable the remote input wire using IO-Link. Use the remote input function to configure the sensor remotely. Connect the white wire of the sensor as shown in the wiring diagram. Pulse the remote line according to the Input Flowchart.

Input Flowchart



Note: Reconfiguration is required before a new TEACH/SET method takes effect.

IO-Link Interface

IO-Link® [1] is a point-to-point communication link between a master device and sensor. Use IO-Link to parameterize sensors and transmit process data automatically. For the latest IO-Link protocol and specifications, see www.io-link.com.

Each IO-Link device has an IODD (IO Device Description) file that contains information about the manufacturer, article number, functionality etc. This information can be easily read and processed by the user. Each device can be unambiguously identified via the IODD as well as via an internal device ID. Download the QS18E's IO-Link IODD package (p/n 199851) from Banner Engineering's website at www.bannerengineering.com.

Banner has also developed Add On Instruction (AOI) files to simplify ease-of-use between the QS18E, multiple third-party vendors' IO-Link masters, and the Logix Designer software package for Rockwell Automation PLCs. Three types of AOI files for Rockwell Allen-Bradley PLCs are listed below. These files and more information can be found at www.bannerengineering.com.

Process Data AOIs—These files can be used alone, without the need for any other IO-Link AOIs. The job of a Process Data AOI is to intelligently parse out the Process Data word(s) in separate pieces of information. All that is required to make use of this AOI is an EtherNet/IP connection to the IO-Link Master and knowledge of where the Process Data registers are located for each port.

Parameter Data AOIs—These files require the use of an associated IO-Link Master AOI. The job of a Parameter Data AOI, when working in conjunction with the IO-Link Master AOI, is to provide quasi-realtime read/write access to all IO-Link parameter data in the sensor. Each Parameter Data AOI is specific to a given sensor or device.

IO-Link Master AOIs—These files require the use of one or more associated Parameter Data AOIs. The job of an IO-Link Master AOI is to translate the desired IO-Link read/write requests, made by the Parameter Data AOI, into the format a specific IO-Link Master requires. Each IO-Link Master AOI is customized for a given brand of IO-Link Master.

Add and configure the relevant Banner IO-Link Master AOI in your ladder logic program first; then add and configure Banner IO-Link Device AOIs as desired, linking them to the Master AOI as shown in the relevant AOI documentation.

[1] IO-Link® is a registered trademark of PROFIBUS Nutzerorganisation e.V.

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Specifications

Supply Voltage and Current

10 V DC to 30 V DC (10% maximum ripple within specified limits) at 30 mA

Supply Protection Circuitry

Protected against reverse polarity and transient overvoltages

Output Protection Circuitry

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

Output Configuration

Channel 1: IO-Link, Push/pull output, configurable PNP or NPN output

Channel 2: Multi-function remote input/output, configurable PNP or NPN

Rating: 50 mA maximum each output at 25 °C

Output Response Time

Momentary delay on power-up, < 0.5 s, output does not conduct during this time

350 microseconds ON & OFF for high speed response time

1 millisecond ON & OFF for standard response time

2 millisecond ON & 1 millisecond OFF for robust response time

Repeatability

140 microseconds for high speed

175 microseconds for standard and robust

IO-Link Interface

Supports Smart Sensor Profile: Yes

Baud Rate: 38400 bps

Process Data Widths: 32 bits In, 8 bits Out

IODD Files: Provides all programming options of push button and remote input wire, plus additional functionality. See the IO-Link Data Reference Guide for more details.

Emitter LED

DV, CV, FP, and LP: Visible red, 625 nm

D models: Infrared, 940 nm

Indicators

Two LEDs (1 green, 1 amber)

Green On: Indicates power applied and sensor ready

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

Amber On: Indicates output conducting

Construction

Housing: ABS

Window: PMMA

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)

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, either integral or 150 mm (6 in) cable, are available.

Models with a quick disconnect require a mating cordset

Operating Conditions

–40 °C to +70 °C (–40 °F to +158 °F)

95% at +50 °C maximum relative humidity (non-condensing)

Environmental Rating

IP67

Application Notes

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

Certifications

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1831 Diegem, BELGIUM

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

Factory Default Settings

Setting	Factory Default
TEACH/SET	D, DV, CV, and FP Models: Two-point Static TEACH LP Models: Light SET
Output Logic	D, DV, CV, and FP Models: Light Operate LP Models: Dark Operate
Output Response Time	Standard
Offset Percentage	30%
Push Button	Unlocked
Auto Compensation	Enabled
OFF Delay	Disabled
Pin 4 Output	IO-Link Enabled Detection Output (Push-pull)
Pin 2 Output	Detection Output: High-speed output when using IO-Link on Pin 4

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

Product Support and Maintenance

Discontinued Models

The following models are no longer available for order but are still covered by the information in this document.

Models	Sensing Mode	Connection
QS18EK6LPQ	Polarized retroreflective	150 mm (6 in) PVC cable model with a 4-pin M8 quick disconnect model
QS18EK6DQ	Diffuse (infrared)	150 mm (6 in) PVC cable with a 4-pin M8 QD
QS18EK6CV15Q	Convergent	150 mm (6 in) PVC cable with a 4-pin M8 QD
QS18EK6CV15Q8	Convergent (16 mm range)	4-pin M12 QD
QS18EK6CV45Q	Convergent (43 mm range)	150 mm (6 in) PVC cable with a 4-pin M8 QD
QS18EK6CV45Q5		150 mm (6 in) PVC cable model with a 4-pin M12 QD
QS18EK6CV45Q7		4-pin M8 QD
QS18EK6CV45Q8		4-pin M12 QD
QS18EK6FPQ8	Plastic fiber option	4-pin M12 QD

Contact Us

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For worldwide locations and local representatives, visit www.bannerengineering.com.

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