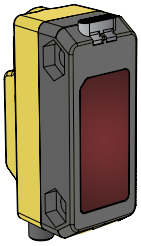
QS18LAF1000IR Electronically Adjustable Background Suppression Sensor

Features

Compact sensors featuring extended range and electronically adjustable background suppression mode.



- Exceptional optical performance; up to 1000 mm sensing range in compact QS18 housing
- Background suppression models for reliable detection of objects when the background condition is not controlled or fixed
- Simple TEACH adjustment of cutoff distance
- Enhanced immunity to fluorescent lights
- Class 1 IR Laser emitter

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	Connection	Output Type
QS18N6LAF1000IR	2 m (6.5 ft) unterminated 4-wire PVC jacketed cable (other connection options are listed below)	NPN LO/DO
QS18P6LAF1000IR		PNP LO/DO

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

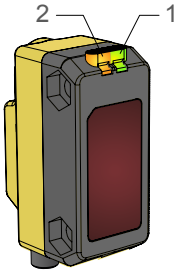
- To order the 4-pin M12 quick disconnect model, add the suffix “Q8” to the model number (for example, **QS18N6LAF1000IRQ8**)
- To order the 4-pin M8 quick disconnect model, add the suffix “Q7” to the model number (for example, **QS18N6LAF1000IRQ7**)
- To order the 150 mm cable with a 4-pin M12 quick disconnect model: add the suffix “Q5” to the model number (for example, **QS18N6LAF1000IRQ5**)
- To order the 150 mm cable with a 3-pin M8 quick disconnect model, add the suffix “Q3” to the model number (for example, **QS18N6LAF1000IRQ3**)
- To order the 150 mm cable with a 4-pin M8 quick disconnect model, add the suffix “Q” to the model number (for example, **QS18N6LAF1000IRQ**)

Models	Connection	Output Type
QS18RN6LAF1000IR	2 m (6.5 ft) unterminated 4-wire PVC jacketed cable (no other connection options are available)	NPN DO
QS18RP6LAF1000IR		PNP DO
QS18AN6LAF1000IR		NPN LO
QS18AP6LAF1000IR		PNP LO

Overview

The QS18LAF1000IR Electronically Adjustable Background Suppression Sensor ignores objects beyond the set cutoff distance.

Background suppression mode can be used in most situations with varying object color and position or with varying background conditions.



1. Green: Power indicator
2. Amber: Light sensed indicator

Original Instructions
11-Feb-26

247182
p/n: 247182 Rev. A

Class 1 Laser Description and Safety Information

Laser light. Do not stare into the beam.

Complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 56, dated May 8, 2019.

CLASS 1
LASER PRODUCT

CAUTION:
- **Never stare directly into the sensor lens.**
- Laser light can damage your eyes.
- Avoid placing any mirror-like object in the beam. Never use a mirror as a retroreflective target.

CAUTION:
- **Return defective units to the manufacturer.**
- Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.
- Do not attempt to disassemble this sensor for repair. A defective unit must be returned to the manufacturer.

CAUTION:
- **Ne regardez jamais directement la lentille du capteur.**
- La lumière laser peut endommager la vision.
- Évitez de placer un objet réfléchissant (de type miroir) dans la trajectoire du faisceau. N'utilisez jamais de miroir comme cible rétro-réfléchissante.

CAUTION:
- **Tout dispositif défectueux doit être renvoyé au fabricant.**
- L'utilisation de commandes, de réglages ou de procédures autres que celles décrites dans le présent document peut entraîner une exposition dangereuse aux radiations.
- N'essayez pas de démonter ce capteur pour le réparer. Tout dispositif défectueux doit être renvoyé au fabricant.

Class 1 lasers are lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

Complies with IEC 60825-1:2014 and EN 60825-1:2014+A11:2021.

For safe laser use:
- Do not stare at the laser.
- Do not point the laser at a person’s eye.
- Mount open laser beam paths either above or below eye level, where practical.
- Terminate the beam emitted by the laser product at the end of its useful path.

Class 1 Laser Characteristics

Output power: 0.9 mW
Laser wavelength: 940 nm
Pulse duration: 3 ms

Installation

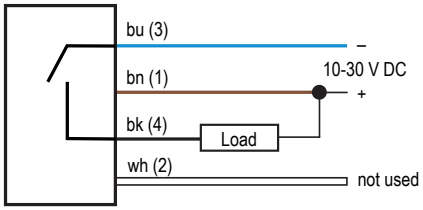
Mount the Device

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.

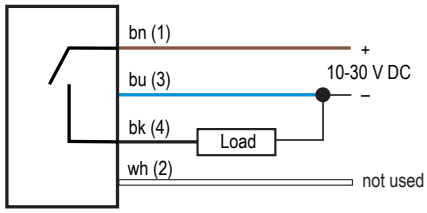
Wiring

Cabled wiring diagrams are shown. Quick disconnect wiring diagrams are functionally identical. Observe proper ESD precautions (grounding) when connecting quick disconnect models.

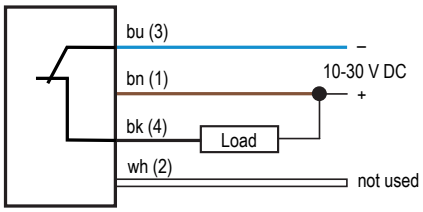
4-wire NPN (Sinking) Outputs, Light Operate



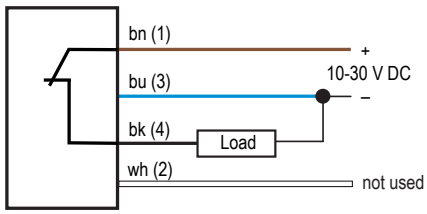
4-wire PNP (Sourcing) Outputs, Light Operate



4-wire NPN (Sinking) Outputs, Dark Operate

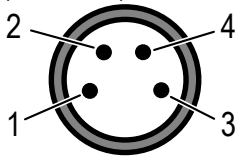


4-wire PNP (Sourcing) Outputs, Light Operate

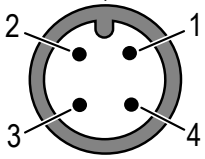


3-pin M8 male quick disconnect

4-pin M8 male quick disconnect



4-pin M12 male quick disconnect



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

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.

Configuration

To configure your sensor, select from one of the following TEACH methods.

Single-point TEACH

1. Present the target. The sensor-to-target distance must be within the sensor's range.
2. Press and hold the button for two to four seconds until the green LED is on and the amber LED flashes.
3. Press the button once to complete the TEACH procedure. If the TEACH procedure fails, the green and amber LEDs flash five times together.

Two-point Window TEACH

1. Move the target to the first point. The sensor-to-target distance must be within the sensor's range.
2. Press and hold the button for four to six seconds until the green LED and amber LED flash alternately.

3. Press the button once to configure the first point. The amber LED is off and the green LED flashes.
4. Move the target to the second point. The sensor-to-target distance must be within the sensor's range.
5. Press the button once to configure the second point and complete the TEACH procedure. If the TEACH procedure fails, the green and amber LEDs flash five times together.

Change the Output Mode (only applies to the light operate and dark operate models)

1. Press and hold the button for six to eight seconds until the green LED and amber LED are on.
2. Press the button once to toggle the output mode.

Cancel the TEACH Procedure. To cancel the TEACH procedure, press and hold the button more than eight seconds.

IMPORTANT: The sensor returns to Run mode 120 seconds after no action during any TEACH procedure.

Specifications

Supply Voltage
10 V DC to 30 V DC (10% maximum ripple within specified limits) at less than 15 mA, exclusive of load

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
Solid-state complementary (SPDT): NPN or PNP (current sinking or sourcing), depending on model

Off-state leakage current: less than 5 µA at 30 V DC

ON-state saturation voltage:

NPN: less than 1.5 V
PNP: less than 2.0 V

Output Rating
100 mA total output current

Sensing Beam
Infrared laser, 940 nm

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

Ambient Light Immunity
25K lux

Adjustments
One TEACH button

Environmental Rating
IP67

Operating Conditions
–10 °C to +50 °C (14 °F to +122 °F)

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

Response Speed
33 ms

Indicators
Two LED indicators on the sensor top: Green on (power is on) and amber on (object is present)

Construction
PC/ABS housing, acrylic lens cover; PVC cable

Spot Size

Distance (mm)	Size (Horizontal × Vertical) (mm)
30	7 × 6
50	7 × 6
100	7 × 6
200	8 × 8
300	9 × 10
400	10 × 12
500	11 × 14
600	12 × 16
700	13 × 18
800	14 × 20
900	15 × 22
1000	16 × 24

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.

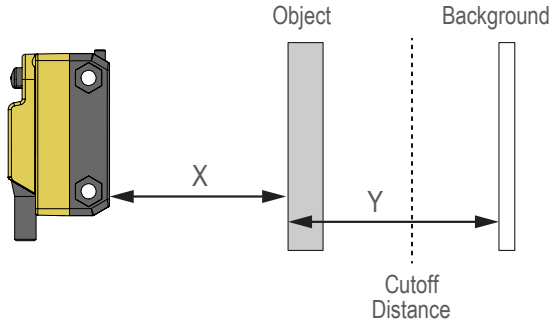
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

For additional product support, go to www.bannerengineering.com.

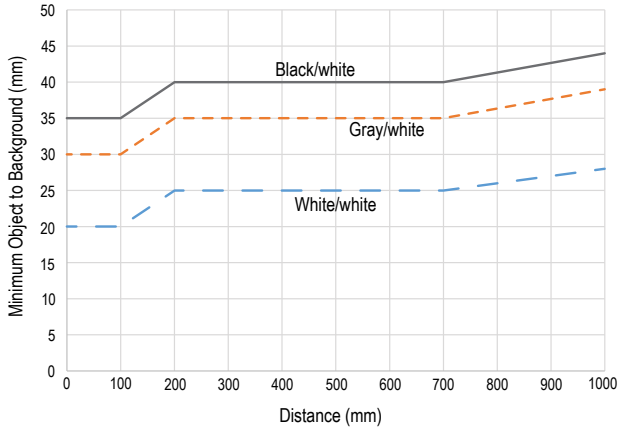
Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	2.0	30	0.5

Performance Curves



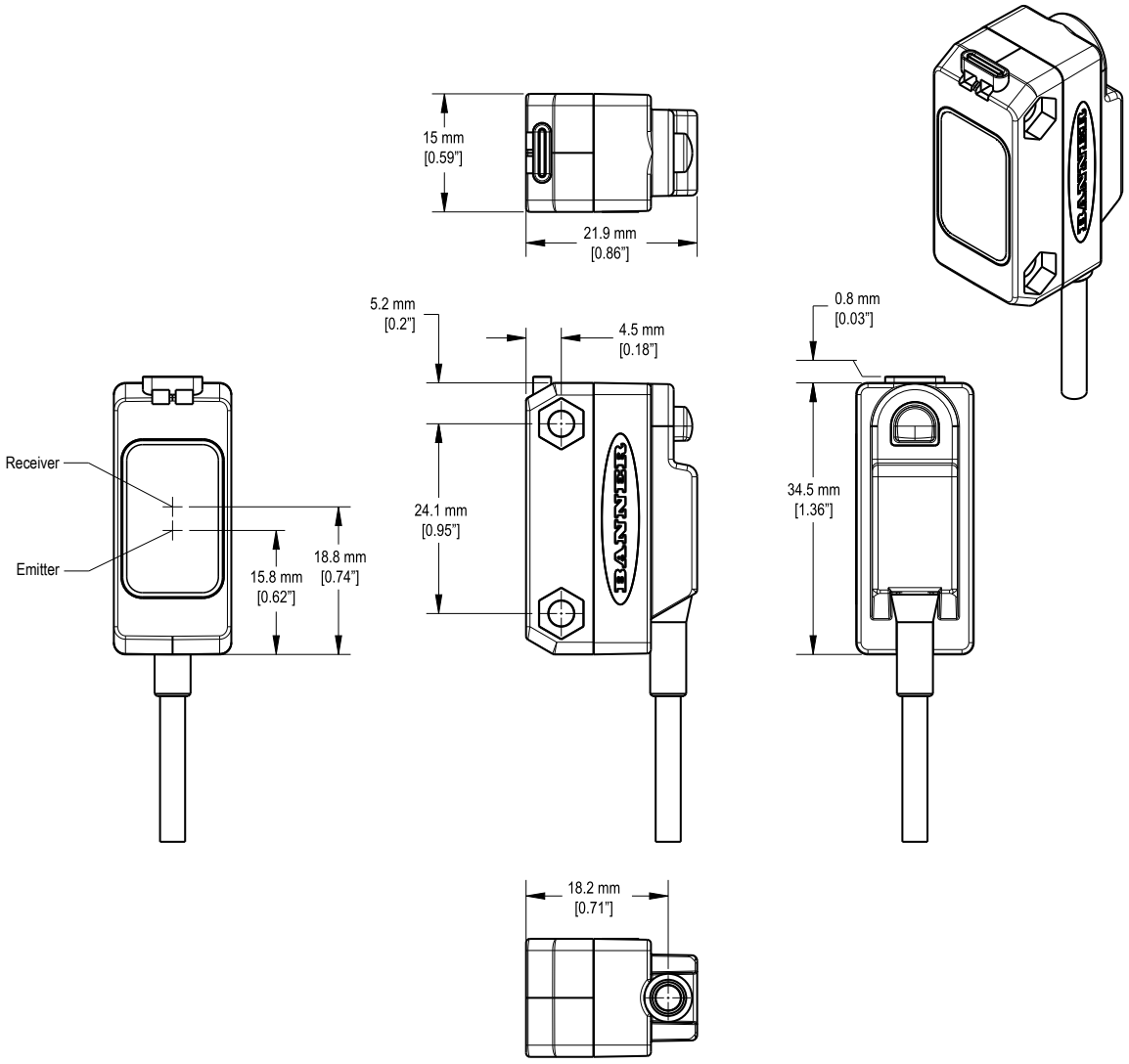
X: Distance to object (mm)
Y: Minimum separation between the object and the background (mm)

Minimum Object Separation Distance



Dimensions

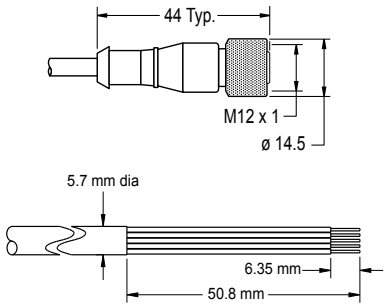
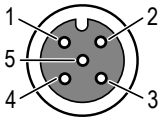
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.

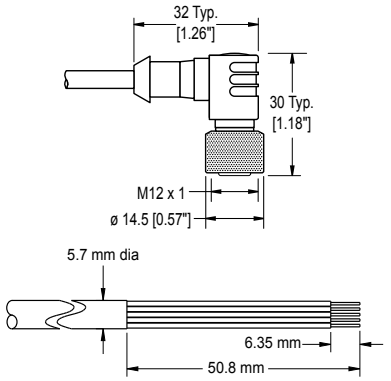
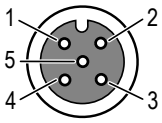


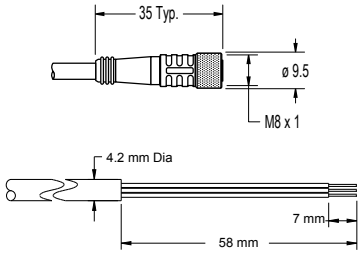
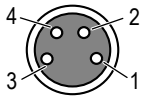
- Two M3 x 0.5 - 6g x 20 mm stainless steel screws
- Two M3 x 0.5 - 6H stainless steel nuts
- Two M3 flat stainless steel washers

Maximum torque: 0.9 Nm (8 in-lbf)

Accessories

5-pin A-Code Single-Ended M12 Female Cordsets (datasheet p/n 235936)				
Model	**Length**	**Dimensions (mm)**	**Pinout (Female)**	
BC-M12F5-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
BC-M12F5-22-2	2 m (6.56 ft)			
BC-M12F5-22-5	5 m (16.4 ft)			
BC-M12F5-22-8	8 m (26.25 ft)			
BC-M12F5-22-10	10 m (30.81 ft)			
BC-M12F5-22-15	15 m (49.2 ft)			

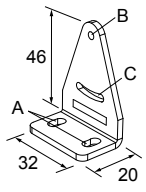
5-pin A-Code Single-Ended M12 Female Right-Angle Cordsets (datasheet p/n 235936)				
Model	**Length**	**Dimensions (mm)**	**Pinout (Female)**	
BC-M12F5A-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray
BC-M12F5A-22-2	2 m (6.56 ft)			
BC-M12F5A-22-5	5 m (16.4 ft)			
BC-M12F5A-22-8	8 m (26.25 ft)			
BC-M12F5A-22-10	10 m (30.81 ft)			
BC-M12F5A-22-15	15 m (49.2 ft)			

4-pin Single-Ended M8 Female Cordsets (datasheet p/n 236623)				
Model	**Length**	**Dimensions (mm)**	**Pinout (Female)**	
BC-M8F4-24-0.5	0.5 m (1.64 ft)			1 = Brown 2 = White 3 = Blue 4 = Black
BC-M8F4-24-1	1 m (3.28 ft)			
BC-M8F4-24-2	2 m (6.56 ft)			
BC-M8F4-24-5	5 m (16.4 ft)			
BC-M8F4-24-8	8 m (26.25 ft)			
BC-M8F4-24-10	10 m (30.81 ft)			

SMB312S

- Stainless steel 2-axis, side-mount bracket
- CAD Files: DXF, PDF, IGS, STP

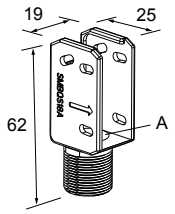
A = 4.3 × 7.5, B = diam. 3, C = 3 × 15.3



SMBQS18A

- Wrap-around protection bracket
- Die-cast bracket
- Base fits 18 mm threaded hole
- Metal hex nut, lock washer and grommet included
- Mounting holes specially designed for QS18AF sensors
- CAD Files: DXF, PDF, IGS, STP

Hole size: A = ø 15.3



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