BANNER ®

Product Features

Miniature sensors featuring extended range and electronically adjustable background suppression mode

- Miniature sensor for installation in the smallest of spaces
- Exceptional optical performance; up to 400 mm sensing range in miniature 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	Sensing Beam	Range	Connection[1]	Supply Voltage	Output Type
QS18N6LAF400IR	940 nm Infrared Laser	20-400 mm (1.2 in-15.7 in)	2 m (6.5 ft) 3-wire	10 to 30 V dc	NPN LO/DO
QS18P6LAF400IR					PNP LO/DO
QS18RN6LAF400IR					NPN DO
QS18RP6LAF400IR					PNP DO
QS18AN6LAF400IR					NPN LO
QS18AP6LAF400IR					PNP LO

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[1] Only standard 2 m (6.5 ft) cable models are listed.
- For 4-pin M8 pigtail QD: add suffix "Q" to the model number (for example, QS18NLAF400IRQ);
- For 3-pin M8 pigtail QD: add suffix "Q3" to the model number (for example, QS18NLAF400IRQ3);
- For 4-pin M12: add suffix "Q4" to the model number (for example, QS18NLAF400IRQ4);
- For 4-pin M12 pigtail QD: add suffix "Q5" to the model number (for example, QS18NLAF400IRQ5);
- For 4-pin integral QD: add suffix "Q7" to the model number (for example, QS18NLAF400IRQ7);
- For 4 or 5 pin Euro QD: add suffix "Q8" to the model number (for example, QS18NLAF400IRQ8);

Overview
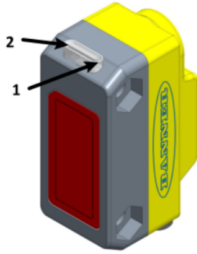
The QS18LAF400IR Laser Measurement Sensor ignores objects beyond the set cutoff distance. Background suppression mode can be used in most situations with varying object color and position or with varying background conditions.

1. Green: Power Indicator
2. Amber: Output Indicator
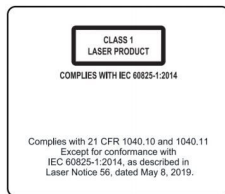
QS18LAF400IR Laser Description and Safety Information

> ⚠️ **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.

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

Laser Classification

Class 1 laser product; Complies with IEC 60825-1:2014 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice 56, dated 5-08-19

> **CLASS 1 LASER PRODUCT**
>
> COMPLIES WITH IEC 60825-1:2014
>
> Complies with 21 CFR 1040.10 and 1040.11
> Except for conformance with
> IEC 60825-1:2014, as described in
> Laser Notice 56, dated May 8, 2019.

Laser Wavelength

940 nm

Average Output Power

0.9 mW

Pulse Width

3 ms

Rep Rate

30 - 90 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.
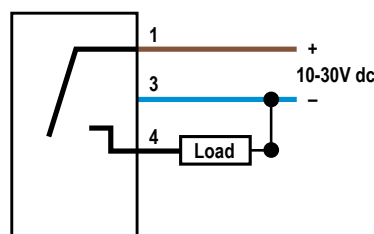
QS18LAF400IR Wiring

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

NPN (Sinking) Outputs
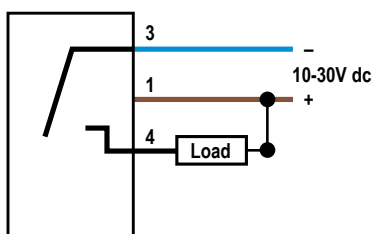
PNP (Sourcing) Outputs

Wiring Key

1 = Brown
3 = Blue
4 = Black

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Configuration Instructions

Select the TEACH Mode

A. Single point mode
1. Move target to a position (less than 400mm).
2. Press and hold the button for 2-4 seconds until green LED is on and yellow LED flash
3. Press the button once to complete single point mode teach
4. If teaching fails, green and yellow LED will flash five times together.

B. Background mode
1. Move target to a position (less than 400mm).
2. Press and hold the button for 4-6 seconds until yellow LED is on and green LED flash
3. Press the button once to complete single point mode teach
4. If teaching fails, green and yellow LED will flash five times together.

C. Two-point Window
1. Move target to first point.
2. Press and hold the button for 6-8 seconds until green LED and yellow LED flash alternately
3. Press the button once to teach first point
4. Then yellow LED is off and green LED flash
5. Move white card to second point.
6. Press the button once to teach second point and complete two point mode teach
7. If teaching fails, green and yellow LED will flash five times together.

D. Change output mode
1. Press and hold the button for 8-10 seconds until green LED and yellow LED are on together
2. Release the button to change to NO or NC

E. Cancel teach
1. Press and hold the button more than 10 seconds to cancel teach mode.

QS18LAF400IR 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 3-wire PVC-jacketed cable, 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 male 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)

Certifications

CE   cULus

Response Speed
less than 30 milliseconds ON/OFF

Indicators
Two LED indicators on the sensor top:
Green on: Power is on
Amber on: Output is on

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

Spot Size

QS18LAF400IR	
Distance (mm)	**Size (Horizontal × Vertical) (mm)**
30	12 × 15
100	35 × 45
200	70 × 85
300	100 × 125
400	140 × 170

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

QS18LAF400IR Performance Curves

Object   Background

Y

X

Cutoff
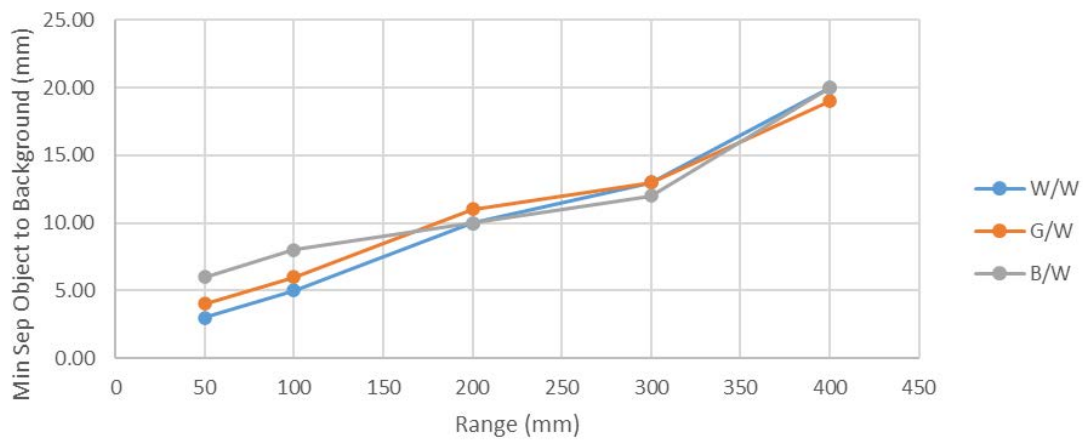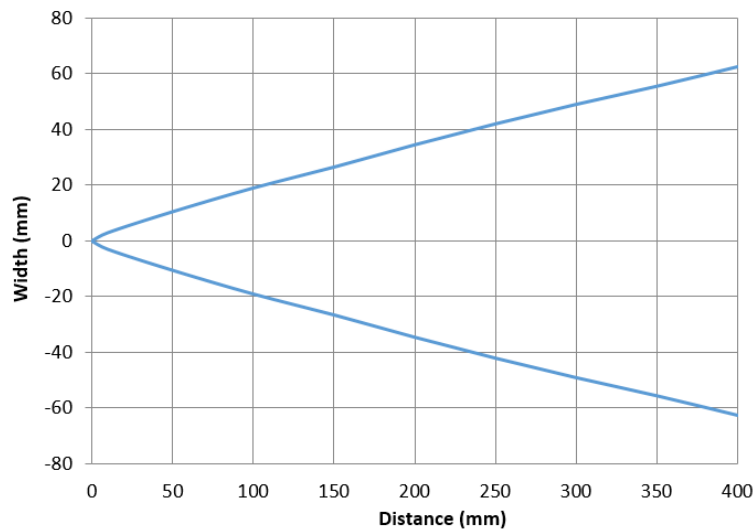Distance
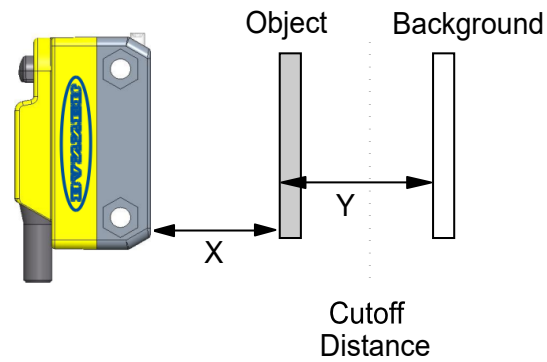
X: Distance to Object (mm)

Y: Minimum Separation Between Object and Background (mm)

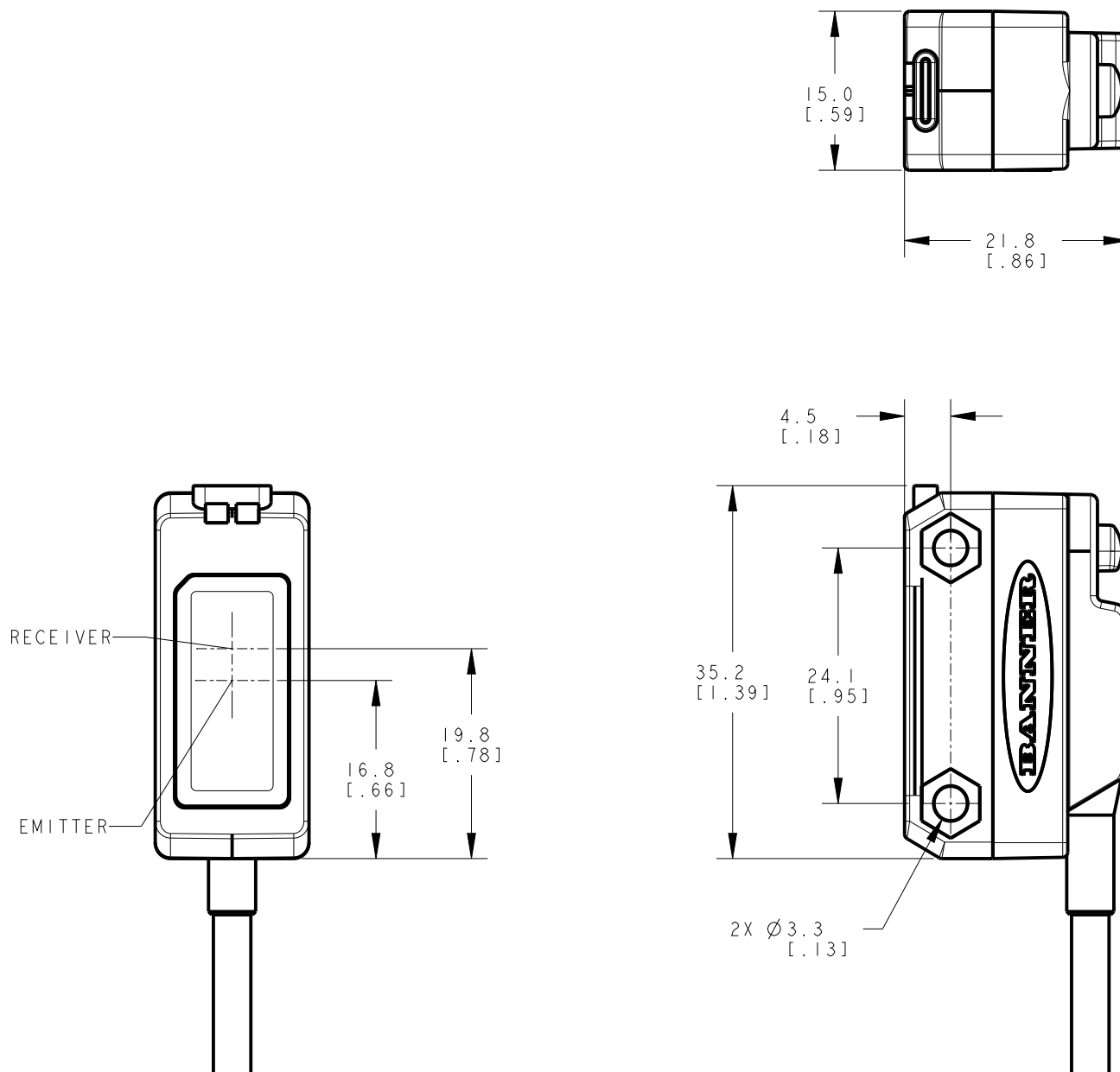### QS18 Minimum Separation Object to Background

QS18 TOF Beam Pattern

Dimensions

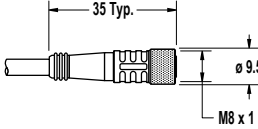All measurements are listed in millimeters [inches], unless not ed otherwise.

15.0
[.59]

21.8
[.86]

4.5
[.18]

RECEIVER

EMITTER

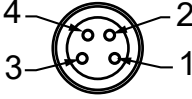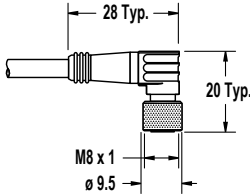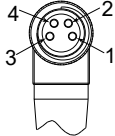19.8
[.78]

16.8
[.66]

35.2
[1.39]

24.1
[.95]

2X Ø3.3
[.13]

Hardware Included:
- Two M3 x 0.5 - 6g x 20 mm SS Screws
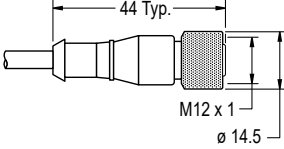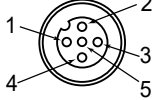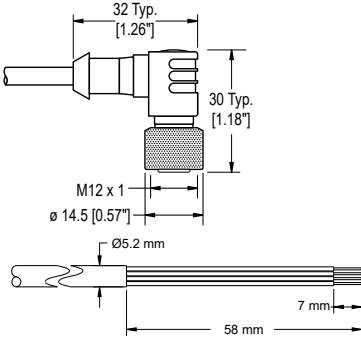- Two M3 x 0.5 - 6H SS Nuts
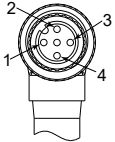- Two M3 flat SS Washers

Maximum torque 0.9 Nm (8 in-lbf)

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Accessories

Cordsets

4-Pin Threaded M8 Cordsets—Single Ended				
Model	Length	Style	Dimensions	Pinout (Female)
PKG4M-2	2.04 m (6.68 ft)	Straight	35 Typ. / ø 9.5 / M8 x 1	4 2 3 1
PKG4M-5	5 m (16.4 ft)			
PKG4M-9	9.04 m (29.6 ft)			1 = Brown 2 = White 3 = Blue 4 = Black
PKW4M-2	2 m (6.56 ft)	Right Angle	28 Typ. / 20 Typ. / M8 x 1 / ø 9.5	4 2 3 1
PKW4M-5	5 m (16.4 ft)			
PKW4M-9	9 m (29.5 ft)			

| 4-Pin Threaded M12 Cordsets—Single Ended				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	2 m (6.56 ft)	Straight	44 Typ. / M12 x 1 / ø 14.5 / Ø5.2 mm / 7 mm / 58 mm	1 2 3 4 5
MQDC-415	5 m (16.4 ft)			
MQDC-430	9 m (29.5 ft)			
MQDC-450	15 m (49.2 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
MQDC-406RA	2 m (6.56 ft)	Right-Angle	32 Typ. [1.26"] / 30 Typ. [1.18"] / M12 x 1 / ø 14.5 [0.57"] / Ø5.2 mm / 7 mm / 58 mm	2 3 1 4
MQDC-415RA	5 m (16.4 ft)			
MQDC-430RA	9 m (29.5 ft)			
MQDC-450RA	15 m (49.2 ft)			

Brackets

All measurements are listed in millimeters, unless noted otherwise.

SMBQS18A
- Wrap-around protection bracket
- Die-cast bracket
- Base fits 18 mm threaded hole
- Metal hex nut, lock washer and grommet included
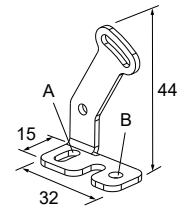- Mounting holes specially designed for QS18AF sensors

Hole size: A = ø 15.3
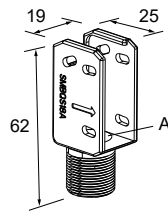
SMBQS18AF
- Right-angle mounting bracket
- 14-ga. 304 stainless steel

Hole center spacing: A to B = 20.3
Hole size: A = 4.3 × 9.4, B = ø 4.3

Banner Engineering Corp Limited Warranty

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For patent information, see www.bannerengineering.com/patents.

Document title: QS18 Infrared Electronically Adjustable Time of Flight Background Suppression Sensor
Part number: 238145
Revision: B
Original Instructions
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238145

December 30, 2023