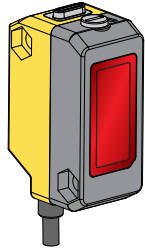


WORLD-BEAM® QS18AFF200 Mechanically Adjustable Foreground Suppression Sensor (30-200mm)



Datasheet

Compact sensors featuring extended range and foreground suppression mode



- Exceptional optical performance; up to 200 mm sensing range in compact QS18 housing
- Foreground suppression models for reliable detection when a fixed background is present and the object color or shape varies
- Objects detected to the face of the sensor (no dead zone)
- Simple multi-turn screw adjustment of cutoff distance
- Enhanced immunity to fluorescent lights
- Crosstalk immunity algorithm allows two sensors to be used in close proximity
- Visible red 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.

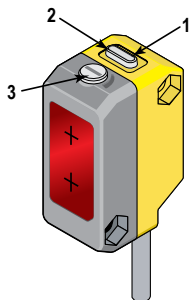
Models

| Models ¹ | Supply Voltage | Sensing Range | Output Type |
|---------------------|----------------|---------------------------------|-------------------------|
| QS18VN6AFF200 | 10 to 30 V dc | Adjustable Cutoff: 30 to 200 mm | NPN |
| QS18VP6AFF200 | | | PNP |
| QS18AB6AFF200 | | | Bipolar (1 NPN & 1 PNP) |

Overview

WORLD-BEAM® QS18 Adjustable-Field Sensors with Foreground Suppression detect the light reflected from the background. The output changes when the light from the background is blocked.

In general, if the background is fixed and the color or shape of the objects in the foreground vary, foreground suppression mode will provide reliable detection. A foreground suppression sensor uses the background in the same way a retroreflective sensor would use a reflector. The sensor output will change whenever an object passes between itself and the background.



1. Green: Power Indicator
2. Yellow: Light Sensed Indicator (Flashes for Marginal Conditions)
3. Cutoff Point Adjustment Screw

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

- To order 9 m (30 ft) cable models: add suffix "W/30" to the model number (for example, QS18VN6AFF200 W/30).
- To order 150 mm (6 in) pigtail with a 4-pin Pico-style connector models, add suffix "Q" to the model number (for example, QS18VN6AFF200Q)
- To order 150 mm (6 in) pigtail with a 4-pin Euro-style connector models, add suffix "Q5" to the model number (for example, QS18VN6AFF200Q5)



Sensor Orientation

To ensure reliable detection, orient the sensor as shown in relation to the target to be detected.

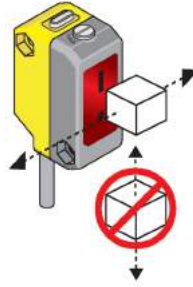
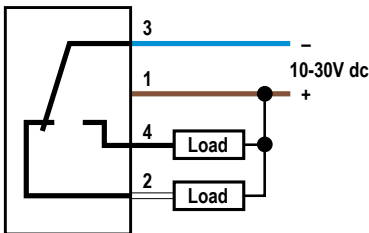


Figure 1. Optimal Orientation of Target to Sensor

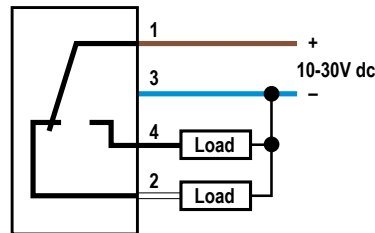
Wiring Diagrams

Cabled wiring diagrams are shown. Quick disconnect wiring diagrams are functionally identical.

NPN (Sinking) Outputs



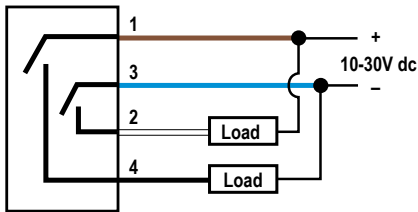
PNP (Sourcing) Outputs



Wiring Key

- 1 = Brown
- 2 = White
- 3 = Blue
- 4 = Black

Bipolar Outputs



Sensor Setup - Foreground Suppression

Foreground Suppression Mode (also called Background Detection): The light reflected off the background is detected. The output changes when the light from the background is blocked.

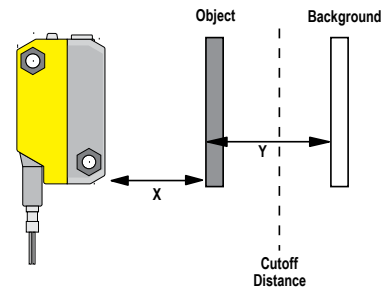
In general, if the background is fixed and the color or shape of the objects in the foreground vary, foreground suppression mode will provide reliable detection. A foreground suppression sensor uses the background in the same way a retroreflective sensor would use a reflector. The sensor output will change whenever an object passes between itself and the background.

To ensure reliable foreground suppression, a minimum separation distance between the object and the background is necessary. See [Figure 5](#) on page 5 to determine the minimum separation distance.

1. Mount the sensor within 200 mm of the fixed background.
2. Turn the adjustment potentiometer **clockwise** until it clicks (5 turns).
3. Turn the adjustment potentiometer **counter-clockwise** until the yellow indicator turns **on**. This places the cutoff distance in front of the fixed background (see [Figure 2](#) on page 3).
4. Place the application's darkest object into the sensor's field of view at the maximum sensor to the object distance, and verify that the yellow indicator turns **off**. The sensor is optimized for detecting thin objects close to the fixed background and is ready for operation.

For maximum sensing reliability in applications with variations in background position or color (for example, conveyor belts with flutter), follow these additional steps.

5. Continuing from step 4, turn the adjustment potentiometer **counter-clockwise**, counting the revolutions, until the yellow indicator turns **on**.
6. Turn the adjustment potentiometer **clockwise** half the number of revolutions from step 5. This places the cutoff distance midway between the object and the background. The sensor is optimized for reliable detection in applications with thick objects and modest variation in background. The sensor is ready for operation.



X: Distance to Background

Y: Minimum Separation Between Object and Background

Figure 2. Set the cutoff distance in front of the fixed background

Setup Example

The sensor is positioned above a black conveyor belt at a distance of 150 mm. The objects on the conveyor are boxes of varying colors. According to [Figure 5](#) on page 5, the box height must be greater than 10 mm for reliable detection against a black background. In this application, reliable detection will be achieved when set up according to the procedure outlined in [Sensor Setup - Foreground Suppression](#) on page 2.

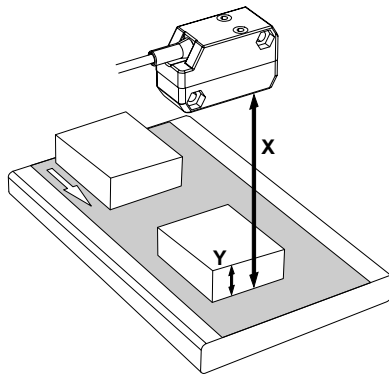


Figure 3. Foreground Suppression Mode application example

1. Object
 2. Background (Conveyor)
- X: Distance to Background = 150 mm
 Y: Minimum Separation Between Object and Background > 10 mm

Output States

| Foreground Suppression Mode | | | |
|-----------------------------|------------------------|--|--|
| Sensor Model Type | Output | Object Between Sensor Face and Cutoff Distance | No Object Between Sensor Face and Fixed Background |
| All Models | Yellow Indicator Light | OFF | ON |
| Complementary Models | Black Wire (Pin 4) | OFF | ON |
| | White Wire (Pin 2) | ON | OFF |
| Bipolar Models | Black Wire (Pin 4) | OFF | ON |
| | White Wire (Pin 2) | OFF | ON |

Specifications

Supply Voltage

10 to 30 V dc (10% maximum ripple within specified limits) at less than 16 mA, exclusive of load

Sensing Beam

Visible red LED, 640 nm

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Output Configuration

Solid-state complementary: NPN or PNP (current sinking or sourcing), or bipolar (both sinking and sourcing) depending on model;
Rating: 100 mA total output current

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

ON-state saturation voltage: < 1.5 V at 10 mA; < 3.0 V at 100 mA

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

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 |

Output Response

2.8 millisecond ON/OFF

Note: 200 millisecond delay on power-up; outputs do not conduct during this time

Adjustments

Five-turn adjustment screw sets cutoff distance between min. and max. positions, clutched at both ends of travel

Repeatability

250 µs

Indicators

2 LED indicators on sensor top:

Green solid: Power on

Amber solid: Light sensed

Amber flashing: Marginal sensing condition

Construction

ABS housing, acrylic lens cover; PVC cable, nickel-plated brass connector, acetal adjustment pot

Environmental Rating

IEC IP67; NEMA 6; UL Type 1

Connections

2 m (6.5 ft) 4-wire PVC cable, 9 m (30 ft) PVC cable, or 4-pin Pico-style or Euro-style 150 mm (6 in) pigtail QD, depending on model

Operating Conditions

Relative Humidity: 95% relative humidity at 50 °C (non-condensing)

Temperature: -20 °C to 55 °C (-4 °F to 131 °F)

Application Notes

For mirror-like objects, minimize the sensor to object mounting distance and tilt the sensor so reflected light is directed away from the sensor when the object is present.

Certifications



Performance Curves

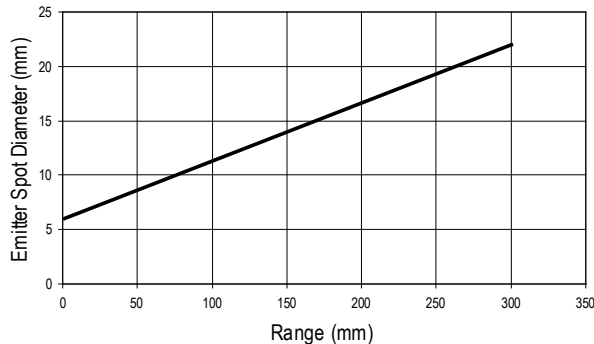


Figure 4. Typical Emitter Spot Diameter vs. Distance

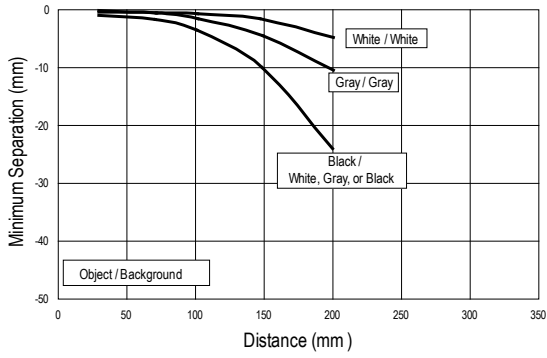
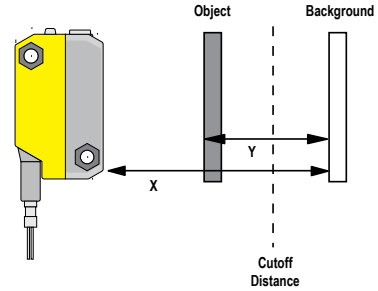


Figure 5. Minimum Separation Distance Between Object and Background



X: Distance to Background (mm)

Y: Minimum Separation Between Object and Background (mm)

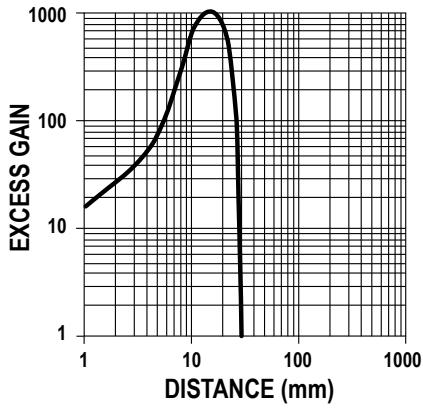


Figure 6. Excess Gain Curve with 30 mm Cutoff (based on 90% White Card)

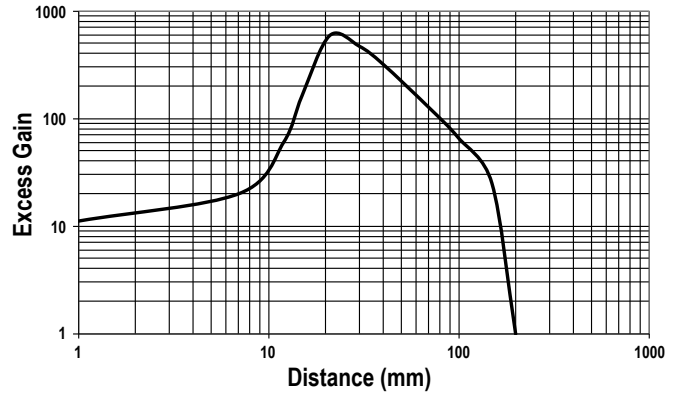
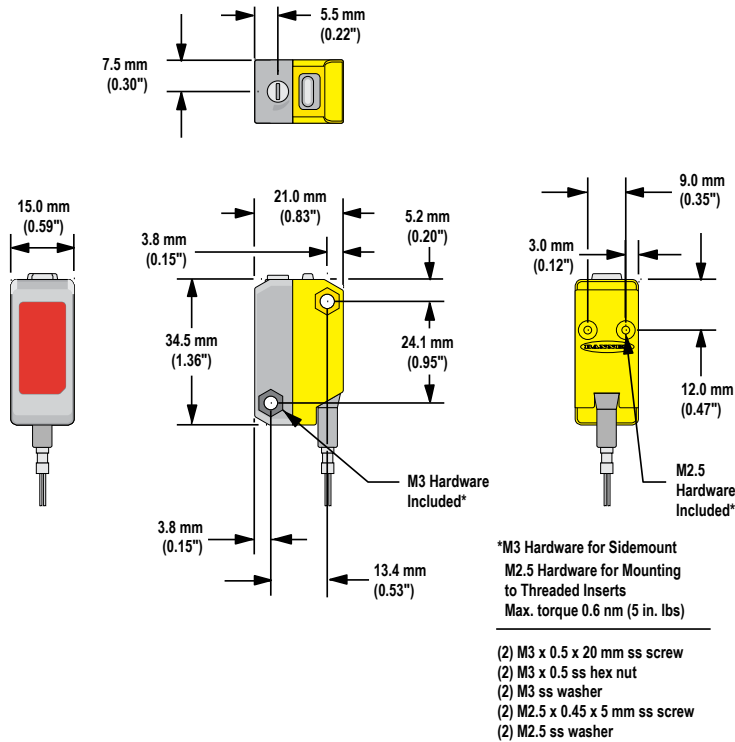


Figure 7. Excess Gain Curve with 200 mm Cutoff (based on 90% White Card)

Dimensions

All measurements are listed in millimeters [inches], unless noted otherwise.



Accessories

Quick-Disconnect (QD) Cordsets

| 4-Pin Snap-on M8/Pico-Style Cordsets—Single Ended | | | | |
|---|---------------|----------|------------|--|
| Model | Length | Style | Dimensions | Pinout (Female) |
| PKG4-2 | 2 m (6.56 ft) | Straight | | <p>1 = Brown 2 = White 3 = Blue 4 = Black</p> |

| 4-Pin Threaded M12/Euro-Style Cordsets—Single Ended | | | | |
|---|----------------|----------|------------|-----------------|
| Model | Length | Style | Dimensions | Pinout (Female) |
| MQDC-406 | 1.83 m (6 ft) | Straight | | |
| MQDC-415 | 4.57 m (15 ft) | | | |
| MQDC-430 | 9.14 m (30 ft) | | | |
| MQDC-450 | 15.2 m (50 ft) | | | |

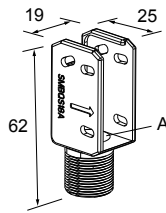
Mounting Brackets

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

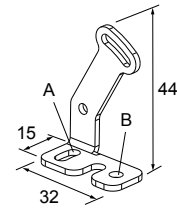


SMBQS18AF

- 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



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