



WORLD-BEAM® QS18 Adjustable-Field Sensors with Background Suppression

Compact sensors featuring extended range and background suppression mode

Features



- Exceptional optical performance; up to 300 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 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



Adjustable-Field
BackgroundSuppression

Models - Background Suppression

Long Range Models			
Models	Supply Voltage	Sensing Range	Output Type
QS18VN6AF300	10 to 30V dc	Adjustable Cutoff: 30 to 300 mm Minimum sensing range 4 to 10 mm depending on cutoff	NPN
QS18VP6AF300			PNP
QS18AB6AF300			Bipolar (1 NPN & 1 PNP)

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

- For 9 m (30') cables: add suffix "W/30" to the model number (e.g., **QS18VN6AF300 W/30**).
- For 150 mm (6") pigtail with a 4-pin Pico-style connector, add suffix "Q" to the model number (e.g., **QS18VN6AF300Q**).
- For 150 mm (6") pigtail with a 4-pin Euro-style connector, add suffix "Q5" to the model number (e.g., **QS18VN6AF300Q5**).



Overview

Banner's WORLD-BEAM® QS18 Adjustable-Field Sensors with Background Suppression ignore 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.

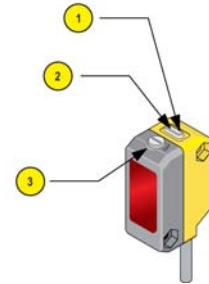


Figure 1. Sensor Features

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

Sensor Installation

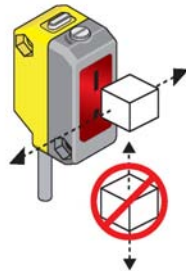


Figure 2. Required Orientation of Object to Sensor



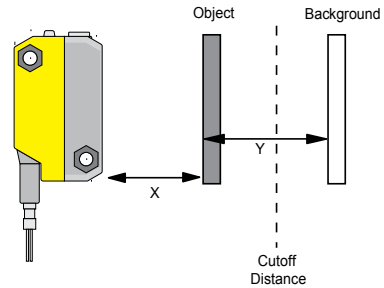
WARNING . . . Not To Be Used for Personnel Protection

Never use this product as a sensing device for personnel protection. Doing so could lead to serious injury or death

This product does NOT include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or deenergized sensor output condition. Consult your Banner Safety Products catalog for safety products that meet OSHA, ANSI and IEC standards for personnel protection.

Sensor Setup - Background Suppression

1. Mount the sensor with the darkest object at the longest application distance (the distance to object must be less than shown in Figure 7 for your object color).
2. Turn adjustment pot **counter-clockwise** until the yellow indicator turns **off** (5 turns max.).
3. Turn the adjustment pot **clockwise** until the yellow indicator turns **on**.
4. Replace darkest object with the brightest background at the closest application distance.
5. Turn the adjustment pot **clockwise**, counting the revolutions, until the yellow indicator turns **on**.
6. Turn the adjustment pot **counter-clockwise** half the number of turns from step 5. This will place the cutoff distance midway between the object and the background switchpoints (See Figure 3). The sensor is ready for operation.



X: Distance to Object

Y: Minimum Separation Between Object and Background

Figure 3. Set cutoff distance approximately midway between the farthest target and the closest background

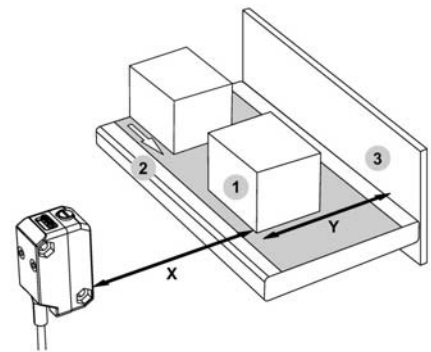
Setup Example

Background Suppression Mode: Objects beyond the set cutoff distance will not be detected.

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

To ensure reliable background suppression, a minimum separation distance between the object and the background is necessary. See "Minimum Separation Distance Between Object and Background: Background Suppression Mode" (Figure 7) to determine the minimum separation distance.

Example: An object with a reflectivity similar to black paper is set 150 mm away from the sensor. A background with reflectivity similar to white paper is set 200 mm away from the sensor. According to Figure 7, the minimum separation distance between the object and the background is 12 mm. In this application, reliable detection will be achieved when set up according to the procedure outlined in Sensor Setup - Background Suppression Mode (see [Sensor Setup - Background Suppression](#) on page 3).



1. Object
2. Conveyor
3. Background

X: Distance to Object = 150 mm

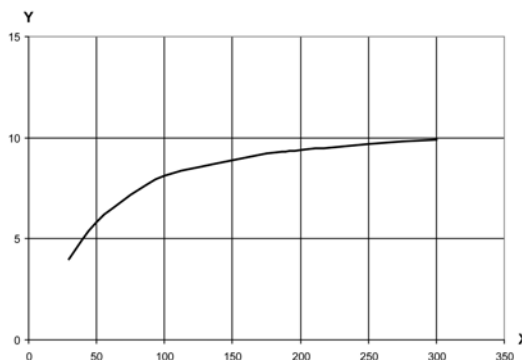
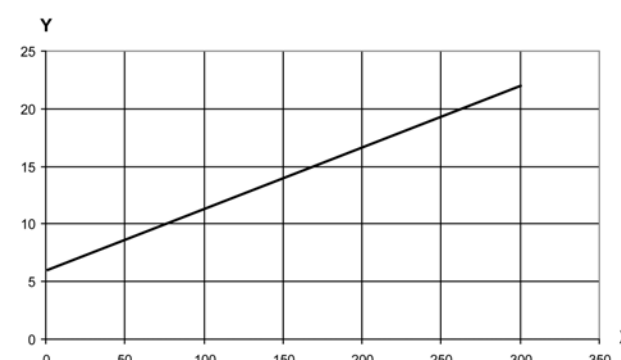
Y: Minimum Separation Between Object and Background > 12 mm

Figure 4. Background Suppression Mode Application Example

Output States

Background Suppression Mode				
Sensor Model Type	Output	Object Inside Minimum Sensing Range	Object Between Minimum Sensing Range and Cutoff Distance	Object Beyond Cutoff Distance
All Models	Yellow Indicator Light	Undefined	ON	OFF
Complementary Models	Black Wire (Pin 4)	Undefined	ON	OFF
	White Wire (Pin 2)	Undefined	OFF	ON
Bipolar Models	Black Wire (Pin 4)	Undefined	ON	OFF
	White Wire (Pin 2)	Undefined	ON	OFF

Performance Curves

Minimum Sensing Range (Dead Zone) vs. 90% White Cutoff Setting	Typical Emitter Spot Diameter vs. Distance
	
<p>Figure 5. X: 90% White Card Cutoff Setting (mm) Y: Minimum Sensing Range (mm) for 6% Blk</p>	<p>Figure 6. X: Range (mm) Y: Emitter Spot Diameter (mm)</p>

Minimum Separation Distance Between Object and Background: Background Suppression Mode

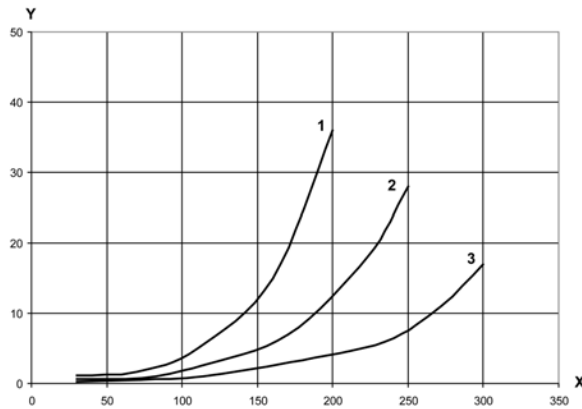
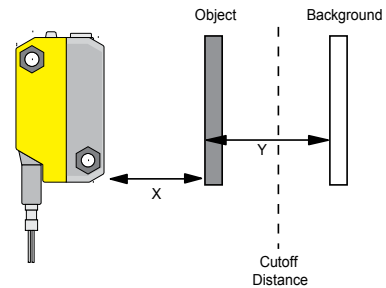


Figure 7.

X: Distance to Object (mm)

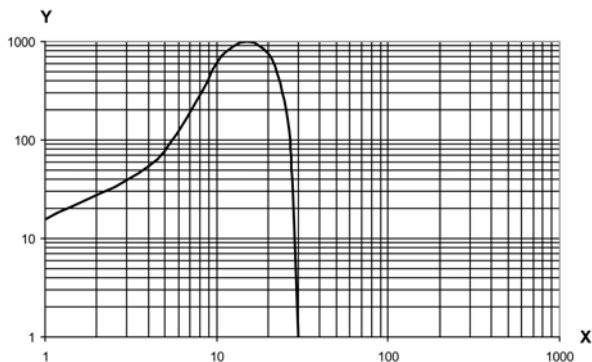
Y: Minimum Separation Between Object and Background (mm)

- 1: Black object/ White background
- 2: Gray object/ White background
- 3: White object/ White background



Excess Gain Curves

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



Excess Gain Curve with 300 mm Cutoff (based on 90% White Card)

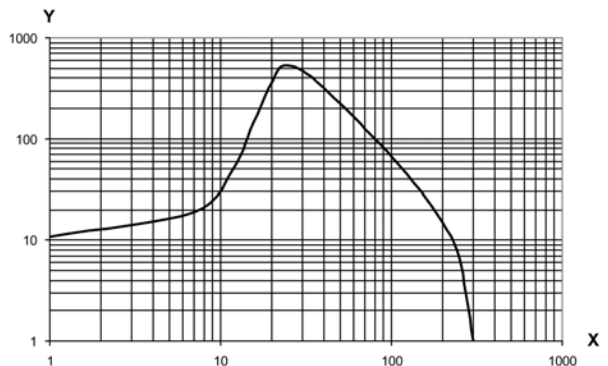


Figure 8.

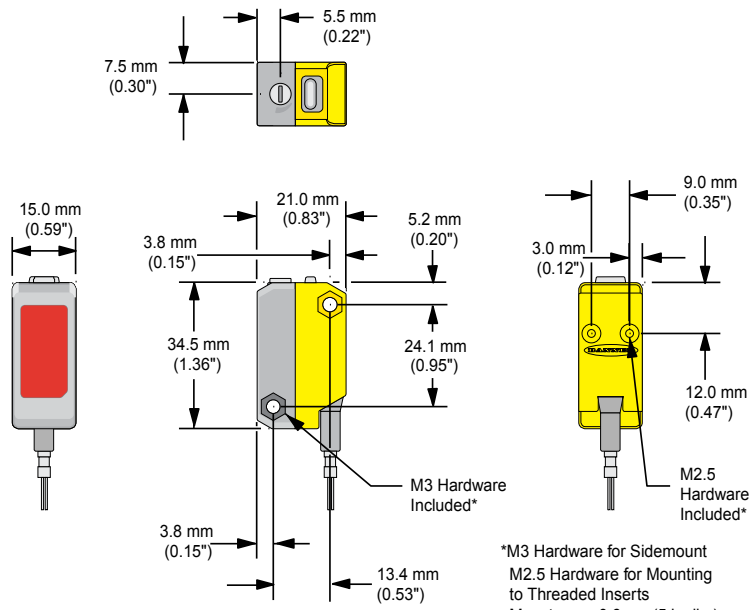
X: Cutoff Range (mm)

Y: Excess Gain

Specifications

Feature	Description
Supply Voltage	10 to 30V dc (10% maximum ripple within specified limits) at less than 27 mA, exclusive of load; Protected against reverse polarity and transient voltages
Sensing Beam	Visible red LED, 660 nm
Output Configuration	<p>Solid-state complementary; NPN (sinking), PNP (sourcing), or bipolar (both sinking and sourcing) depending on model;</p> <p>Rating: 100 mA total output current</p> <p>Off-state leakage current:</p> <ul style="list-style-type: none"> • NPN: less than 200 μA @ 30V dc (see Application Note 1) • PNP: less than 10 μA @ 30V dc <p>ON-state saturation voltage:</p> <ul style="list-style-type: none"> • NPN: less than 1.6V @ 100 mA • PNP: less than 3.0V @ 100 mA <p>Protected against false pulse on power-up and continuous overload or short circuit of outputs</p>
Output Response	2.8 millisecond ON/OFF; 200 ms delay on power-up; outputs do not conduct during this time
Repeatability	250 μ s
Adjustments	Five-turn adjustment screw sets cutoff distance between min. and max. positions, clutched at both ends of travel
Indicators	<p>2 LED indicators on sensor top:</p> <p>Green ON steady: Power ON</p> <p>Yellow ON steady: Light sensed Yellow flashing: Marginal sensing condition</p>
Construction Materials	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') 4-wire PVC cable, 9 m (30') PVC cable, or 4-pin Pico-style or Euro-style 150 mm (6") pigtail QD, depending on model
Operating Conditions	<p>Temp: -20° to +55° C (-4° to 131° F) Relative Humidity: 95% @ 50° C (non-condensing)</p>
Application Notes	<ol style="list-style-type: none"> 1. NPN off-state leakage current is < 200 μA for load resistances > 3 kΩ or optically isolated loads. For load current of 100 mA, leakage is < 1% of load current. 2. For emitter spot alignment, cover the receiver (top lens position) to temporarily turn emitter to maximum brightness.
Certifications	CE, UL pending

Dimensions

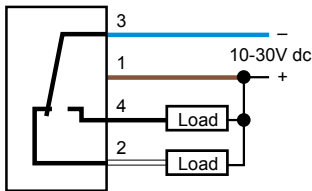


*M3 Hardware for Sidemount
 M2.5 Hardware for Mounting to Threaded Inserts
 Max. torque 0.6 nm (5 in. lbs)

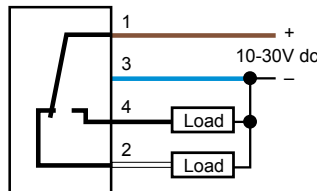
- (2) M3 x 0.5 x 20 mm ss screw
- (2) M3 x 0.5 ss hex nut
- (2) M3 ss washer
- (2) M2.5 x 0.45 x 5 mm ss screw
- (2) M2.5 ss washer

Hookups

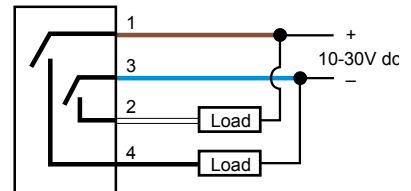
NPN (Sinking) Outputs



PNP (Sourcing) Outputs



Bipolar Outputs



Wiring Key: 1 = Brown
 2 = White
 3 = Blue
 4 = Black

Quick-Disconnect (QD) Cordsets

Style	Model	Length	Dimensions	Pinout
4-pin Pico-style straight, Snap-on Connector	PKG4-2	2 m (6.5')		

Style	Model	Length	Dimensions	Pinout
4-pin Euro-style straight, Threaded Connector	MQDC-406 MQDC-415 MQDC-430	2 m (6.5') 5 m (15') 9 m (30')		

Mounting Brackets

SMBQS18A	<ul style="list-style-type: none"> • Nickel-plated die-cast zinc • Wrap-around bracket 	
SMBQS18AF	<ul style="list-style-type: none"> • 14 ga., 304 stainless steel • Right-angle mounting bracket 	

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