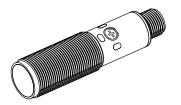
# S18-2 Plastic 18 mm Barrel Sensors



# Datasheet

Next Generation Self-contained DC-operated Sensors



- Economical photoelectric sensors for cost sensitive and high volume installations
- Powerful and bright visible red emitter beam for easy alignment and set-up
- Highly visible output and dual-function power and stability indicators
- Wide operating temperature range: -40 °C to +70 °C (-40 °F to +158 °F)
- Robust 250° adjustment potentiometer on select models
- Stable detection in the presence of fluorescent lights for non through-beam applications



### WARNING: Not To Be Used for Personnel Protection

Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device 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 de-energized sensor output condition.

# Models

Emitter/Receiver Models <sup>1</sup>					
Model Range Output					
S18-2NAEL-2M		25 m (82 ft)			
S18-2NAEJ-2M	Emitter	25 m (82 ft) with beam inhibit	None		
S18-2NAES-2M		25 m (82 ft) with adjustment			
S18-2VNRL-2M		05 (00.5)	Complementary NPN		
S18-2VPRL-2M		25 m (82 ft)	Complementary PNP		
S18-2VNRS-2M	Receiver	05 (00 () 11 () 1	Complementary NPN		
S18-2VPRS-2M		25 m (82 ft) with adjustment	Complementary PNP		

Polarized Retroreflective Models				
Model Range Output				
S18-2VNLP-2M	6 m (10.7 ft) with DDT 94 reflector	Complementary NPN		
S18-2VPLP-2M	6 m (19.7 ft) with BRT-84 reflector	Complementary PNP		
S18-2VNLPC-2M	C == (10.7 ft) with DDT 04 reflector with adjustment	Complementary NPN		
S18-2VPLPC-2M	6 m (19.7 ft) with BRT-84 reflector, with adjustment	Complementary PNP		

Retroreflective Models 1			
Model Range Output			
S18-2VNLV-2M	7.5 m (24.6 ft) with BRT-84 reflector, with adjustment	Complementary NPN	
S18-2VPLV-2M	7.5 III (24.0 II) WILL BRIT-04 Tellector, WILL adjustment	Complementary PNP	

<sup>1</sup> Integral 2 m (6.5 ft) unterminated cable models are listed.

To order the 150 mm (6 in) PVC cable model with a 4-pin M8/Pico-style quick disconnect, add the suffix "Q3" to the model number. For example, S18-VNDL-Q3.



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<sup>•</sup> To order the 9 m (30 ft) PVC cable model, add the suffix "9M" to the model number. For example, S18-2VNDL-9M.

<sup>•</sup> To order the 4-pin M12/Euro-style integral quick disconnect model, add the suffix "Q8" to the model number. For example, S18-2VNDL-Q8.

<sup>•</sup> To order the 150 mm (6 in) PVC cable model with a 4-pin M12/Euro-style quick disconnect, add the suffix "Q5" to the model number. For example, S18-2VNDL0Q5.

Diffuse Models 1				
Model Range Output				
S18-2VNDL-2M	750 (00 5 :)	Complementary NPN		
S18-2VPDL-2M	750 mm (29.5 in) with adjustment	Complementary PNP		
S18-2VNDS-2M	200 mans (44 0 in) with a division and	Complementary NPN		
S18-2VPDS-2M	300 mm (11.8 in) with adjustment	Complementary PNP		

Fixed Field Models				
Model Range Output				
S18-2VNFF30-2M	00	Complementary NPN		
S18-2VPFF30-2M	30 mm	Complementary PNP		
S18-2VNFF50-2M	50	Complementary NPN		
S18-2VPFF50-2M	50 mm	Complementary PNP		
S18-2VNFF75-2M	75	Complementary NPN		
S18-2VPFF75-2M	75 mm	Complementary PNP		
S18-2VNFF100-2M	100	Complementary NPN		
S18-2VPFF100-2M	100 mm	Complementary PNP		
S18-2VNFF150-2M	450	Complementary NPN		
S18-2VPFF150-2M	150 mm	Complementary PNP		
S18-2VNFF200-2M	000	Complementary NPN		
S18-2VPFF200-2M	200 mm	Complementary PNP		

# Installing the S18-2 Sensor

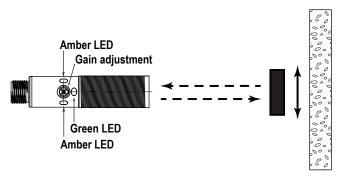
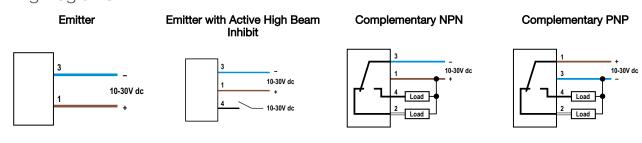


Figure 1. S18-2 Features and Installation

# To install the S18-2 Sensor:

- Align the sensor as required for the application.
   For the most sensitive object detection, align the sensor so that the objects move across the sensor's axis.
- 2. Secure the sensor to a bracket.
- 3. Wire sensor as shown in the wiring diagrams.
- 4. Adjust the gain adjuster (sensitivity pot) if necessary.

# Wiring Diagrams



Note: Open lead wires must be connected to a terminal block.

# Specifications

# Supply Voltage

10 V dc to 30 V dc for ambient temperature  $\leq$  55 °C 10 V dc to 24 V dc for ambient temperature > 55 °C

#### Supply Current (Exclusive of Load Current)

Diffuse: 16 mA

Opposed Mode Emitters: 17 mA Opposed Mode Receivers: 8 mA

Retroreflective and Polarized Retroreflective: 16 mA

Fixed Field: 22 mA

# **Output Protection Circuitry**

Protected against false pulse on power-up and continuous short circuit of outputs. Short circuit protection at elevated temperature may require a power cycle to reset.

### Supply Protection Circuitry

Protected against reverse polarity and transient voltages

### **Output Rating**

 $\leq$  50 mA total current for ambient temperatures > 55 °C  $\leq$  100 mA total current through both outputs  $\leq$  55 °C 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

#### **Output Configuration**

Complementary PNP or NPN by model number

#### **Emitter LED**

Visible Red

#### Indicators

Three LEDs (1 green, 2 amber)
Green solid: indicates power applied and sensor ready
Green flashing: indicates marginal sensing signal
Amber solid: indicates Pin 4 (black wire) output conducting

#### Vibration and Mechanical Shock

All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06 in acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)

# **Operating Conditions**

-40 °C to +70 °C (–40 °F to +158 °F) 95% at +50 °C maximum relative humidity (non-condensing)

## **Environmental Rating**

IEC IP67

## Certifications



Class 2 power ; UL Environmental Rating: Type 1

#### **Output Response Time**

Response is independent of signal strength

Opposed models: 1.5 milliseconds ON, 1 millisecond OFF Retro, Polarized Retro, and Diffuse models: 1.5 milliseconds ON,

0.75 milliseconds OFF

Fixed Field models: 2 milliseconds ON, 2 milliseconds OFF Delay on Power-up: 100 milliseconds; outputs do not conduct

during this time

### Repeatability

Repeatability is independent of signal strength

Opposed models: 170 microseconds

Retro, Polarized Retro, and Diffuse models: 100 microseconds

Fixed Field models: 200 microseconds

#### Adjustments

Diffuse (DL, DS), Emitter (ES), Receiver (RS), Polarized Retroreflective (LPC), Retroreflective (LV) models: Single turn sensitivity (gain) adjustment potentiometer

Emitter Beam Inhibit (EJ) models: Tie black wire to 10 to 30 V dc for beam inhibit

Construction

Housing, connector, gain pot driver: ABS

Front window: PMMA Indicator windows: Clear ABS Mounting nuts: 30% glass filled PBT

#### **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.

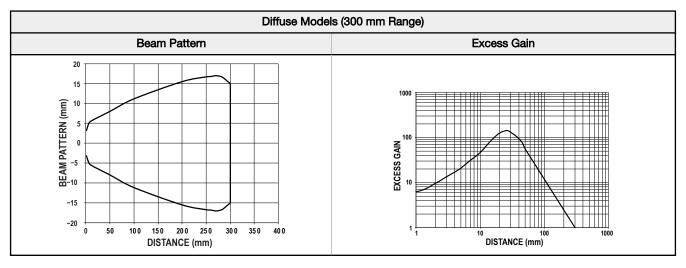
Overcurrent protection may be provided with external fusing or via

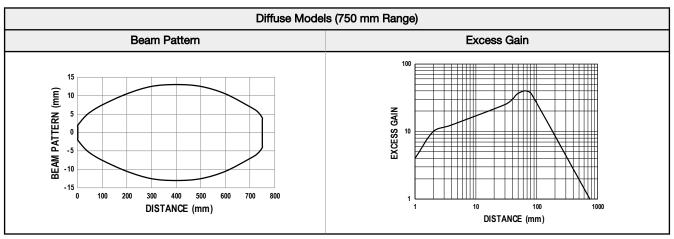
Current Limiting, Class 2 Power Supply.
Supply wiring leads < 24 AWG shall not be spliced.

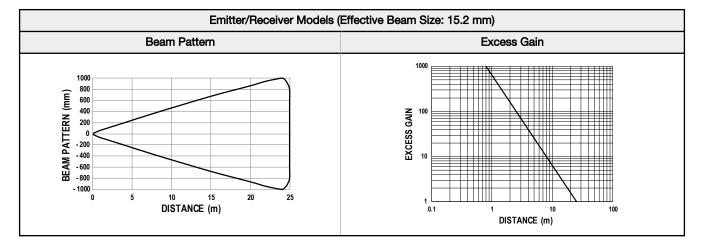
For additional product support, go to www.bannerengineering.com.

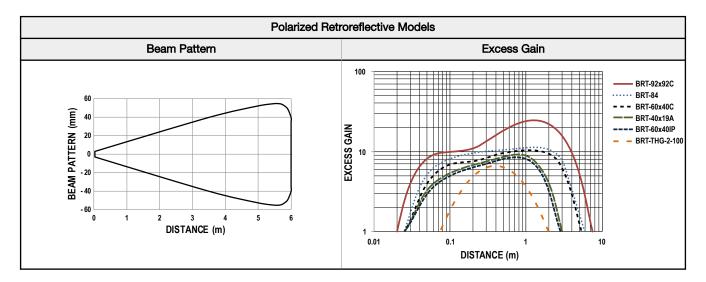
Supply Wiring (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

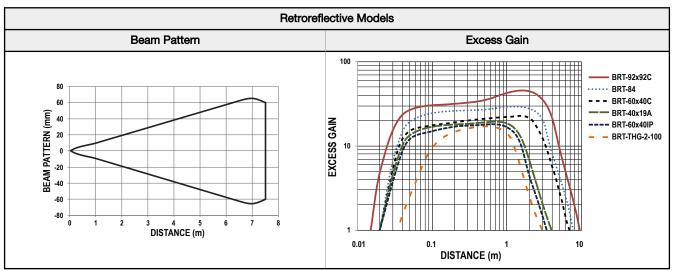
# Performance Curves





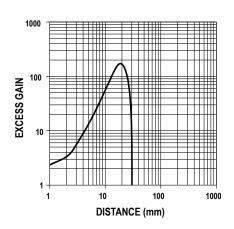






#### Fixed Field Models - Excess Gain

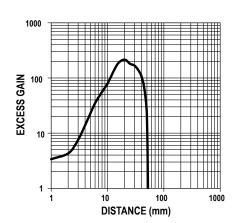
# Target for Excess Gain Curves use a 90% Reflective White Card



# S18-2FF30

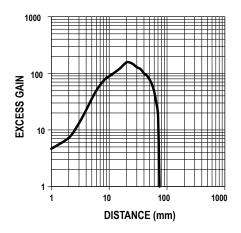
Emitter Image Size: 4.0 mm square at 15 mm and 3.5 mm square at 30 mm

18% Gray Test Card: Cutoff distance will be 98% of value shown6% Black Test Card: Cutoff distance will be 95% of value shown



## S18-2FF50

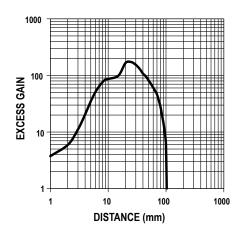
Emitter Image Size: 4 mm square at 25 mm and 3 mm square at 50 mm 18% Gray Test Card: Cutoff distance will be 98% of value shown 6% Black Test Card: Cutoff distance will be 95% of value shown



# S18-2FF75

**Emitter Image Size**: 4.5 mm square at 37 mm and 4.0 mm square at 75 mm

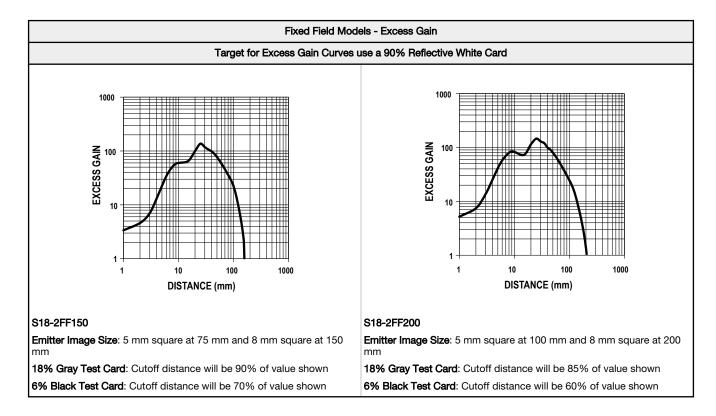
**18% Gray Test Card**: Cutoff distance will be 98% of value shown **6% Black Test Card**: Cutoff distance will be 95% of value shown



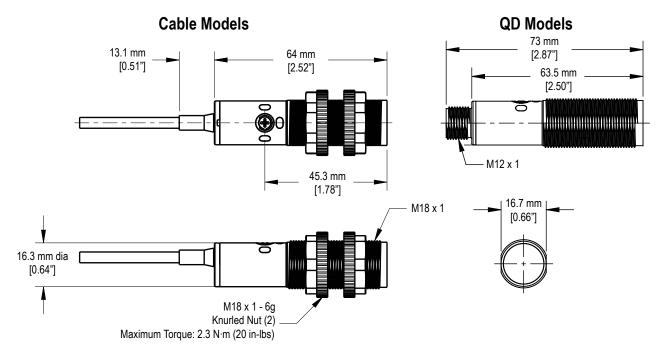
# S18-2FF100

Emitter Image Size: 4.5 mm square at 50 mm and 4.5 mm square at 100 mm

**18% Gray Test Card**: Cutoff distance will be 95% of value shown **6% Black Test Card**: Cutoff distance will be 90% of value shown



### **Dimensions**



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

# Accessories

# Cordsets

All measurements are listed in millimeters, unless noted otherwise.

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	1.83 m (6 ft)		<del> </del>	
MQDC-415	4.57 m (15 ft)	Straight		
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)		M12 x 1 ø 14.5	1-
MQDC-406RA	1.83 m (6 ft)		, 32 Тур.	43
MQDC-415RA	4.57 m (15 ft)		[1.26"]	
MQDC-430RA	9.14 m (30 ft)			1 = Brown
MQDC-450RA	15.2 m (50 ft)	Right-Angle	30 Typ. [1.18"]  M12 x 1  ø 14.5 [0.57"]	2 = White 3 = Blue 4 = Black

4-Pin Threaded M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout (Female)
PKG4M-2	2 m (6.56 ft)		) 25 Tun	
PKG4M-5	5 m (16.4 ft)		35 Typ. ———	42
PKG4M-9	9 m (29.5 ft)	Straight	ø 9.5	
PKW4M-2	2 m (6.56 ft)			3-10-91-1
PKW4M-5	5 m (16.4 ft)		<del>-</del> — 28 Тур. — <del>-</del>	
PKW4M-9	9 m (29.5 ft)	Right Angle	1 = E 20 Typ. 3 = 4 = E	

# Apertures

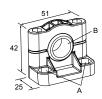
Model	Units	Aperture Description	Product
AP18SCN	3	Kit includes round apertures of 0.5 mm (0.02 in), 1.0 mm (0.04 in), and 2.5 mm (0.10 in) diameter.	
AP18SRN	3	Kit includes rectangular apertures of 0.5 mm (0.02 in), 1.0 mm (0.04 in), and 2.5 mm (0.10 in) wide. Each kit also includes a thread-on housing, Teflon® FEP® lens, and o-ring.	
APG18S	1	Kit with glass lens to protect plastic sensor lens from chemical environments and weld splatter damage.	000

# **Brackets**

### SMB18SF

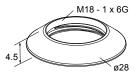
- 18 mm swivel bracket with M18 × 1 internal thread
- Black thermoplastic polyester
- Stainless steel swivel locking hardware included

Hole center spacing: A = 36.0Hole size:  $A = \emptyset 5.3$ ,  $B = \emptyset 18.0$ 



### SMBS18-2-1

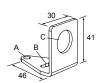
• 30% glass-filled PBT



### SMB18A

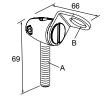
- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel
- 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware

Hole center spacing: A to B = 24.2 Hole size: A =  $\emptyset$  4.6, B = 17.0  $\times$  4.6, C =  $\emptyset$  18.5



### SMB18FA..

- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- 18 mm sensor mounting hole



Hole size: B=ø 18.1

Model	Bolt Thread (A)
SMB18FA	3/8 - 16 × 2 in
SMB18FAM10	M10 - 1.5 × 50
SMB18FAM12	n/a; no bolt included. Mounts directly to 12 mm (½ in) rods

For additional brackets, check the current Banner catalog or visit www.bannerengineering.com. All measurements are listed in millimeters, unless noted otherwise.

# Reflectors

#### BRT-2X2

- Square, acrylic target
- Reflectivity factor: 1.0
- Max. temperature: +50 °C (+122 °F)
- Optional brackets are available
- Approximate size: 51 mm × 51 mm



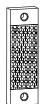
### **BRT-84X84A**

- Square, acrylic target
- Reflectivity Factor: 2.0
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- Approximate size: 84 mm × 84 mm



### BRT-40X19A

- Rectangular, acrylic target
- Reflectivity Factor: 1.3
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- Approximate size: 19 mm × 60 mm overall; 19 mm × 40 mm reflector



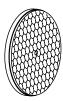
# BRT-60X40C

- Rectangular, acrylic target
- Reflectivity Factor: 1.4
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- Optional brackets are available
- Approximate size: 40 mm × 60 mm



#### BRT-84

- Round, acrylic target
- Reflectivity Factor: 1.4
- Temperature: -20 °C to +60 °C (-4 °F to +140 °F)
- · Optional brackets are available
- Size: 84 mm diameter
- Mounting Hole: 4.5 mm diameter



### Retroreflective Tape

Model	Reflectivit y Factor	Maximum Temperature	Size
BRT-	0.7	+60 °C	50 mm (2 in) wide,
THG-2-100		(+140 °F)	2.5 m (100 in) long

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