S18 Series Sensors (DC Voltage)

Installation Guide

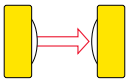
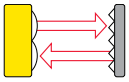
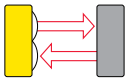
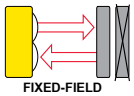
For complete technical information about this product, including dimensions, accessories, and specifications, see *www.bannerengineering.com* and search for your model number. See also document 121522.



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

Sensing Mode	Model [1]		Range	LED	Output
 OPPOSED	**S186E**	Emitter	20 m (66 ft)	Infrared 950 nm	-
	S18SN6R	Receiver			NPN
	S18SP6R				PNP
 RETRO	**S18SN6L**		2 m (79 in)	Infrared 950 nm	NPN
	S18SP6L				PNP
 POLAR RETRO [2]	**S18SN6LP**		2 m (79 in)	Visible Red 680 nm	NPN
	S18SP6LP				PNP
 DIFFUSE	**S18SN6D**		100 mm (4 in)	Infrared 880 nm	NPN
	S18SP6D				PNP
	S18SN6DL		300 mm (12 in)		NPN
	S18SP6DL				PNP
 FIXED-FIELD	**S18SN6FF25**		25 mm (1 in) cutoff	Infrared 880 nm	NPN
	S18SP6FF25				PNP
	S18SN6FF50		50 mm (2 in) cutoff		NPN
	S18SP6FF50				PNP
	S18SN6FF100		100 mm (4 in) cutoff		NPN
	S18SP6FF100				PNP

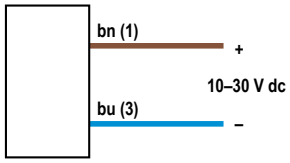
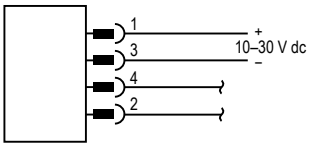
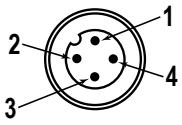
Note: Users must purchase one emitter and one receiver for opposed mode sensors.

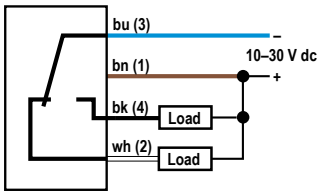
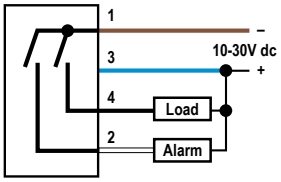
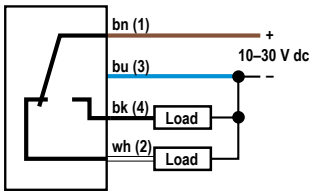
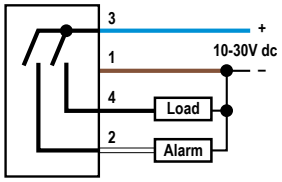
[1] Standard 2 m (6.5 ft) cable models are listed.

- To order the 9 m (30 ft) cable models, add suffix **W/30** (for example, **S186E W/30**).
- To order the 4-pin M12/Euro-style QD models, add suffix **Q** (for example, **S186EQ**). A model with a QD connector requires a mating cable.

[2] Use polarized models when shiny objects will be sensed.

Wiring Diagrams

Cabled Emitters	QD Emitters	Pinout (male)	Key
			1. Brown 2. White 3. Blue 4. Black

NPN Standard	NPN Alarm	PNP Standard	PNP Alarm
			

Wiring for the quick disconnect (QD) models is functionally identical.

Specifications

Supply Voltage and Current
10 to 30 V dc (10% maximum ripple)
Supply current (exclusive of load current):
Emitters, non-polarized retroreflective, retroreflective, diffuse models: 25 mA
Receivers: 20 mA
Polarized retroreflective models: 30 mA
Fixed-field models: 35 mA

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Indicators
Two LEDs (green and amber):
Green on: power to sensor is on
Green flashing: output is overloaded
Amber on: N.O. output is conducting
Amber flashing: excess gain marginal (1 to 1.5×) in light condition

Construction
Housing: PBT polyester housing
Lens: polycarbonate (opposed-mode) or acrylic (other models)

Connections
2 m (6.5 ft) integral cable; 9 m (30 ft) integral cable; or 4-pin M12/Euro-style quick-disconnect fitting

Output Configuration
SPDT solid-state dc switch; Choose NPN (current sinking) or PNP (current sourcing) models
Light Operate: N.O. output conducts when sensor sees its own (or the emitter's) modulated light
Dark Operate: N.C. output conducts when the sensor sees dark; the N.C. (normally closed) output may be wired as a normally open marginal signal alarm output, depending upon wiring to power supply (U.S. patent 5087838)

Output Rating
150 mA maximum (each) in standard wiring. When wired for alarm output, the total load may not exceed 150 mA.
OFF-state leakage current: < 1 microamp at 30 V dc
ON-state saturation voltage: < 1 V at 10 mA dc; < 1.5 V at 150 mA dc

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

Output Response Time
Opposed mode models: 3 ms ON, 1.5 ms OFF
Retroreflective, fixed-field, and diffuse mode models: 3 ms ON and OFF
NOTE: 100 ms delay on power-up; outputs do not conduct during this time.

Repeatability
Opposed mode models: 375 µs
Retroreflective, fixed-field, and diffuse mode models: 750 µs
Repeatability and response are independent of signal strength.

Operating Conditions
–40 °C to +70 °C (–40 °F to +158 °F)
90% at +50 °C maximum relative humidity (non-condensing)

Environmental Rating
Leakproof design rated NEMA 6P and IEC IP67 per IEC 60529
IP69K per DIN40050 for quick disconnect and cable models when the cables are protected from direct spray

Vibration and Mechanical Shock
All models meet MIL-STD-202F, Method 201A (Vibration: 10 Hz to 60 Hz maximum, 0.06 inch (1.52 mm) double amplitude, 10G acceleration) requirements.
Method 213B conditions H&I.
Shock: 75G with device operating; 100G for non-operation

Certifications

Required Overcurrent Protection

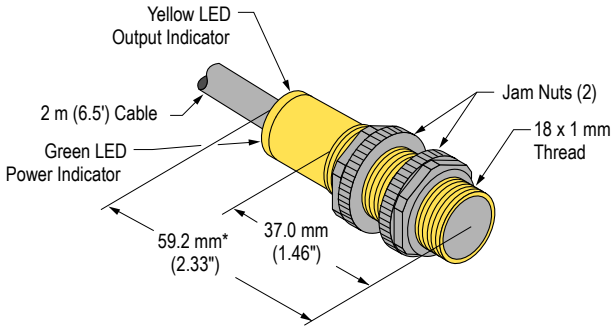
WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

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

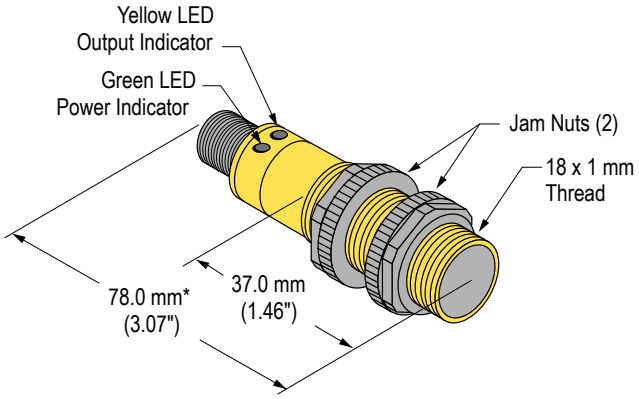
Dimensions

Cabled Models



*Polarized retro and fixed-field models = 65.0 mm (2.56")

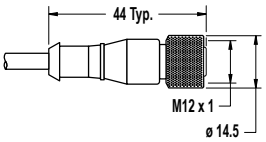
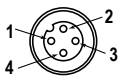
QD Models

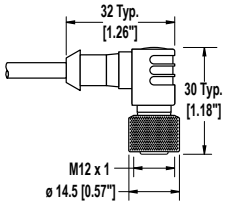


*Polarized retro and fixed-field models = 83.8 mm (3.30")

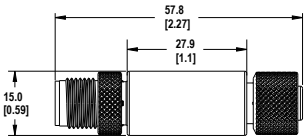
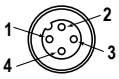
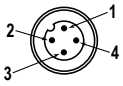
Accessories

Cordsets

4-Pin Threaded M12/Euro-Style Cordsets—Single Ended				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MQDC-406	1.83 m (6 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black
MQDC-415	4.57 m (15 ft)			
MQDC-430	9.14 m (30 ft)			
MQDC-450	15.2 m (50 ft)			

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

Sensor Status Indicators

S15L Series In-Line Sensor Status Indicator						
Model	**Input Type**	**LED Color**	**Dimensions**	**Female**	**Male**	**Wiring**
S15LGYPQ	PNP	Power ON = Green Input Active = Yellow				1 = Brown, 10 to 30 V DC 2 = White 3 = Blue, dc common 4 = Black, Sensor Input
S15LGYNQ	NPN					

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

FCC Part 15 and CAN ICES-3 (B)/NMB-3(B)

This device complies with part 15 of the FCC Rules and CAN ICES-3 (B)/NMB-3(B). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules and CAN ICES-3 (B)/NMB-3(B). These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the manufacturer.

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