# S18 Series Sensors (DC Voltage)

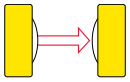
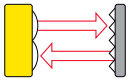
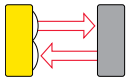
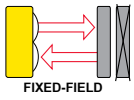
## Installation Guide

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: 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.

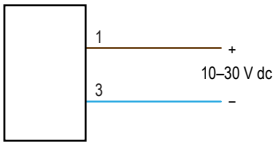
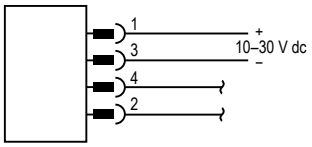
## Models

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

[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, **S186EW/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.

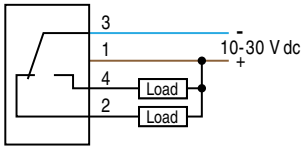
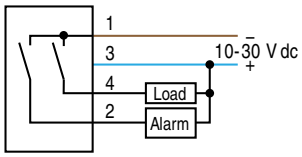
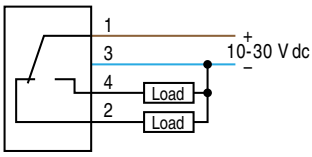
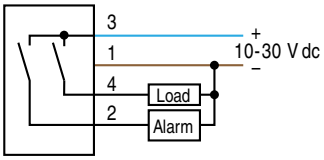
[2] Use polarized models when shiny objects will be sensed.

## Wiring Diagrams

| Cabled Emitters | QD Emitters | Key |
|---|---|---|
|  |  | 1. Brown<br>2. White<br>3. Blue<br>4. Black |





| NPN Standard | NPN Alarm | PNP Standard | PNP Alarm |
|---|---|---|---|
|  |  |  |  |



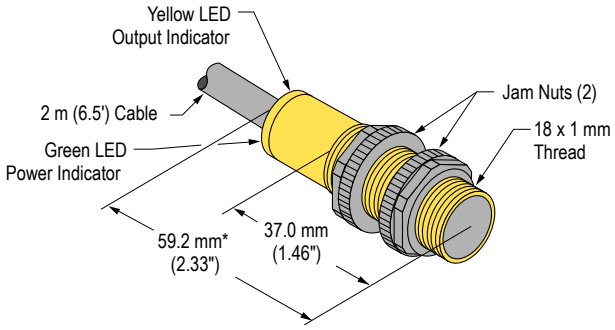
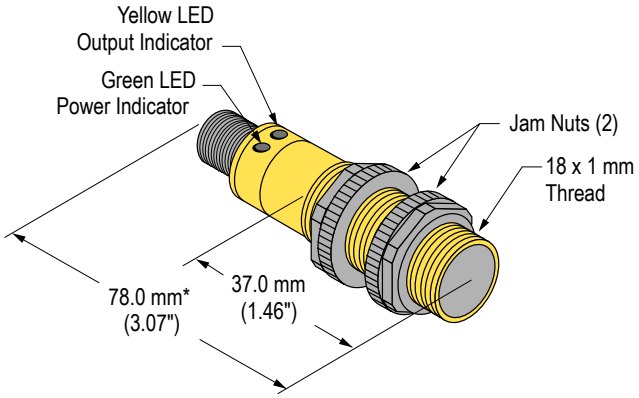






Wiring for the quick disconnect (QD) models is functionally identical.

## Dimensions

| Cabled Models | QD Models |
|---|---|
|  |  |



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



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

## 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

**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 requirements. Method 201A (Vibration; frequency 10 Hz to 60 Hz, max., double amplitude 0.06 inch acceleration 10G). Method 213B conditions H&I.
Shock: 75G with unit operating; 100G for non-operation

**Certifications**

**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.

**Required Overcurrent Protection**

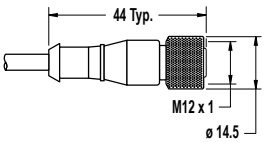
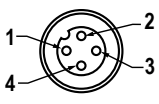
**WARNING:** Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

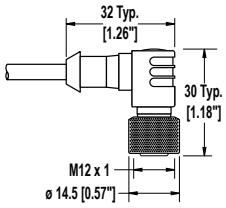
Overcurrent protection is required to be provided by end product application per the supplied table.
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.
Supply wiring leads < 24 AWG shall not be spliced.
For additional product support, go to *www.bannerengineering.com*.

| 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 |

## Accessories

**4-Pin Threaded M12/Euro-Style Cordsets**

| Model | Length | Style | Dimensions | Pinout (Female) |
|---|---|---|---|---|
| **MQDC-406** | 1.83 m (6 ft) | Straight |  |  <br>1 = Brown<br>2 = White<br>3 = Blue<br>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 | | | | |
|---|---|---|---|---|
| **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) | | | |

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