Specifications

Specifications — DC Models SM31EPD & SM31RPD

Supply Voltage
10 V to 30 V dc (10% maximum ripple) at less than 25 mA (exclusive of load)

Receiver Output Configuration
Bipolar: One PNP and one NPN open-collector transistor

Receiver Output Rating
150 mA maximum each output at 25 °C, derated to 100 mA at 70 °C (derate approximately 1 mA per °C)
Output leakage: less than 1 microamp (off-state)
Output saturation voltage (PNP output): less than 1 V at 10 mA and less than 2 V at 150 mA load
Output saturation voltage (NPN output): less than 200 millivolts at 10 mA and less than 1 V at 150 mA load

Receiver Output Protection Circuitry
Protected against false pulse on power-up, inductive load transients, power supply polarity reversal, and continuous overload or short circuit of outputs

Receiver Response Time
The sensors respond to either a light or a dark signal of 1 millisecond or longer duration (independent of signal strength), 500 Hz maximum

Note: 100 ms delay on power-up; outputs do not conduct during this time.

Repeatability of Response
0.14 milliseconds, independent of signal strength

Range
0 m to 0.3 m (0 ft to 1 ft) minimum.
Actual range depends on the light-transmission properties of the clear plastic material being sensed

Connections
SM31EPD: PVC-jacketed 2-conductor cable
SM31RPD: PVC-jacketed 4-conductor cable
Standard length is 2 m (6 ft)
SM31EPDQD and SM31RPDQD: integral quick-disconnect (QD) connector; mating cables (required) must be ordered separately

Adjustments
SM31RPD has a Light/Dark operate select switch and a 15-turn slotted brass screw GAIN (sensitivity) adjustment potentiometer (clutched at both ends of travel)
Both controls are located on the rear panel of the sensor and are protected by the gasketed, clear acrylic cover

Indicators
Red LED on the rear of the emitter: ON means power to the sensor is ON
Red LED indicator located on the rear of the receiver: Banner's exclusive, patented Alignment Indicating Device (AID™, US patent #4356393) turns on whenever a light condition is sensed, with a superimposed pulse rate proportional to the light signal strength (the stronger the signal, the faster the pulse rate)

Construction
Sensor: Thermoplastic
Lens: Acrylic

Environmental Rating
Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, and 12; IEC IP67

Operating Conditions
Temperature: –20 °C to +70 °C (–4 °F to +158 °F)
Humidity: 90% at +50 °C maximum relative humidity (non-condensing)

Application Notes
The NPN output of model SM31RPD is directly compatible as an input to Banner logic modules, including all non-amplified MICRO-AMP® modules and CL Series MAXI-AMP™ modules

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

Certifications

Specifications — AC Models SMA31EPD & SM2A31RPD

Supply Voltage and Current
24 V to 240 V ac (50 Hz/60 Hz), 250 V ac maximum

Receiver Output Configuration
SPST SCR solid-state relay with either normally closed or normally open contact (selectable Light/Dark operate)

Receiver Output Rating
Minimum load current: 5 mA
Maximum steady-state load capability: 300 mA maximum at up to 50 °C ambient (122 °F), derated to 100 mA maximum at 70 °C (158 °F)
Inrush capability: 3 amps for 1 second or 10 amps for 1 cycle (non-repeating)
OFF-state leakage current: less than 1.7 mA rms
ON-state voltage drop: ≤ 5 volts at 300 mA, ≤10 volts at 15 mA load

Receiver Output Protection
Protected against false pulse on power-up and inductive load transients

Receiver Response Time
2 milliseconds ON and 1 millisecond OFF, independent of signal strength
Does not include load response time of up to 1/2 ac cycle (8.3 milliseconds)

Note: 300 ms delay on power-up; outputs do not conduct during this time.

Repeatability of Response
0.3 millisecond, independent of signal strength

Range
0 m to 0.3 m (0 ft to 1 ft) minimum. Actual range depends on the light-transmission properties of the clear plastic material being sensed.

Connections
PVC-jacketed 2-conductor cable. Standard length is 2 m (6 feet).
Models SMA31EPDQD and SM2A31RPDQD have an integral quick-disconnect (QD) connector; mating cables (required) must be ordered separately

Adjustments
SM2A31RPD has a Light/Dark operate select switch and a 15-turn slotted brass screw GAIN (sensitivity) adjustment potentiometer (clutched at both ends of travel). Both controls are located on the rear panel of the sensor and are protected by a gasketed, clear acrylic cover.

Indicators
Red LED on the rear of the emitter: ON means power to the sensor is ON
Red LED on the rear of the receiver: ON when the output is energized

Construction
Sensor: Thermoplastic
Lens: Acrylic

Environmental Rating
Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67

Operating Conditions
Temperature: –20 °C to +70 °C (–4 °F to +158 °F)
Humidity: 90% at +50 °C maximum relative humidity (non-condensing)

Application Notes
1. Model SM2A31RPD may be destroyed from overload conditions.
2. Low voltage use of the ac receiver requires careful analysis of the load to determine if the leakage current or on-state voltage of the sensor will interfere with proper operation of the load.
3. The false-pulse protection feature may cause momentary drop-out of the load when the sensor is wired in series or parallel with mechanical switch contacts.

Required Overcurrent Protection

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

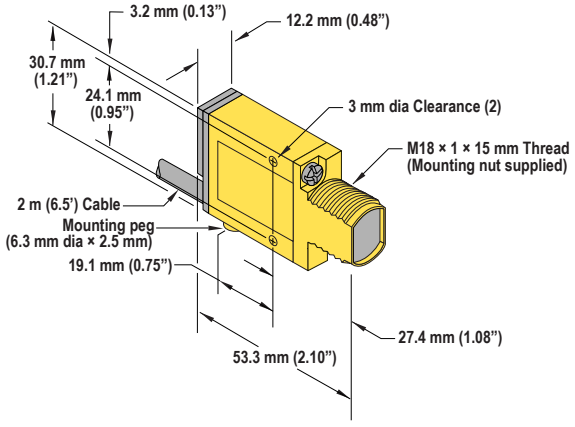
Overcurrent protection is required to be provided by end product application per the supplied table.
Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.
Supply wiring leads < 24 AWG shall not be spliced.
For additional product support, go to *www.bannerengineering.com*.

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

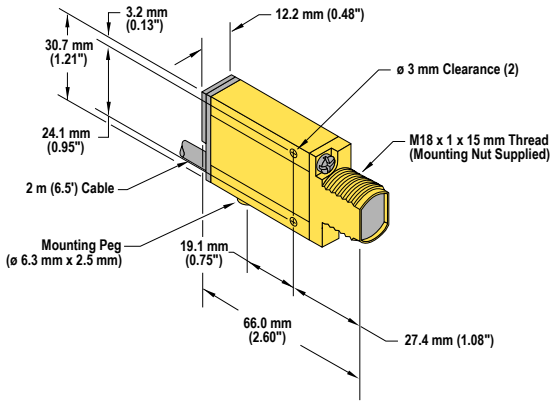
Certifications

Dimensions

DC Models

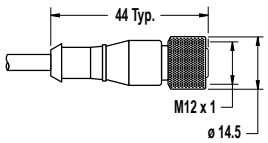
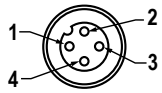
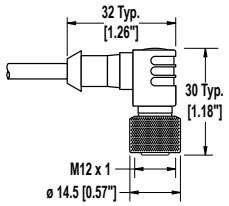


AC Models

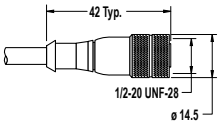
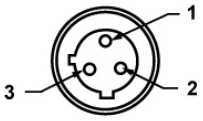
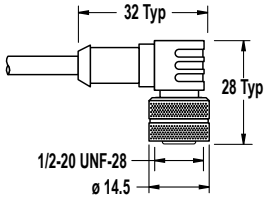


Accessories

Quick Disconnect Cordsets — DC Sensors

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

Quick Disconnect Cordsets — AC Sensors

3-Pin Micro-Style Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
MQDC-306	1.83 m (6 ft)	Straight		 1 = Green 2 = Red/Black 3 = Red/White
MQDC-315	4.57 m (15 ft)			
MQDC-330	9.14 m (30 ft)			
MQDC-306RA	1.83 m (6 ft)	Right-Angle		
MQDC-315RA	4.57 m (15 ft)			
MQDC-330RA	9.14 m (30 ft)			

Banner Engineering Corp. Limited Warranty

Banner Engineering Corp. warrants its products to be free from defects in material and workmanship for one year following the date of shipment. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture which, at the time it is returned to the factory, is found to have been defective during the warranty period. This warranty does not cover damage or liability for misuse, abuse, or the improper application or installation of the Banner product.

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