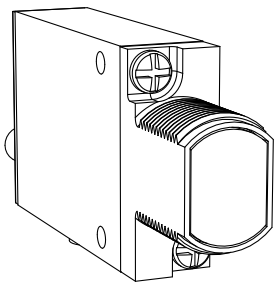
Features

For use with MP-8 Multiplexer



Models SM3IEM and SM31EML are self-contained DC emitters designed for use in multiple-sensor arrays with the MP-8 multiplexer module. They work with Banner DC receivers SM3IR and SM3IRL to provide the benefits of easy alignment and low maintenance typical of high-power modulated LED sensing technology.

Typical uses are high-speed product profile measurement, part guidance, or wide-coverage curtain-of-light applications. The SM31EM/SM31R combination has a wide beam angle for very forgiving alignment within its 3 m (10-foot) range.

The MP-8 multiplexer module prevents optical crosstalk interference between adjacent emitter/receiver pairs. This allows sensing beams to be situated in tight patterns for accurate product measurement or position-sensing applications. The MP-8 module has inputs for up to eight separate emitter/receiver pairs. The MP-8 module sequentially energizes the emitters so that only one is on at a time, and samples the output from the associated receiver. The receiver information is latched into a register until the next time it is sampled. This information is presented as a logic-level signal at the MP-S's output terminal strip. SM31EM and SM31EML emitters are designed for very fast switching by the MP-8 module. MP-8 modules themselves may be connected together in series or parallel strings to accommodate additional sensor pairs.

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

Model	Range	Effective Beam Diameter
SM31EMQD with SM31R receiver	3 m (10 ft)	3 mm (0.14 inch)
SM31EML with SM31RL receiver	30 m (100 ft)	12 mm (0.5 inch)

The 2 m (6.5 ft) cable models are listed, except for SM31EMQD.

- To order the 4-pin M12 male quick-disconnect (QD) model, add "QD" to the model. For example, SM31EMQD.
- Models with a QD connector require a mating cordset. See "Accessories" on page 4.

NOTE: The black and white wires of these cables are not used in emitter connections.

The following models are no longer available for order but are still covered by the information in this document.

- SM31EM (2 m cable)
- SM31EM W/30 (9 m cable)
- SM31EML W/30 (9 m cable)
- SM31EMLQD

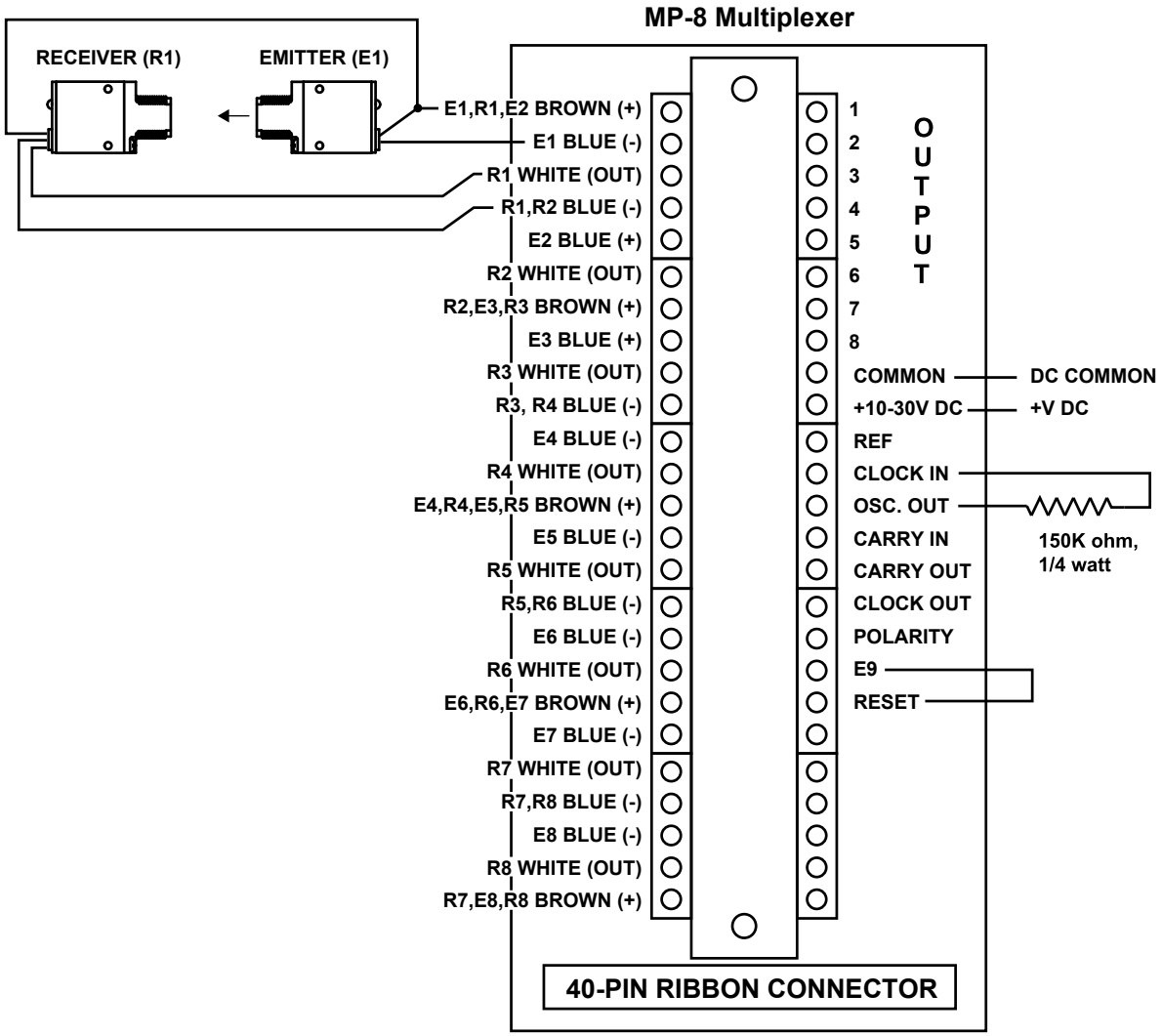
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03415
p/n: 03415 Rev D

Connect the SM31EM or SM31EML to MP-8 Multiplexer (with SM31R or SM31RL receivers)

The wiring diagram shown is typical for all eight sensing positions.

Connect to MP-8 Multiplexer



1. If an output is desired when the light beam is broken, place the control on the back of the receiver in the dark operate (fully counterclockwise) position. If an output is desired when the light beam is unobstructed, place the control in the light operate (fully clockwise) position.
2. The black output wire (current sourcing) from each receiver is not used. It may be cut off or dressed back onto the cable sheathing.
3. Each sensor pair requires 45 mA (maximum) at 10 V DC to 30 V DC. To determine the required DC power supply size, add the following: 100 mA to power the MPS, plus 45 mA per sensor pair, plus the collective current from the outputs used (100 mA maximum, each output).

IMPORTANT: Do not use switching-type DC power supplies.

4. Register outputs sink up to 100 mA each. Connect the load between the OUTPUT and +V DC terminals.
5. Connect a 150 KΩ (brown, green, yellow), ¼ watt resistor (supplied) between the OSC OUT and CLOCK IN terminals to set the proper clock frequency for the sensors used (approximately 2 milliseconds per step).
6. Connect the RESET terminal to the E9 terminal. If fewer than eight sensor pairs are used, connect RESET to the first unused E(-) terminal. For example, if four sensor pairs are used, connect RESET to the E5(-) terminal.
7. Receiver wires +(brown), -(blue), and emitter wires. +(brown) may be connected directly to the dc power supply.

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Specifications

Supply Voltage
Operating voltage is supplied by the Banner model MP-8 Multiplexer module

Sensor Response Time
Receivers respond to either a light or dark signal of 1 millisecond or longer duration, independent of signal strength

Response Time of the Array
Dependent upon the clock speed setting of the MP-8 module; see wiring diagram

Sensing Beam
Infrared, 880 nm

Construction
Reinforced PBT polyester housing, totally encapsulated, o-ring sealing, acrylic lenses, stainless steel screws

Connections
PVC-jacketed 2-wire cable (6-foot length) standard. Sensors with QD connector are also available (QD model suffix); QD cables ordered separately

Indicator LED
Red LED on the rear of the emitter lights to confirm proper connection to the MP-8 module

Operating Temperature
–20 °C to +70 °C (–4 °F to +158 °F)

Environmental Rating
IP67

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.

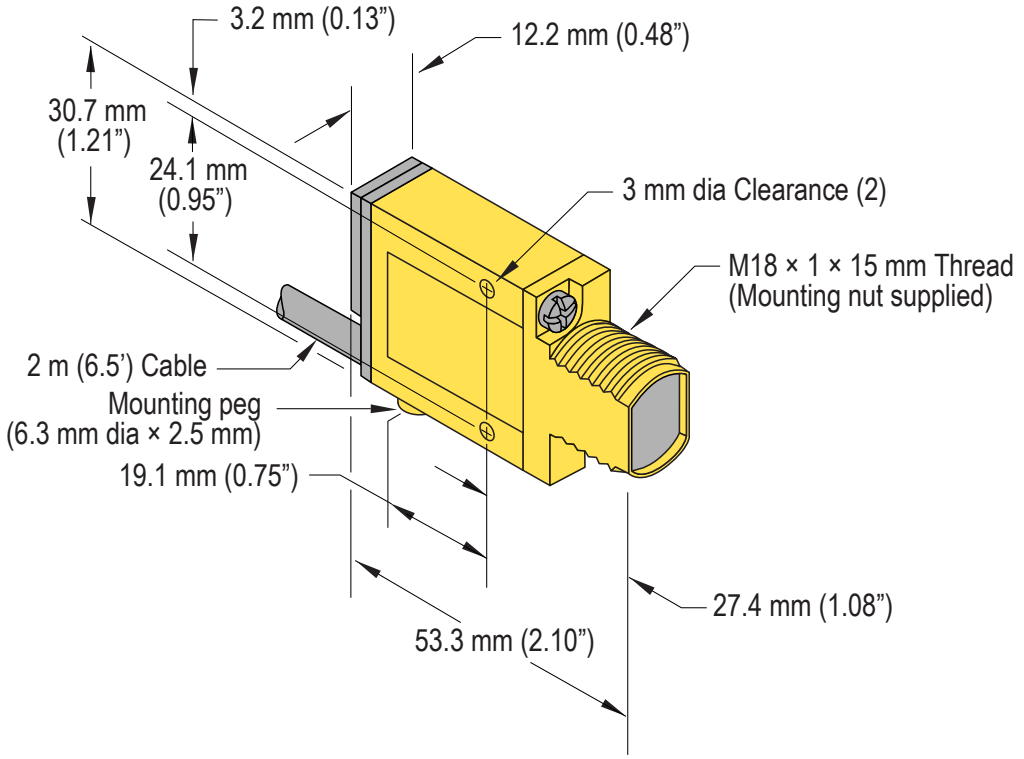
Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	2.0	30	0.5

Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

Dimensions

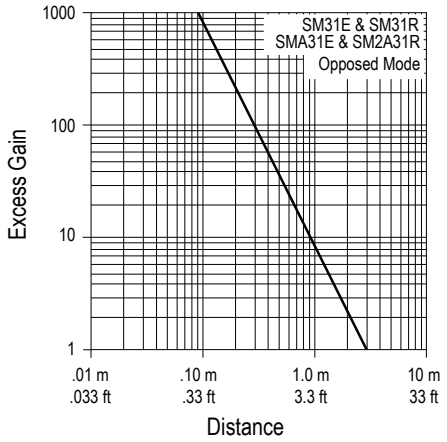
All measurements are listed in millimeters [inches], unless noted otherwise. The measurements provided are subject to change.



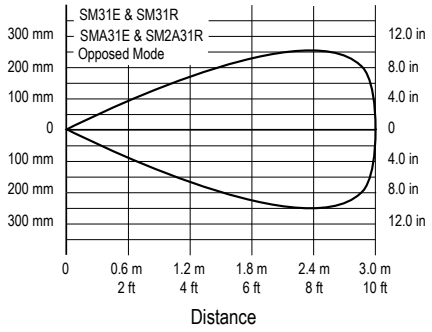
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Performance Curves

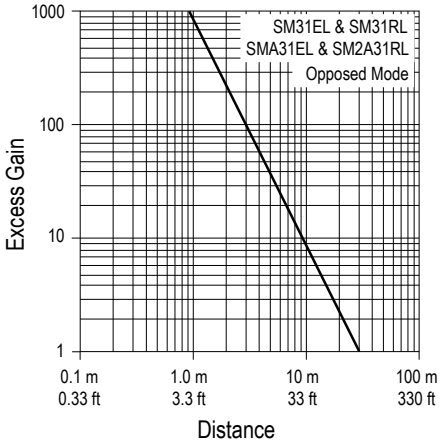
Excess Gain—SM31EM & SM31R



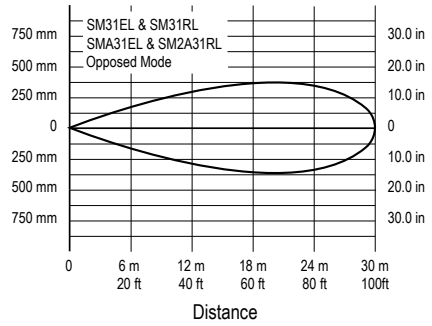
Beam Pattern—SM31EM & SM31R



Excess Gain—SM31EML & SM31RL



Beam Pattern—SM31EML & SM31RL



Accessories

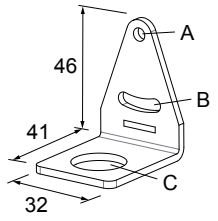
Brackets

SMB312PD

- 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
- CAD Files: DXF, PDF, IGS, STP

Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17 × 4.6, C = ø 18.5

NOTE: Not for use with plastic fiber optic sensors

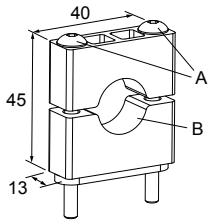


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SMB18C

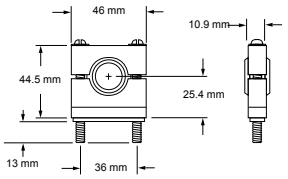
- 18 mm split clamp, black thermoplastic polyester
- Stainless steel mounting hardware included
- CAD Files: DXF, PDF, IGS, STP

A = ø 3 mm (2)
Hole size: B = ø 18 mm



SMB18S

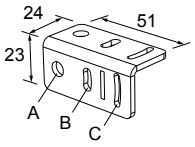
- 18 mm swivel bracket
- Black thermoplastic polyester
- Stainless steel mounting hardware included (Two M5 x 0.8 x 60 mm screws)
- CAD Files: DXF, PDF, IGS, STP



SMB312B

- Stainless steel 2-axis, bottom-mount bracket
- Includes mounting foot
- CAD Files: DXF, PDF, IGS, STP

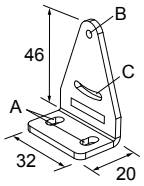
A = diam. 6.9, B = 4.3 × 10.5, C = 3.1 × 15.2



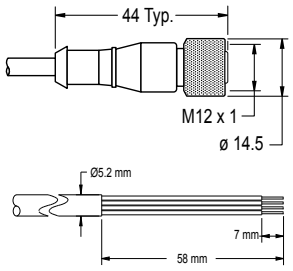
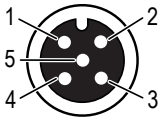
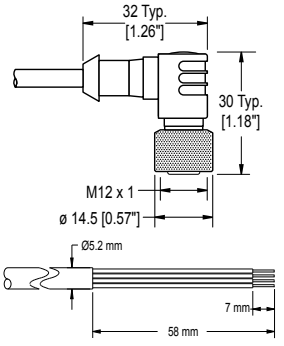
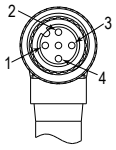
SMB312S

- Stainless steel 2-axis, side-mount bracket
- CAD Files: DXF, PDF, IGS, STP

A = 4.3 × 7.5, B = diam. 3, C = 3 × 15.3



M12 Quick-Disconnect Cables

4-Pin Single-Ended M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406	2 m (6.56 ft)	Straight			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Not used
MQDC-415	5 m (16.4 ft)				
MQDC-430	9 m (29.5 ft)				
MQDC-450	15 m (49.2 ft)				
MQDC-406RA	2 m (6.56 ft)	Right-Angle			
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

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Extension Cables

The following cable is available for extending the length of existing sensor cable. This is a 30 m (100 ft) length of MINI-BEAM cable, which may be spliced to the existing cable. Connectors, if used, must be customer-supplied.

Model	Type	Used With
EC312A-100	2-conductor	MINI-BEAM emitters

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