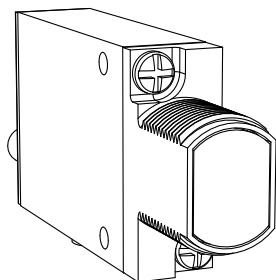


# MINI-BEAM® SM31EM/SM31EML Emitters



## Datasheet

For use with MP-8 Multiplexer



Models SM31EM 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 SM31R and SM31RL 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-8'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
SM31EM 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)



**Note:** MINI-BEAMS can be supplied with cables longer than the standard 6-foot length. The most readily available cable length is 30 feet. Lengths longer than 30 feet may also be quoted.



**Note:** 15-foot *euromast*<sup>™</sup> 4-wire cables with straight or right-angled QD connector are available for use with depowered QD MINI-BEAM emitters model SM31EMQD and SM31EMLQD. Model MQDC-415 has a straight connector; model MQDC-415RA has a right-angled connector. The black and white wires of these cables are not used in emitter hookups.



## 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.

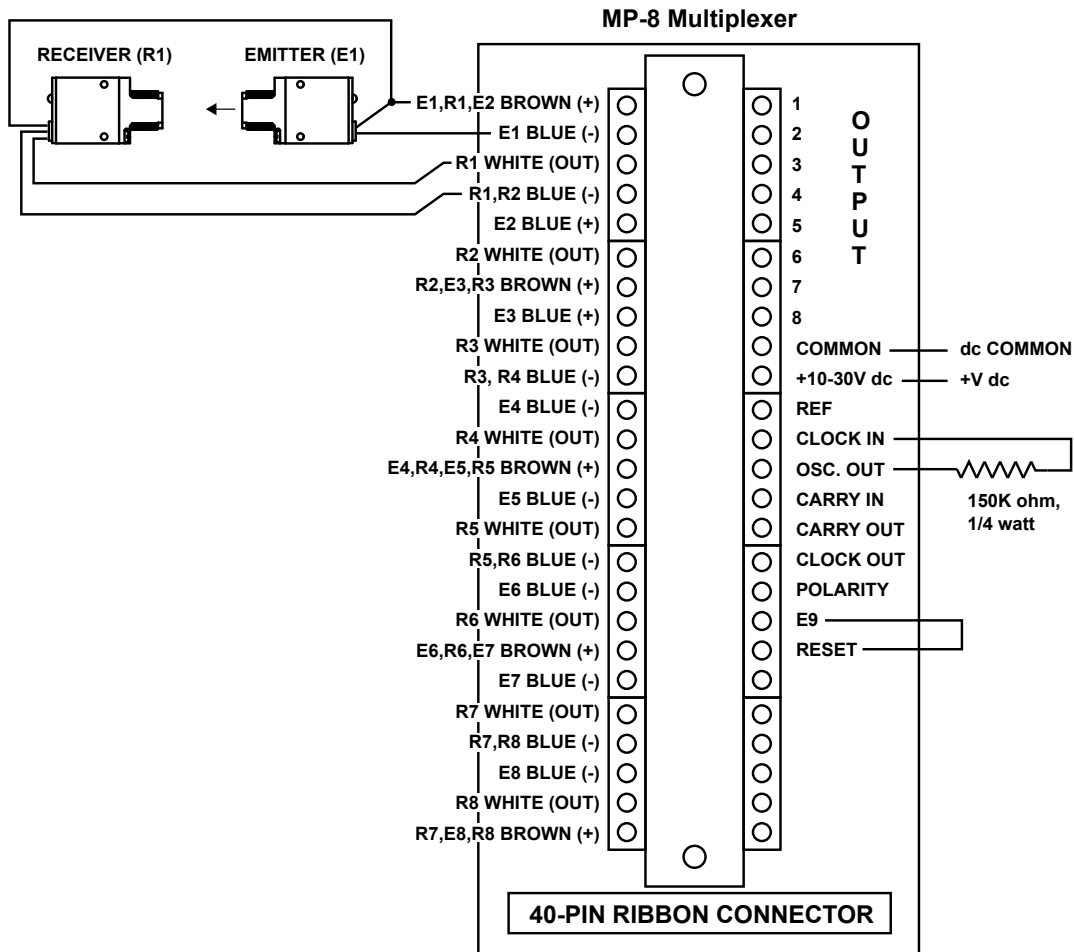


Figure 1. Connect to MP-8 Multiplexer

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 K $\Omega$  (brown, green, yellow), 1/4 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.

## 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 clock speed setting of 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 (Quick-Disconnect) connector are also available (QD model suffix); QD cables ordered separately

### Indicator LED

Red LED on rear of 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

Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 12, and 13.

### 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](http://www.bannerengineering.com).

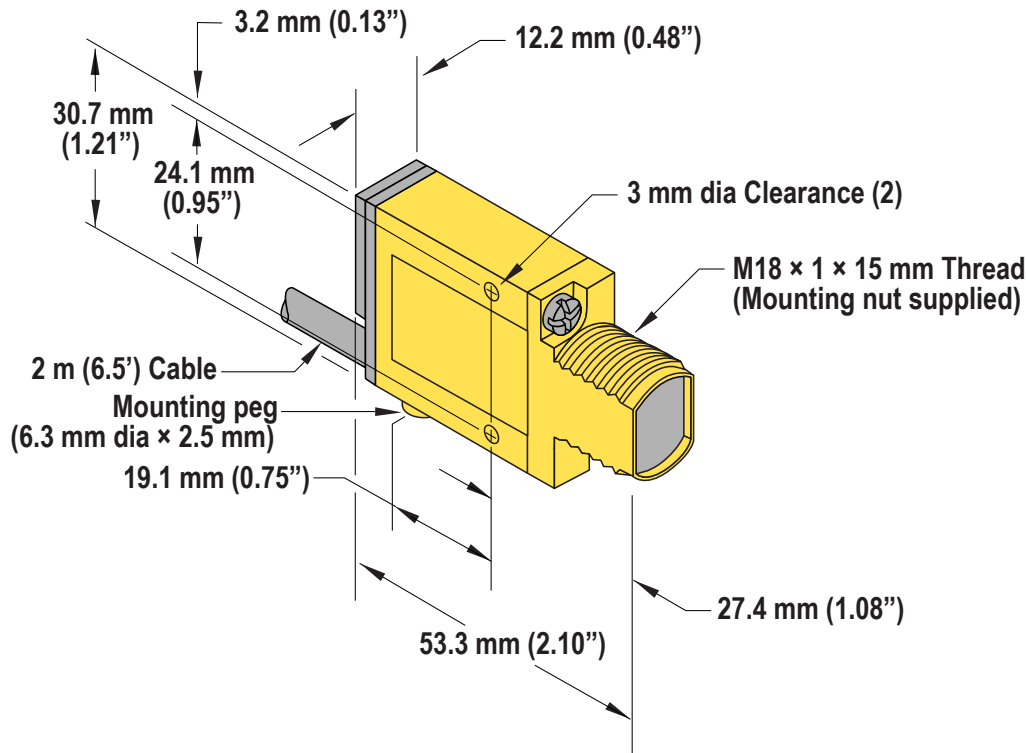
Supply Wiring (AWG)	Required Overcurrent Protection (Amps)
20	5.0
22	3.0
24	2.0
26	1.0
28	0.8
30	0.5

### Certifications



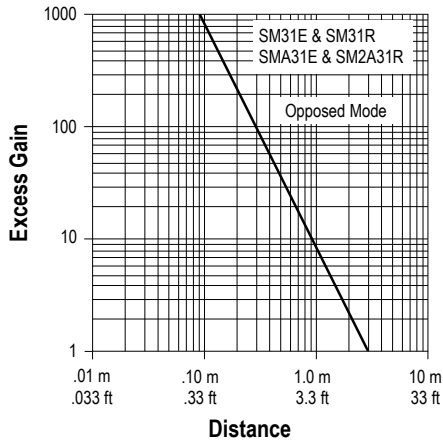
## Dimensions

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

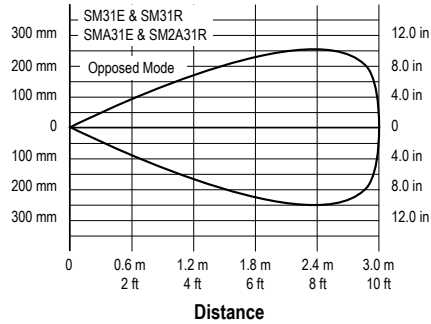


## Performance Curves

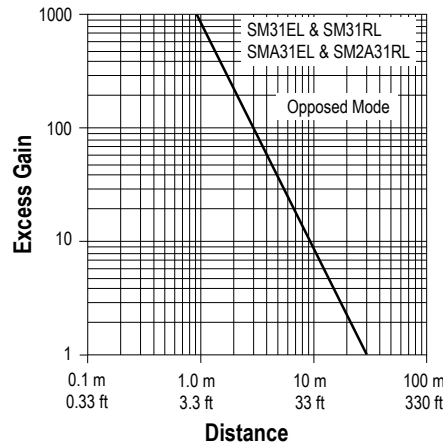
### Excess Gain—SM31EM & SM31R



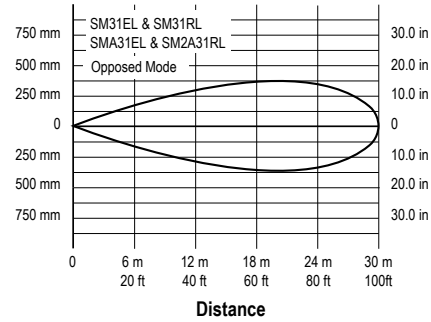
### Beam Pattern—SM31EM & SM31R



### Excess Gain—SM31EML & SM31RL



### Beam Pattern—SM31EML & SM31RL

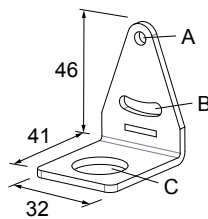


## Accessories

### 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



Hole center spacing: A to B = 24.2

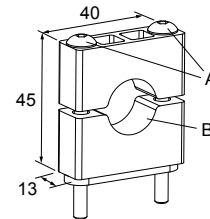
Hole size: A =  $\varnothing$  4.6, B = 17 x 4.6, C =  $\varnothing$  18.5



**Note:** Not for use with plastic fiber optic sensors

#### SMB18C

- 18 mm split clamp, black thermoplastic polyester
- Stainless steel mounting hardware included

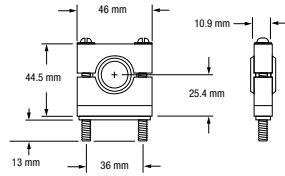


A =  $\varnothing$  3 mm (2)

Hole size: B =  $\varnothing$  18 mm

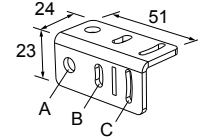
**SMB18S**

- 18 mm swivel bracket
- Black thermoplastic polyester
- Stainless steel mounting hardware included (Two M5 x 0.8 x 60 mm screws)



**SMB312B**

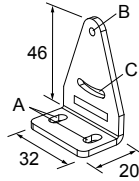
- Stainless steel 2-axis, bottom-mount bracket
- Includes mounting foot



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

**SMB312S**

- Stainless steel 2-axis, side-mount bracket



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

**Euro-Style Quick-Disconnect Cables**

4-Pin Threaded M12/Euro-Style Cordsets—Single Ended				
Model	Length	Style	Dimensions	Pinout (Female)
MQDC-406	1.83 m (6 ft)	Straight		<p>1 = Brown 2 = White 3 = Blue 4 = Black</p>
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)			

**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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