



S186ELD(Q) Laser Diode Emitter

Class 1 Laser for Use With Banner Modulated Photoelectric Receivers



Features

- Self-contained Class 1 modulated visible laser diode emitters permit higher gain and extended range in opposed mode sensing systems
- Narrow effective beam for small-object detection or for precise position control
- 10 to 30V dc operation; third wire extinguishes laser light when connected to +V dc
- Compatible with all EZ-BEAM® receivers; may also be used with a variety of other Banner modulated photoelectric receivers (see Excess Gain chart below)
- Popular 18 millimeter threaded barrel design

Models

Model	Range	Cable*	Supply Voltage	Effective Beam at Receiver at 25° C	
S186ELD	Range varies, depending on which receiver is used (see Excess Gain chart, page 2).	2 m (6.5') Unterminated	10 to 30V dc	Opposed Distance	Beam Width
S186ELDQ		4-wire Euro-style QD connector		1.5 m (5')	4 mm (0.2")
				3 m (10')	5.5 mm (0.2")
				6 m (20')	8.5 mm (0.3")
				15 m (50')	18 mm (0.7")
				30 m (100')	32 mm (1.3")

* 9 m cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g., S186ELD W/30).
A model with a QD connector requires a mating cordset; see page 4.

Excess Gain

Excess Gain of the S186ELD emitter is dependent on the receiver used. Following is a comparison of the excess gain for recommended receivers at 15 m (50'). For information on compatibility of the S186ELD emitter with other Banner photoelectric receivers, contact the factory Applications Group at the address or numbers listed on the back cover.

	MULTI-BEAM®	MAXI-BEAM®	VALU-BEAM®	EZ-BEAM®	MINI-BEAM®	ECONO-BEAM®	Others
Excess Gain at 15 m (50')	SBRX1 3,000	RSBR 750	SMW95R 5,000	T18SN6R 400	SM31R 300	SE61R 45	SM51RB 140
	SBR1 3,000	RSBRSR 120	SMI91RQD 3,000	T30SN6R 400	SM31RL 1,700	SE61RMHS 40	Q23SN6R 25
	SBRXD1 3,000			S12SN6R 400	SM31RMHS 200		Q10AN6R 20
	SBRD1 3,000				SM31RLMHS 1,100		Q45BB6R 1,500



WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.



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Alignment

Conventional modulated infrared LED photoelectric emitters are designed with beam divergence angles of several degrees. As a result, most emitters are easily aligned to their receivers by simple line-of-sight methods.

The beam size listed in Figure 1 is also the effective beam size at the receiver. The effective beam is equal to the minimum opaque object profile required to block the light beam. The beam size at the emitter is 2.5 mm (0.1") diameter.

The effect of angular misalignment is dramatic (see Figure 2). The wide beam angles offered by conventional photoelectric emitters allow several degrees of misalignment between the optical axes of the emitter and receiver. This is not true for laser emitters which require their beam center to directly strike the receiver lens. Figure 2 shows how far the laser beam will miss the center of the receiver lens for each degree of angular misalignment. Note that even at only a 5' range, one degree of misalignment will cause the laser beam to miss the lens of most receivers.

Alignment Tip: The visible red beam of the laser emitter is easily seen in subdued lighting. At opposed distances of up to 10', attach a sheet of white paper directly in front of the receiver lens. Mark the location of the lens center on the paper; use the mark as an aiming target. Sight along the beam from directly behind the laser emitter. Adjust the emitter mounting until the red image (the dot of red light) is centered exactly on the mark. Remove the paper and check the response of the receiver.

For longer distances (up to 25'), replace the white paper with a 4" x 4" square of high-grade retroreflective tape (Banner model BRT-THG-4X4-5 or equivalent; see Figure 3). For greater distances, use a larger sheet of retroreflective material (see page 4).

Description of Class 1 Lasers

Class 1

Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

Reference 60825-1 Amend. 2 © IEC:2001(E), section 8.2.

Class 1 Laser Characteristics:

Wavelength = 650 nm
 Pulse Power ≤ 1 milliwatt
 Pulse Width = 7 microseconds
 Rep Rate = 30 microseconds

CAUTION . . .

Never stare directly into the emitter lens.
 Laser light can damage your eyes. Avoid placing any mirror-like object in the beam. Never use a mirror as a target. (See Figure 3.)

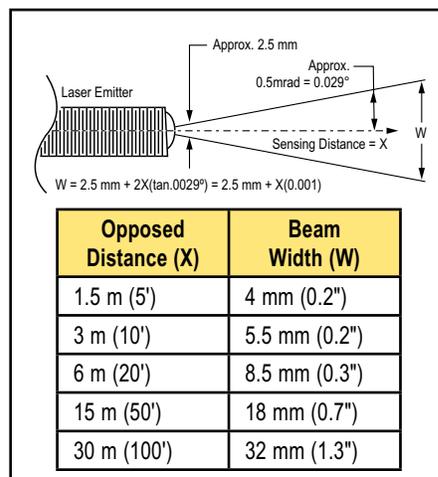


Figure 1. Laser emitter beam divergence at 25° C (beam size vs. distance)

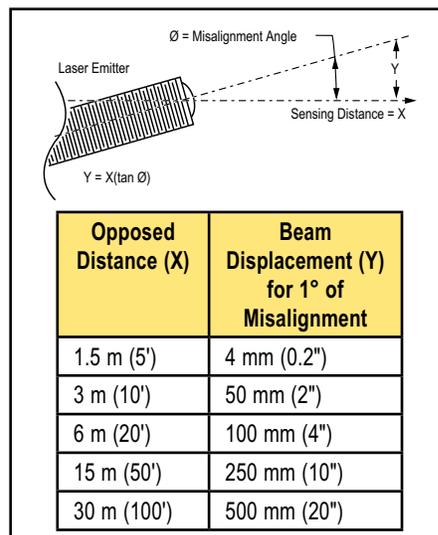


Figure 2. Beam displacement per degree of misalignment

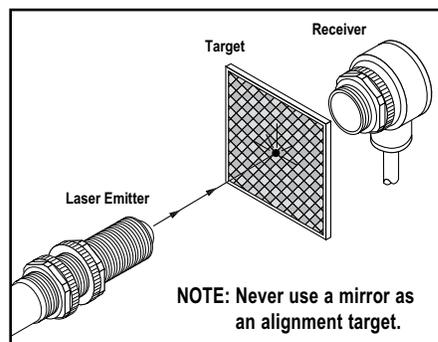


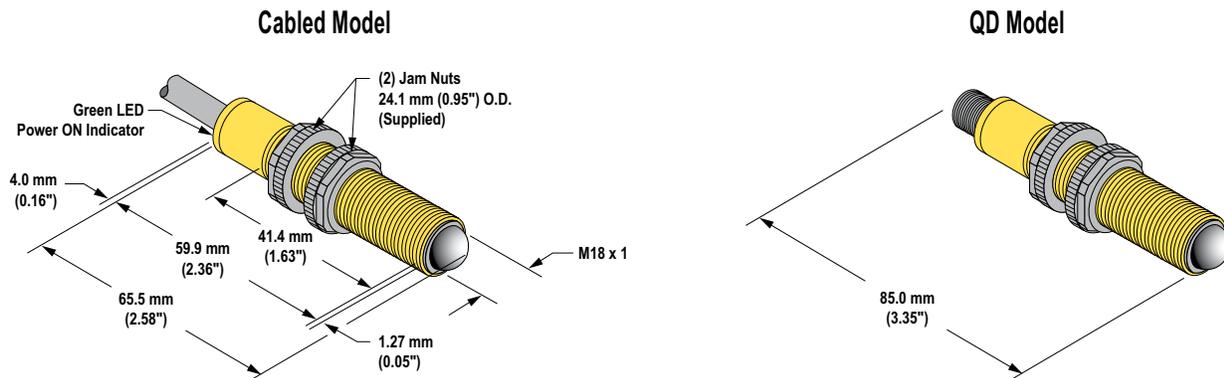
Figure 3. At long distances, use retroreflective tape to locate the beam at the receiver location.

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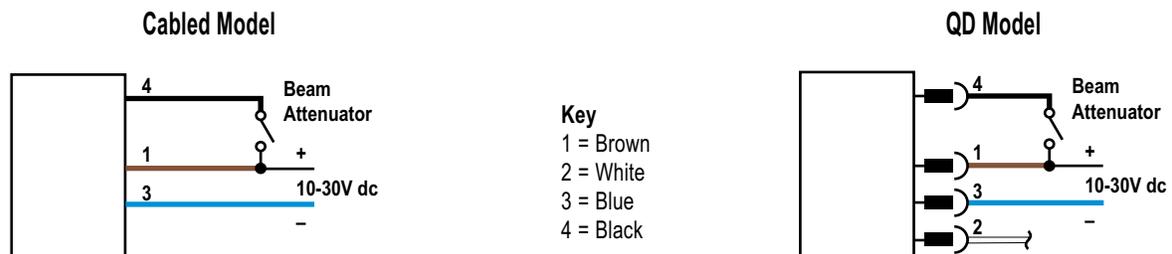
Specifications

Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 35 mA
Supply Protection Circuitry	Protected against reverse polarity
Sensing Beam	650 nm visible red Class 1 laser (temperature coefficient 0.2 nm/°C) Pulse Width: 7µs Rep Rate: 30µs Peak Output Power: less than 1 milliwatt
Beam Diameter at Aperture	2.5 mm (0.10") collimated ellipse
Beam Divergence	±0.5 milliradians typical
Laser Control	Enable beam by applying 0V dc or by opening circuit; apply +10 to 30V dc to black wire to inhibit beam
Indicators	Green indicator, visible through rear cover, indicates power applied
Construction	M18 x 1 threaded yellow PBT polyester barrel housing. Acrylic lens. Electronics totally encapsulated. Two mounting nuts are included.
Environmental Rating	NEMA 6P; IEC IP67
Connections	PVC-jacketed 2 m (6.5') or 9 m (30') attached cable, or 4-pin Euro-style quick-disconnect (QD) fitting.
Operating Conditions	Temperature: -10° to +50° C (+14° to 122° F) Maximum relative humidity: 90% at 50° C (non-condensing)
Laser Classification	Class 1 laser product complies with 21 CFR 1040.10, EN60825-1:2001, except for deviations pursuant to Laser Notice 50, dated 7-26-01.
Certifications	

Dimensions

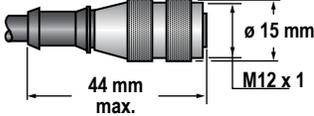
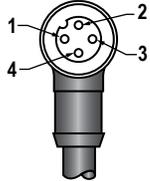
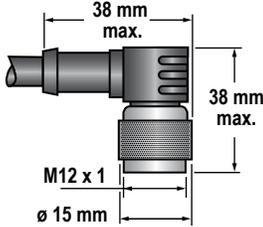


Hookups

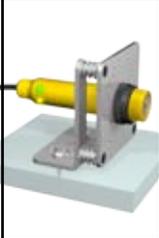


S186ELD Laser Diode Emitter

Quick-Disconnect (QD) Cordsets

Style	Model	Length	Dimensions	Pinout
Euro-style 4-Pin Straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5') 5 m (15') 10 m (30')		 <p>Key 1 = Brown 2 = White 3 = Blue 4 = Black</p>
Euro-style 4-Pin Right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5') 5 m (15') 10 m (30')		

Mounting Brackets

SMB46A	<ul style="list-style-type: none"> • 12-gauge stainless steel • Precision sensor alignment adjustment • 2 mm shortarm hex key included • Clearance for M5 (#10) hardware 		SMB18A	<ul style="list-style-type: none"> • 11-gauge stainless steel • Right-angle mounting bracket • Curved mounting slot for versatile orientation • Clearance for M4 (#8) hardware 	
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For bracket dimensions, visit www.bannerengineering.com.

Reflective Tape

Model	Reflectivity Factor	Maximum Temperature	Size	Unit	
BRT-THG-4X4-5	0.7	+60° C (+140° F)	100 x 100 mm (4" x 4")	Package of 5	
BRT-THG-8.5X11-2			216 x 280 mm (8.5" x 11")	Package of 2	
BRT-THG-18X36			457 x 914 mm (18" x 36")	Single Sheet	



WARRANTY: Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.