

WORLD-BEAM QS186LE Laser Emitter



Datasheet



Class 1 and 2 lasers for use with Banner modulated photoelectric receivers

- Self-contained Class 1 or Class 2 modulated visible laser diode emitters permit higher gain than LEDs and extended range in opposed-mode sensing systems.
- Narrow effective beam provides small-object detection and precise position control.
- Bright spot and multiple shapes provide great visual marking of objects.
- 10 to 30 V dc operation; third wire extinguishes laser light when connected to +V correct dc.

Models	Laser Class	Laser Spot Shape	Excess Gain at 15 m (50 ft) ¹	Typical Beam Size
QS186LE	Class 1	Small Spot	With receiver Q23SN6R: 7500	See Table 1 on page 2.
QS186LE10			With receiver SM31RL: 340	
QS186LE11			With receiver QS18VN6R: 4500	
QS186LE12			With receiver VS3AN5R: 2100	
QS186LE14			With receiver VS2AN5R: 1100	
QS186LE2	Class 2	Small Spot	With receiver Q23SN6R: 12200	See Table 2 on page 3.
QS186LE210			With receiver SM31RL: 1200	
QS186LE211			With receiver QS18VN6R: 7000	
QS186LE212			With receiver VS3AN5R: 5500	
QS186LE214			With receiver VS2AN5R: 3600	
		Circle	-	
		Vertical Line	-	
		Horizontal Line	-	
		Cross	-	

Standard 2 m (6.5 ft) cable models are listed. To order the 9 m (30 ft) cable model, add suffix "W/30" (QS18LE W/30). To order the 4-pin Pico-style pigtail QD models, add suffix "Q" (QS18LEQ). To order the 4-pin integral Pico-style QD models, add suffix "Q7" (QS18LEQ7). To order the 4-pin Euro-style QD pigtail models, add suffix "Q5" (QS18LEQ5). To order the 4-pin integral Euro-style QD models, add suffix "Q8" (QS18LEQ8).

Models with a QD connector require a mating cable.



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.

¹ Not recommended for dusty or dirty environments; the scattered light would greatly reduce excess gain.



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 widths listed (see [Figure 1](#) on page 2) are also the effective beam sizes at the receiver for model QS186LE. The effective beam size is equal to the minimum opaque object profile required to block the laser beam. The beam size at the emitter is 2.5 mm (0.1 inches) diameter. Beam sizes at various distances for other models are shown in the tables below.

The effect of angular misalignment is dramatic (see [Figure 3](#) on page 3). 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 the beam center to directly strike the receiver lens. The figures show how far the laser beam will miss the center of the receiver lens for one degree of angular misalignment (in any plane). Note that even at a 5 foot range, one degree of misalignment will cause the laser beam to miss the lens of most receivers.

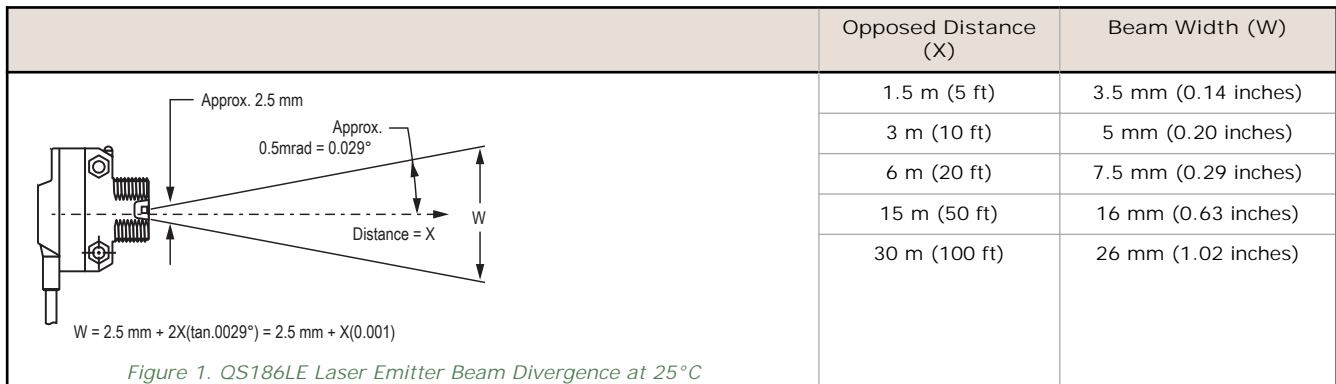


Table 1: Typical Beam Size vs Distance (Class 1 Lasers)

Typical Beam Size vs. Distance, Class 1 Lasers							
Small Spot (Model QS186LE)							
Distance	1.5 m (5 ft)	3 m (10 ft)	6 m (20 ft)	15 m (50 ft)	30 m (100 ft)	-	-
Spot Size	3.5 mm (0.14 in)	5 mm (0.2 in)	7.5 mm (0.29 in)	16 mm (0.63 in)	26 mm (1.02 in)	-	-
Circle (Model QS186LE10) ²							
Distance	0.4 m (1.3 ft)	0.8 m (2.6 ft)	1 m (3.3 ft)	2 m (6.6 ft)	3 m (10 ft)	4 m (13 ft)	5 m (16 ft)
Circle Diameter	16 mm (0.63 in)	32 mm (1.26 in)	40 mm (1.57 in)	82 mm (3.23 in)	120 mm (4.72 in)	158 mm (6.22 in)	196 mm (7.72 in)
Vertical Line (Model QS186LE11) ³							
Distance	0.2 m (0.6 ft)	0.4 m (1.3 ft)	0.6 m (1.9 ft)	0.8 m (2.6 ft)	1 m (3.3 ft)	1.5 m (5 ft)	2 m (6.6 ft)
Line Size	80 x 3 mm (3.1 x 0.1 in)	145 x 3 mm (5.7 x 0.1 in)	210 x 3 mm (8.3 x 0.1 in)	270 x 3 mm (10.6 x 0.1 in)	330 x 3 mm (13.0 x 0.1 in)	480 x 3 mm (18.9 x 0.1 in)	600 x 3 mm (23.6 x 0.1 in)
Horizontal Line (Model QS186LE12) ³							
Distance	0.2 m (0.6 ft)	0.4 m (1.3 ft)	0.6 m (1.9 ft)	0.8 m (2.6 ft)	1 m (3.3 ft)	1.5 m (5 ft)	2 m (6.6 ft)
Line Size	95 x 2 mm (3.7 x 0.1 in)	175 x 2 mm (6.9 x 0.1 in)	252 x 2 mm (9.9 in x 0.1 in)	333 x 2.5 mm (13.1 x 0.1 in)	418 x 2.5 mm (16.5 x 0.1 in)	613 x 3 mm (24.1 x 0.1 in)	765 x 3 mm (30.1 x 0.1 in)
Cross (Model QS186LE14) ²							
Distance	0.4 m (1.3 ft)	0.8 m (2.6 ft)	1 m (3.3 ft)	2 m (6.6 ft)	3 m (10 ft)	4 m (13 ft)	5 m (16 ft)
Line Size	60 mm (2.4 in)	125 mm (4.9 in)	155 mm (6.1 in)	310 mm (12.2 in)	460 mm (18.1 in)	615 mm (24.2 in)	760 mm (29.9 in)

² May contain a small collimated spot in the center of the pattern. For best focus, view circle at distances greater than 1 meter and cross at distances greater than 0.3 m (image is not crisp at closer distances).

³ Light distribution is non-uniform, having less light at ends. The horizontal line is more uniform than the vertical line.