WORLD-BEAM® QS18LD Laser Diffuse Series Sensors

Datasheet



- Visible Class 1 laser for diffuse sensing
- Narrow effective beam provides small-object detection and precise position control
- Crosstalk rejection algorithm protects against optical disturbance from adjacent sensors
- Excellent optical performance throughout sensing range, even close up
- 10 to 30 V dc operation, with complementary (SPDT) NPN or PNP outputs, depending on model
- Bright LED operating status indicators are visible from 360°
- Compact, rugged sealed housing, protected circuitry
- Mounting versatility – popular 18 mm threaded barrel or side-mount
- Choose 2 m (6.5 ft) or 9 m (30 ft) cable or one of four QD options

Models	Sensing Range	Spot Size at Focus	Cable	Output
QS18VN6LD	650 nm Visible Red Class 1 Laser 300 mm (12 in)	Approximately 1 mm at 300 mm (0.039 in at 12 in)	4-wire, 2 m (6.5 ft) integral cable	NPN
QS18VP6LD				PNP

The standard 2 m (6.5 ft) cable models are listed. To order the 9 m (30 ft) cable models, add the suffix “W/30” to the model number (e.g., QS18VN6LD W/30). A model with a QD connector requires a mating cordset. To order the QD models:

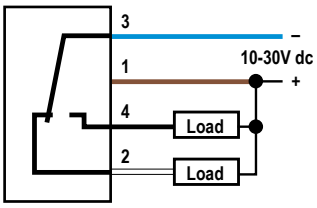
- For 4-pin integral Euro-style QD, add suffix “Q8” (e.g., QS18VN6LDQ8).
- For 4-pin integral Pico-style QD, add suffix “Q7” (e.g., QS18VN6LDQ7).
- For 4-pin Euro-style 150 mm (6 inch) pigtail QD, add suffix “Q5” (e.g., QS18VN6LDQ5).
- For 4-pin Pico-style 150 mm (6 inch) pigtail QD, add suffix “Q” (e.g., QS18VN6LDQ).

WARNING: Not To Be Used for Personnel Protection

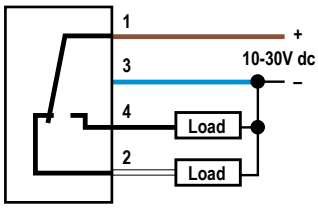
Never use this device as a sensing device for personnel protection. Doing so could lead to serious injury or death. This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition.

Wiring Diagrams

NPN (Sinking) Outputs



PNP (Sourcing) Outputs



Wiring Key

1 = Brown
2 = White
3 = Blue
4 = Black

Cabled wiring diagrams are shown. Quick disconnect (QD) wiring diagrams are functionally identical.

Description of Laser Classes

Class 1 Lasers

Class 1 lasers are lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

Reference IEC 60825-1:2001, Section 8.2.

Class 1 Laser Characteristics: See Specifications.

CAUTION: Do Not Disassemble for Repair

This device contains no user-serviceable components. Do not attempt to disassemble for repair. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. A defective unit must be returned to the manufacturer.



For Safe Laser Use (Class 1 or Class 2):

- Do not stare at the laser.
- Do not point the laser at a person's eye.
- Mount open laser beam paths either above or below eye level, where practical.
- Terminate the beam emitted by the laser product at the end of its useful path.

Specifications

Supply Voltage
10 to 30 V dc (10% maximum ripple) at less than 15 mA, exclusive of load

Sensing Beam
Visible red LED, 650 nm

Laser Characteristics
Wavelength: 650 nm visible red Class 1 laser
Pulse Width: 7 microseconds
Rep Rate: 130 microseconds
Average Output Power: 0.065 mW

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
Solid-state complementary (SPDT): NPN or PNP (current sinking or sourcing), depending on model;
Rating: 100 mA maximum each output at 25 °C
Off-state leakage current:
NPN: less than 200 µA @ 30 V dc (See Application Note 1)
PNP: less than 10 µA @ 30 V dc
ON-state saturation voltage:
NPN: less than 1.6 V @ 100 mA
PNP: less than 3.0 V @ 100 mA

Output Protection Circuitry
Protected against false pulse on power-up and continuous overload or short circuit of outputs

Output Response
700 microseconds ON/OFF
NOTE: 200 millisecond delay on power-up; outputs do not conduct during this time

Repeatability
130 microseconds

Sensing Hysteresis
15% of range typical

Adjustments
Single-turn sensitivity (Gain) adjustment potentiometer

Indicators
2 LED indicators on sensor top:
Green solid: Power on
Amber solid: Light sensed
Amber flashing: Marginal excess gain (1 to 1.5x excess gain)

Construction
ABS housing, acrylic lens cover, 3 mm mounting hardware included

Environmental Ratings
IEC IP67; NEMA 6; UL Type 1

Connections
2 m (6.5 ft) 4-wire PVC cable, 9 m (30 ft) 4-wire PVC cable, 4-pin Pico-style or Euro-style QD, 4-pin Pico-style or Euro-style 150 mm (6 in) pigtail QD, depending on model

Operating Conditions
Temperature: –10 °C to 50 °C (14 °F to 122 °F)
Relative Humidity: 90% @ 50 °C (non-condensing)

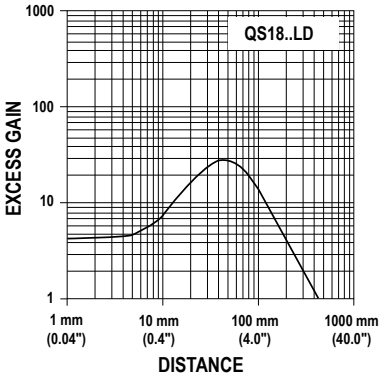
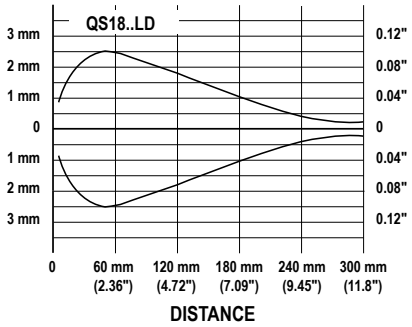
Laser Classification
Class 1 laser product; Complies with IEC 60825-1:2001 and 21 CFR 1040.10, except for deviations pursuant to Laser Notice 50, dated 7-26-01

Application Notes
NPN off-state leakage current is < 200 µA for load resistances > 3 kΩ or optically isolated loads. For load current of 100 mA, leakage is < 1% of load current.

Certifications

Performance Curves

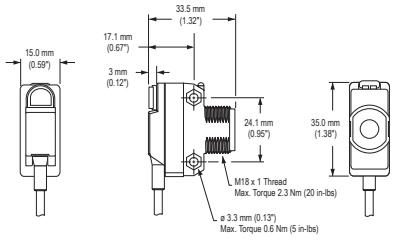
Performance is based on a 90% reflectance white test card.

Excess Gain	Beam Pattern
	

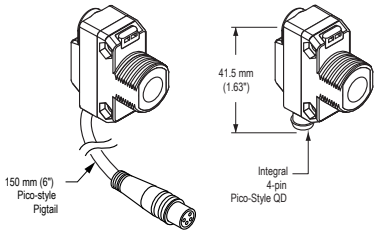
Dimensions

All measurements are listed in millimeters (inches).

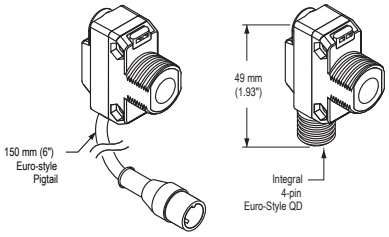
Cabled Models



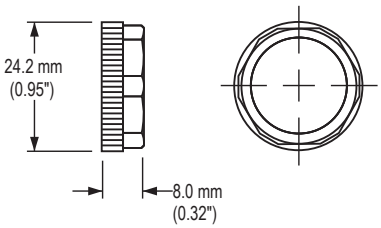
Pico-Style QD Models



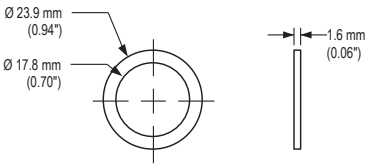
Euro-Style QD Models



Locknut (included with all models)



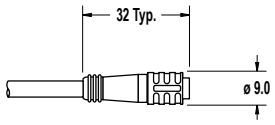
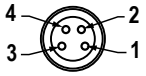
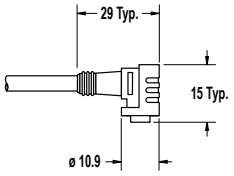
Washer (included with all models)

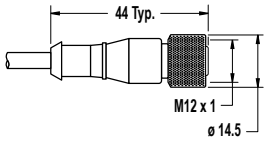
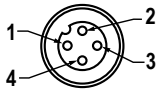
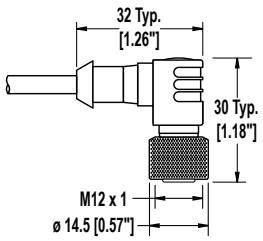


M3 Hardware Packet Contents:

- 2 – M3 x 0.5 x 20 mm SS Screw
- 2 – M3 x 0.5 SS Hex Nut
- 2 – M3 SS Washer

Accessories

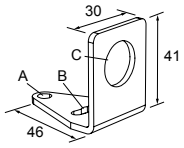
4-Pin Snap-on M8/Pico-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
PKG4-2	2.00 m (6.56 ft)	Straight		 1 = Brown 2 = White 3 = Blue 4 = Black
PKW4Z-2	2.00 m (6.56 ft)	Right-Angle		

4-Pin Threaded M12/Euro-Style Cordsets				
Model	Length	Style	Dimensions	Pinout
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)			

Mounting Brackets

SMB18A

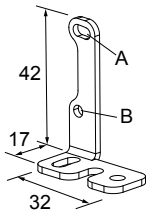
- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel
- 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware



Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17.0 × 4.6, C = ø 18.5

SMBQS18RA

- Right-angle mounting bracket
- 14-ga. 304 stainless steel

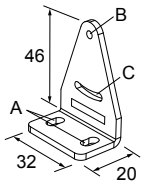


Hole center spacing: A to B=20.3
Hole size: A =4.3 × 9.3, B=ø 4.3

Mounting Brackets

SMB312S

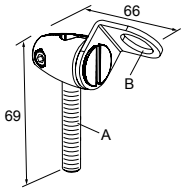
- Stainless steel 2-axis, side-mount bracket



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

SMB18FA..

- Swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- 18 mm sensor mounting hole

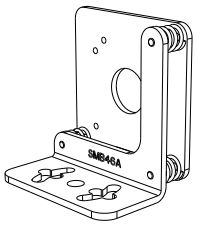


Hole size: B=ø 18.1

Model	Bolt Thread (A)
SMB18FA	3/8 - 16 × 2 in
SMB18FAM10	M10 - 1.5 × 50

SMB46A

- 2-piece 12-ga. stainless steel bracket assembly with precision sensor alignment adjustment
- 2 mm hex key included



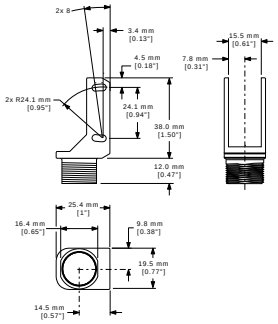
Hole center spacing: A to B = 18.5, B = 30.5

Hole size: A = ø 6.6, B = 7.1 x 20.3

SMBQS18Y

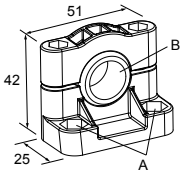
- Die-cast bracket for 18 mm holes
- Includes metal hex nut and lock washer
- Allows ± 8° for cabled sensors

Hole size: A = ø 15.3



SMB18SF

- 18 mm swivel bracket with M18 × 1 internal thread
- Black thermoplastic polyester
- Stainless steel swivel locking hardware included

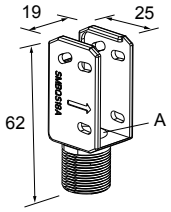


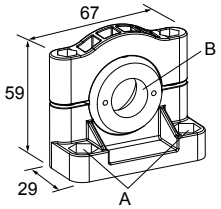
Hole center spacing: A = 36.0
Hole size: A = ø 5.3, B = ø 18.0

SMBQS18A

- Wrap-around protection bracket
- Die-cast bracket
- Base fits 18 mm threaded hole
- Metal hex nut, lock washer and grommet included
- Mounting holes specially designed for QS18AF sensors

Hole size: A = ø 15.3



Mounting Brackets	
SMB3018SC • 18 mm swivel side or barrel-mount bracket • Black reinforced thermoplastic polyester • Stainless steel swivel locking hardware included Hole center spacing: A = 50.8 Hole size: A = ø 7.0, B = ø 18.0	

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