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SLM Series Slot Sensors

Features



- An easy-to-use, self-contained, opposed-mode sensor pair in a U-shaped housing
- Rugged, sealed, die-cast metal housing is rated IEC IP67
- Easy and economical to mount; molded-in beam guides simplify beam placement
- Eight slot widths from 10 mm to 220 mm for a wide variety of sensing applications
- Current sourcing (PNP), current sinking (NPN), or bipolar (one NPN and one PNP) output, depending on model
- Fast 500-microsecond response time
- 10 V DC to 30 V DC supply voltage
- Single-turn potentiometer sensitivity adjustment
- Visible red beam
- Selectable Light Operate (LO) or Dark Operate (DO) with sealed switch

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

3-pin M8 male quick disconnect models

Models	Slot Width	Output Type
SLM10P6Q	10 mm (0.39 in)	PNP
SLM10N6Q		NPN
SLM20P6Q	20 mm (0.79 in)	PNP
SLM20N6Q		NPN
SLM30P6Q	30 mm (1.18 in)	PNP
SLM30N6Q		NPN
SLM50P6Q	50 mm (1.97 in)	PNP
SLM50N6Q		NPN
SLM80P6Q	80 mm (3.15 in)	PNP
SLM80N6Q		NPN
SLM120P6Q	120 mm (4.72 in)	PNP
SLM120N6Q		NPN
SLM180P6Q	180 mm (7.09 in)	PNP
SLM180N6Q		NPN
SLM220P6Q	220 mm (8.66 in)	PNP
SLM220N6Q		NPN

2 m (6.5 ft) cabled models

Cabled Models	Slot Width	Output Type
SLM10B6	10 mm (0.39 in)	Bipolar (one NPN and one PNP)
SLM20B6	20 mm (0.79 in)	
SLM30B6	30 mm (1.18 in)	
SLM50B6	50 mm (1.97 in)	
SLM80B6	80 mm (3.15 in)	
SLM120B6	120 mm (4.72 in)	
SLM180B6	180 mm (7.09 in)	
SLM220B6	220 mm (8.66 in)	

- To order the 9 m (30 ft) PVC cable model, add the suffix "W/30" to the cabled model number. For example, SLM10B6 W/30.
- To order the 150 mm (6 in) PUR cable model with a 4-pin M12 quick disconnect, add the suffix "QPMA" to the model number. For example, SLM10B6QPMA.

Models with a quick disconnect require a mating cordset.

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

- SLM10B6 W/30
- SLM20B6 W/30
- SLM50B6 W/30
- SLM120B6 W/30
- SLM180B6 W/30
- SLM220B6 W/30

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122703
p/n: 122703 Rev H

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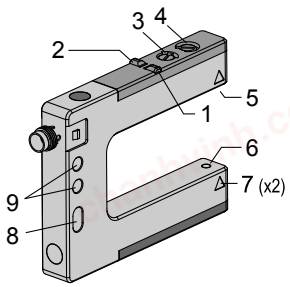
Overview

The SLM Series Slot Sensor (sometimes called a “fork sensor”) comprises an opposed-mode emitter and its receiver inside a single convenient housing.

Opposed-mode sensing is very reliable, and the single, self-contained housing provides easy installation, with no sensor alignment required. In addition, molded-in arrows on the housing show the position of the beam, simplifying installation placement. Applications include counting, gear-tooth detection, edge detection, part sensing on conveyor rails and belts, position and orientation verification, dimension verification, tool-break monitoring, and level monitoring.



1. Output LED (amber)
2. Power on LED (green)
3. Dark/Light Operate select switch
4. Sensitivity potentiometer
5. Receiver aperture
6. Emitter aperture
7. Beam position arrows
8. Mounting hole (all models except SLM10 and SLM20)
9. Mounting holes (all models)

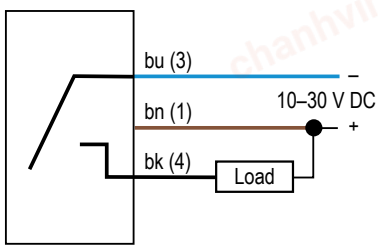
In light operate (LO) mode, the output is ON when the target returns the same or more light to the sensor and OFF when the sensor detects less light than the configured/taught target.

In dark operate (DO) mode, the output is ON when the target returns less light to the sensor than the configured target and OFF when the sensor detects more light than the configured/taught target.

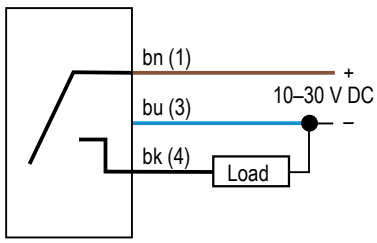
In **opposed** sensing modes, light operate means the output is on when the beam is unblocked and dark operate means the output is on when the beam is blocked.

Wiring Diagrams

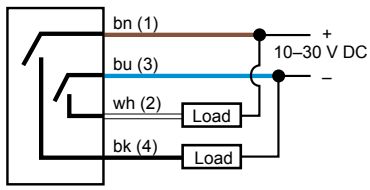
NPN



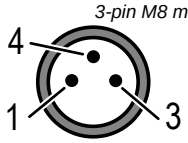
PNP



Bipolar



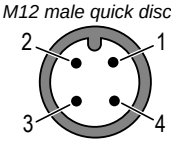
3-pin M8 male pinout



Key

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

4-pin M12 male quick disconnect



Configuring the SLM Slot Sensor

For the best results, place the objects to be detected midway between the emitter and receiver.

Adjusting the Sensitivity

Adjust the sensor’s sensitivity by turning the 270-degree-turn Sensitivity potentiometer with a small flat-blade screwdriver.

Apply power to the sensor and turn the potentiometer all the way clockwise (maximum gain). If the object to be sensed does not block the beam at the maximum gain, turn the gain down a little at a time, testing with the object, until the object can be sensed reliably.

If adjusting the sensitivity with the potentiometer does not provide reliable object detection, investigate alternative sensing methods.

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Selecting Light or Dark Operate

Select dark operate (DO) or light operate (LO) by turning the DO/LO selector switch to the desired setting using a small flat-blade screwdriver.

If dark operate is selected, the output conducts when the receiver element does not see the emitted light (object is present). If light operate is selected, the output conducts when the receiver element sees the emitted light (object is absent).

Specifications

Supply Voltage and Current

10 V DC to 30 V DC (10% max. ripple) at less than 25 mA, exclusive of load

Supply Protection Circuitry

Protected against reverse polarity and transient voltages

Output Configuration

Cabled and M12 QD models: Bipolar: One current sourcing (PNP) and one current sinking (NPN)

M8 QD models: Current sourcing (PNP) or current sinking (NPN), depending on model

Output Rating

100 mA with short circuit protection

OFF-state leakage current:

NPN: < 200 µA
PNP: < 10 µA

ON-state saturation voltage:

NPN: 1.6 V at 100 mA
PNP: 2.0 V at 100 mA

Output Protection Circuitry

Protected against output short-circuit and false pulse on power-up

100 ms max. delay at power up; outputs do not conduct during this time

Output Response Time

500 microseconds

Repeatability

95 microseconds

Operating Conditions

–20 °C to +60 °C (–4 °F to +140 °F)

95% at +55 °C maximum relative humidity (non-condensing)

Slot Opening

10 mm, 20 mm, 30 mm, 50 mm, 80 mm, 120 mm, 180 mm, or 220 mm (depending on model); beam is 5 mm (0.2 in) from outer edge

Adjustments

1-turn potentiometer sensitivity adjustment

Light/dark operate selection switch

Indicators

Two LED Indicators: Power (green) and Output (amber)

Green on: Power on

Green flashing: Sensor short circuit

Amber on: Output is activated

Construction

Housing: die-cast zinc with nickel plating

Endcaps: ABS

Optic windows: acrylic

Connections

Cabled models: 2 m (6.5 ft) or 9 m (30 ft) 4-conductor, PVC-jacketed cable

M8 QD models: 3-pin, threaded integral QD connector

M12 QD models: 150 mm (6 in) PUR cable with 4-pin, threaded connector

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

IND. CONT. EQ.
E224071

	SLM10	SLM20	SLM30	SLM50	SLM80	SLM120	SLM180	SLM220
Minimum object detection at maximum gain [1][1]	1.00 mm (0.040 in)	1.25 mm (0.050 in)	1.50 mm (0.060 in)	1.65 mm (0.065 in)	1.80 mm (0.070 in)	1.80 mm (0.070 in)	1.80 mm (0.070 in)	2.40 mm (0.095 in)
Minimum object detection at 2 times excess gain[1]	0.30 mm (0.012 in)	0.30 mm (0.012 in)	0.40 mm (0.016 in)	0.60 mm (0.024 in)	0.75 mm (0.030 in)	0.90 mm (0.035 in)	0.90 mm (0.035 in)	1.00 mm (0.039 in)
Hysteresis[2]	0.10 mm (0.004 in)	0.10 mm (0.004 in)	0.10 mm (0.004 in)	0.10 mm (0.004 in)	0.20 mm (0.008 in)	0.20 mm (0.008 in)	0.20 mm (0.008 in)	0.20 mm (0.008 in)

Continued on page 4

[1] The smallest diameter rod that can be detected when passed slowly through sensing beam. Minimum object detection is measured midway between the emitter and receiver. For best results, place the object to be detected in the midway position when possible. The minimum object detection size may increase if the object is very close to the receiver side.
[2] The distance an object must move to toggle between output OFF and output ON state.

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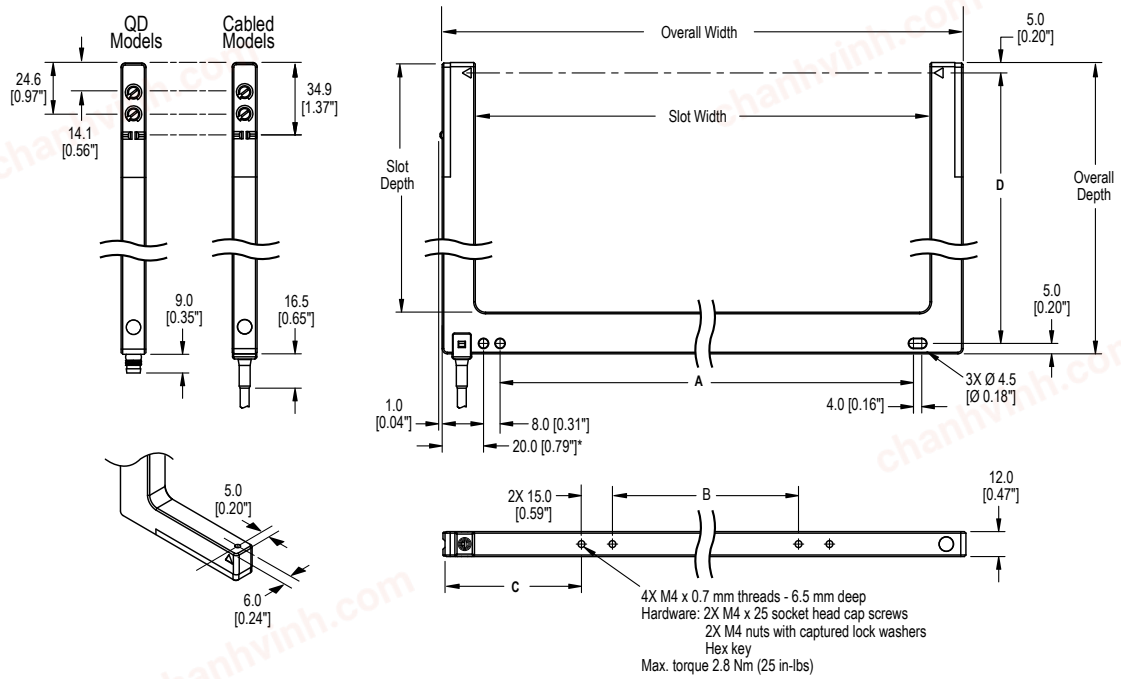
	SLM10	SLM20	SLM30	SLM50	SLM80	SLM120	SLM180	SLM220
Repeatability [3]	0.02 mm (0.001 in)	0.02 mm (0.001 in)	0.02 mm (0.001 in)	0.04 mm (0.002 in)	0.06 mm (0.002 in)	0.08 mm (0.003 in)	0.08 mm (0.003 in)	0.08 mm (0.003 in)

Dimensions

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



*Model SLM10.. measures 18.0 [0.71"]

Models	Slot Width	Slot Depth	Overall Width	Overall Depth	A Side Mount	B Back Mount	C	D
SLM10	10 mm (0.39")	60.8 mm (2.39")	42 mm (1.65")	80 mm (3.15")	n/a	n/a	n/a	70 mm (2.76")
SLM20	20 mm (0.79")		52 mm (2.05")					
SLM30	30 mm (1.18")		62 mm (2.44")		10 mm (0.39")			
SLM50	50 mm (1.97")		82 mm (3.23")		30 mm (1.18")	15 mm (0.59")	33.5 mm (1.32")	
SLM80	80 mm (3.15")		112 mm (4.41")		60 mm (2.36")		48.5 mm (1.91")	
SLM120	120 mm (4.72")	120.7 mm (4.75")	152 mm (5.98")	140 mm (5.51")	100 mm (3.94")	30 mm (1.18")	46 mm (1.81")	130 mm (5.12")
SLM180	180 mm (7.09")		212 mm (8.35")		160 mm (6.30")	70 mm (2.76")	56 mm (2.20")	
SLM220	220 mm (8.66")		252 mm (9.92")		200 mm (7.87")	90 mm (3.54")	66 mm (2.60")	

[3] The variation in switching distance for a standard target at controlled sensing conditions.

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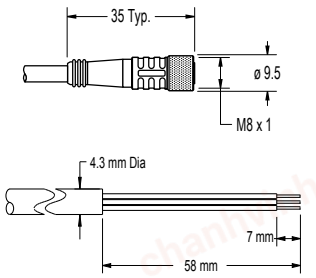
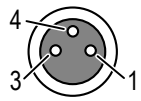
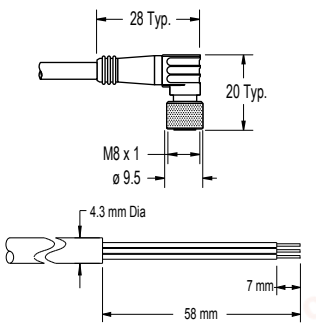
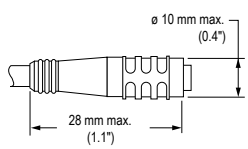
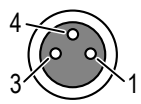
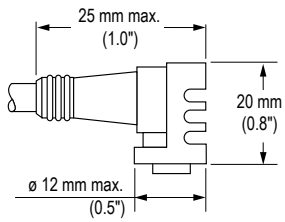
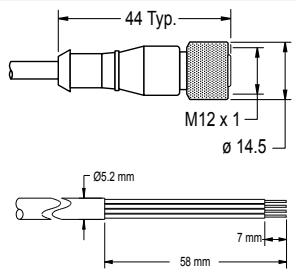
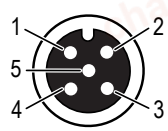
Accessories

3-pin Single-Ended Threaded M8 Female Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
PKG3M-2	2 m (6.56 ft)	Straight		 1 = Brown 3 = Blue 4 = Black
PKG3M-4	4 m (13.12 ft)			
PKG3M-5	5 m (16.4 ft)			
PKG3M-7	7 m (22.96 ft)			
PKG3M-9	9 m (29.52 ft)			
PKG3M-10	10 m (32.81 ft)			
PKW3M-2	2 m (6.56 ft)	Right-Angle		
PKW3M-5	5 m (16.40 ft)			
PKW3M-9	9 m (29.53 ft)			

3-pin Single-Ended Snap/M8 Female Cordsets				
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**
PKG3Z-2	2 m (6.56 ft)	Straight		 1 = Brown 3 = Blue 4 = Black
PKW3-2	2 m (6.56 ft)	Right-Angle		

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)				

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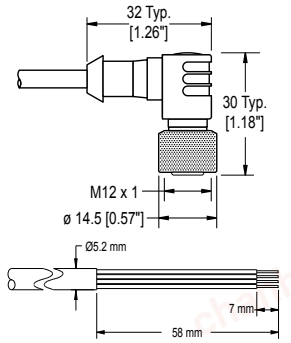
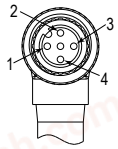
4-Pin Single-Ended M12 Female Cordsets					
Model	**Length**	**Style**	**Dimensions**	**Pinout (Female)**	
MQDC-406RA	2 m (6.56 ft)	Right-Angle			
MQDC-415RA	5 m (16.4 ft)				
MQDC-430RA	9 m (29.5 ft)				
MQDC-450RA	15 m (49.2 ft)				

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