BANNER
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MINI-BEAM® dc-Voltage Series

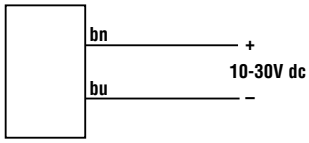
Self-contained photoelectric sensors

Glass Fiber Optic sensor

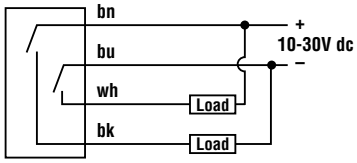


Convergent-mode sensor

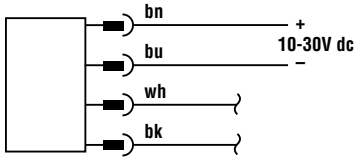
Emitters with Attached Cable



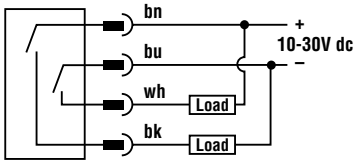
All Other Models with Attached Cable



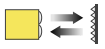
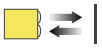
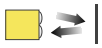
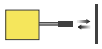
Emitters with Quick Disconnect (4-Pin Euro-Style)



All Other Models with Quick Disconnect (4-Pin Euro-Style)



NOTES: Output Type for all models is Bipolar NPN/PNP. Load 150 mA max., each output.

Sensing Mode		Range	LED	Model*
	Opposed Emitter	3 m (10')	Infrared 880 nm	SM31E
	Opposed Receiver			SM31R
	Opposed Emitter - Long Range	30 m (100')		SM31EL
	Opposed Receiver - Long Range			SM31RL
	Opposed Emitter Clear Plastic Detection	0 to 300 mm (0 to 12") Actual range varies, depending on the light transmission properties of the plastic material being sensed.	Visible Red 650 nm	SM31EPD
	Opposed Receiver Clear Plastic Detection			SM31RPD
	Non-Polarized Retroreflective	5 m (15')		SM312LV
	Polarized Retroreflective	50 mm to 2 m (2" to 7')		SM312LVAG
	Extended-Range Polarized Retroreflective	10 mm to 3 m (0.4" to 10')		SM312LP
	Diffuse	380 mm (15")	Infrared 880 nm	SM312D
		300 mm (12")		SM312DBZ
	Divergent Diffuse	130 mm (5")		SM312W
	Convergent	16 mm (0.65") Focus		SM312C
		43 mm (1.7") Focus		SM312C2
		16 mm (0.65") Focus	Visible Red 650 nm	SM312CV
		43 mm (1.7") Focus		SM312CV2
		16 mm (0.65") Focus	Visible Blue 475 nm	SM312CVB
		49 mm (1.9") Focus		SM312CV2B
		16 mm (0.65") Focus	Visible Green 525 nm	SM312CVG
		49 mm (1.9") Focus		SM312CV2G
	Glass Fiber Optic	Range varies, depending on sensing mode and fiber optics used.	Infrared 880 nm	SM312F
			Visible Red 650 nm	SM312FV
			Visible Blue 475 nm	SM312FVB
			Visible Green 525 nm	SM312FVG
	Plastic Fiber Optic		Visible Red 650 nm	SM312FP
			Visible Blue 475 nm	SM312FPB
			Visible Green 525 nm	SM312FPG
	Special High-Power Option Plastic Fiber Optic		Visible Red 650 nm	SM312FPH

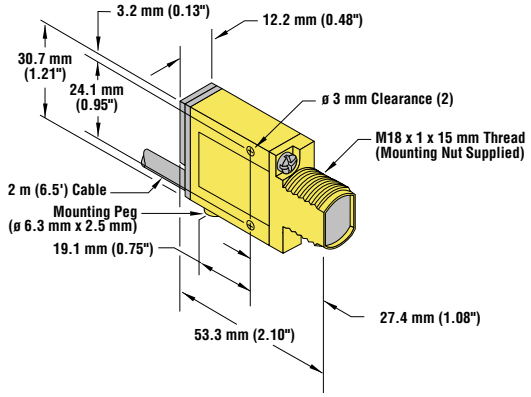
*Standard 2 m (6.5') cable models are listed.

- **9 m (30') cable:** add suffix **"W/30"** (e.g., **SM31EW/30**).
- **4-pin Euro QD models:** add suffix **"QD"** (e.g., **SM31EQD**).
- **150 mm (6") QD Pigtail:** add suffix **"QDP"** (e.g., **SM31EQDP**).

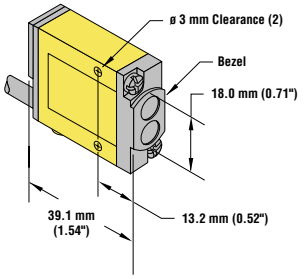
For 0.3 ms response: add suffix **"MHS"** (eg., **SM31EMHS**).

Dimensions

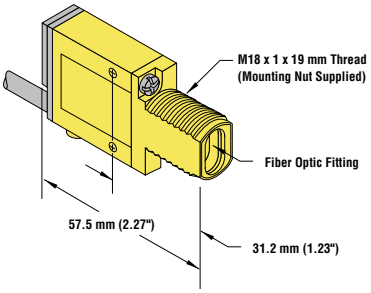
Models with suffix E, EL, EPD, R, RL, RPD, LV, LVAG, LP, D, C, C2, CV, CV2, CVG, CV2G, CVB, and CV2B



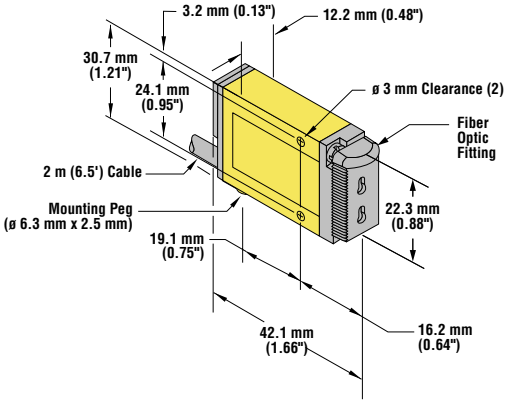
Models with suffix DBZ and W



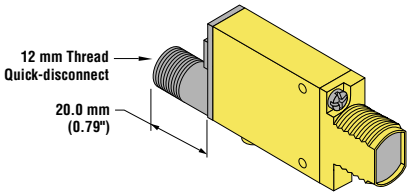
Models with suffix F, FV, FVB, and FVG



Models with suffix FP, FPB, FPG, and FPH

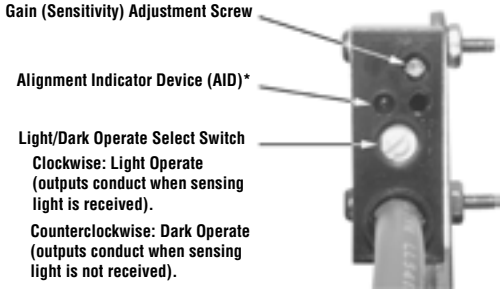


QD Models



Sensor Features

(shown with gasketed acrylic cover removed)



*U.S. Patent no. 4356393

NOTE: Please observe proper ESD precautions (grounding) when adjusting gain pot or LO/DO switch.

Specifications

Supply Voltage and Current 10 to 30V dc (10% maximum ripple) at less than 25 mA (exclusive of load)

Supply Protection Circuitry
Protected against reverse polarity and transient voltages

Output Configuration
Bipolar: One current sourcing (PNP) and one current sinking (NPN) open collector transistor

Output Rating
150 mA maximum each output at 25° C, derated to 100 mA at 70° C
(derate ≈ 1 mA per ° C)

OFF-state leakage current: less than 1 microamp
Output saturation voltage (PNP output): < 1 volt at 10 mA, < 2 volts at 150 mA
Output saturation voltage (NPN output): < 200 millivolts at 10 mA, < 1 volt at 150 mA

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

Output Response Time
Sensors will respond to either a "light" or "dark" signal of 1 millisecond or longer duration, 500 Hz maximum. Modification for 0.3 millisecond response is available (MHS-suffix models; these models also feature reduced sensitivity range and reduced repeatability.)

NOTE: Outputs are non-conducting during 100 millisecond delay on power-up.

Repeatability
Opposed: 0.14 milliseconds
Non-Polarized and Polarized Retro, Diffuse, Convergent, Glass Fiber Optic, and Plastic Fiber Optic: 0.3 milliseconds
Response time and repeatability specifications are independent of signal strength.

Adjustments
Light/Dark Operate Select switch
15-turn slotted brass screw Gain (sensitivity) adjustment potentiometer (clutched at both ends of travel)
Located on the rear panel, protected by a gasketed, clear acrylic cover.

Indicators
Patented alignment Indicator Device system (AID™, US patent #4356393) lights a rear-panel-mounted LED indicator when the sensor sees light. Its pulse rate is proportional to the light signal strength (the stronger the signal, the faster the pulse rate).

Construction
Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses, stainless steel screws

Environmental Rating
Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12, and 13; IEC IP67.

Connections
PVC-jacketed 4-conductor 2 m (6.5') or 9 m (30') cables, or 4-pin Euro-style QD fitting; QD cables available separately.

Operating Conditions
Temperature: -20° to +70°C (-4° to +158°F)
Maximum relative humidity: 90% at 50°C (non-condensing)

Application Note
The NPN (current sinking) output of dc MINI-BEAM sensors is directly compatible as an input to Banner logic modules, including all non-amplified MAXI-AMP and MICRO-AMP modules. MINI-BEAMs are TTL compatible.

Certifications