



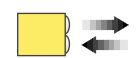
# MINI-BEAM® SM312D

Self-contained DC-operated Diffuse Mode Sensors

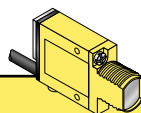


- Compact, modulated, self-contained diffuse proximity mode sensors for 10-30V dc operation
- Range to 380 mm (15") (referenced to 90% reflectance white test card)
- Switch-selectable for light operate or dark operate
- Includes Banner's exclusive **AID™** alignment system\*
- Highly repeatable 1 millisecond response
- Both sourcing and sinking outputs (150 mA max. each); continuous overload and short-circuit protected
- Rugged, epoxy-encapsulated construction: meets NEMA standards 1, 2, 3, 3S, 4, 4X, 6, 12 and 13; IEC IP67
- Physically and electrically interchangeable with 18 mm barrel-type photoelectrics

\*US patent number 4356393



Infrared, 880 nm



## MINI-BEAM Diffuse Mode Models

Models	Range	Cable*	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
SM312D SM312DQD	380 mm (15")	2 m (6.5') 4-Pin Euro QD	10-30V dc	Bipolar NPN/PNP		

**\*Notes:**

- 9 m (30') cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g., **SM312D W/30**).
- A 150 mm (6") long pigtail cable with attached QD connector is available by adding suffix "QDP" to the model number of any MINI-BEAM sensor (e.g., **SM312DQDP**). See page 5 for more information.
- A model with a QD connector requires an accessory mating cable. See page 8 for more information.
- May be ordered with 0.3 millisecond on/off response by adding suffix "MHS" to the model numbers (e.g., **SM312DMHS**). This modification reduces sensing range (and excess gain).

## MINI-BEAM Installation and Alignment

Proper operation of the SM312D sensor requires that it be mounted securely and aligned properly. Excessive movement or vibration can result in intermittent or false operation caused by loss of alignment. For best results, final-mount the SM312D in an 18mm-hole by its threaded barrel or use a mounting bracket (see page 6).

1) Begin with the sensor at the desired distance from the object to be sensed, and at the approximate position where it will be mounted. The background should be as far behind the object as possible (at least three times the distance of the sensor from the object), and as dark a color as possible compared to the object. Ideally, the object should present its largest reflective surface to the sensor.

2) Apply power to the sensor, and advance the 15-turn GAIN control to maximum (clockwise end of rotation). The GAIN control is clutched at both ends to avoid damage, and will “free-wheel” when either end point is reached.

If the sensor is “seeing” its reflected light, the sensor alignment LED should be “on”. Move the sensor up-down-right-left (include angular rotation) to obtain the fastest receiver LED pulse rate. If a pulse is not observable (too fast to count), reduce the GAIN control (counterclockwise rotation) to obtain a countable pulse rate.

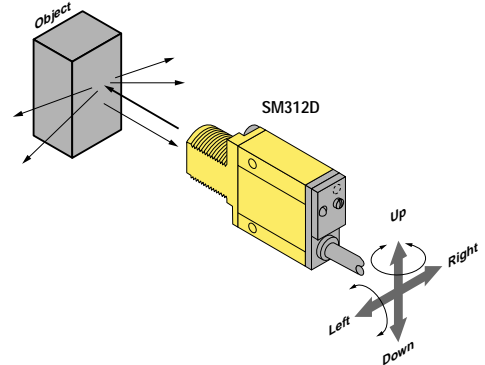
3) Repeat the alignment motions after each GAIN reduction. When you have found the sensor orientation that produces the fastest pulse rate, mount the sensor solidly in that position. Increase the receiver GAIN to maximum. Test the system by removing the object from the sensing position. The receiver LED indicator should go “off”. If the LED indicator does not go “off”, the sensor is reacting to light reflected from a background surface. Reduce the GAIN setting until the alignment indicator goes “off”, plus two additional full turns. Again place the object in the sensing position. If the alignment indicator does not come “on”, the sensor is receiving as much or more light energy from the background as from the object. Consider the following alternatives:

- move the sensor closer to the object and reduce the sensitivity (GAIN);
- reduce background reflectivity by painting the background with flat-black paint, or by scuffing the background or cutting a hole through it;
- tilt the sensor or the background so that the sensing beam is not perpendicular to the background.

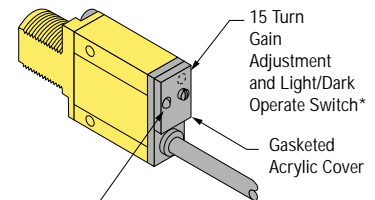
### \* Note regarding Light/Dark operate switch:

- Turn switch *fully* clockwise for light operate (sensor outputs conduct when sensing light is received)
- Turn switch *fully* counterclockwise for dark operate (sensor outputs conduct when sensing light is not received)

### Diffuse Mode Alignment



### SM312D



“AID” Indicator LED Lights when the sensor sees its own modulated light and pulses at a rate proportional to the strength of the received light signal.