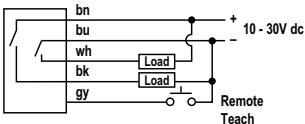


Additional information on this product is immediately available online at [www.bannerengineering.com/55214](http://www.bannerengineering.com/55214)



View or download additional information, including excess gain curves, beam patterns and accessories.  
For further assistance, contact a Banner Engineering Applications Engineer at (763) 544-3164 or (888) 373-6767.



Cable and QD hookups are functionally identical

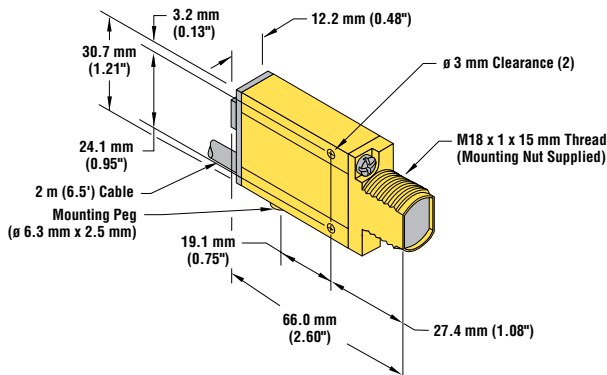
Sensing Mode and Range		Beam	Model*	Output	Sensing Mode and Range		Beam	Model*	Output		
Retroreflective	5 m (15')	Visible Red 650 nm	SME312LV	Bipolar NPN/PNP	Glass Fiber Optic	Range Varies depending on sensing mode and fiber optics used	Infrared 880 nm	SME312F	Bipolar NPN/PNP		
	Polarized Retroreflective		10 mm - 3 m (0.4" - 10')				SME312LP	Visible Red 650 nm		SME312FV	
1 m (3.3') Clear Material		SME312LPC	Visible Green 525 nm				SME312FVG				
	Diffuse	380 mm (15")	Infrared 880 nm				SME312D	Plastic Fiber Optic		Range Varies depending on sensing mode and fiber optics used	Visible Blue 475 nm
1100 mm (43")		Visible Red 650 nm	SME312DV				Visible White 450 - 650 nm				SME312FVW
		130 mm (5") Clear Mat'l	Infrared 880 nm				SME312W				Visible Red 650 nm
Convergent	16 mm (0.65") 1.3 mm (0.05") <sup>†</sup>	Visible Red 650 nm	SME312CV		Bipolar NPN/PNP	Plastic Fiber Optic	Range Varies depending on sensing mode and fiber optics used	Visible Green 525 nm		SME312FPG	
			SME312CV2					Visible Blue 475 nm		SME312FPB	
	43 mm (1.7") 3.0 mm (0.12") <sup>†</sup>	Visible Green 525 nm	SME312CVG					Visible White 450 - 650 nm		SME312FPB	
			16 mm (0.65") 1.0 mm (0.04") <sup>†</sup>					Visible Blue 475 nm		SME312CVB	
	16 mm (0.65") 1.8 mm (0.07") <sup>†</sup>	Visible White 450 - 650 nm		SME312CVW							

<sup>†</sup> Spot size, at focus

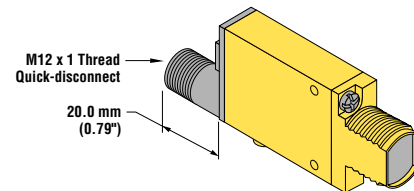
\* Standard 2 m (6.5') cable models are listed.  
• 9 m (30') cable: add suffix "W/30" to the model number (e.g., SME312CVB W/30).  
• 5-pin integral QD models: add suffix "Q" (e.g., SME312CVBQ).

**Dimensions**

**Retroreflective, Diffuse, and Convergent Models**  
(Suffix LV, LP, LPC, D, DV, CV, CV2, CVG, CVB and CVW)



**All Quick-Disconnect Models**



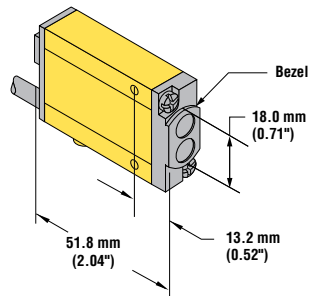
additional dimensions on page 2

See Safety Use Warning on Back Page

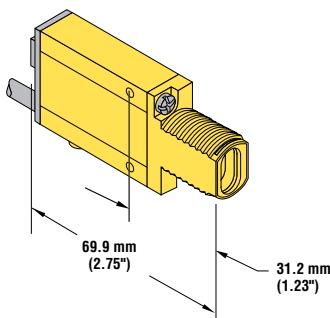
# MINI-BEAM® Expert™ Series – DC Voltage

## Dimensions, continued

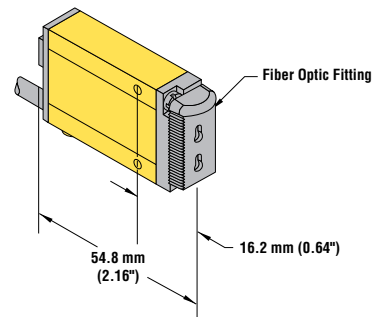
### Divergent Diffuse Models (Suffix W)



### Glass Fiber Optic Models (Suffix F, FV, FVG, FVB and FVW)



### Plastic Fiber Optic Models (Suffix FP, FPG, FPB and FPW)



## Overview

### Status indicators

Normal operation of the MINI-BEAM *Expert* is called RUN mode. The two LED indicators (bi-color Green/Red and Yellow) operate as follows in RUN mode and TEACH mode:

	RUN Mode	TEACH Mode
Bi-Color Green/Red	<b>ON Green:</b> Power is ON <b>Flashing Green:</b> Sensed light level is approaching sensing threshold*	<b>ON Red:</b> Sensor “sees” its own modulated light source; pulse rate is proportional to the received light signal strength**
Yellow	<b>ON:</b> Outputs conducting <b>OFF:</b> Outputs not conducting	<b>ON:</b> Ready to TEACH output ON condition <b>OFF:</b> Ready to TEACH output OFF condition

\* This is the Stability indicator, which signals when maintenance, realignment, or reconfiguration is needed during RUN mode.

\*\* The faster the pulse rate, the stronger the light signal.

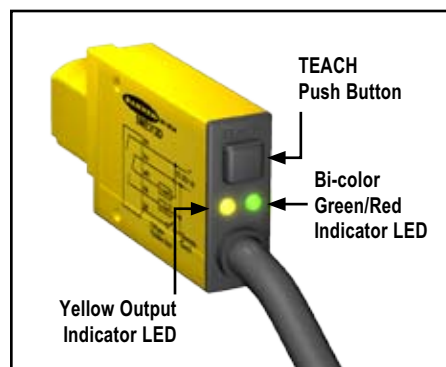


Figure 1. Features

If contrast is marginal, the bi-color indicator will flash green (to indicate instability). Reprogramming or realigning the sensor, or cleaning the sensor or fiber lenses may solve a problem with stability.

### Remote Configuration

The remote function may be used to configure the sensor remotely or to disable the push button for security. Connect the gray wire of the sensor to ground (0V dc), with a remote programming switch connected between them. Pulse the remote line according to the diagrams in the configuration procedures. The length of the individual programming pulses is equal to the value T:

$$0.04 \text{ seconds} \leq "T" \leq 0.8 \text{ seconds}$$

### Troubleshooting

The MINI-BEAM *Expert's* Power LED may begin to alternate flashing red/green; this indicates a microprocessor memory error. If it occurs, try reteaching the sensor, or try cycling power ON and OFF, then reteaching the sensor. If this does not solve the problem, or if it occurs frequently, replace the sensor.

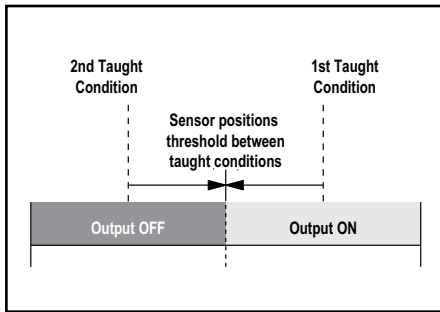


Figure 2. Static TEACH (Light Operate shown)

## Static TEACH

The two sensing conditions may be presented in either order. The condition presented first is the condition for which the output will energize (the “Output ON” target).

Sensitivity is automatically set (and optimized) when teaching the sensor the ON and OFF conditions. When the push button is clicked, the sensor samples each sensing condition and registers it into memory. After the second sensing condition is registered, the MINI-BEAM Expert automatically sets the sensitivity to the optimum value for the application, and then returns to RUN mode.

	Push Button 0.04 seconds ≤ “Click” ≤ 0.8 seconds	Remote Line 0.04 seconds ≤ “T” ≤ 0.8 seconds	Result
Access TEACH Mode	<ul style="list-style-type: none"> <li>Press and hold push button until the bi-color (green/red) indicator begins to flash red, or turns OFF.</li> </ul>	No action required; sensor is ready for 1st sensing condition.	<b>Push-Button Method Only</b> Yellow: ON Red: Pulses to indicate relative received signal strength. Sensor is ready for output ON condition.
Teach 1st Sensing Condition	<ul style="list-style-type: none"> <li>Present 1st sensing condition.</li> <li>Click push button.</li> </ul>	<ul style="list-style-type: none"> <li>Present 1st sensing condition.</li> <li>Single-pulse remote line.</li> </ul>	Yellow: OFF Red: Pulses to indicate relative received signal strength. Sensor registers output ON condition, ready for output OFF condition.
Teach 2nd Sensing Condition and Return to RUN Mode	<ul style="list-style-type: none"> <li>Present 2nd sensing condition.</li> <li>Click push button.</li> </ul>	<ul style="list-style-type: none"> <li>Present 2nd sensing condition.</li> <li>Single-pulse remote line.</li> </ul>	<b>Teach Accepted</b> Green: ON (or flashes if signal is close to the switching threshold) Yellow: OFF, until the sensing condition changes Sensor registers output OFF condition, positions threshold, and returns to RUN mode.
			<b>Teach Unacceptable</b> Yellow: ON Red: Pulses to indicate relative received signal strength. Sensor returns to wait state, ready for 1st sensing condition.

NOTE: The sensor will return to RUN mode if the first TEACH condition is not registered within 90 seconds. TEACH mode may be cancelled before either 1st or 2nd condition by holding the push button depressed for ≥ 2 seconds.

## Push Button Enable/Disable

In addition to its programming function, the remote line may be used to disable the push buttons for security. Disabling the push buttons prevents undesired tampering with the sensor configuration settings. Connect the sensor’s gray wire as described on page 2, and four-pulse to either enable or disable the push buttons.

	Push Button	Remote Line 0.04 seconds ≤ “T” ≤ 0.8 seconds	Result
Push Button Enable/Disable	Not available	<ul style="list-style-type: none"> <li>Four-pulse the remote line to enable or disable the push button.</li> </ul>	Sensor toggles between enable/disable settings and returns to RUN mode.

# MINI-BEAM® Expert™ Series – DC Voltage

## Specifications

### Supply Voltage and Current

10 to 30V dc (10% max. ripple) at less than 45 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 max. each output at 25° C, derated to 100 mA at 70° C (derate  $\approx 1$  mA per °C)

**Off-state leakage current:** less than 5 $\mu$ A @ 30V dc

**ON-state saturation current:** less than 1V @ 10 mA; less than 1.5V @ 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 a "dark" signal of 500  $\mu$ s or longer duration, 1 kHz max.

NOTE: 1 second delay on power-up; outputs do not conduct during this time.

### Repeatability

100 microseconds (all models)

### Construction

Reinforced thermoplastic polyester housing, totally encapsulated, o-ring seal, acrylic lenses, and stainless steel screws.

### Environmental Rating

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

### Connections

PVC-jacketed 5-conductor 2 m (6.5') or 9 m (30') unterminated cable, or 5-pin Euro-style quick-disconnect (QD) fitting are available. QD cables are ordered separately.

### Operating Conditions

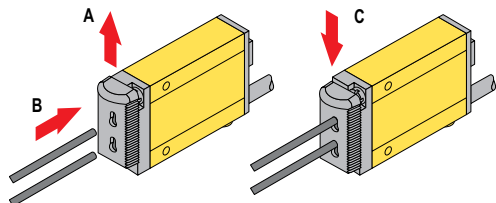
**Temperature:** -20° to +70° C (-4° to +158° F)

**Max. rel. humidity:** 90% at 50° C (non-condensing)

## Fiber Installation

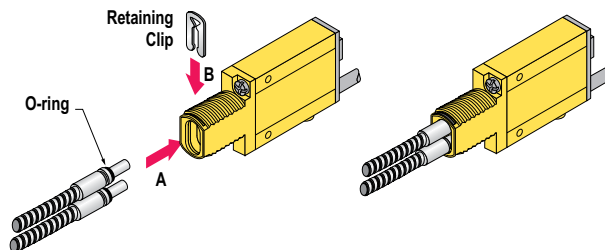
### Plastic Fibers

- Unlock the fiber gripper as shown. If 0.25 mm or 0.5 mm core fibers are being used, insert the small fiber adapters onto the fiber ends.
- Gently insert the prepared plastic fiber ends into the ports, as far as they will go.
- Slide the fiber gripper back to lock.



### Glass Fibers

- Install the O-ring (supplied with the fiber) on each fiber end, as shown in the drawing.
- While pressing the fiber ends firmly into the ports on the front of the sensor, slide the U-shaped retaining clip (supplied with the sensor) into the slot in the sensor's barrel, until it snaps into place.



### WARNING . . . Not To Be Used for Personnel Protection

Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

These sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Consult your current Banner Safety Products catalog for safety products which meet OSHA, ANSI and IEC standards for personnel protection.

Additional information on this product is immediately available online at [www.bannerengineering.com/55214](http://www.bannerengineering.com/55214)



View or download additional information, including excess gain curves, beam patterns and accessories.  
For further assistance, contact a Banner Engineering Applications Engineer at (763) 544-3164 or (888) 373-6767.



**WARRANTY:** Banner Engineering Corp. warrants its products to be free from defects for one year. Banner Engineering Corp. will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty does not cover damage or liability for the improper application of Banner products. This warranty is in lieu of any other warranty either expressed or implied.