



# MINI-BEAM<sup>®</sup> SM2A312FP

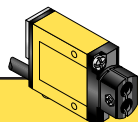
Self-contained AC-operated Sensors for use with Banner Plastic Fiber Optics



- Compact, modulated, self-contained visible red fiber optic sensors for 24-240V ac 2-wire operation
- Useable in opposed and diffuse fiber optic modes with Banner plastic fiber optic assemblies
- Switch-selectable for light operate or dark operate
- 8 millisecond response
- SPST SCR solid-state output switches up to 300 mA; low leakage current and saturation voltage
- Rugged, epoxy-encapsulated construction: meets NEMA standards 1, 2, 3, 3S, 4, 4X, 12 and 13; IEC IP67



visible red 650 nm



## MINI-BEAM Plastic Fiber Optic

Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Diffuse mode performance based on 90% reflectance white test card	
SM2A312FP SM2A312FPQD	Range varies by sensing mode and fiber optics used	2 m (6.5 ft) 3-Pin Micro QD	24-240V ac	SPST Solid-state 2-Wire		

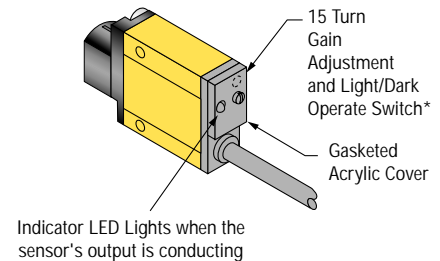
### For Standard MINI-BEAMS:

- 9 m (30 ft) cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g. - SM2A312FP W/30).
- A 150 mm (6 in.) long pigtail cable with attached QD connector is available by adding suffix "QDP" to the model number of any MINI-BEAM sensor (e.g. - SM2A312FPQDP). See page 5 for more information.
- A model with a QD connector requires an accessory mating cable. See page 7 for more information.

## MINI-BEAM Features

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

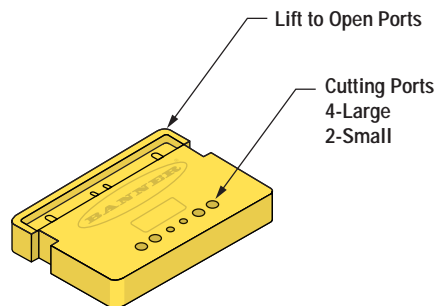
- Turn switch *fully* clockwise for light operate (sensor outputs conduct when object is absent)
- Turn switch *fully* counterclockwise for dark operate (sensor outputs conduct when object is present)



## MINI-BEAM Fiber Cutting Information (unterminated plastic fibers)

Unterminated plastic fibers are designed to be cut by the customer to the length required for the application. To facilitate cutting, a Banner model PFC-1 cutting device is supplied with the fiber. Cut the fiber as follows:

- 1) Locate the "control end" of the fiber (the unfinished end). Determine the length of fiber required for the application. Lift the top (blade) of the cutter to open the cutting ports. Insert one of the control ends through one of the four large cutting ports on the PFC-1 cutter so that the excess fiber protrudes from the back of the cutter.
- 2) Double-check the fiber length, and close the cutter until the fiber is cut. Using a different cutting port, cut the second control end to the required length.
- 3) Gently wipe the cut ends of the fiber with a clean, dry cloth to remove any contamination. **Do not use solvents or abrasives on any exposed optical fiber. Do not use a cutting port more than once. The blade may tend to dull after one cut.**



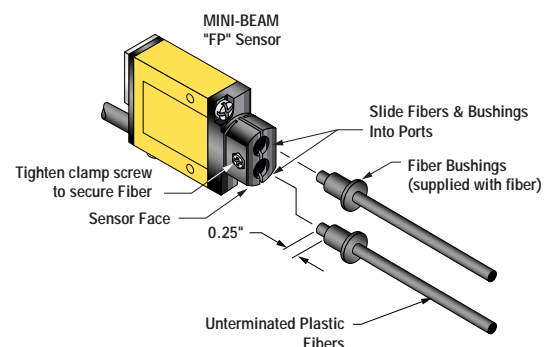
### PFC-1 Cutter (supplied with fiber)




- Use small ports for .25 mm (0.01 in) and .5 mm (0.02 in) fibers
- Use large ports for .75 mm (0.03 in), 1.0 mm (0.04 in), and 1.5 mm (0.06 in) fibers

## MINI-BEAM Fiber Installation Information

- 1) If using a bifurcated fiber, first separate the two halves of the control end of the fiber for a distance of two inches (minimum). Thread the control ends of the fiber through the bushings (supplied with the fiber) until they extend through about 6 mm (.25").
- 2) Slide the fibers with the bushings into the ports on the face of the MINI-BEAM until the fibers stop. Slide the bushings farther into the ports until they seat up against the face of the MINI-BEAM. Hold the fibers and bushings in place.
- 3) While holding the fibers and bushings against the face of the MINI-BEAM, tighten the clamp screw to secure the fibers and bushings in place.

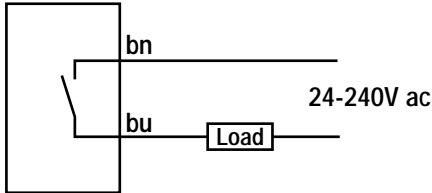


<b>MINI-BEAM AC Product Specifications</b>	
Supply Voltage and Current	24 to 240V ac (50/60 Hz), 250V ac max
Supply Protection Circuitry	Protected against transient voltages
Output Configuration	SPST SCR solid-state relay with either normally closed or normally open contact (light/dark operate selectable); 2-wire hookup
Output Rating	Minimum load current 5 mA; maximum steady-state load capability 300 mA to 50°C ambient (122°F) 100 mA to 70°C ambient (158°F) <b>Inrush capability</b> 3 amps for 1 second (non repetitive); 10 amps for 1 cycle (non repetitive) <b>Off-state leakage current</b> less than 1.7 mA rms <b>On-state voltage</b> drop ≤5 volts at 300 mA load, ≤10 volts at 15 mA load
Output Protection Circuitry	Protected against false pulse on power-up
Output Response Time	4 milliseconds on and off "OFF" response time specification does not include load response of up to ½ ac cycle (8.3 milliseconds). Response time specification of load should be considered when important. (NOTE: 300 millisecond delay on power-up.)
Repeatability	1.3 milliseconds; Response time and repeatability specifications are independent of signal strength.
Adjustments	LIGHT/DARK OPERATE select switch, and 15-turn slotted brass screw GAIN (sensitivity) adjustment potentiometer (clutched at both ends of travel). Both controls are located on rear panel of sensor and protected by a gasketed, clear acrylic cover.
Indicators	Red indicator LED on rear of sensor is "ON" when the load is energized
Construction	Reinforced VALOX® housing, totally encapsulated, o-ring sealing, acrylic lenses, and stainless steel screws
Environmental Rating	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 12, and 13; IEC IP67
Connections	PVC-jacketed 2-conductor 2 m (6.5ft) or 9 m (30ft) cables, or 3-pin micro-style quick disconnect (QD) fitting are available. QD cables are ordered separately. See page 7.
Operating Temperature	<b>Temperature:</b> -20° to +70°C (-4° to +158°F) <b>Maximum Relative Humidity:</b> 90% at 50°C (non-condensing)
Application Notes	i) ac MINI-BEAMS may be destroyed from overload conditions ii) Use on low voltage requires careful analysis of the load to determine if the leakage current or on-state voltage of the sensor will interfere with proper operation of the load iii) The false-pulse protection feature may cause momentary drop-out of the load when the sensor is wired in series or parallel with mechanical switch contacts
Certifications	

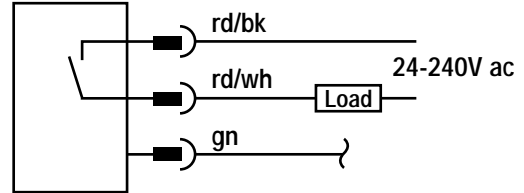
VALOX® is a registered trademark of General Electric Company

## MINI-BEAM AC Hookup Diagrams

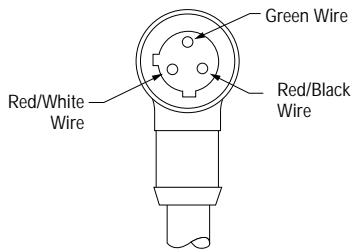
### AC Sensors with Attached Cable



### AC Sensors with Quick Disconnect (3-Pin Micro-Style)



### 3-Pin Micro-Style Pin-out (Cable Connector Shown)



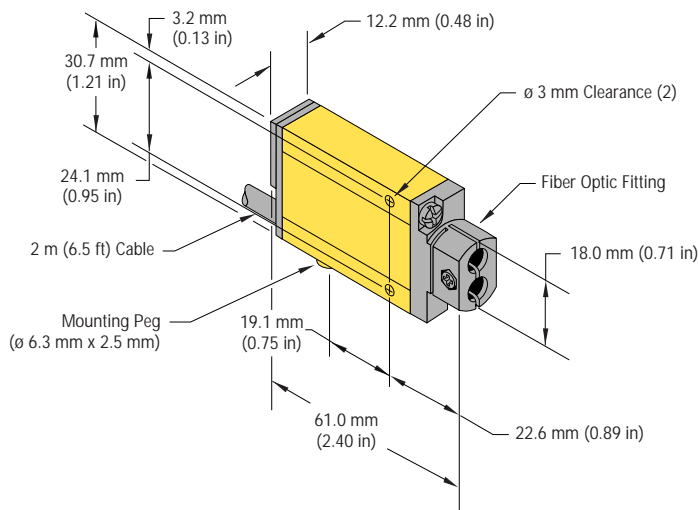
### Quick Disconnect (QD) Option

AC MINI-BEAM sensors are sold with either a 2 m (6.5 ft) or a 9 m (30 ft) attached PVC-covered cable, or with a 3-pin micro-style QD cable fitting.

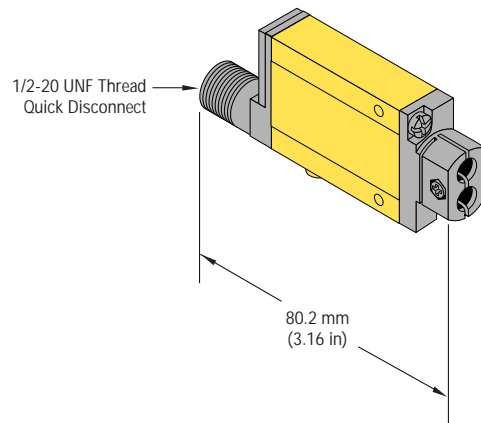
AC QD sensors are identified by the letters "QD" in their model number suffix. For more information on mating QD cables, see page 7.


## MINI-BEAM Dimension Information

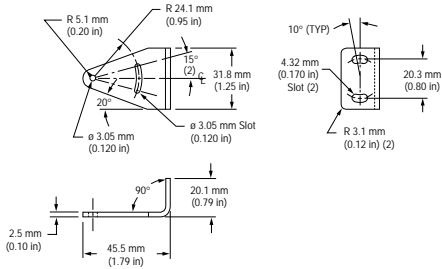

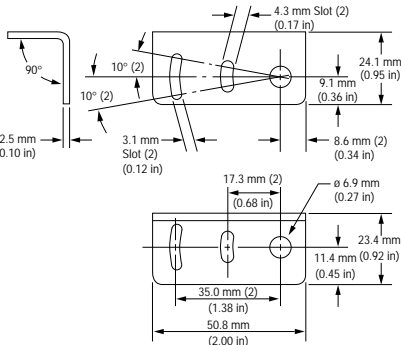

### MINI-BEAM AC Sensor with Integral Cable



### MINI-BEAM AC Sensor with Quick-Disconnect



MINI-BEAM MODIFICATIONS			
Model Suffix	Modification	Description	Example of Model Number
W/30	9 meter (30 ft) cable	All MINI-BEAM sensors may be ordered with an integral 9 m (30 ft) cable in place of the standard 2 m (6.5 ft) cable	SM2A312FP W/30
QDP	Pigtail Quick Disconnect	All MINI-BEAMS may be built with a 150 mm (6 in) long integral cable which is terminated with the appropriate QD connector. 	SM2A312FPQDP

Mounting Brackets			
Model	Description		
SMB312S	Stainless steel 2-axis, side mounting bracket		
SMB312B	Stainless steel 2-axis, bottom mounting bracket		

Mounting Brackets			
Model	Description	Dimensions	
SMB46L	<ul style="list-style-type: none"> <li>• "L" bracket</li> <li>• 14 ga 316 stainless steel</li> </ul>		
SMB46S	<ul style="list-style-type: none"> <li>• "S" bracket</li> <li>• 14 ga 316 stainless steel</li> </ul>		
SMB46U	<ul style="list-style-type: none"> <li>• "U" bracket</li> <li>• 14 ga 316 stainless steel</li> </ul>		

## Extension Cables (without connectors)

The following cables are available for extending the length of existing sensor cable. These are 30 m (100 ft) lengths of MINI-BEAM cable. This cable may be spliced to existing cable. Connectors, if used, must be customer-supplied.

Model	Type	Used with:
EC312A-100	2-conductor	All MINI-BEAM SM2A312 ac models

## Micro-Style Quick Disconnect Cables

**Cable:** PVC jacket, polyurethane connector body, nickel-plated brass coupling nut  
**Conductors:** 22 or 20 AWG high-flex stranded, PVC insulation, gold-plated contacts  
**Temperature:** -40 to +80°C (-40 to +176°F)  
**Voltage Rating:** 250V ac/300V dc (3-pin), 125V ac/150V dc (4-pin)



Style	Model	Length	Dimensions	Pin-out
3-Pin Straight	MQDC-306 MQDC-315 MQDC-330	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)		
3-Pin Right-angle	MQDC-306RA MQDC-315RA MQDC-330RA	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)		