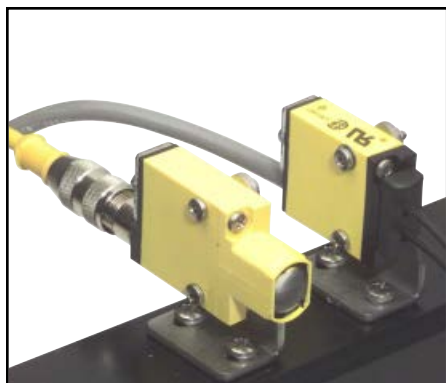




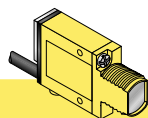
# MINI-BEAM® DC Sensors with Blue Light Source

For Web and Container Registration Mark Sensing Applications



- 475 nm visible blue LED light source provides an economical solution to a large percentage of mainstream color mark applications
- Reliably senses many difficult color combinations, including yellow-against-white and pink-against-white
- Used to sense white labels on Kraft cardboard
- Minimum switch-point hysteresis to take full advantage of the blue LED configuration
- Includes Banner's *exclusive* AID™ alignment system
- 10 to 30V dc operation
- Bi-polar solid-state outputs (one sinking and one sourcing)
- Standard 1 millisecond output response; 0.3 millisecond models are available (see notes, page 3)
- Convergent, glass and plastic fiber-optic models available
- Choose integral 2 m (6.5') cable or integral euro-style quick disconnect fitting; 9 m (30') cable and 150 mm (6") quick disconnect pigtail are available by special order

<sup>1</sup>U.S. Patent 4356393



Visible blue, 475 nm



## Blue LED MINI-BEAM Convergent Mode

Models	Focus	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
<b>Visible Blue 475 nm</b>						
SM312CVB SM312CVBQD	16 mm (0.65")	2 m (6.5') 4-Pin Euro-style QD	10-30V dc	Bipolar NPN/PNP		
SM312CV2B SM312CV2BQD	49 mm (1.9")	2 m (6.5') 4-Pin Euro-style QD	10-30V dc	Bipolar NPN/PNP		

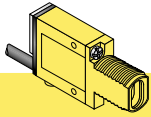


### WARNING . . . Not To Be Used for Personnel Protection

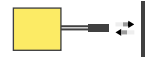
Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death.

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.

# MINI-BEAM Sensors with Blue LED – DC Models

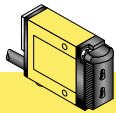


Visible blue, 475 nm

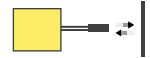


## Blue LED MINI-BEAM Glass Fiber Optic

Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Diffuse mode performance based on 90% reflectance white test card	
SM312FVB SM312FVBQD	Range varies by sensing mode and fiber optics used	2 m (6.5') 4-Pin Euro-style QD	10-30V dc	Bipolar NPN/PNP		



Visible blue, 475 nm



## Blue LED 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	
SM312FPB SM312FPBQD	Range varies by sensing mode and fiber optics used	2 m (6.5') 4-Pin Euro-style QD	10-30V dc	Bipolar NPN/PNP		

### For MINI-BEAM Blue LED Sensors:

- i) 9 m (30') cables are available by adding suffix "W/30" to the model number of any cabled sensor (e.g., **SM312FVB W/30**)
- ii) Standard models have 1 millisecond output response, models with 0.3 millisecond (300 microsecond) response are available by adding suffix "MHS" to the model number (e.g., **SM312FVBMHS**). Note that this modification reduces the maximum operating temperature to +50°C (122°F), and reduces sensing range (and excess gain).
- iii) A 150 mm (6") long pigtail cable with attached QD connector is available by adding suffix "QDP" to the model number (e.g., **SM312FVBQDP**).
- iv) A model with a QD connector requires an optional mating cable (see accessories, page 6).

# MINI-BEAM Sensors with Blue LED – DC Models

## Blue LED MINI-BEAM DC Specifications

<b>Supply Voltage and Current</b>	10 to 30V dc (10% maximum ripple) at less than 25 mA (exclusive of load)
<b>Supply Protection Circuitry</b>	Protected against reverse polarity and transient voltages
<b>Output Configuration</b>	Bipolar: One current sourcing (PNP) and one current sinking (NPN) open-collector transistor
<b>Output Rating</b>	150mA maximum each output at 25°C, derated to 100mA at 70°C (derate ≈1mA per °C) <b>Off-state leakage current</b> less than 1 microamp <b>Output saturation voltage</b> (PNP output) less than 1 volt at 10mA and less than 2 volts at 150mA <b>Output saturation voltage</b> (NPN output) less than 200 millivolts at 10mA and less than 1 volt at 150mA
<b>Output Protection Circuitry</b>	Protected against false pulse on power-up and continuous overload or short-circuit of outputs
<b>Output Response Time</b>	Sensors will respond to either a "light" or a "dark" signal of 1 millisecond or longer duration, 500Hz max. 0.3 millisecond response modification is available. See note on page 1. (NOTE: 100 millisecond delay on power-up: outputs do not conduct during this time.)
<b>Repeatability</b>	0.3 milliseconds. Response time and repeatability specifications are independent of signal strength.
<b>Adjustments</b>	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.
<b>Indicators</b>	Exclusive, patented Alignment Indicating Device system (AID™, US patent #4356393) lights a rear-panel mounted red LED indicator whenever the sensor sees a "light" condition, with a superimposed pulse rate proportional to the light signal strength (the stronger the signal, the faster the pulse rate).
<b>Construction</b>	Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses, and stainless steel screws.
<b>Environmental Rating</b>	Meets NEMA standards 1, 2, 3, 3S, 4, 4X, 12, and 13; IEC IP66
<b>Connections</b>	PVC-jacketed 4-conductor 2 m (6.5') or 9 m (30') cables, or 4-pin Euro-style quick disconnect (QD) fitting are available. QD cables are ordered separately. See page 6.
<b>Operating Conditions</b>	<b>Temperature:</b> -20 to +70°C (-4 to +158°F) <b>Maximum relative humidity:</b> 90% at 50°C (non-condensing)
<b>Application Notes</b>	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.
<b>Certifications</b>	

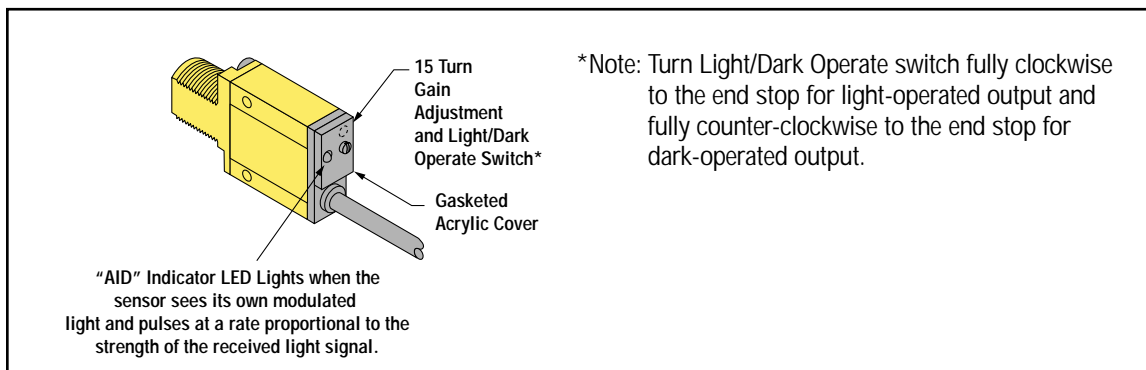
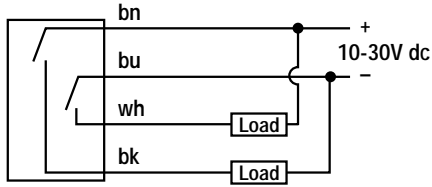


Figure 1. MINI-BEAM DC Sensor features

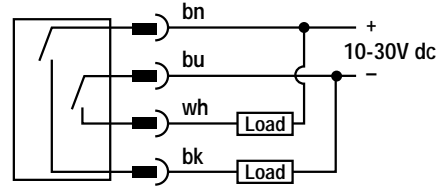
# MINI-BEAM Sensors with Blue LED – DC Models

## Blue LED MINI-BEAM DC Sensor Hookups

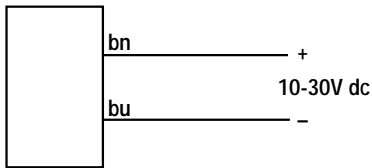
Sensors with Attached Cable



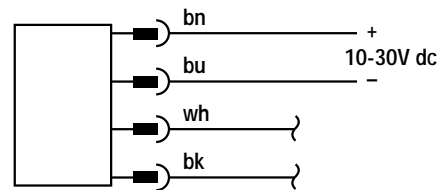
Sensors with Quick Disconnect  
(4-Pin Euro-Style)



Emitters with Attached Cable



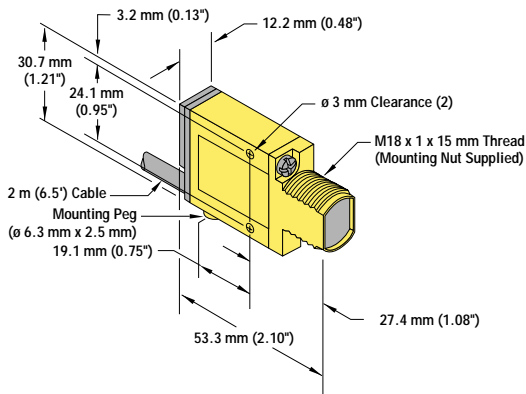
Emitters with Quick Disconnect  
(4-Pin Euro-Style)



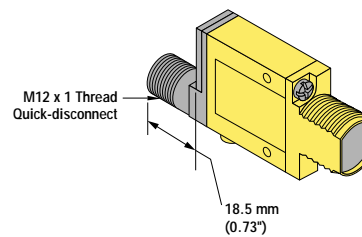
## Blue LED MINI-BEAM DC Sensor Dimensions

MINI-BEAM DC Sensor - Convergent  
(model suffix CVB)

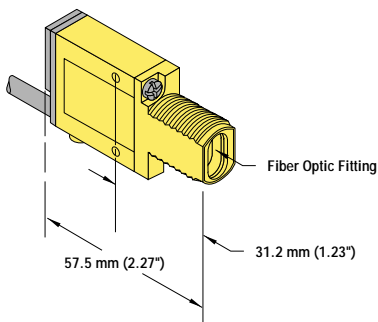
Cabled Models



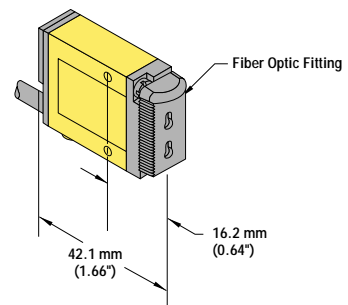
Quick-Disconnect Models



MINI-BEAM DC Sensor - Glass Fiber Optic  
(model suffix FVB)



MINI-BEAM DC Sensor - Plastic Fiber Optic  
(model suffix FPB)



# MINI-BEAM Sensors with Blue LED – DC Models

## Accessories

### MINI-BEAM Modifications

Model Suffix	Modification	Description	Example of Model Number
W/30	9 m (30') cable	All MINI-BEAM sensors may be ordered with an integral 9 m (30') cable in place of the standard 2 m (6.5') cable.	SM312CVB W/30
MHS	Modified for High Speed	Standard dc MINI-BEAM sensors with 1 millisecond output response may be modified for 0.3 millisecond (300 $\mu$ s) response. NOTE: Faster response comes at the expense of lower excess gain. Also, operating temperature range becomes -20° to +50°C (-4° to +122°F).	SM312CVBMHS
QDP	Pigtail Quick-Disconnect	All MINI-BEAMS may be built with a 150 mm (6") long integral cable, which is terminated with the appropriate QD connector. See the Accessories section for more information.	SM312CVBQDP



### Extension Cables (without connectors)

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

Model	Type	Used with:
EC312-100	4-conductor	All MINI-BEAM SM312 dc models

### Quick-Disconnect Cables


The following cables are available for MINI-BEAM DC Series QD models

Style	Model	Length	Dimensions	Pin-out
4-Pin Euro-style Straight	MQDC-406 MQDC-415 MQDC-430	2 m (6.5') 5 m (15') 9 m (30')		
4-Pin Euro-style Right-angle	MQDC-406RA MQDC-415RA MQDC-430RA	2 m (6.5') 5 m (15') 9 m (30')		

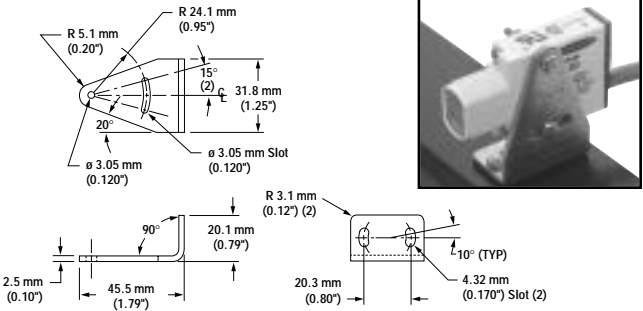
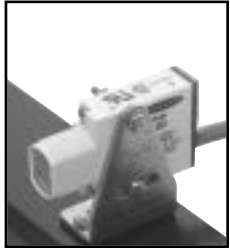
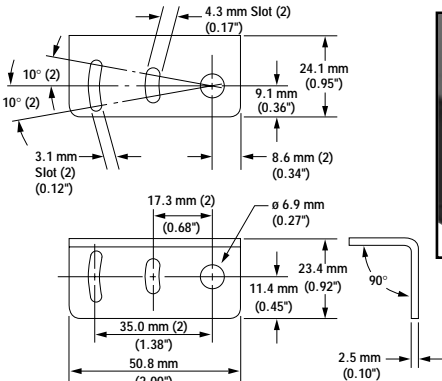

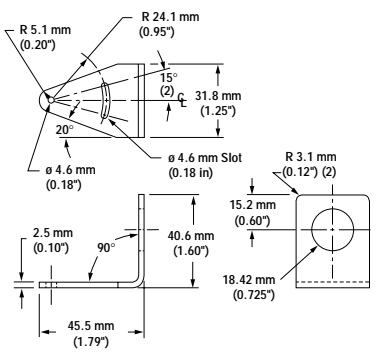
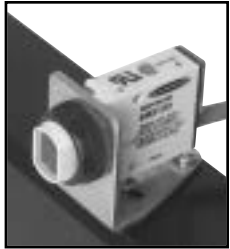
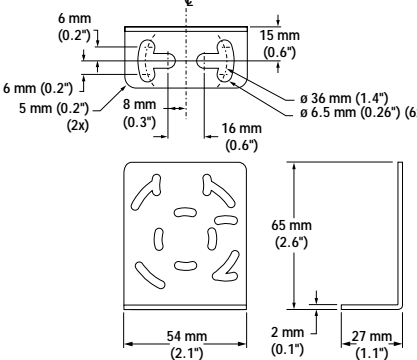
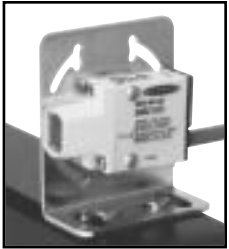
# MINI-BEAM Sensors with Blue LED – DC Models

## Replacement Lens Assemblies

MINI-BEAM lens assemblies are field-replaceable.

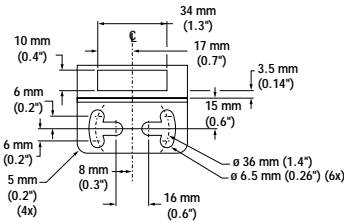

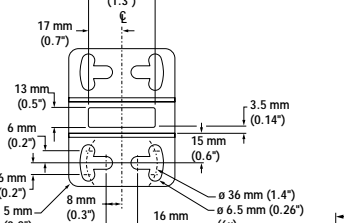

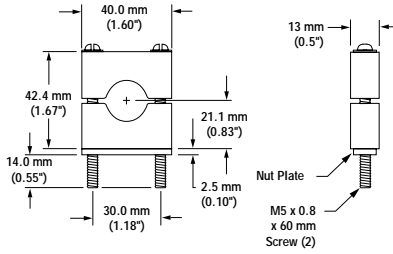

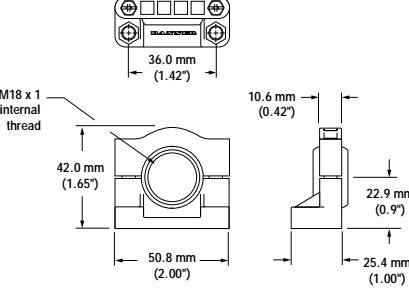

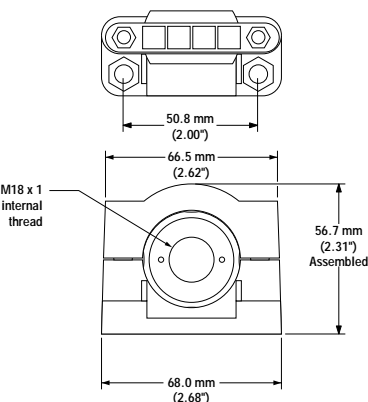

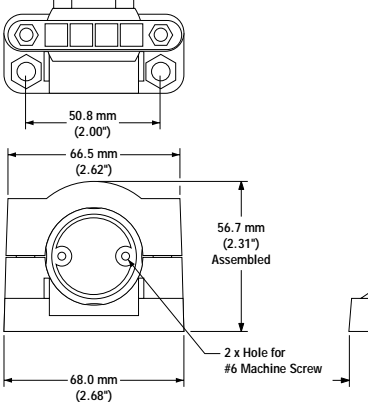

Model	Description	
UC-300C.7 UC-300C2 UC-300F UC-300FP	Replacement lens for CVB Replacement lens for CV2B Replacement lens for FVB Replacement lens for FPB	

## MINI-BEAM Mounting Brackets

<b>SMB312S</b>	<ul style="list-style-type: none"> <li>• Stainless steel</li> <li>• 2-axis, side-mount bracket</li> </ul>	<b>SMB312B</b>	<ul style="list-style-type: none"> <li>• Stainless steel 2-axis, bottom mounting bracket</li> <li>• Includes mounting foot</li> </ul>
			
<b>SMB312PD</b>	<ul style="list-style-type: none"> <li>• Stainless steel 18 mm barrel mounting bracket</li> <li>• Not for use with plastic fiber optic models</li> </ul>	<b>SMB46L</b>	<ul style="list-style-type: none"> <li>• “L” bracket</li> <li>• 14 ga 316 stainless steel</li> </ul>
			

# MINI-BEAM Sensors with Blue LED - DC Models

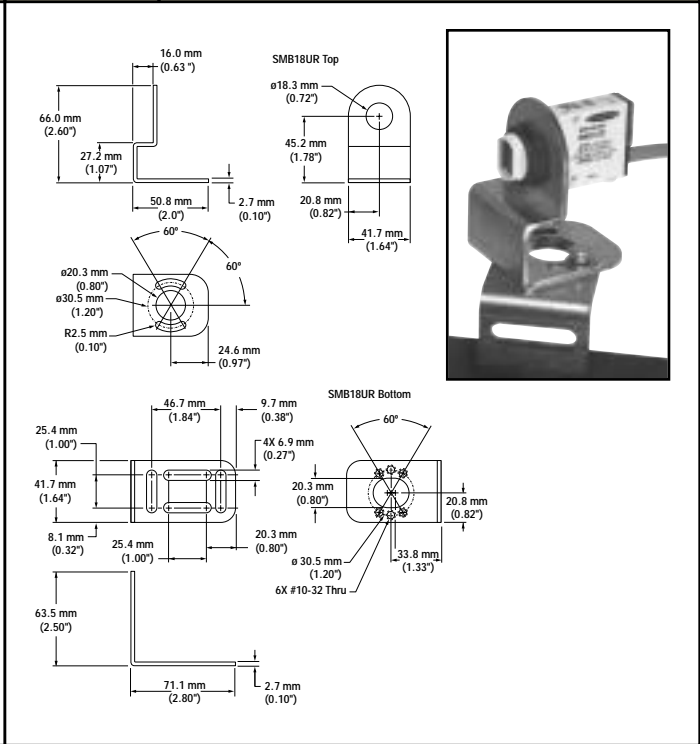
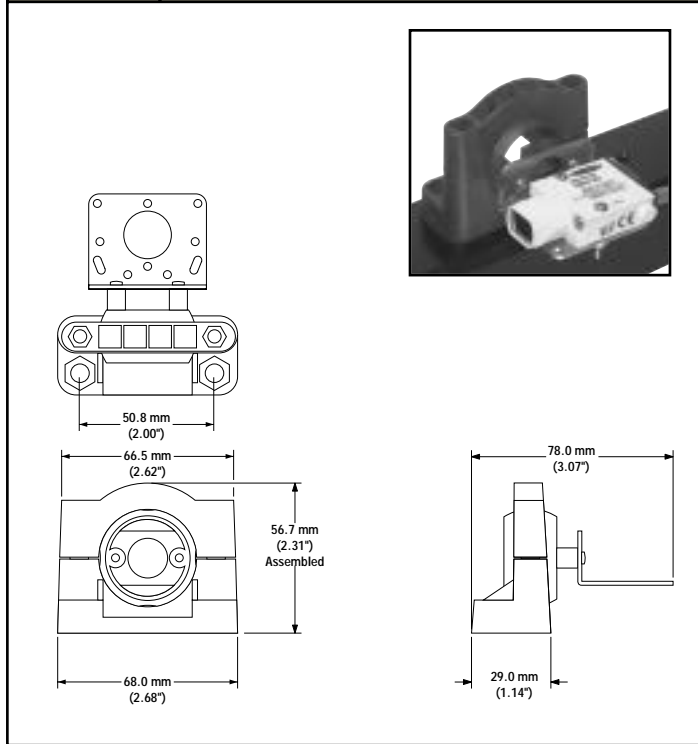
## MINI-BEAM Mounting Brackets

<p><b>SMB46S</b></p>	<ul style="list-style-type: none"> <li>• "S" bracket</li> <li>• 14 ga 316 stainless steel</li> </ul>	<p><b>SMB46U</b></p>	<ul style="list-style-type: none"> <li>• "U" bracket</li> <li>• 14 ga 316 stainless steel</li> </ul>
 	 		
<p><b>SMB18C</b></p>	<ul style="list-style-type: none"> <li>• 18 mm split clamp black reinforced PBT</li> <li>• Stainless steel mounting hardware included</li> <li>• Not for use with plastic fiber optic models</li> </ul>	<p><b>SMB18SF</b></p>	<ul style="list-style-type: none"> <li>• 18 mm swivel, black reinforced PBT</li> <li>• Stainless steel mounting hardware included</li> <li>• Not for use with plastic fiber optic models</li> </ul>
 	 		
<p><b>SMB3018SC</b></p>	<ul style="list-style-type: none"> <li>• 18 mm swivel barrel or side mount</li> <li>• Black PBT thermoplastic polyester</li> </ul>	<p><b>SMB3018SUS</b></p>	<ul style="list-style-type: none"> <li>• Side-mount swivel bracket – extended range of motion</li> <li>• Black PBT thermoplastic polyester</li> </ul>
 	 		

# MINI-BEAM Sensors with Blue LED – DC Models

## MINI-BEAM Mounting Brackets

<b>SMB30SK</b>	<ul style="list-style-type: none"> <li>• Flat-mount swivel bracket with extended range of motion</li> <li>• Black reinforced PBT and 316 stainless steel</li> </ul>	<b>SMB18UR</b>	<ul style="list-style-type: none"> <li>• Universal rotating bracket, 18 mm or 30 mm</li> <li>• 300 series stainless steel</li> </ul>
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**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.