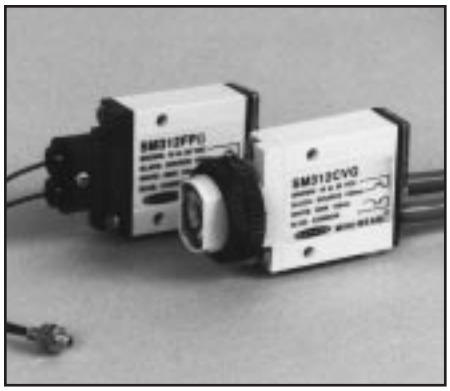
BANNER®
the photoelectric specialist

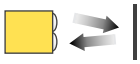
MINI-BEAM® Sensors with Green Light Source

For Web and Container Registration Mark Sensing Applications

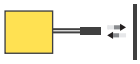


- 525 nm visible green LED light source provides an economical solution to a large percentage of mainstream color mark applications
- Reliably senses most common color combinations, including many combinations that are difficult to sense with a red or blue light source
- Minimum switch-point hysteresis to take full advantage of the green LED configuration
- 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, below)

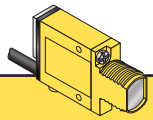
Green LED MINI-BEAM Sensing Mode Options



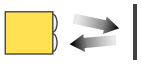
Convergent



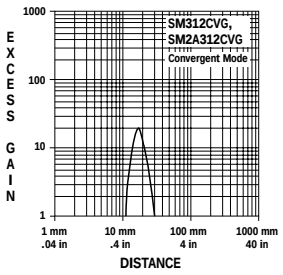
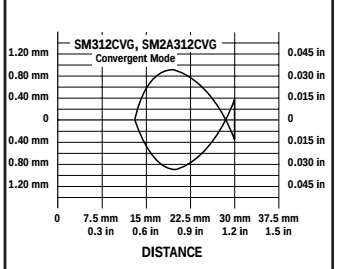
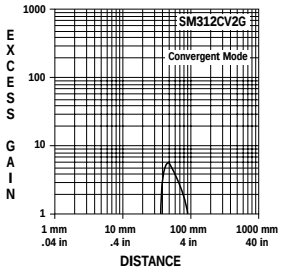
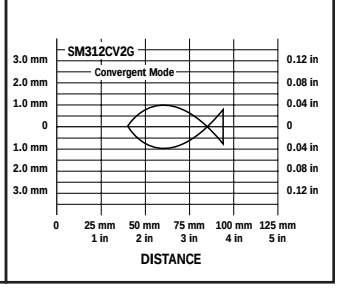
Glass or Plastic Fiber Optic



Visible Green, 525 nm



Green LED MINI-BEAM Convergent Mode

Models	Focus	Cable	Supply Voltage	Output Type	Excess Gain	Beam Pattern
					Performance based on 90% reflectance white test card	
Visible Green 525 nm						
SM312CVG **SM312CVGQD**	16 mm (0.65 in.)	2 m (6.5 ft) 4-Pin Euro QD	10-30V dc	Bipolar NPN/PNP		
SM312CV2G **SM312CV2GQD**	49 mm (1.9 in.)	2 m (6.5 ft) 4-Pin Euro QD	10-30V dc	Bipolar NPN/PNP		

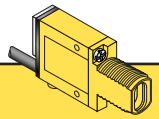
WARNING These photoelectric presence sensors do NOT include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can result in either an energized or a de-energized sensor output condition.

Never use these products as sensing devices for personnel protection. Their use as a safety device may create an unsafe condition which could lead to serious injury or death.

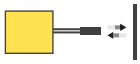
Only MICRO-SCREEN™ MINI-SCREEN®, MULTI-SCREEN®, MACHINE-GUARD™ and PERIMETER-GUARD™ Systems, and other systems so designated, are designed to meet OSHA and ANSI machine safety standards for point-of-operation guarding devices. No other Banner sensors or controls are designed to meet these standards, and they must NOT be used as sensing devices for personnel protection.

Printed in USA P/N 50975

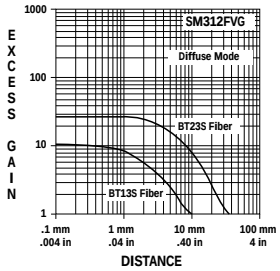
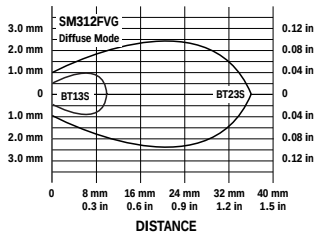
MINI-BEAM Sensors with Green LED

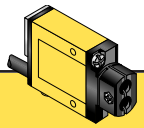


Visible Green, 525 nm

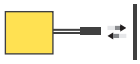


Green LED MINI-BEAM Glass Fiber Optic

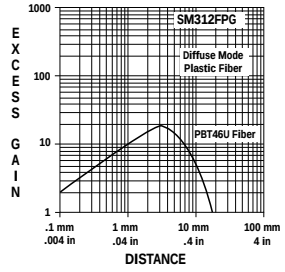
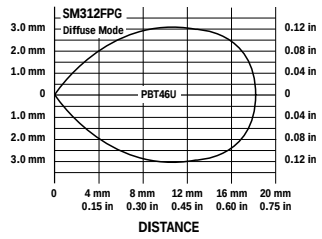
Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Excess Gain
					Diffuse mode performance based on 90% reflectance white test card	
SM312FVG **SM312FVGQD**	Range varies by sensing mode and fiber optics used	2 m (6.5 ft) 4-Pin Euro QD	10-30V dc	Bipolar NPN/PNP		



Visible Green 525 nm



Green LED MINI-BEAM Plastic Fiber Optic

Models	Range	Cable	Supply Voltage	Output Type	Excess Gain	Excess Gain
					Diffuse mode performance based on 90% reflectance white test card	
SM312FPG **SM312FPGQD**	Range varies by sensing mode and fiber optics used	2 m (6.5 ft) 4-Pin Euro QD	10-30V dc	Bipolar NPN/PNP		

For MINI-BEAM Green LED Sensors:

i) 9 m (30 ft) cables are available by adding suffix **"W/30"** to the model number of any cabled sensor (e.g. - **SM312FVG 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. - **SM312FVGMHS**). Note that this modification reduces the maximum operating temperature to +50º C (122º F), and reduces sensing range (and excess gain).

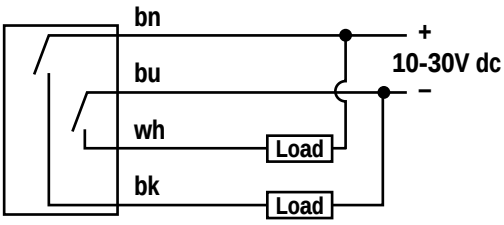
iii) A 150 mm (6 in) long pigtail cable with attached QD connector is available by adding suffix "QDP" to the model number (e.g. - **SM312FVGQDP**).

iv) A model with a QD connector requires an optional mating cable (see accessories, page 6).

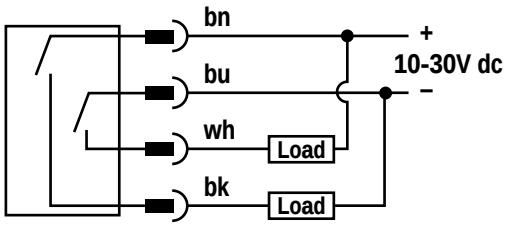
Green LED MINI-BEAM Product Specifications	
Supply Voltage and Current	10 to 30V dc (10% maximum ripple) at less than 25mA (exclusive of load)
Supply Protection Circuitry	Protected against reverse polarity and transient voltages
Output Configuration	Bipolar: One current sourcing (PNP) and one current sinking (NPN) open-collector transistor
Output Rating	150mA maximum each output at 25°C, derated to 100mA at 70°C (derate ≈1mA per °C) **Off-state leakage current** less than 1 microamp **Output saturation voltage** (PNP output) less than 1 volt at 10mA and less than 2 volts at 150mA **Output saturation voltage** (NPN output) less than 200 millivolts at 10mA and less than 1 volt at 150mA
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 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 are non-conducting during this time.)
Repeatability	**Opposed:** 0.14 milliseconds; **Non-Polarized and Polarized Retro, Diffuse, Convergent, Glass and Plastic Fiber Optic:** 0.3 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	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).
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 IP66
Connections	PVC-jacketed 4-conductor 2 m (6.5 ft) or 9 m (30 ft) cables, or 4-pin euro-style quick disconnect (QD) fitting are available. QD cables are ordered separately. See page 6.
Operating Temperature	**Temperature:** -20 to +70° C (-4 to +158° F) **Maximum relative humidity:** 90% at 50° C (non-condensing)
Application Notes	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	

MINI-BEAM DC Hookup Diagrams

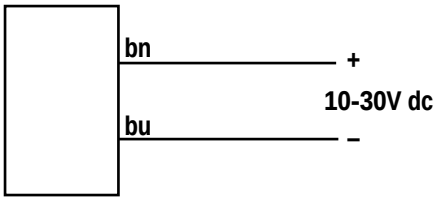
DC Sensors with Attached Cable



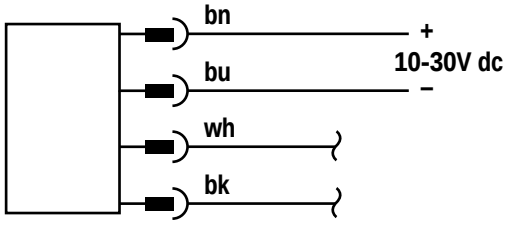
DC Sensors with Quick Disconnect (4-Pin Euro-Style)



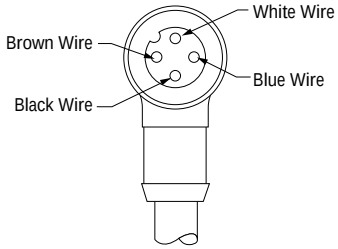
DC Emitters with Attached Cable



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



4-Pin Euro-Style Pin-out
(Cable Connector Shown)



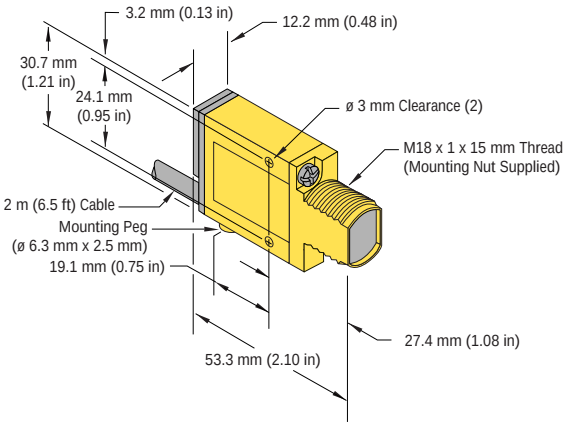
Quick Disconnect (QD) Option

DC 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 4-pin euro-style QD cable fitting.

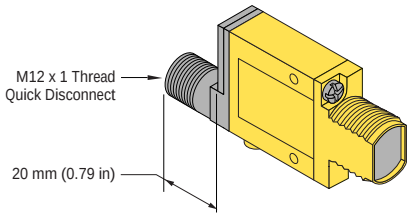
DC QD sensors are identified by the letters “QD” in their model number suffix. For information on mating QD cables, see page 6.

MINI-BEAM Dimension Information

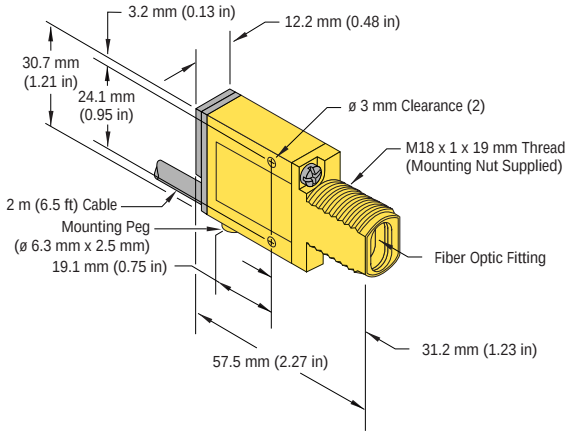
MINI-BEAM DC Sensor - Convergent (model suffix CVG)



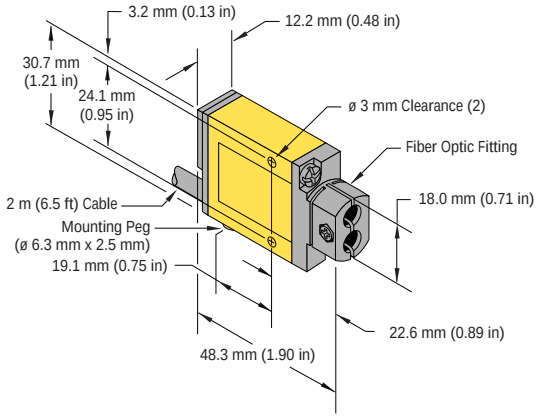
MINI-BEAM DC Sensor with Quick-Disconnect



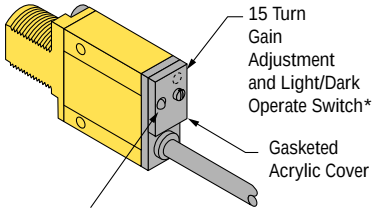
MINI-BEAM DC Sensor - Glass Fiber Optic (model suffix FVG)



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



MINI-BEAM Sensor - Rear View



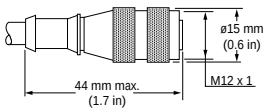
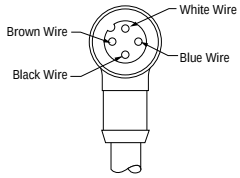
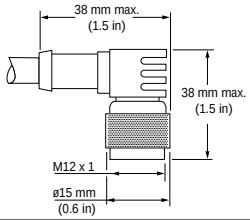
"AID" Indicator LED Lights when the sensor sees its own modulated light and pulses at a rate proportional to the strength of the received light signal.

*Note: Turn Light/Dark operate switch fully clockwise to the end stop for light-operated output and fully counter-clockwise to the end stop for dark-operated output.

MINI-BEAM Sensors with Green LED

Euro-Style Quick Disconnect Cables

Cable: PVC jacket, polyurethane connector body, chrome-plated brass coupling nut
Conductors: 22 or 20 AWG high-flex stranded, PVC insulation, gold-plated contacts
Temperature: -40 to +90°C (-40 to +194°F)
Voltage Rating: 250V ac/300V dc

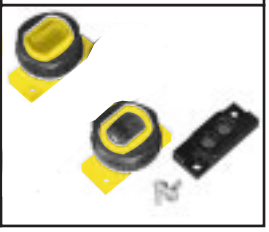
Style	Model	Length	Used with:	Dimensions	Pin-out
4-Pin Straight	**MQDC-406** **MQDC-415** **MQDC-430**	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)	• Standard OMNI-BEAM (QDH suffix) • Q45 dc sensors (Q5 suffix) • MINI-BEAM dc SM312 series • EZ-BEAM dc (Q suffix except S12) • SP12 series • T18U series ultrasonic • QM42 series		
4-Pin Right-angle	**MQDC-406RA** **MQDC-415RA** **MQDC-430RA**	2 m (6.5 ft) 5 m (15 ft) 9 m (30 ft)			

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	SM312CVG 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 µs) response. NOTE: Faster response comes at the expense of lower excess gain. Also, operating temperature range becomes -20º to +50ºC (-4º to +122ºF)	SM312CVGMHS
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. See the Accessories section for more information. 	SM312CVGQDP

Replacement Lens Assemblies

MINI-BEAM lens assemblies are field-replaceable.

Model	Description	
UC-300C.7	Replacement lens for CVG	
UC-300C2	Replacement lens for CV2G	
UC-300F	Replacement lens for FVG	
UC-300FP	Replacement lens for FPG	

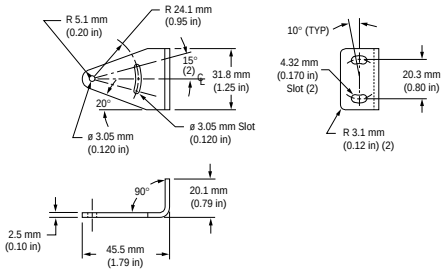
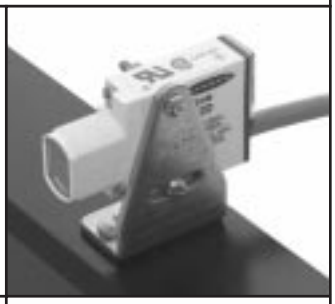
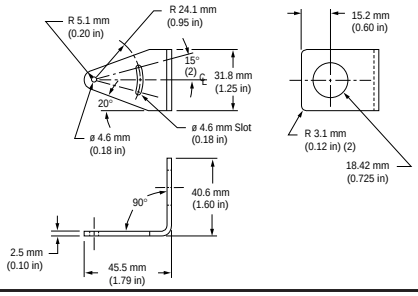
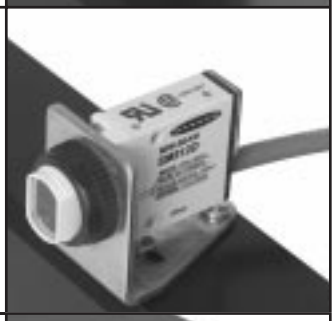
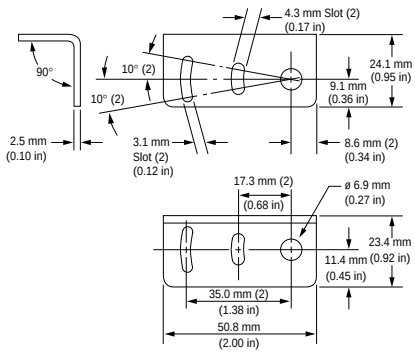
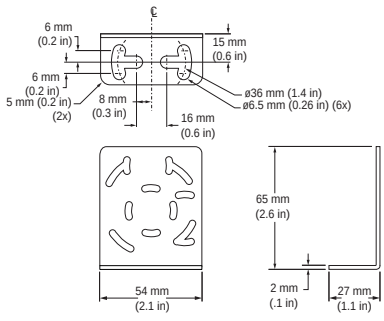
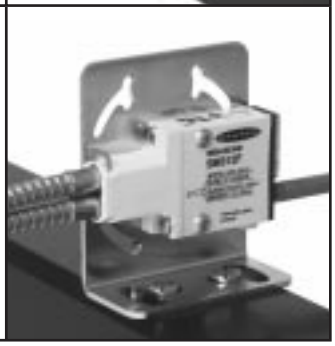
WARRANTY: Banner Engineering Corporation warrants it products to be free from defects for one year. Banner Engineering Corporation will repair or replace, free of charge, any product of its manufacture found to be defective at the time it is returned to the factory during the warranty period. This warranty 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.

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.

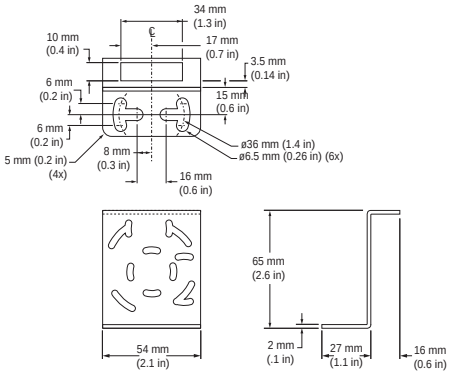
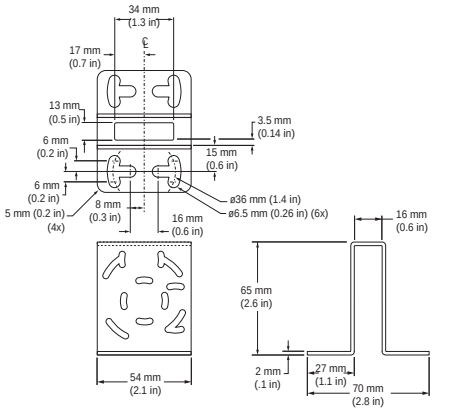
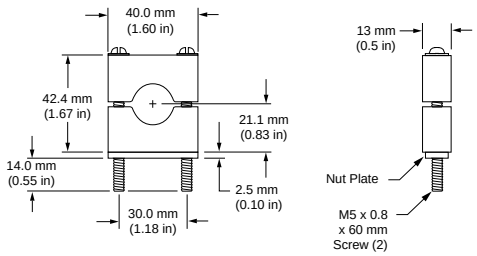
Model	Type	Used with:
EC312-100	4-conductor	All MINI-BEAM SM312 dc models

Mounting Brackets

Model	Description		
SMB312S	Stainless steel 2-axis, side mounting bracket		
SMB312PD	Stainless steel 18 mm barrel-mounting bracket NOTE: Not for use with plastic fiber optic models		
SMB312B	Stainless steel 2-axis, bottom mounting bracket		
SMB46L	• "L" bracket • 14 ga 316 stainless steel		

MINI-BEAM Sensors with Green LED

Mounting Brackets

Model	Description	Dimensions	
SMB46S	• "S" bracket • 14 ga 316 stainless steel		
SMB46U	• "U" bracket • 14 ga 316 stainless steel		
SMB18C	• 18 mm split clamp black VALOX® bracket • Stainless steel mounting hardware included NOTE: Not for use with plastic fiber optic models		
SMB18S	• 18 mm swivel, black VALOX® bracket • Stainless steel mounting hardware included NOTE: Not for use with plastic fiber optic models