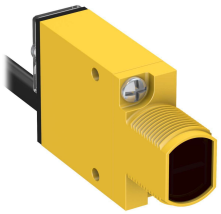
Features

Self-contained photoelectric sensors



- 10 to 30 V DC with bipolar NPN/PNP outputs
- Signal strength or output indicator
- 2 m or 9 m integral cable, or M12 quick-disconnect fitting
- 18 mm threaded lens mount on some models

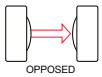
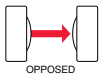
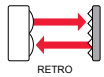
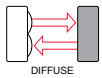
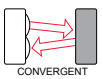
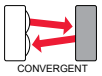
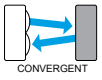
WARNING:

- **Do not use this device for personnel protection**
- Using this device for personnel protection could result in serious injury or death.
- This device does not include the self-checking redundant circuitry necessary to allow its use in personnel safety applications. A device failure or malfunction can cause either an energized (on) or de-energized (off) output condition.

Models

Integral 2 m (6.5 ft) unterminated cable models are listed.

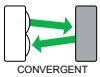
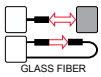
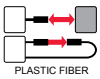
- To order the 9 m (30 ft) PVC cable model, add the suffix "W/30" to the cabled model number. For example, SM31EW/30.
- To order the 4-pin M12 QD models, add the suffix “QD” to the model number. For example, SM31EQD.
- To order the 150 mm (6 in) cable with QD, add the suffix “QDP” to the model number. For example, SM31EQDP.
- To order a 0.3 ms response time model, add the suffix “MHS” to the model number. For example, SM31EMHS.

Sensing Mode		Range	LED	Model
 OPPOSED	Opposed Emitter	3 m (10 ft)	Infrared, 880 nm	SM31E
	Opposed Receiver			SM31R
	Opposed Emitter - Long Range	30 m (100 ft)		SM31EL
	Opposed Receiver - Long Range			SM31RL
 OPPOSED	Opposed Emitter - Clear Plastic Detection	0 to 300 mm (0 to 12 in) Actual range varies, depending on the light transmission properties of the plastic material being sensed.	Visible red, 650 nm	SM31EPD
	Opposed Receiver - Clear Plastic Detection			SM31RPD
 RETRO	Non-Polarized Retroreflective	5 m (15 ft)		SM312LV
 POLAR RETRO	Polarized Retroreflective	55 mm to 2 m (2 in to 7 ft)		SM312LVAG
	Extended-Range Polarized Retroreflective	10 mm to 3 m (0.4 in to 10 ft)		SM312LP
 DIFFUSE	Diffuse	380 mm (15 in)	Infrared, 880 nm	SM312D
		300 mm (12 in)		SM312DBZ
	Divergent Diffuse	130 mm (5 in)		SM312W
 CONVERGENT	Convergent	16 mm (0.65 in) Focus		SM312C
		43 mm (1.7 in) Focus		SM312C2
 CONVERGENT		16 mm (0.65 in) Focus	Visible red, 650 nm	SM312CV
		43 mm (1.7 in) Focus		SM312CV2
 CONVERGENT		16 mm (0.65 in) Focus	Visible blue, 475 nm	SM312CVB
		49 mm (1.9 in) Focus		SM312CV2B

Continued on page 2

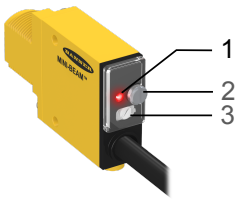
69943
p/n: 69943 Rev. I

Continued from page 1

Sensing Mode		Range	LED	Model
 CONVERGENT		16 mm (0.65 in) Focus	Visible green, 525 nm	SM312CVG
		49 mm (1.9 in) Focus		SM312CV2G
 GLASS FIBER	Glass Fiber Optic	Range varies, depending on sensing mode and fiber optics used.	Infrared, 880 nm	SM312F
			Visible red, 650 nm	SM312FV
			Visible blue, 475 nm	SM312FVB
			Visible green, 525 nm	SM312FVG
 PLASTIC FIBER	Plastic Fiber Optic		Visible red, 650 nm	SM312FP
			Visible blue, 475 nm	SM312FPB
			Visible green, 525 nm	SM312FPG
	Special High-Power Option Plastic Fiber Optic		Visible red, 650 nm	SM312FPH

Overview

1. Adjustment Indicator Device (AID)
2. Gain (sensitivity) adjustment screw
3. Light/dark operate select switch



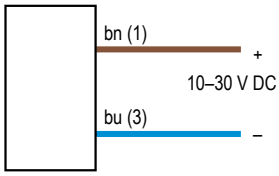
Adjust the light/dark operate switch clockwise for light operate and counterclockwise for dark operate. In dark operate (DO) mode, the output is ON when the target returns less light to the sensor than the configured target and OFF when the sensor detects more light than the configured/taught target. In light operate (LO) mode, the output is ON when the target returns the same or more light to the sensor and OFF when the sensor detects less light than the configured/taught target.

See "Installation and Alignment" on page 3 for descriptions of each sensing mode and how light and dark operate work with each sensing mode.

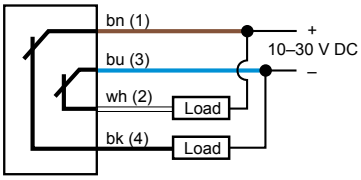
MINI-BEAM (DC) Wiring Diagrams

The output type for all models is Bipolar NPN/PNP; load 150 mA maximum, each output.

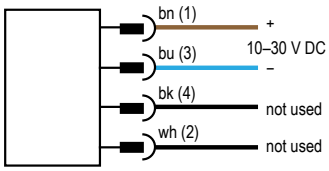
Emitters with attached cables



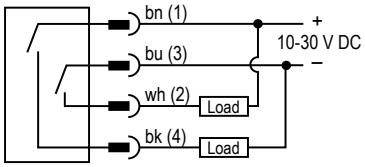
All other models with attached cables



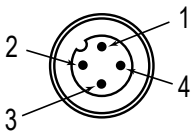
Emitters with 4-pin M12 QD



All other models with 4-pin M12 QD



4-pin male M12 QD



Installation and Alignment

MINI-BEAM sensors perform most reliably if they are properly aligned and securely mounted. For maximum mechanical stability, mount MINI-BEAM sensors through 18 mm diameter holes by their threaded barrel (where available), or use a mounting bracket. A complete selection of mounting brackets is available. Visit www.bannerengineering.com or contact Banner Engineering for information on mounting options.

1. Using line-of-sight, position the MINI-BEAM sensor to its emitter (opposed-mode sensing) or to its target (all other sensing modes).
    - When using a retroreflective sensor, the target is the retroreflector (or *retro target*).
    - For diffuse or convergent sensing modes, the target is the object to be detected.
2. Apply power to the sensor (and to the emitter, if using the opposed mode).
3. Advance the 15-turn Gain control to maximum (clockwise end of rotation), using a small flat-blade screwdriver.

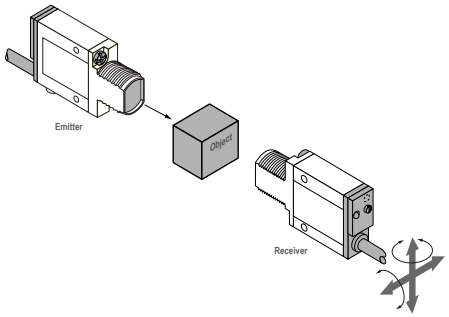
   The Gain control is clutched at both ends to avoid damage and will free-wheel when either endpoint is reached.

   If the MINI-BEAM sensor receives its light signal, then the red LED alignment indicator flashes at a rate proportional to the signal strength (faster = more signal).
4. Move the sensor (or move the retro target, if applicable) up-down-right-left (including angular rotation) to find the center of the movement zone within which the LED indicator remains ON.
5. Reduce the Gain setting by turning the Gain control.

   Reducing the Gain setting reduces the movement zone size and enables more precise alignment.
6. Repeat the alignment motions after each Gain reduction.
7. When optimum alignment is achieved, mount the sensor(s) (and the retro target, if applicable) solidly in that position.
8. Increase the Gain to the maximum.
9. Test the sensor by placing the object to be detected in the sensing position, and then removing it.
   The Alignment Indicator LED should turn ON when the sensing beam is established (Light condition), and turn OFF when the beam is broken (Dark condition).

Opposed Mode Alignment

In opposed-mode sensing, the sensor's emitter and receiver are housed in two separate units. The emitter is placed opposite the receiver so that the light beam goes directly from the emitter to the receiver. An object is detected when it breaks the working part of the light beam, known as the effective beam.



In **opposed** sensing modes, light operate means the output is on when the beam is unblocked and dark operate means the output is on when the beam is blocked.

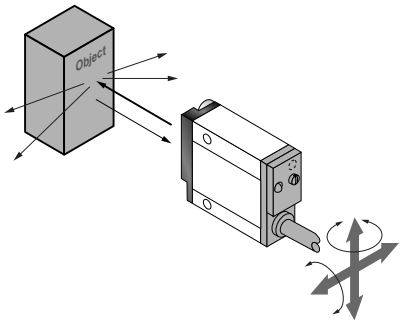
Flooding occurs when a portion of the sensing beam passes around the object to be sensed. *Burn-through* occurs when a portion of the emitter's light energy passes through a thin or translucent object, and is sensed by the receiver.

To correct either problem, do one or more of the following to reduce the light energy:

- Reduce the Gain adjustment on the receiver
- Add an aperture to one or both lenses (MINI-BEAM apertures, available from Banner, fit neatly inside the lens assembly)
- Intentionally misalign the emitter and receiver

Diffuse Mode Alignment

In diffuse-mode sensing, light emitted from the sensor strikes the surface of the object to be detected and is reflected back to the receiver, which is housed with the emitter. With a diffuse-mode sensor, the object is detected when it "makes" the beam, that is, the object reflects the sensor's transmitted light energy back to the sensor.



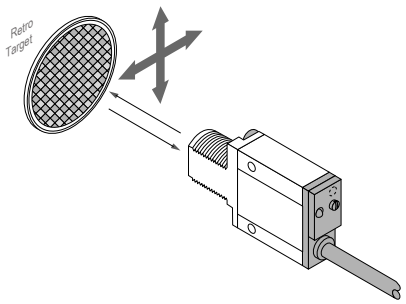
In **diffuse** sensing modes, light operate means the output is on when the target is present and within the sensing range. Dark operate means the output is on when no target is detected.

If the Alignment LED does not turn OFF when the object is removed from the beam, the sensor is probably detecting light reflected from some background object. To remedy this problem:

- Reduce the reflectivity of the background by painting the surface(s) flat-black, scuffing any shiny surface, or drilling a large hole, directly opposite the diffuse sensor
- Move the sensor closer to the object to be detected and reduce the Gain adjustment. Rule of thumb for diffuse sensing: The distance to the nearest background object should be at least three times the sensing distance

Retroreflective Mode Alignment

A retroreflective sensor contains both the emitter and receiver elements. The effective beam is established between the emitter, the retroreflector, and the receiver. As with an opposed-mode sensor, an object is sensed when it interrupts or "breaks" the effective beam.



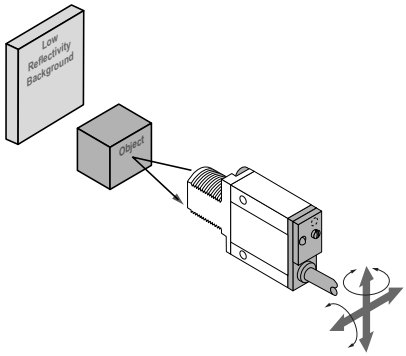
In **retroreflective** sensing modes, light operate means the output is on when the beam is unblocked and dark operate means the output is on when the beam is blocked.

A highly reflective object may reflect enough light back to a retroreflective sensor to allow that object to slip through the beam, without being detected. This problem is called *proxing*, and the following methods may be used to correct it:

- Position the sensor and retro target so the beam will not strike a shiny surface perpendicular to the sensor lens
- Reduce the Gain adjustment
- Add a polarizing filter (for model SM312LV)

Convergent Mode Alignment

Convergent-mode sensors use a lens system to focus the emitter and receiver elements to an exact point in front of the sensor. Like diffuse-mode and divergent-mode sensors, convergent-mode sensors detect an object when that object completes or "makes" the light beam. This design produces a small, intense, and well-defined sensing area, at a fixed distance from the sensor lens. It is a very efficient use of reflective energy.



In **convergent** sensing modes, light operate means the output is on when the object is present and within the sensing range. Dark operate means the output is on when no target is detected.

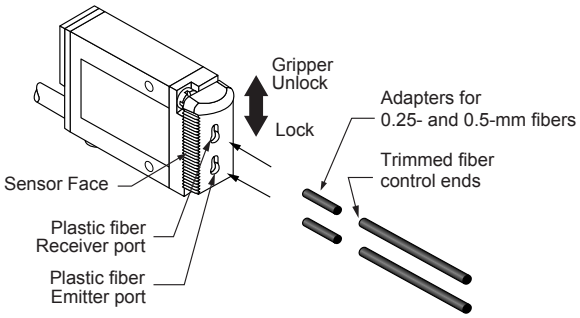
The sensing energy of a convergent mode sensor is concentrated at the specified focus point. Convergent mode sensors are less sensitive to background reflections than diffuse mode sensors. However, if background reflections are a problem:

- Skew the sensor position at a 10° to 25° angle to eliminate direct reflections from shiny background surfaces
- Reduce the reflectivity of the background by painting the surface(s) flat-black, scuffing any shiny surface, or drilling a large hole, directly opposite the sensor
- Reduce the Gain adjustment

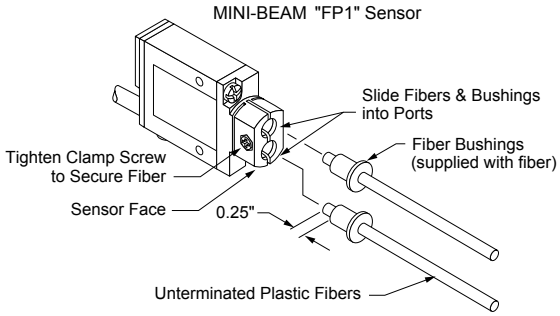
Installing Plastic Fibers on a MINI-BEAM

Follow these instructions to install plastic fibers into your sensor. MINI-BEAMS may have either a fiber gripper or a clamp screw. **MINI-BEAM** and **ECONO-BEAM** sensors for use with plastic fiber optic assemblies include sensors with the letters **FP** in their model number.

MINI-BEAM with fiber grippers



MINI-BEAM with clamp screws

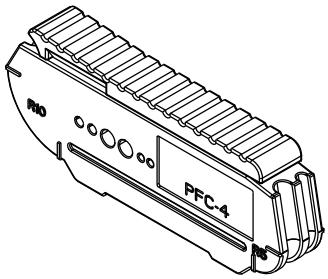


1. Prepare the sensor ends of the fibers (see "Cut the Plastic Fiber" on page 5).
2. Prepare the sensor for the fibers.
    - For models with a fiber gripper: Unlock the fiber gripper as shown in the figure and apply the appropriate fiber adaptors to the fiber, if needed.
    - For models with a clamp screw: Loosen the clamp screw on the sensor face.
3. Insert the plastic fibers.
    - For models with a fiber gripper: Gently insert the prepared fiber ends into the ports as far as they will go.
    - For models with a clamp screw: Align the fiber ends flush with the ends of the bushings as shown. Hold the bushings to the fibers and slide both into the sensor ports. Push the fiber an additional 1 inch through the bushing.
4. Lock in the fibers.

- For models with a fiber gripper: Slide the fiber gripper back to lock, as shown in the figure.
- For models with a clamp screw: Tighten the clamp screw to secure the fibers.

Cut the Plastic Fiber

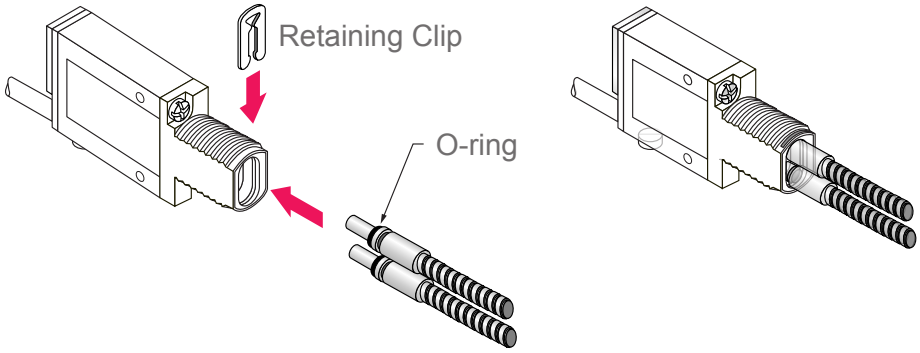
- An unterminated plastic fiber is designed to be cut by the customer to the length required for the application. To facilitate cutting, a Banner model PFC-4 cutting device is supplied with this fiber.



1. Locate the non-terminated end, and determine the length of fiber required for the application.
2. Lift the top of the cutter to open the cutting ports.
3. Insert the non-terminated end through one of the four large cutting ports on the PFC-4 cutter so that the excess fiber protrudes from the back of the cutter.
4. Double-check the fiber length, and close the cutter until the fiber is cut.
5. Gently wipe the cut ends of the fiber with a clean, dry cloth to remove any contamination.

NOTE: 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.

Installing the Glass Fibers in MINI-BEAMs



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

Specifications

Supply Voltage and Current

10 to 30 V DC (10% maximum ripple) at less than 25 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 maximum each output at 25 °C, derated to 100 mA at 70 °C (derate ≈ 1 mA per °C)

OFF State Leakage Current: less than 1 microamp

Output Saturation Voltage (PNP Output): less than 1 V at 10 mA, less than 2 V at 150 mA

Output Saturation Voltage (NPN Output): less than 200 millivolts at 10 mA, less than 1 V at 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 “dark” signal of 1 millisecond or longer duration, 500 Hz maximum. Modification for 0.3 millisecond response is available (MHS-suffix models; these models also feature reduced sensitivity range and reduced repeatability.)

NOTE: Outputs are non-conducting during 100 millisecond delay on power-up.

Repeatability

Opposed: 0.14 milliseconds

Non-Polarized and Polarized Retro, Diffuse, Convergent, Glass Fiber Optic, and Plastic Fiber Optic: 0.3 milliseconds

Response time and repeatability specifications are independent of signal strength.

Adjustments

Light/Dark Operate Select switch

15-turn slotted brass screw Gain (sensitivity) adjustment potentiometer (clutched at both ends of travel)

Located on the rear panel, protected by a gasketed, clear acrylic cover.

Indicators

Patented Alignment Indicator Device system (AID™, US patent #4356393) lights a rear-panel-mounted LED indicator when the sensor sees light. Its pulse rate is proportional to the light signal strength (the stronger the signal, the faster the pulse rate).

Construction

Reinforced thermoplastic polyester housing, totally encapsulated, o-ring sealing, acrylic lenses, stainless steel screws

Environmental Rating

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

Connections

PVC-jacketed 4-conductor 2 m (6.5 ft) or 9 m (30 ft) cables, or 4-pin M12 male QD fitting; QD cables available separately

Operating Conditions

–20 °C to +70 °C (–4 °F to +158 °F)

90% at +50 °C maximum relative humidity (non-condensing)

Application Note

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.

Required Overcurrent Protection

WARNING: Electrical connections must be made by qualified personnel in accordance with local and national electrical codes and regulations.

Overcurrent protection is required to be provided by end product application per the supplied table.

Overcurrent protection may be provided with external fusing or via Current Limiting, Class 2 Power Supply.

Supply wiring leads < 24 AWG shall not be spliced.

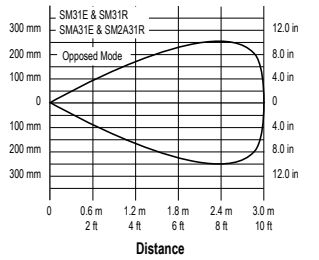
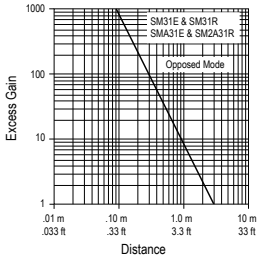
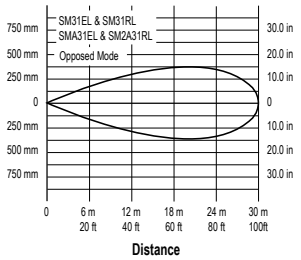
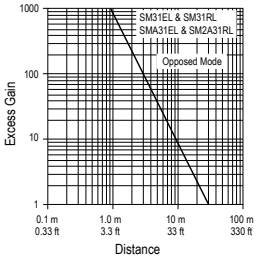
For additional product support, go to www.bannerengineering.com.

Supply Wiring (AWG)	Required Overcurrent Protection (A)	Supply Wiring (AWG)	Required Overcurrent Protection (A)
20	5.0	26	1.0
22	3.0	28	0.8
24	1.0	30	0.5

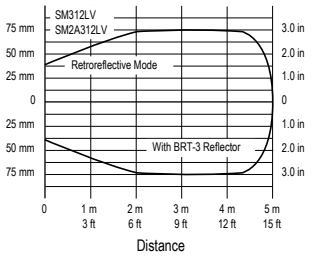
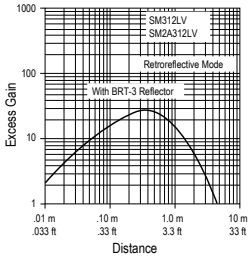
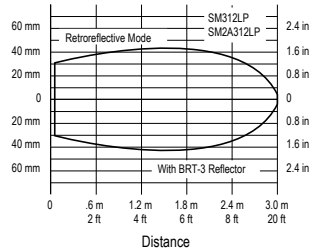
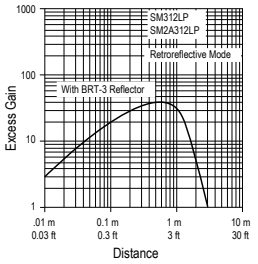
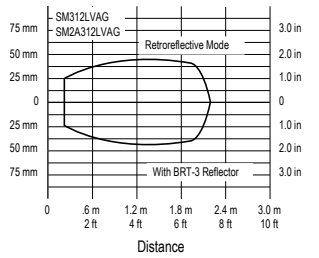
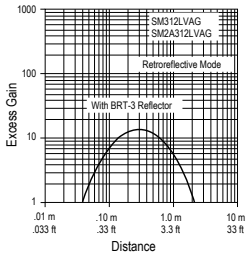
Certifications

Banner Engineering BV
Park Lane, Culliganlaan 2F bus 3
1831 Diegem, BELGIUM

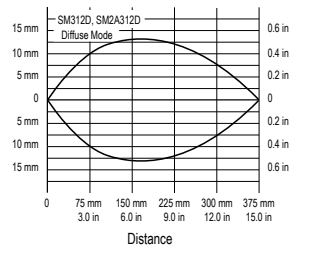
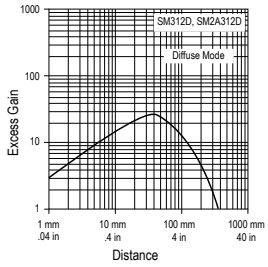
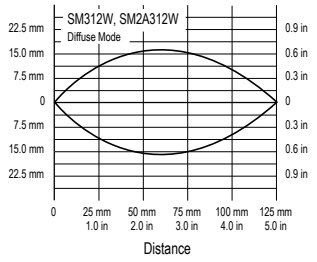
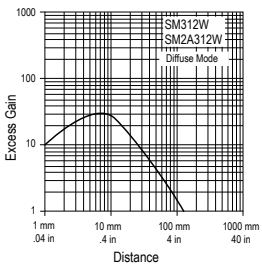
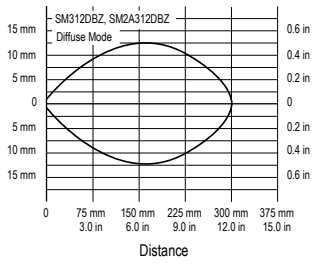
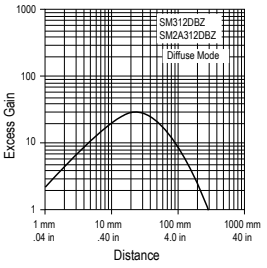
Performance Curves for SM31Ex Emitter and SM31Rx Receiver Models

Beam Pattern for SM31E/R	Excess Gain Curve for SM31E/R	Beam Pattern for SM31EL/RL	Excess Gain Curve for SM31EL/RL
			
Effective Beam: 3.5 mm		Effective Beam: 13 mm	

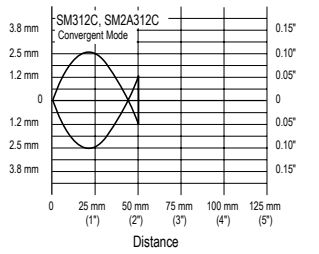
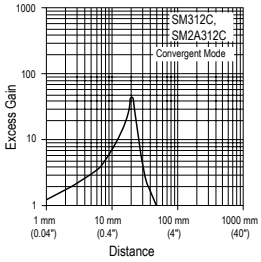
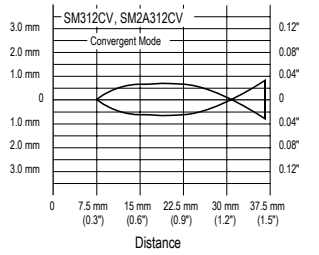
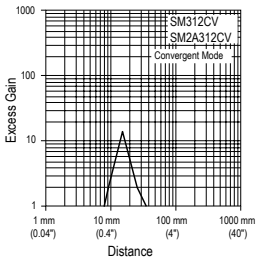
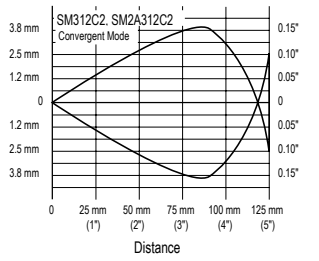
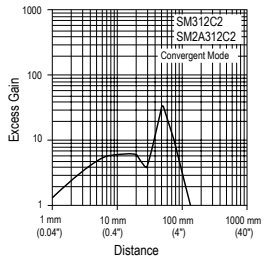
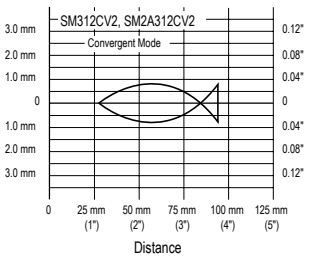
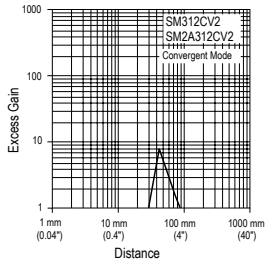
Performance Curves for the SM312Lx Retroreflective Models

Beam Pattern for SM312LVxx	Excess Gain Curve for SM312LVxx	Beam Pattern for SM312LP	Excess Gain Curve for SM312LP
			
			

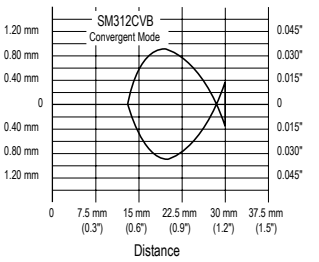
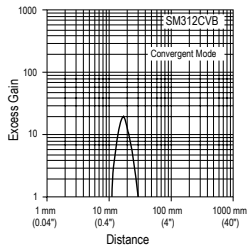
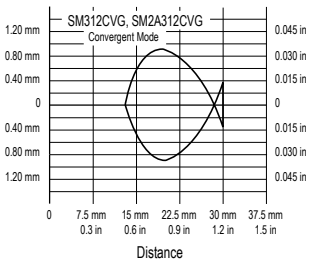
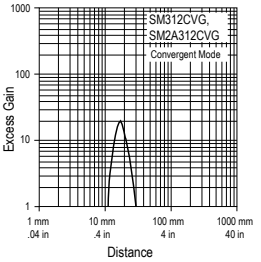
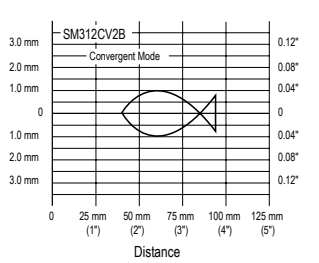
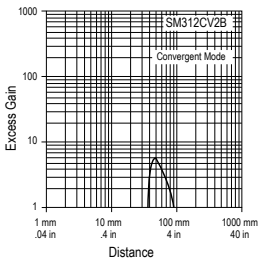
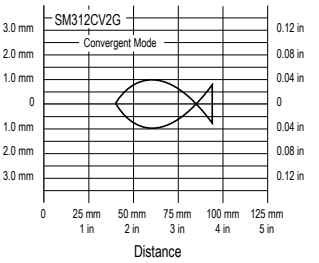
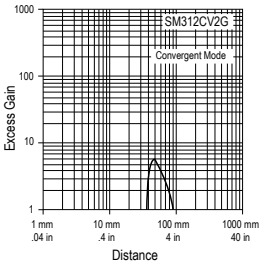
Performance Curves for the SM312Dx and SM312W Diffuse Models

Beam Pattern for SM312Dx	Excess Gain Curve for SM312Dx	Beam Pattern for SM312W	Excess Gain Curve for SM312W
			
			

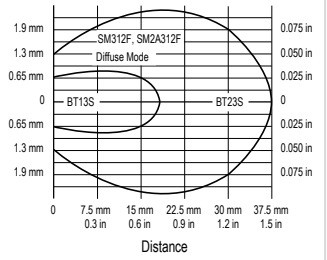
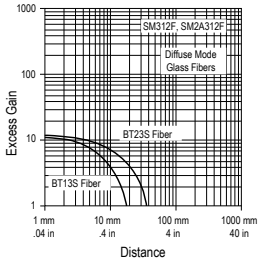
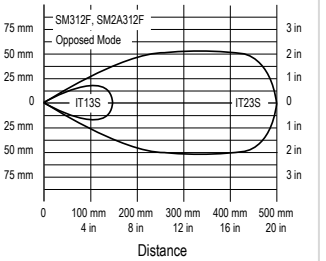
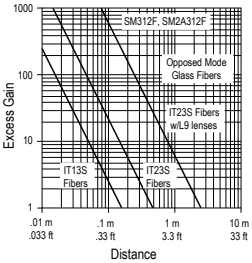
Performance Curves for the SM312Cx Convergent Models

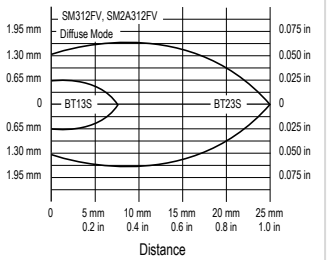
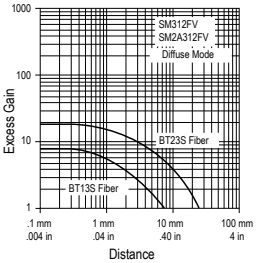
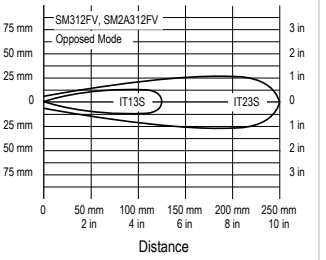
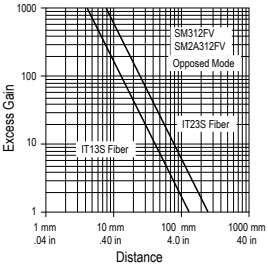
Beam Pattern for SM312C	Excess Gain Curve for SM312C	Beam Pattern for SM312CV	Excess Gain Curve for SM312CV
			
			

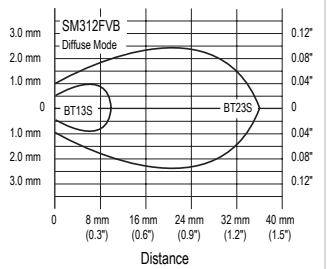
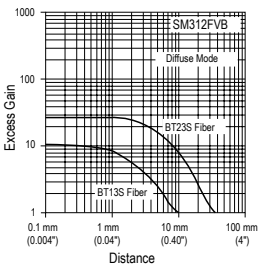
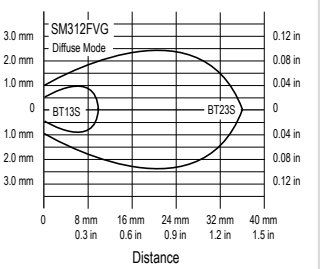
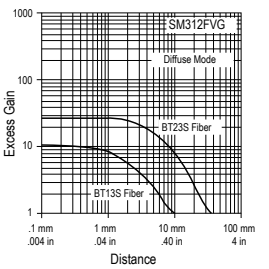
Performance is based on a 90% reflectance white test card.

Beam Pattern for SM312CVB	Excess Gain Curve for SM312CVB	Beam Pattern for SM312CVG	Excess Gain Curve for SM312CVG
			
			

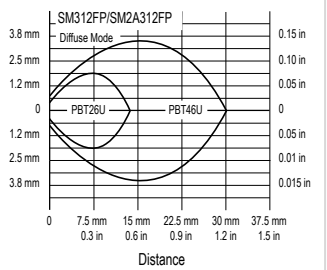
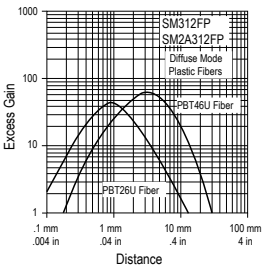
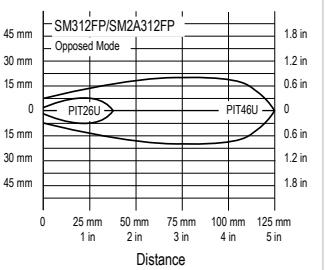
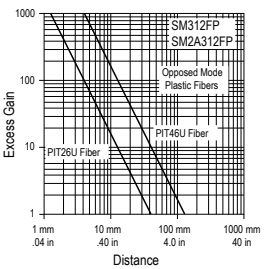
Performance Curves for the SM312F Glass Fiber Optic Models

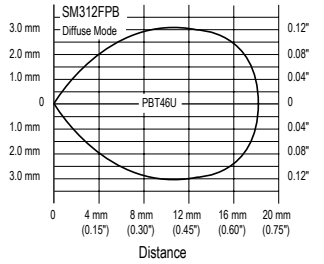
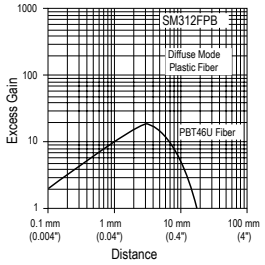
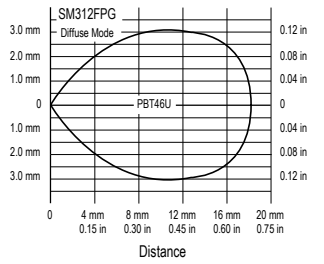
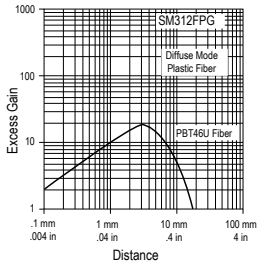
Diffuse Mode		Opposed Mode	
Beam Pattern for SM312F	**Excess Gain Curve for SM312F**	**Beam Pattern for SM312F**	**Excess Gain Curve for SM312F**
			

Diffuse Mode		Opposed Mode	
Beam Pattern for SM312FV	**Excess Gain Curve for SM312FV**	**Beam Pattern for SM312FV**	**Excess Gain Curve for SM312FV**
			

Beam Pattern for SM312FVB	Excess Gain Curve for SM312FVB	Beam Pattern for SM312FVG	Excess Gain Curve for SM312FVG
			

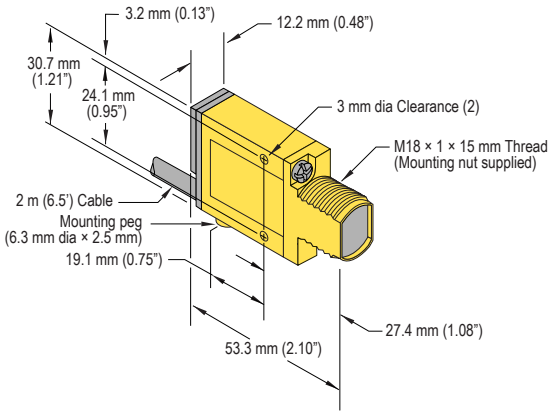
Performance Curves for the SM312FP Plastic Fiber Models

Diffuse Mode		Opposed Mode	
Beam Pattern for SM312FP	**Excess Gain Curve for SM312FP**	**Beam Pattern for SM312FP**	**Excess Gain Curve for SM312FP**
			

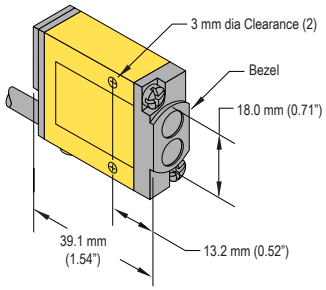
Beam Pattern for SM312FPB	Excess Gain Curve for SM312FPB	Beam Pattern for SM312FPG	Excess Gain Curve for SM312FPG
			

MINI-BEAM Dimensions

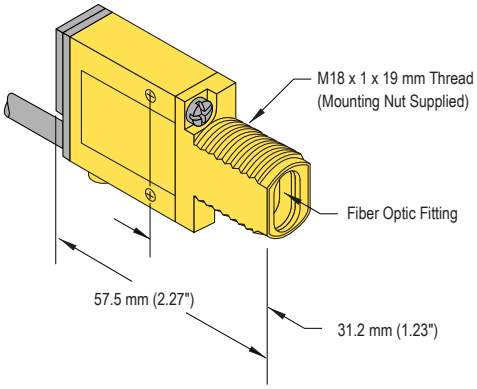
Cabled Models
(Suffix E, EL, EPD, R, RL, RPD, LV, LVAG, LP, LPC, D, C, C2, CV, CV2, CVG, CV2G, CVB, CV2B, CVW)



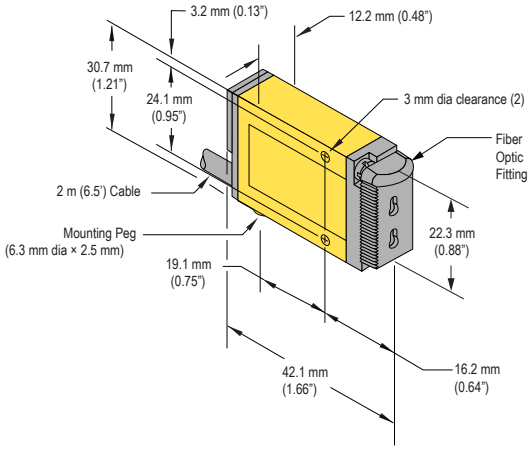
Divergent Diffuse Models
(Suffix DBZ and W)



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



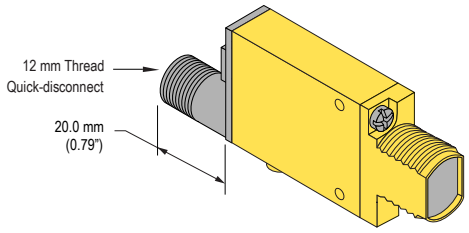
Plastic Fiber Models
(Suffix FP, FPB, FPG, FPH, FPW)



Continued on page 11

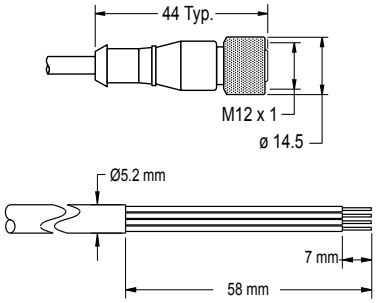
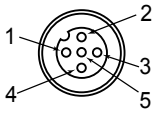
Continued from page 10

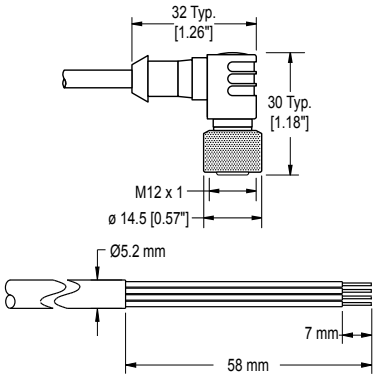
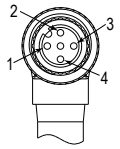
QD Models



Accessories

4-Pin M12 Cordsets

4-pin Single-Ended M12 Female Cordsets				
Model	**Length**	**Dimensions (mm)**	**Pinout (Female)**	
BC-M12F4-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
BC-M12F4-22-2	2 m (6.56 ft)			
BC-M12F4-22-5	5 m (16.4 ft)			
BC-M12F4-22-8	8 m (26.25 ft)			
BC-M12F4-22-10	10 m (30.81 ft)			
BC-M12F4-22-15	15 m (49.2 ft)			
BC-M12F4-22-20	20 m (65.61 ft)			
BC-M12F4-22-25	25 m (82.02 ft)			
BC-M12F4-22-30	30 m (98.42 ft)			

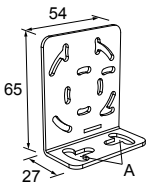
4-pin Single-Ended M12 Female Right-Angle Cordsets				
Model	**Length**	**Dimensions (mm)**	**Pinout (Female)**	
BC-M12F4A-22-1	1 m (3.28 ft)			1 = Brown 2 = White 3 = Blue 4 = Black 5 = Unused
BC-M12F4A-22-2	2 m (6.56 ft)			
BC-M12F4A-22-5	5 m (16.4 ft)			
BC-M12F4A-22-8	8 m (26.25 ft)			
BC-M12F4A-22-10	10 m (30.81 ft)			
BC-M12F4A-22-15	15 m (49.2 ft)			

Mounting Brackets

SMB46L

- Right-angle
- L bracket
- 14-ga. 316 stainless steel

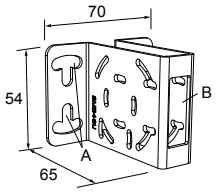
Hole center spacing: A = 16.0
Hole size: A = 16.5 × 18.7



SMB46U

- Right-angle
- U bracket for sensor protection
- 14-ga. 316 stainless steel

Hole center spacing: A = 16.0
Hole size: A = 16.5 × 18.7, B = 34.0 × 13.0



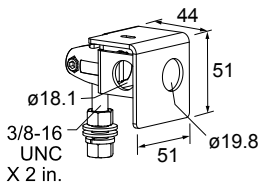
SMB18AFA..

- Protective, swivel bracket with tilt and pan movement for precision adjustment
- Easy sensor mounting to extruded rail T-slots
- Metric and inch size bolts available
- Mounting hole for 18 mm sensors

Hole size: B = ø 18.1

Bolt Thread (A):

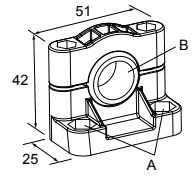
SMB18AFA = 3/8 - 16 × 2 in
SMB18AFAM10 = M10 - 1.5 × 50



SMB18SF

- 18 mm swivel bracket with M18 × 1 internal thread
- Black thermoplastic polyester
- Stainless steel swivel locking hardware included

Hole center spacing: A = 36.0
Hole size: A = ø 5.3, B = ø 18.0

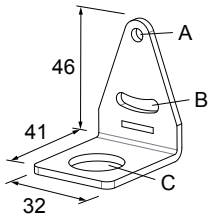


SMB312PD

- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel
- 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware

Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17 × 4.6, C = ø 18.5

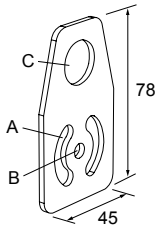
NOTE: Not for use with plastic fiber optic sensors



SMBAMS18P

- Flat SMBAMS series bracket with 18 mm hole
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel

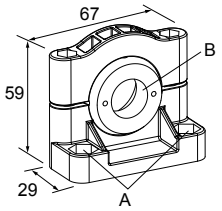
Hole center spacing: A = 26.0, A to B = 13.0
Hole size: A = 26.8 × 7.0, B = ø 6.5, C = ø 19.0



SMB3018SC

- 18 mm swivel side or barrel-mount bracket
- Black reinforced thermoplastic polyester
- Stainless steel swivel locking hardware included

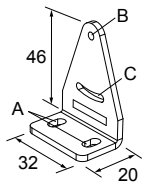
Hole center spacing: A = 50.8
Hole size: A = ø 7.0, B = ø 18.0



SMB312S

- Stainless steel 2-axis, side-mount bracket

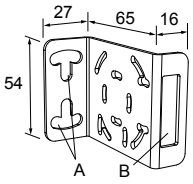
A = 4.3 × 7.5, B = diam. 3, C = 3 × 15.3



SMB46S

- Right-angle
- S bracket
- 14-ga. 316 stainless steel

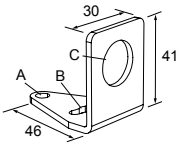
Hole center spacing: A = 16.0
Hole size: A = 16.5 × 18.7, B = 34.0 × 10.0



SMB18A

- Right-angle mounting bracket with a curved slot for versatile orientation
- 12-ga. stainless steel
- 18 mm sensor mounting hole
- Clearance for M4 (#8) hardware

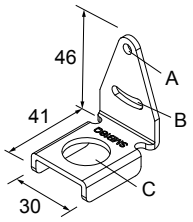
Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17.0 × 4.6, C = ø 18.5



SMB18Q

- Right-angle flanged bracket
- 18 mm sensor mounting hole
- 12-ga. stainless steel

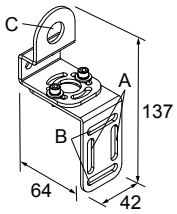
Hole center spacing: A to B = 24.2
Hole size: A = ø 4.6, B = 17.0 × 4.6, C = ø 19.0



SMB18UR

- 2-piece universal swivel bracket
- 300 series stainless steel
- Stainless steel swivel locking hardware included
- Mounting hole for 18 mm sensor

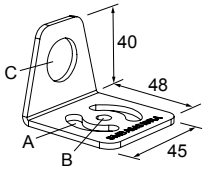
Hole center spacing: A = 25.4, B = 46.7
Hole size: B = 6.9 × 32.0, C = ø 18.3



SMBAMS18RA

- Right-angle SMBAMS series bracket with 18 mm hole
- Articulation slots for 90+° rotation
- 12-ga. (2.6 mm) cold-rolled steel

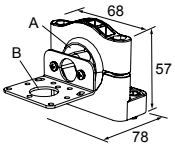
Hole center spacing: A = 26.0, A to B = 13.0
Hole size: A = 26.8 × 7.0, B = ø 6.5, C = ø 19.0



SMB30SK

- Flat-mount swivel bracket with extended range of motion
- Black reinforced thermoplastic polyester and 316 stainless steel
- Stainless steel swivel locking hardware included

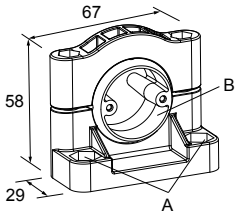
Hole center spacing: A = 50.8
Hole size: A = ø 7, B = ø 18



SMB30SUS

- Side-mount swivel with extended range of motion
- Black reinforced thermoplastic polyester
- Stainless steel swivel locking hardware included

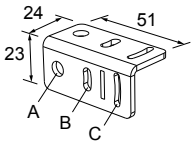
Hole center spacing: A = 50.8, B = 24.1
Hole size: A = ø 7, B = ø 7.6



SMB312B

- Stainless steel 2-axis, bottom-mount bracket
- Includes mounting foot

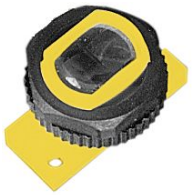
A = diam. 6.9, B = 4.3 × 10.5, C = 3.1 × 15.2



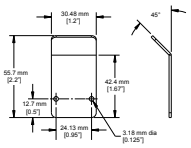
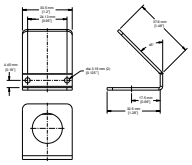
Miscellaneous Accessories and Replacement Parts

MINI-BEAM lens assemblies are field-replaceable.

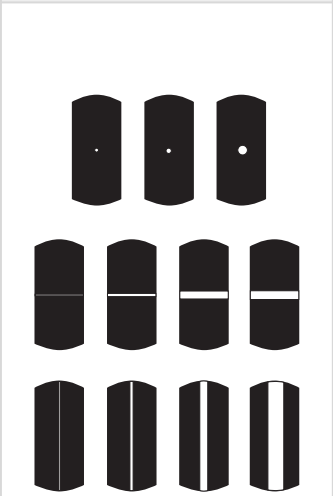
Replacement Lens Model	Replacement Lens for MINI-BEAM Model	Possible Sensing Mode or Range Changes	
UC-300AG	LVAG	LV to LVAG	
UC-300BZ	W and DBZ	D to DBZ and F to DBZ	
UC-300C..7	C, CV, and CVG	CV2 to CV	
UC-300C2	C2 and CV2	CV to CV2	
UC-300E	E and R	-	
UC-300EL	EL and RL	Extends the range of the E/R models	
UC-300EPD	EPD	-	
UC-300F	F and FV	D to F and DBZ to F	
UC-300FP	FP (old style)	-	
UC-300FP2	FP	-	
UC-300L	LV and D	F to D, LVAG to LV, and DBZ to D	
UC-300LP	LP	-	
UC-300RPD	RPD	-	



MINI-BEAM right-angle reflectors are useful for tight sensing locations. These reflectors significantly decrease excess gain.

Right-Angle Reflectors	
RAR300SM • Side mount right-angle reflector • Profile dimension of 14 mm (0.56 inches) in the direction of the scan • Use with MINI-BEAM models 31E, EL, R, RL; and 312D, DBZ, LV, W	
RAR300FM • Front mount right-angle reflector that attaches directly to the threaded barrel of most MINI-BEAMs • Profile dimension of 34 mm (1.35 inches) in the direction of the scan • Use with MINI-BEAM models 31E, EL, R, RL; and 312D, LV	

Opposed-mode MINI-BEAM sensors may be fitted with apertures that narrow or shape the effective beam of the sensor to more closely match the size or profile of the object to be sensed, for example, the use of “line” (or “slit”) apertures for sensing wire or thread. Each model contains 20 apertures.

MINI-BEAM Opposed-Mode Aperture Kits			
Model	**Description**	**Qty**	
Circular			
AP31-020	0.5 mm dia.	20	
AP31-040	1.0 mm dia.	20	
AP31-100	2.5 mm dia.	20	
Horizontal Slot			
AP31-020H	0.5 x 6.4 mm	20	
AP31-040H	1.0 x 6.4 mm	20	
AP31-100H	2.5 x 6.4 mm	20	
AP31-200H	5.1 x 6.4 mm	20	
Vertical Slot			
AP31-020V	0.5 x 12.7 mm	20	
AP31-040V	1.0 x 12.7 mm	20	
AP31-100V	2.5 x 12.7 mm	20	
AP31-200V	5.1 x 12.7 mm	20	
Kit			
AP31-DVHX2	2 of each aperture	2	

Aperture	Range (Standard Group I and II Sensor Pairs)				Range (Group I Sensor Pairs with UC-300EL Upper Covers Substituted)	
	Aperture on Both Emitter and Received		Aperture on Receiver Only			
	Group I Sensors	Group II Sensors	Group I Sensors	Group II Sensors	Aperture on Both Emitter and Received	Aperture on Receiver Only
AP31-020	89 mm	102 mm	457 mm	1.5 m	127 mm	914 mm
AP31-040	330 mm	457 mm	940 mm	3.2 m	183 mm	2 m
AP31-100	1.5 m	3 m	2.5 m	8.2 m	2.1 m	5.8 m
AP31-020H	406 mm	1.8 m	965 mm	9.1 m	864 mm	3.4 m
AP31-040H	914 mm	4 m	1.8 m	12.5 m	1.8 m	5.2 m
AP31-100H	2.3 m	10.4 m	2.9 m	20.7 m	5.2 m	8.5 m
AP31-200H	2.8 m	21.3 m	3 m	24.4 m	8.2 m	11 m
AP31-020V	457 mm	1.7 m	1 m	8.2 m	1 m	3.4 m
AP31-040V	1 m	5.5 m	1.8 m	15.8 m	2.1 m	5.5 m
AP31-100V	2.3 m	10.7 m	2.9 m	22.9 m	6.1 m	8.5 m
AP31-200V	2.8 m	22.9 m	3 m	25.9 m	8.5 m	11 m

GROUP I Emitter/ Receiver Pairs (see Range): SM31E/SM31R

GROUP II Emitter/ Receiver Pairs (see Range): SM31EL/SM31RL

Example: A MINI-BEAM sensor pair is in Group I. With an AP31-040 circular aperture on the receiver only, range is 940 mm (37 in). With AP31-040 apertures on both emitter and receiver, range is 330 mm (13 in). Group I range with AP31-040 apertures and UC-300EL upper covers on both units is 183 mm; range with receiver aperture only is 2 m (80 in).

Product Support and Maintenance

Clean Sensor with Compressed Air Then Isopropyl Alcohol

Handle the sensor with care during installation and operation. Sensor windows soiled by fingerprints, dust, water, oil, etc. may create stray light that may degrade the peak performance of the sensor. Blow dust from the sensor using filtered, compressed air. If the sensor is still dirty, gently wipe the sensor with a dry optical cloth. If the dry optical cloth does not remove all residue, use 70% isopropyl alcohol on a clean optical cloth, then dry with a clean dry optical cloth and blow with filtered, compressed air.

Contact Us

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