Glass Fiber Optics

- Solve numerous challenging sensing applications in the most hostile environments, including temperatures up to 480° C, corrosive materials and extreme moisture
- Withstand severe shock and vibration
- Ignore extreme electrical noise
- Constructed of a combination of optical glass fiber, stainless steel, PVC, brass, molded thermoplastics and optical-grade epoxy

Glass Fiber Optic Model Key

I	A T	2	3	S	X X

ASSEMBLY STYLE designator

B = Bifurcated fiber
I = Individual fiber*

SENSING END TIP STYLE designator

A = 90° Angle
AM = Miniature 90° Angle
AT = 90° Angle/Thread
F = Ferrule
M = Miniature Tip
MP = Miniature Probe
MT = Miniature Thread
R = Rectangular Bundle Termination
T = Thread
TA = Thread/90° Angle
TETA = Thread and Extra Tight 90° Angle

MODIFICATIONS designator

"MXX" = Sensing end tip modification
"M600" Sensing end withstands 315° C
"M900" = Sensing end withstands 480° C

SHEATHING MATERIAL designator

S = Stainless steel flexible conduit
P = PVC with galvanized monocoil reinforcing wire

OVERALL LENGTH designator (in feet)

2 = 2 ft. = 610 mm ±38 mm
3 = 3 ft. = 914 mm ±38 mm

FIBER BUNDLE DIAMETER designator

.44 = 0.7 mm
.5 = 0.8 mm
.75 = 1.2 mm
1 = 1.6 mm
1.5 = 2.3 mm
2 = 3.2 mm
2.5 = 4.0 mm

* Individual glass fibers are packaged separately.

Glass Fiber Optics Specifications	
Construction	Combination of optical glass fiber, stainless steel or PVC, brass, molded thermoplastics, and optical-grade epoxy. Optical fiber is F2 core, EN1 clad, approx. 50 µm diameter per strand. Flexible steel interlock sheathing is 302 stainless.
Sensing Range	Refer to the specific fiber optic to be used.
Bend Radius	Inside bend radius must be 12 mm or greater for PVC covered fiber optic assemblies, and 25 mm or greater for stainless steel armored cable covered fibers.
Length	Standard length for assemblies is 915 mm; see dimension diagrams. Most models are available from the factory with shorter or longer cable lengths, up to 18 m max.
Length Dimension Tolerance	**Overall assembly length:** ±12 mm per 300 mm of length **Shrink junction dimensions:** ±12 mm
Implied Dimensional Tolerances	**All dimensions are in millimeters:** x = ±2.5 mm, x.x = ±0.25 mm and x.xx = ±0.12 mm, unless specified.
Operating Conditions	Fiber assemblies with stainless-steel (SS) sheathing and metal end tips: -140° to +249° C Fiber assemblies with PVC sheathing and/or plastic end tips: -40° to +105° C Special order assemblies with SS sheathing and metal end tips and model suffix “M600”: -140° to +315° C* Special order assemblies with SS sheathing and metal end tips and model suffix “M900”: -140° to +480° C*; note dimensional changes from STD models * sensing end tip only

⚠ Application Notes and Warnings ⚠

1. The ends of glass fiber optic assemblies are optically ground and polished. Care taken in this manufacturing process accounts for the light coupling efficiency of the fiber optic assembly. As a result, glass fiber assemblies cannot be shortened, spliced or otherwise modified.
2. Use caution when applying fiber optics in hazardous locations. Although fiber optic assemblies are by themselves, intrinsically safe, the sensor and associated electronics must be LOCATED IN A SAFE ENVIRONMENT. Alternatively, fiber optics may be used with sensor model SMI912FQD (page 34). This sensor is approved for use inside hazardous areas when used with an appropriate intrinsic barrier. Also, see NAMUR sensor models Q45AD9F (page 156) and MIAD9F (page 90). Fiber optics do not necessarily provide a hermetic seal between a hazardous environment and the safe environment.
3. In applications where glass fibers to insulate the control from high voltage, specify silicone rubber, Teflon®, or high-density polyethylene sheathing with no reinforcing wire in the cable. It is the responsibility of the user to test each fiber optic assembly for insulation capacity.
4. Do not subject the fibers to sharp bends, pinching, repeated flexing or high levels of radiation.
5. When ordering fiber lengths in excess of 1 m, take into account light signal reduction of 5 percent per 300 mm of additional length.

* Teflon® is a registered trademark of Dupont™.


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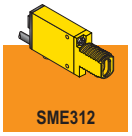

SME312


D12E

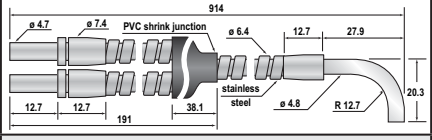
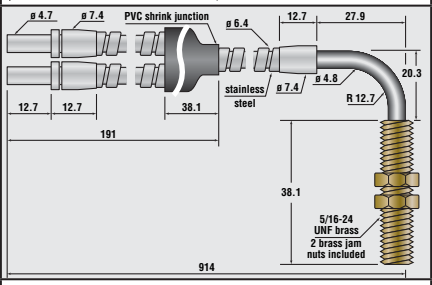
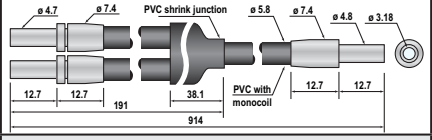
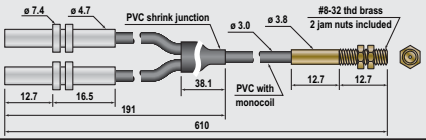
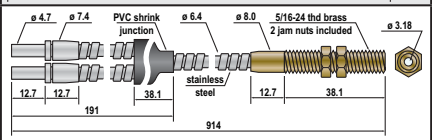
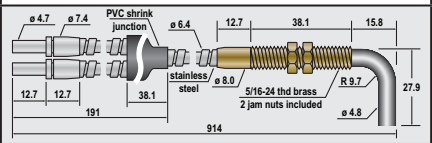
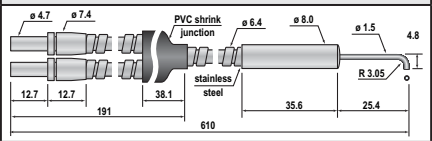
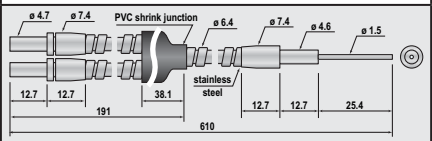
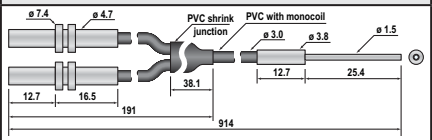
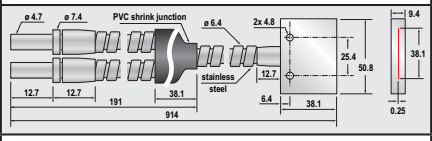
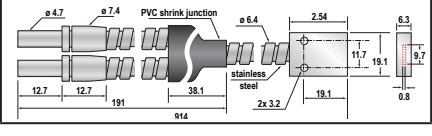

D12


QS18

Indicates lenses available for model. See page 207 for details.

M600 Available 315° C models. Add **M600** to end of model number (example, **BA23SM600**).

M900 Available 480° C models. Add **M900** to end of model number (example, **BA23SM900**).

Model Number			Drawing & Dimensions	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Typical Range (mm)
Diffuse	Standard	BA23S		3.18	19	• 90° Angle M600 M900	Details Online
		BAT23S		3.18	19	• 90° Angle/Thread M600 M900	Details Online
		BF23P		3.18	19	• Smooth ferrule M600 M900	Details Online
		BMT.442P		0.69	9.5	• Miniature thread	Details Online NA
		BT23S		3.18	19	• Thread M600 M900	Details Online
		BTA23S		3.18	19	• Thread/90° Angle M600 M900	Details Online
	Miniature Probe	BAM.752S		1.17	19	• ø 1.5 mm non-bendable probe; 90° angle M600	Details Online NA
		BM.752S		1.17	19	• ø 1.5 mm non-bendable probe M600	Details Online NA
		BMP.753P		1.17	9.5	• ø 1.5 mm non-bendable probe	Details Online NA
	Area Sensing (Array)	BR2.53S		3.96	19	• Straight exit; 38 mm width M600	Details Online
		BR23S		3.18	19	• Straight exit; 10 mm width M600	Details Online

NA: WORLD-BEAM QS18 not recommended.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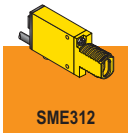
SME312


D12E


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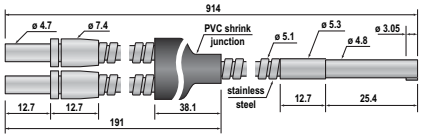
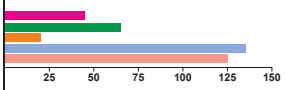
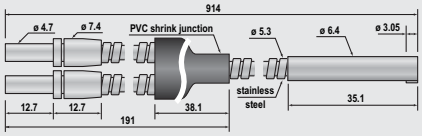
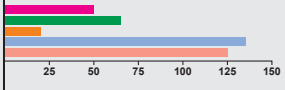
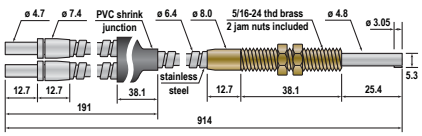
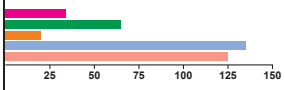
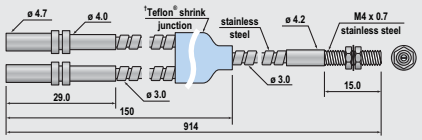
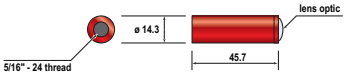
QS18

M600 Available 315° C models. Add **M600** to end of model number (example, **BA23SM600**).

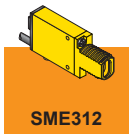
M900 Available 480° C models. Add **M900** to end of model number (example, **BA23SM900**).

	Model Number	Drawing & Dimensions	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Typical Range (mm)
Diffuse	Side-view BA1.53SMETA		2.29	19	• Ultra-compact head M600	Details Online 
Diffuse	Side-view BA1.53SMTA		2.29	19	• Compact head M600	Details Online 
Diffuse	Side-view BTETA1.53S		2.29	19	• Ultra-compact head; thread M600	Details Online 
Diffuse	Vacuum BMT13SMVF		1.57	19	• Miniature thread; entire cable withstands 480° C	Details Online Contact factory representative for range information
Diffuse	Convergent Beam Spot L10		ref. glass fiber key or call factory	ref. glass fiber key or call factory	• Glass lens; withstands 315° C • Focuses light to .80 mm with ø 1.6 mm fiber	

Glass Fiber Optics—Additional Models Available

In addition to the configurations shown, Banner offers thousands of readily available alternative fiber models:

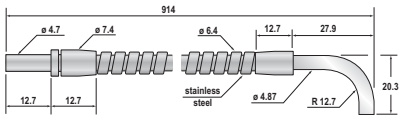
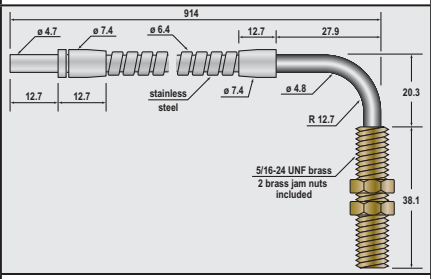
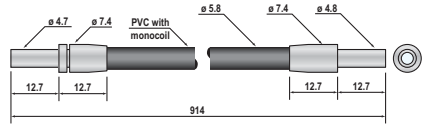
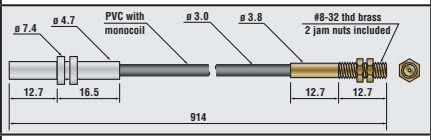
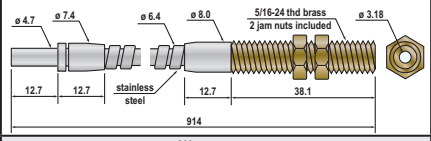
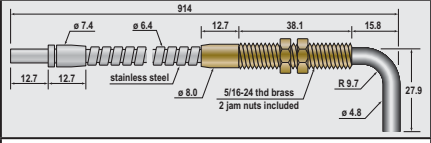
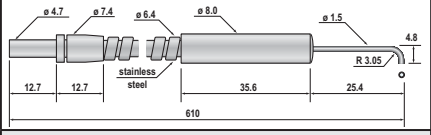
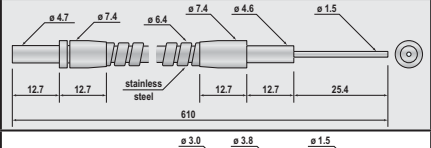
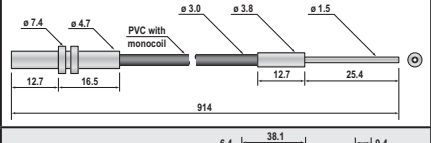
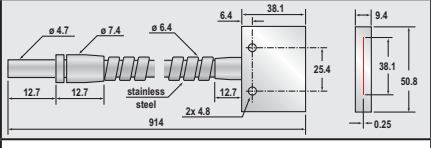
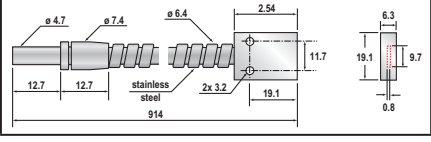
- Substitute PVC over monocoil sheathing for stainless steel.
- Reduce or increase glass fiber optic bundle diameters.
  Example: Change ø 3.18 mm bundle to ø 1.57 mm.
- Substitute a rectangular-shaped fiber bundle (0.5 x 2.5 mm) for a circular bundle.
- Change endtip material from brass to stainless steel.
- Modify straight or angled probe tip dimensions.
- Modify overall fiber length in intervals of 305 mm (standard lengths are 914 and 610 mm).



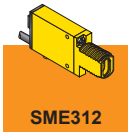
Indicates lenses available for model. See page 209 for details.

M600 Available 315° C models. Add **M600** to end of model number (example, **BA23SM600**).

M900 Available 480° C models. Add **M900** to end of model number (example, **BA23SM900**).

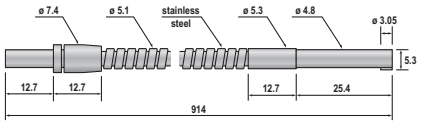
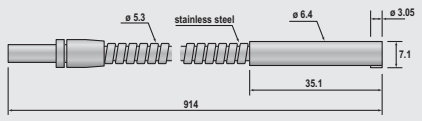
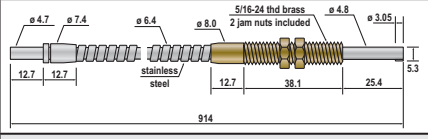
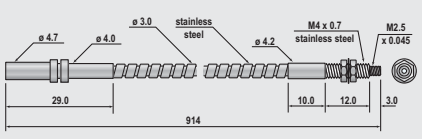
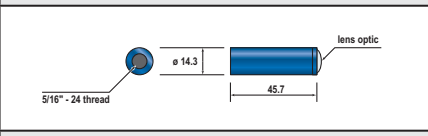
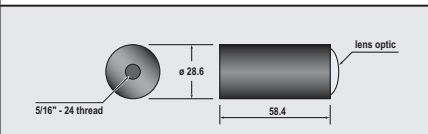
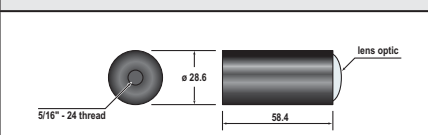
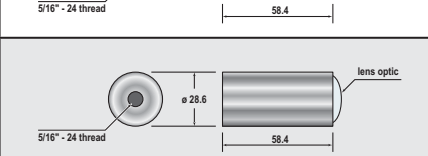
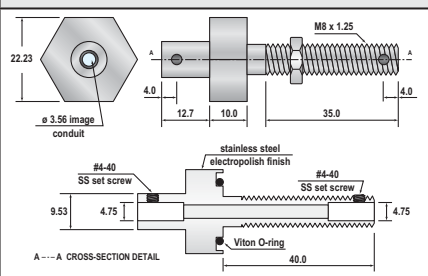
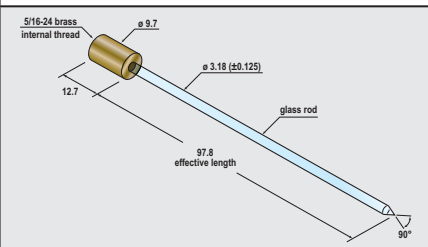
Model Number		Drawing & Dimensions	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Typical Range (mm)
Opposed / Standard	IA23S		3.18	19	• 90° Angle	Details Online
Opposed / Standard	IAT23S		3.18	19	• 90° Angle/Thread	Details Online
Opposed / Standard	IF23P		3.18	19	• Smooth ferrule	Details Online
Opposed / Standard	IMT.442P		0.69	9.5	• Miniature thread	Details Online
Opposed / Standard	IT23S		3.18	19	• Thread	Details Online
Opposed / Standard	ITA23S		3.18	19	• Thread/90° Angle	Details Online
Opposed / Miniature Probe	IAM.752S		1.17	19	• ø 1.5 mm non-bendable probe; 90° angle	Details Online
Opposed / Miniature Probe	IM.752S		1.17	19	• ø 1.5 mm non-bendable probe	Details Online
Opposed / Miniature Probe	IMP.753P		1.17	9.5	• ø 1.5 mm non-bendable probe	Details Online
Opposed / Area Sensing (Array)	IR2.53S		3.96	19	• Straight exit; 38 mm width	Details Online
Opposed / Area Sensing (Array)	IR23S		3.18	19	• Straight exit; 10 mm width	Details Online

NA: WORLD-BEAM QS18 not recommended.



M600 Available 315° C models. Add **M600** to end of model number (example, **BA23SM600**).

M900 Available 480° C models. Add **M900** to end of model number (example, **BA23SM900**).

Model Number		Drawing & Dimensions	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Typical Range (mm)
Diffuse — Side-view	IA1.53SMETA		2.29	19	• Ultra-compact head M600	Details Online
Diffuse — Side-view	IA1.53SMTA		2.29	19	• Compact head M600	Details Online
Diffuse — Side-view	ITETA1.53S		2.29	19	• Ultra-compact head; thread M600	Details Online
Diffuse — Vacuum	IMT753SMVF		1.27	19	• Miniature thread; entire cable withstands 480° C	Contact factory representative for range information
Diffuse — Extended Range Lens	L9 Detailed Dimensions Online		ref. model IT23S	ref. model IT23S	• Glass lens; withstands 315° C	
Diffuse — Extended Range Lens	L16F Detailed Dimensions Online		ref. model IT23S	ref. model IT23S	• Plastic housing; withstands 105° C	
Diffuse — Extended Range Lens	L16FAL Detailed Dimensions Online		ref. model IT23S	ref. model IT23S	• Aluminum housing; withstands 315° C	
Diffuse — Extended Range Lens	L16FSS Detailed Dimensions Online		ref. model IT23S	19	• Stainless steel housing withstands 480° C	
Diffuse — Vacuum Feed Through	VFT-M8MVS Detailed Dimensions Online		3.56	–	• Seals to 1 x 10^{-9} torr; withstands 120° C	
Diffuse — Liquid Level	TGR Detailed Dimensions Online		3.18	–	• Use with BT23S • Sensor switches when tip of glass rod is immersed in liquid	

R58 *Expert*™

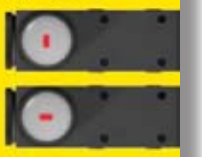
Color Registration Mark Sensors Provide High Color Contrast Sensitivity

Three LED sensing colors in one sensor

- Includes three LEDs: red, green and blue
- Automatically selects the correct LED to use based on the contrast of the background and the registration mark being sensed

Convenient and flexible mounting

- Includes two lens locations on each sensor
- Offers threaded lens and cap for easy exchange without tools
- Available with a vertical or horizontal light spot, depending on model
- Includes eight M5 threaded mounting holes for easy installation



Range and application tolerant

- Tolerates a +/-3 mm shift from the 10 mm focal point
- Accommodates web flutter and similar variations in the target's location

Features

- Provides excellent color contrast sensivity through advanced electronic circuitry
- Detects inconspicuous registration marks in low-contrast, high-gloss sensing applications
- Optimizes application contrast by automatically choosing red, green or blue sensing LEDs
- Offers continuous readout of operating status with easy-to-read, 8-segment light bar indicator
- Features static and dynamic TEACH programming and manual adjustment
- Provides a sensing image that measures 1.2 by 3.8 mm at 10 mm from the lens
- Includes bipolar discrete outputs: current sinking (NPN) and current sourcing (PNP)
- Offers configurable light- or dark-operate outputs
- Includes optional 30-millisecond ON/OFF-delay
- Performs 10,000 actuations per second (10 kHz switching frequency)
- Features rugged, zinc alloy die-cast housing rated IP67; NEMA 6
- Features high-quality acrylic lens suitable for food processing applications
- Includes integral cable or 5-pin Euro-style pigtail quick disconnect

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