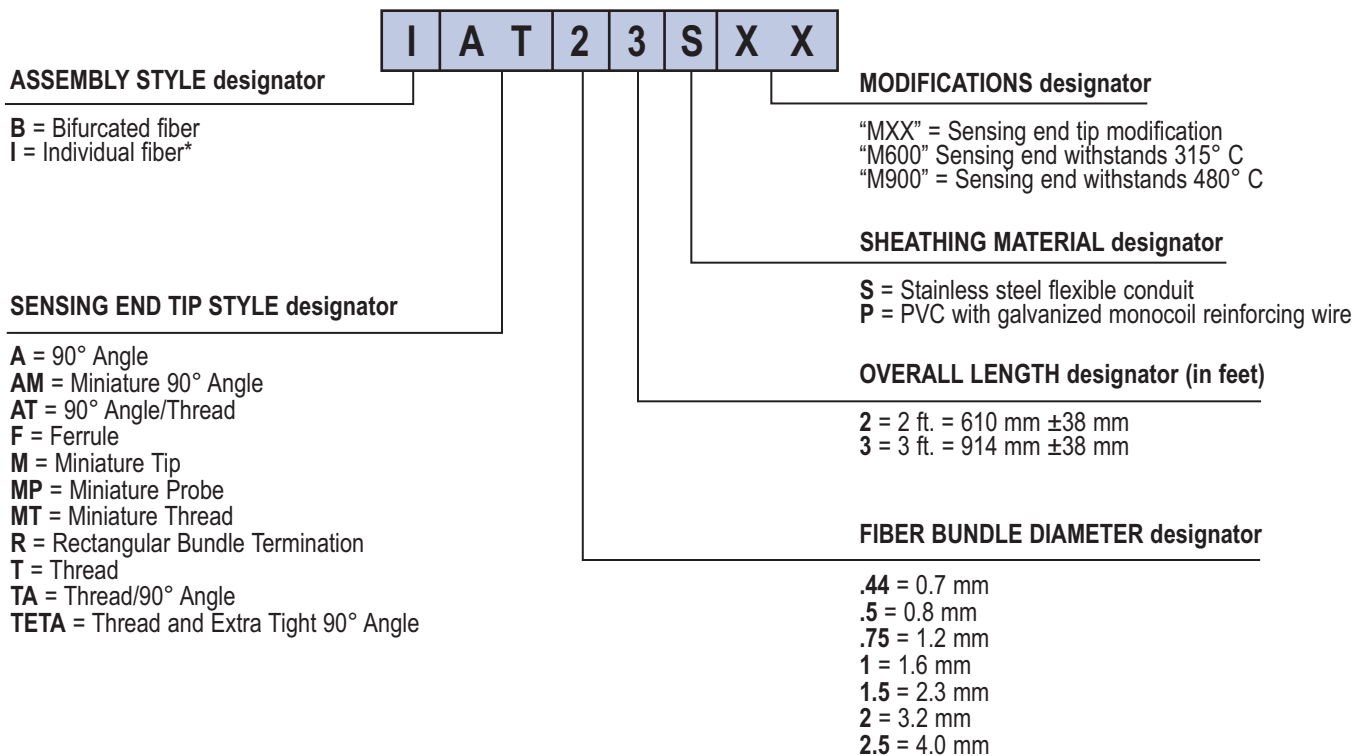


Glass Fiber Optics

- 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



* 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™.

SENSORS
PLASTIC FIBERS
GLASS FIBERS



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)			
Standard	Diffuse	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 NA		Details Online
		BT23S		3.18	19	• Thread M600 M900		Details Online
		BTA23S		3.18	19	• Thread/90° Angle M600 M900		Details Online
Miniature Probe	Diffuse	BAM.752S		1.17	19	• ø 1.5 mm non-bendable probe; 90° angle M600		Details Online
		BM.752S		1.17	19	• ø 1.5 mm non-bendable probe M600		Details Online
		BMP.753P		1.17	9.5	• ø 1.5 mm non-bendable probe NA		Details Online
Area Sensing (Array)	Diffuse	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



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	<ul style="list-style-type: none"> Ultra-compact head <p>M600</p>
		BA1.53SMETA		2.29	19	<ul style="list-style-type: none"> Compact head <p>M600</p>
		BTETA1.53S		2.29	19	<ul style="list-style-type: none"> Ultra-compact head; thread <p>M600</p>
Vacuum		BMT13SMVF		1.57	19	<ul style="list-style-type: none"> Miniature thread; entire cable withstands 480° C <p>M600</p>
		L10		ref. glass fiber key or call factory	ref. glass fiber key or call factory	<ul style="list-style-type: none"> Glass lens; withstands 315° C Focuses light to .80 mm with ø 1.6 mm fiber

SENSORS
PLASTIC FIBERS
GLASS FIBERS



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).

SENSORS
PLASTIC FIBERS
GLASS FIBERS

Model Number	Drawing & Dimensions	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Typical Range (mm)	
Standard	IA23S		3.18	19	• 90° Angle M600 M900	
	IAT23S		3.18	19	• 90° Angle/Thread M600 M900	
	IF23P		3.18	19	• Smooth ferrule M600 M900	
	IMT.442P		0.69	9.5	• Miniature thread NA	
	IT23S		3.18	19	• Thread M600 M900	
	ITA23S		3.18	19	• Thread/90° Angle M600 M900	
Miniature Probe	IAM.752S		1.17	19	• ø 1.5 mm non-bendable probe; 90° angle M600	
	IM.752S		1.17	19	• ø 1.5 mm non-bendable probe M600	
	IMP.753P		1.17	9.5	• ø 1.5 mm non-bendable probe NA	
Area Sensing (Array)	IR2.53S		3.96	19	• Straight exit; 38 mm width M600	
	IR23S		3.18	19	• Straight exit; 10 mm width M600	



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)	
Side-view	IA1.53SMETA 	2.29	19	<ul style="list-style-type: none"> Ultra-compact head 		
	IA1.53SMTA 	2.29	19	<ul style="list-style-type: none"> Compact head 		
	ITETA1.53S 	2.29	19	<ul style="list-style-type: none"> Ultra-compact head; thread 		
Vacuum	IMT733SMVF 	1.27	19	<ul style="list-style-type: none"> Miniature thread; entire cable withstands 480° C 	Contact factory representative for range information	
Diffuse	Extended Range Lens	L9 	ref. model IT23S	ref. model IT23S	<ul style="list-style-type: none"> Glass lens; withstands 315° C 	
		L16F 	ref. model IT23S	ref. model IT23S	<ul style="list-style-type: none"> Plastic housing; withstands 105° C 	
		L16FAL 	ref. model IT23S	ref. model IT23S	<ul style="list-style-type: none"> Aluminum housing; withstands 315° C 	
		L16FSS 	ref. model IT23S	19	<ul style="list-style-type: none"> Stainless steel housing withstands 480° C 	
Vacuum Feed Through	VFT-M8MVS 	3.56	-	<ul style="list-style-type: none"> Seals to 1 x 10⁻⁹ torr; withstands 120° C 		
Liquid Level	TGR 	3.18	-	<ul style="list-style-type: none"> Use with BT23S Sensor switches when tip of glass rod is immersed in liquid 		

SENSORS
 PLASTIC FIBERS
 GLASS FIBERS

PART & AREA

SLOT & LABEL

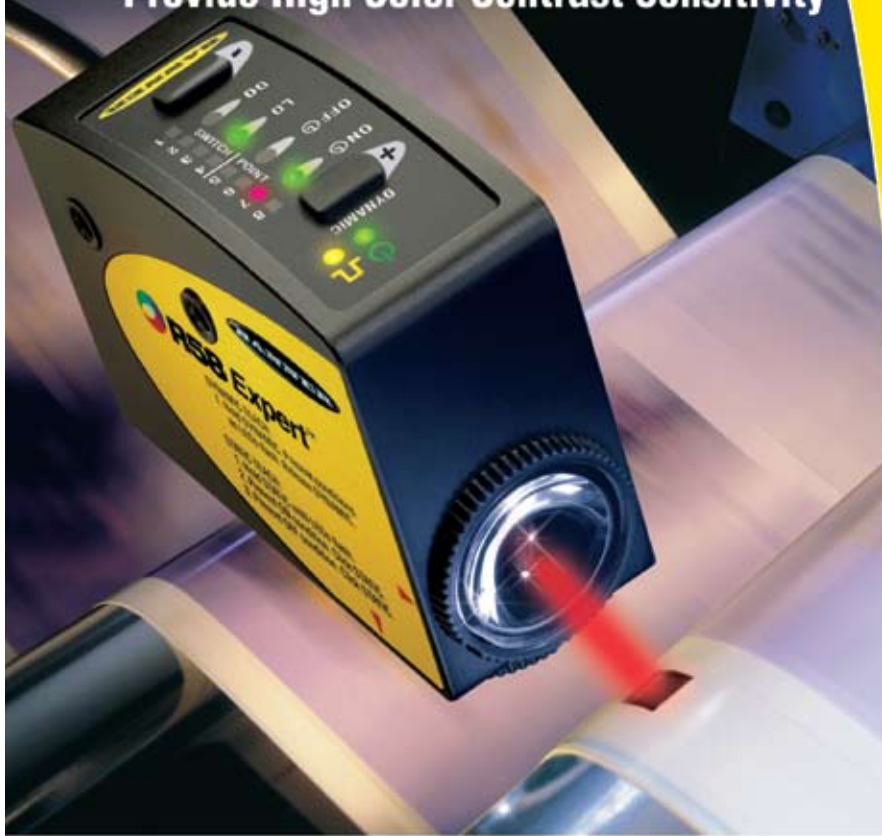
COLOR & LUMINESCENCE

OPTICAL BUTTONS

MAGNETIC

R58 Expert™

Color Registration Mark Sensors Provide High Color Contrast Sensitivity



Features

- Provides excellent color contrast sensitivity 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

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



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