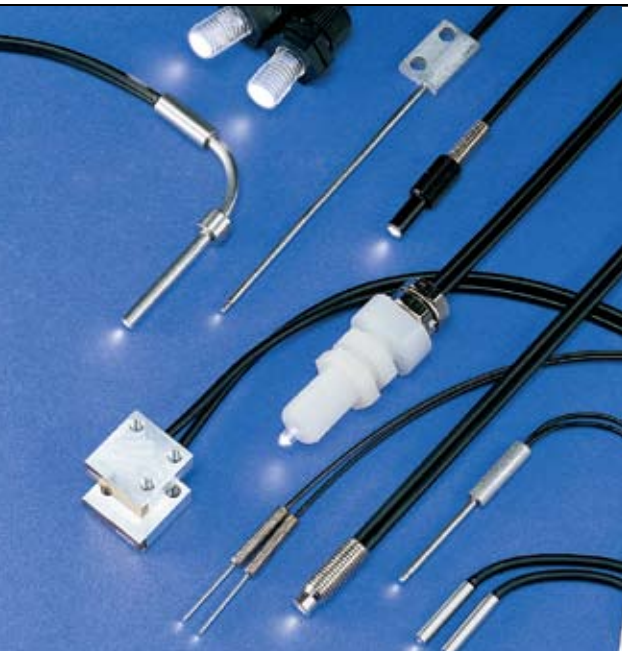


Plastic Fiber Optics

- Provide an economical alternative to glass fiber optics for piping photoelectric sensing light to and from confined areas with suitable environments
- Ideal for detecting small objects
- Withstand repeated flexing and bending
- Available in individual or bifurcated styles*
- Available with optional DURA-BEND™ fibers for improved flexibility in difficult-to-access locations, without the decreased performance to which excessively bent standard plastic fibers optics are prone
- Available with core diameters of 0.25, 0.50, 0.75, 1.0 and 1.5 mm

Plastic Fiber Optic Model Key

P	B	P	4	6	U	C	X

PLASTIC FIBER FAMILY designator

Same for all plastic fibers

ASSEMBLY STYLE designator

B = Bifurcated fiber
I = Individual fiber*
DI = Dual Individual fiber*

SENSING END designator

A = 90° Angle
AT = 90° Angle/Thread
CF = Coaxial Ferrule
CT = Coaxial Thread
E = Encapsulated
EFP = Extended Ferrule Probe
F = Ferrule
FM = Ferrule Miniature
FMP = Ferrule Miniature Probe
L = Lensed
P = Probe
PF = Probe Ferrule
PMSB = Probe Miniature Side-view Bendable
PS = Probe Side-view
PSB = Probe Side-view Bendable
PSM = Probe Side-view Miniature
R = Rectangular
RS = Rectangular Side-view
T = Thread
TA = Thread/90° Angle
TP = Thread/Probe

FIBER CORE DIAMETER designator

1 = 0.25 mm
2 = 0.50 mm
3 = 0.75 mm
4 = 1.00 mm
6 = 1.50 mm
1X4 = 4 x 0.25 mm
1X16 = 16 x 0.265 mm
1X32 = 32 x 0.265 mm

FIBER LENGTH designator

3 = 1 m (1000 mm)
6 = 2 m (2000 mm)
100 = 30 m (30480 mm)

CONTROL END designator

T5 = Terminated
TMB5 = STEELSKIN™ braiding over monocoil reinforcement
U = Unterminated straight cable**
UC = Unterminated Coiled cable
UHF = Unterminated DURA-BEND™ multi-core cable

MODIFICATIONS designator

"MXX" = Sensing end tip modification

* All individual plastic fiber optics are sold and used in pairs. Bifurcated fibers are two-way fibers with a single sensing end that both emits and receives light and with dual-control sensor ends that attach separately to the sensor's LED and photodetector.

** Plastic fibers with "U" in the suffix of the model numbers have unterminated control ends; cut them to the required length using the supplied cutter.

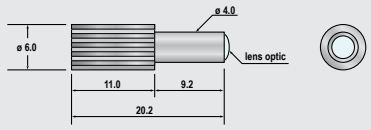
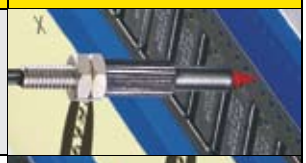
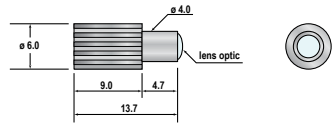
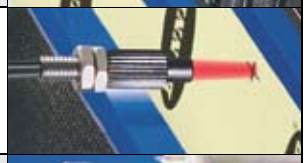
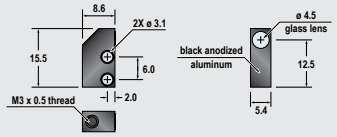
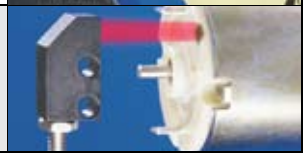
Plastic Fiber Optics Specifications

Construction	**Optical Fiber:** acrylic (PMMA) monofilament, except as noted **Protective Jacket:** black polyethylene, except as noted **Threaded End Tips and Hardware:** nickel-plated brass, except as noted **Probe End Tips:** annealed (bendable) 304 stainless steel **Angled End tips:** hardened 304 stainless steel **Ferrule End Tips:** 303 stainless steel
Sensing Range	Refer to the specific fiber optic/sensor combination
Implied Dimensional Tolerance	**All dimensions are in millimeters:** x = ±2.5 mm, x.x = ±0.25 mm and x.xx = ±0.12 mm, unless specified. "L" = ±40 mm per meter
Minimum Bend Radius	8 mm for 0.25 mm diameter fibers 12 mm for 0.5 mm diameter fibers (except DURA-BEND™) 25 mm for 1.0 mm diameter fibers (except DURA-BEND™) 38 mm for 1.5 mm diameter fibers
Repeat Bending/Flexing	Life expectancy of plastic fiber optic cable is in excess of one million cycles at bend radii of no less than the minimum and a bend of 90° or less. Avoid stress at the point where the cable enters the sensor ("control end") and at the sensing end tip. Coiled plastic fiber optic assemblies are recommended for any application requiring reciprocating fiber motion.
Chemical Resistance	The acrylic core of the monofilament optical fiber will be damaged by contact with acids, strong bases (alkalis) and solvents. The polyethylene jacket will protect the fiber from most chemical environments. However, materials may migrate through the jacket with long term exposure. Samples of fiber optic material are available from Banner for testing and evaluation.
Temperature Extremes	Temperatures below -30° C will cause embrittlement of the plastic materials but will not cause transmission loss. Temperatures above +70° C will cause both transmission loss and fiber shrinkage.
Operating Temperature	-30° to +70° C, unless otherwise specified

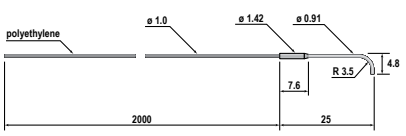
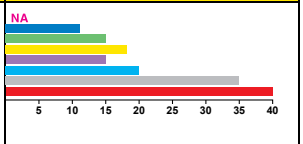
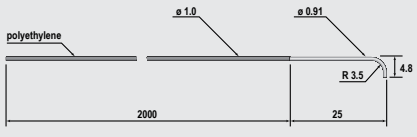
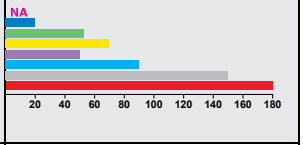
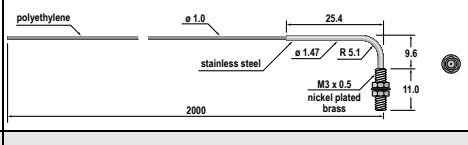
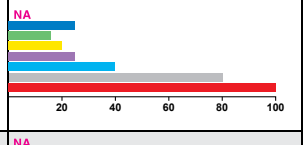
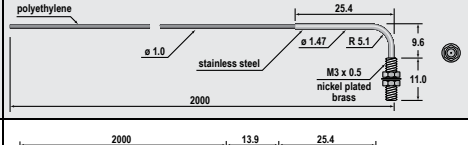
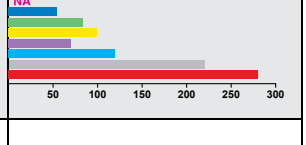
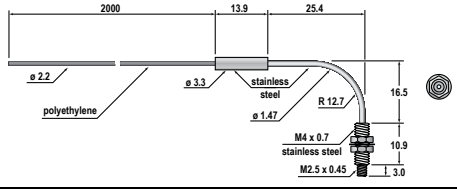
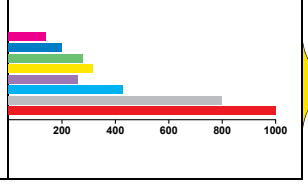
⚠ Application Notes and Warnings ⚠

1. Plastic fiber assemblies with "U" in the suffix of the model numbers have unterminated control ends (the end that is coupled to the photoelectric sensor). The customer can cut these fiber optic assemblies to the required length using the supplied cutter. Use only the supplied cutter to ensure optimal light coupling efficiency.
2. Terminated plastic fiber assemblies are optically ground and polished and cannot be shortened, spliced or otherwise modified.
3. Do not subject the plastic fibers to sharp bends, pinching, high tensile loads or high levels of radiation.
4. When ordering fiber lengths in excess of 2 m, take into account light signal attenuation due to the additional length.
5. Due to their light transmission properties, plastic fiber optics are recommended for use only with visible light fiber optic sensors.
6. 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 NAMUR sensor model Q45AD9FP (page 196). Fiber optics do not necessarily provide a hermetic seal between a hazardous environment and the safe environment.

Diffuse — Convergent Spot Lens

Model Number	Drawing & Dimensions (mm)	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Free Cut*	Typical Range (mm)
L4C6		ref. model PBCT26U	ref. model PBCT26U	• Anodized AL housing; ø 0.25 mm beam spot @ 6 mm • Fixed focus		
L4C20		ref. model PBCT26U	ref. model PBCT26U	• Anodized AL housing; ø 4 mm beam spot @ 20 mm • Fixed focus		
LZ3C8		ref. model PBT26UM3	ref. model PBCT26UM3	• Anodized AL housing; ø 0.5 - 3.2 mm adj. beam spot • Adjustable focus		

Opposed — Standard

Model Number	Drawing & Dimensions (mm)	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Free Cut*	Typical Range (mm)
PIA16U		0.25	8	• 90° angle	✓	
PIA26U		0.5	12	• 90° angle	✓	
PIAT16U		0.25	8	• 90° angle/thread	✓	
PIAT26U		0.5	12	• 90° angle/thread	✓	
PIAT46U		1.0	25	• 90° angle/thread	✓	

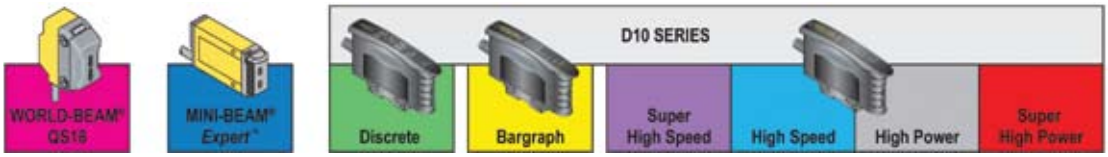
More on next page

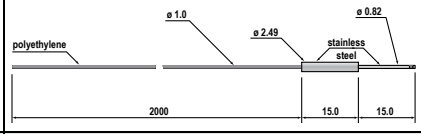
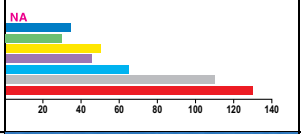
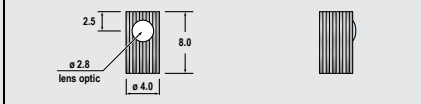
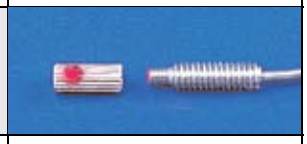
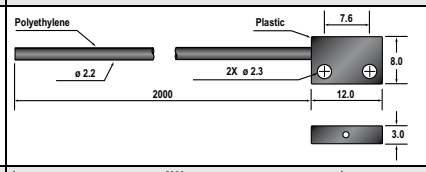
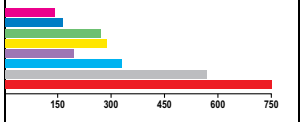
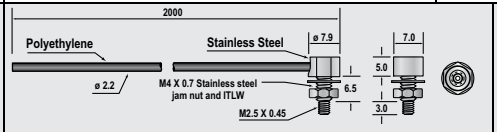
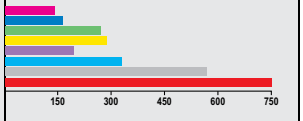
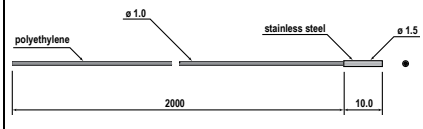
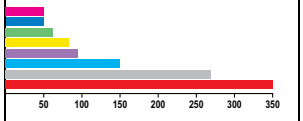
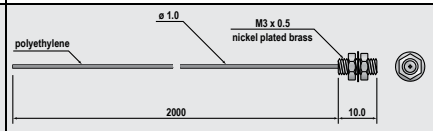
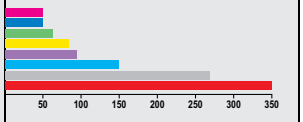
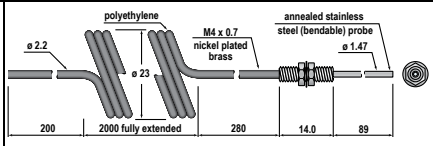
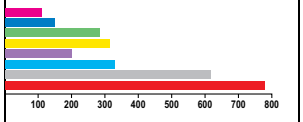
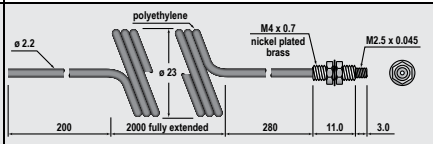
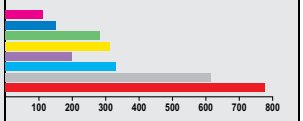
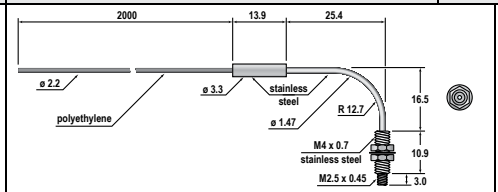
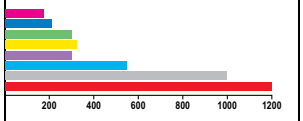
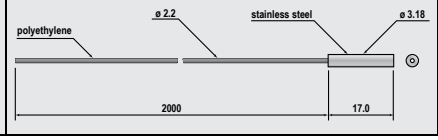
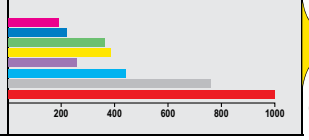
NA: WORLD-BEAM QS18 not recommended.

Indicates lens available for model. See page 253 for details.

* Fibers can be free cut using fiber cutter (see page 255).

SENSORS



Model Number			Drawing & Dimensions (mm)	Core Dia. (mm)	Min. Bend Radius (mm)	Features	Free Cut*	Typical Range (mm)
Opposed	Side-View	PIPSM26U		0.5	12	• Miniature smooth ferrule; non-bendable tip		
		L2RA		ref. model PIT46U	ref. model PIT46U	• Compact glass prism • M2.5 thread	✓	
	Right-Angle	PIA46UHFMB8X12		1.0	2	• Right angle; side exit; Delrin	✓	
		PIAT46UHFMTA		1.0	2	• Right angle; threaded, stainless steel	✓	
	High-Flex	PIFM1X46U		4X 0.25	8	• Best for repetitive flexing (1,000s of cycles)	✓	
		PIT1X46U		4X 0.25	8	• Best for repetitive flexing (1,000s of cycles)	✓	
		PIP46UC		1.0	25	• For applications involving reciprocating motion	✓	
		PIT46UC		1.0	25	• For applications involving reciprocating motion	✓	
	DURA-BEND™	PIAT46UHF		1.0	1	• 90° angle/thread	✓	
		PIF46UHF		1.0	1	• Smooth ferrule	✓	

More on next page

NA: WORLD-BEAM QS18 not recommended.

Indicates lens available for model. See page 253 for details.

* Fibers can be free cut using fiber cutter (see page 255).