TRI-TRONICS®

Smart Sensing Solutions Since 1954

Plastic Fiber Optic Light Guides

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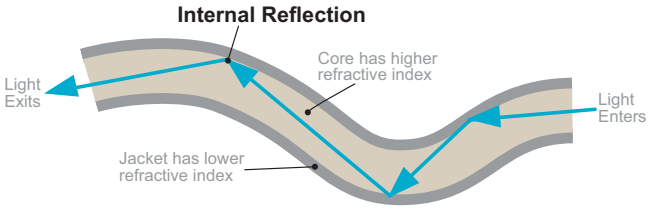
Glass vs Plastic Optical Fibers

Plastic Optical Fibers are similar to glass fibers as they work the same way - they move light from one end to another. But they are suited for use in different applications as well as made from different materials.

Glass fibers will give a stong signal, but plastic fibers have several other benefits to consider. They are less expensive and have greater flexibility. They are resistant to bending, stretching, shock, and vibration.



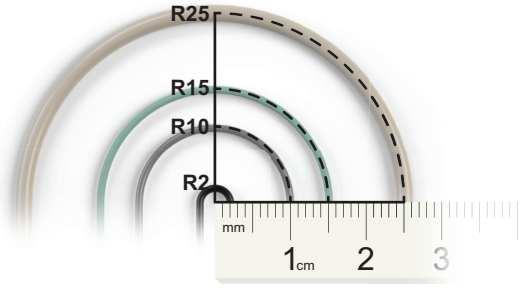
Optical fibers direct light from one location to another.

Plastic optical fibers are also lighter in weight. They generally are sold with a cutting device that allows them to be trimmed to a desired length. They have excellent toughness and durability. They are waterproof, moisture-proof, and magnetic-free.

Compared to Glass fibers, Plastic fibers can really take a beating.

Bend Radius

The Bend Radius is the minimum radius a fiber can be bent without being damaged. The smaller the bend radius, the greater is the material flexibility. Most fibers can be bent up to 25mm (R25) without risk of damage, but the special High Flex fibers can be bent up to 10mm (or as specified).

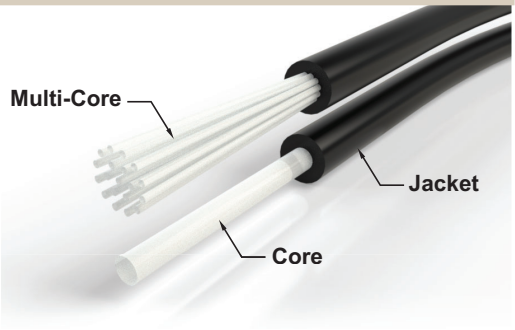


Construction

Core – Thin plastic center of the fiber through which light travels.

Jacket – Layer around plastic fiber to protect from damage and moisture.

Multi-core High-Flex plastic fiber differ from conventional plastic fibers in having multiple independent cores. This configuration allows a bending radius as small as 2mm. They can be bent with no reduction of light transmission. They can be threaded through machinery without the problems associated with extreme vibrations or pulling.



Coaxial - For Reflective Mode only.

The center of fiber core transmits; the ring of cores around the center receive. Received cores around the transmitted fiber core can receive the light from different directions thus increasing accuracy of detection.

Connections

All fibers will fit a 2.2mm diameter fiber port on the sensor: either the plain cut end or with an adapter.


CUT ENDS


ADAPTERS

PLASTIC FIBER OPTIC SPECIFICATIONS

Item		Acceptance Criterion and / or [Test Condition]	Item			
			Unit	Min.	Typ.	Max.
Maximum Rating	Storage Temperature	No Physical Deterioration [in a Dry Atmosphere]	°C	- 55	–	+ 70
	Operation Temperature	No Deterioration in Optical Properties* [in a Dry Atmosphere]	°C	- 55	–	+ 70
	Operation Temperature in a Moist Atmosphere	No Deterioration in Optical Properties** [under 95%RH]	°C	–	–	+ 60
Mechanical Characteristics	Repeated Bending Endurance	Loss Increment =< 1 dB [in Conformity to the JIS C 6861]	Times	10,000	–	–
	Tensile Strength	[Tensile Force at 5㌫ Elongation; in Conformity to the JIS C 6861]	N	70	–	–
Material	Core	Optical Fiber: Polymetyl - Methacrylate Resin				
	Jacket	Protective Jacket: Fluorinated Polymer				

All tests are carried out under temperature of 25°C unless otherwise specified.

* Attenuation increase shall be within 10% after 1,000 hours.
** Attenuation increase shall be within 10% after 1,000 hours, except that due to absorbed water.

The specification is subject to change without notice.
The information contained herein is presented as a guide for the product selection. Please contact our business department for the issue of an official specification sheet.

High Temp Resistant

Available soon!

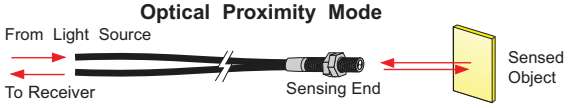
Fiber Sensing Modes:

Sensing Modes: Reflective or Through-Beam
Plastic optical fibers use the same photoelectric sensing modes as sensors (diffuse reflective, through-beam, retroreflective). The two types of fiber-optic assemblies that are used with these sensing modes are bifurcated (reflective) and individual (through-beam).

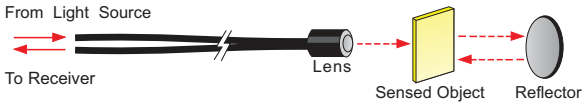
Reflective

Reflective
Fiber optic reflective mode combines the emitter and the receiver into one assembly. Reflective mode fibers (also called bifurcated) are used for both retroreflective and diffuse reflective sensing. When an object is in front of the sensing tip of the reflective cable, light from the emitter reflects off the object and back into the receiver and detection is achieved.

Optical Proximity Mode



Retroreflective Mode

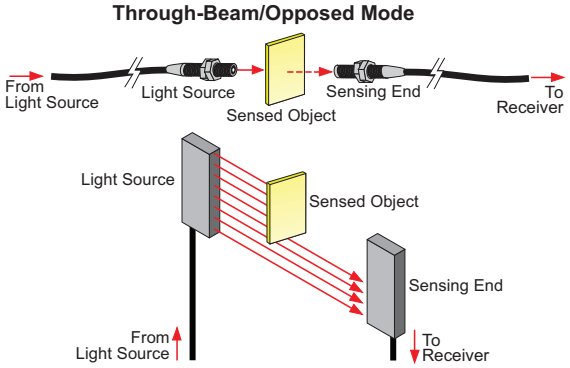


Through-Beam

Through-Beam
Fiber optic through-beam mode requires two assemblies. One is attached to the Light Source of the remote sensor and is used to guide light to the sensing location. The other is attached to the Receiver of the sensor. Sensing is achieved when the light beam that goes from the Light Source to the Receiver is completed (light on) or interrupted (dark on).

Note: Infrared light is not used since plastic fibers tend to absorb light from IR LEDs.

Through-Beam/Opposed Mode



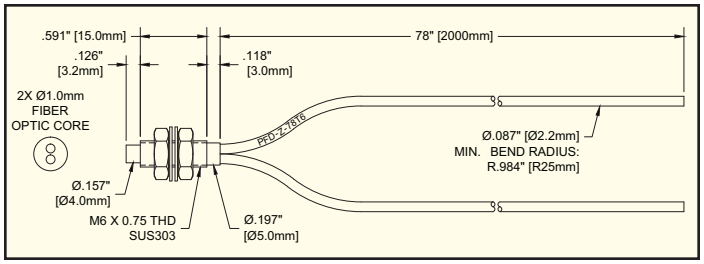
Reflective Threaded

M6 Threaded Straight - Core Size Z

Part Number PFD-Z-78T6

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in

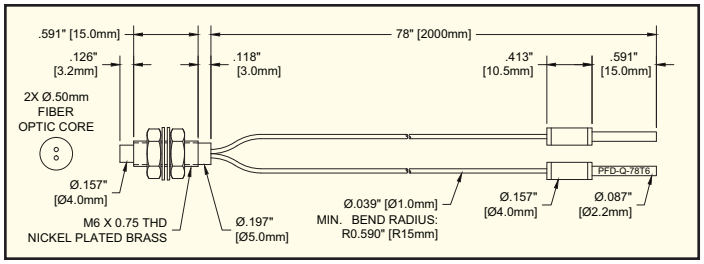


M6 Threaded Straight - Core Size Q

Part Number PFD-Q-78T6

Core Size Ø0.5mm
Outside Jacket Ø1.0mm

Bend Radius 15mm
Length 2m, 78in

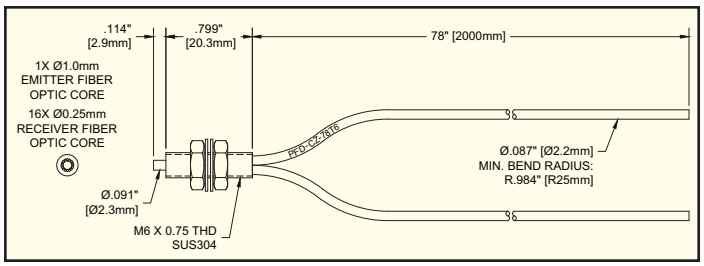


M6 Threaded Straight - Coaxial

Part Number PFD-CZ-78T6

Emitter Core 1x Ø1.0mm
Receiver Core 16x Ø0.25mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in



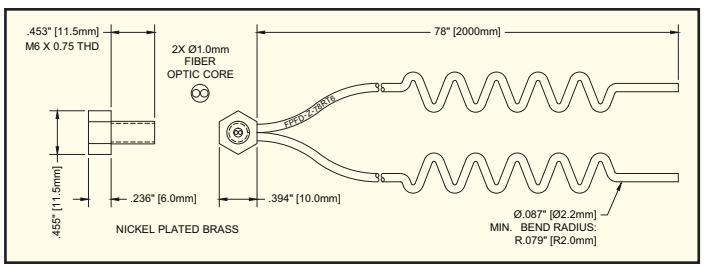
M6 Threaded Right Angle - Core Size Z

Part Number FPFD-Z-78RT6

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 2mm
Length 2m, 78in

High Flex



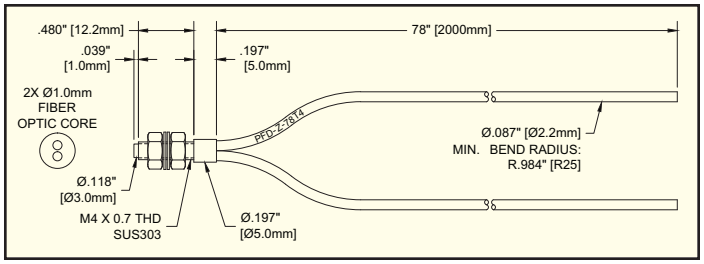
Reflective Threaded

M4 Threaded Straight - Core Size Z

Part Number PFD-Z-78T4

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in

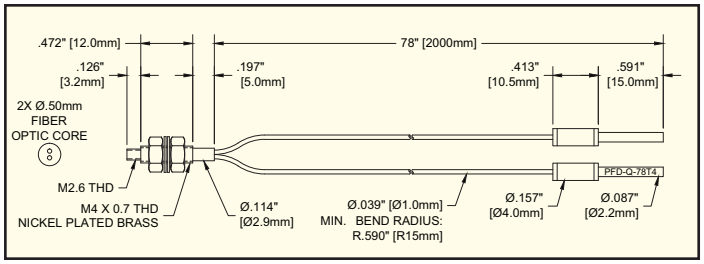


M4 Threaded Straight - Core Size Q

Part Number PFD-Q-78T4

Core Size Ø0.5mm
Outside Jacket Ø1.0mm

Bend Radius 15mm
Length 2m, 78in

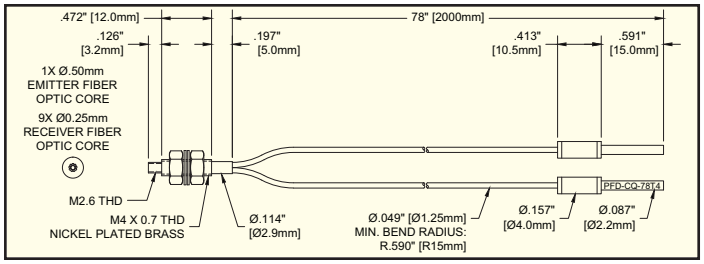


M4 Threaded Straight - Coaxial

Part Number PFD-CQ-78T4

Emitter Core 1x Ø0.5mm
Receiver Core 9x Ø0.25mm
Outside Jacket Ø1.25mm

Bend Radius 25mm
Length 2m, 78in

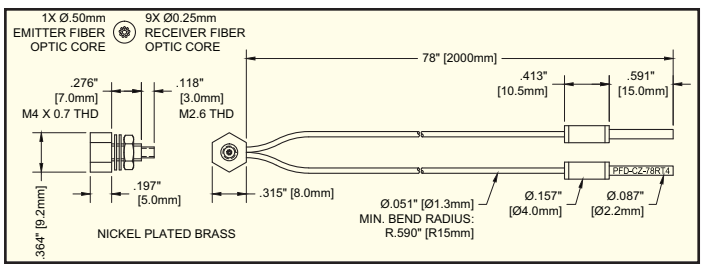


M4 Threaded Right Angle - Coaxial

Part Number PFD-CZ-78RT4

Emitter Core 1x Ø0.5mm
Receiver Core 9x Ø0.25mm
Outside Jacket Ø1.3mm

Bend Radius 15mm
Length 2m, 78in



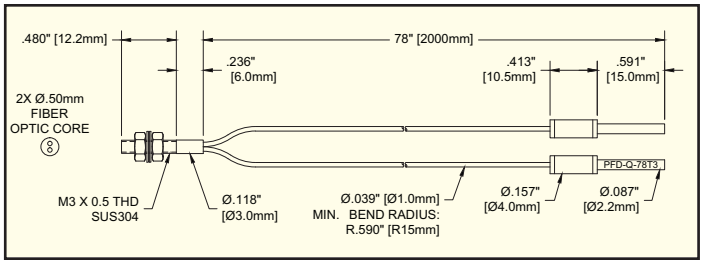
Reflective Threaded

M3 Threaded Straight - Core Size Q

Part Number PFD-Q-78T3

Core Size Ø0.5mm
Outside Jacket Ø1.0mm

Bend Radius 15mm
Length 2m, 78in

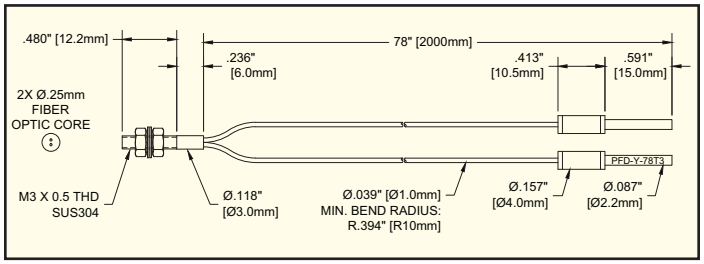


M3 Threaded Straight - Core Size Y

Part Number PFD-Y-78T3

Core Size Ø0.25mm
Outside Jacket Ø1.0mm

Bend Radius 10mm
Length 2m, 78in



Reflective Specialty

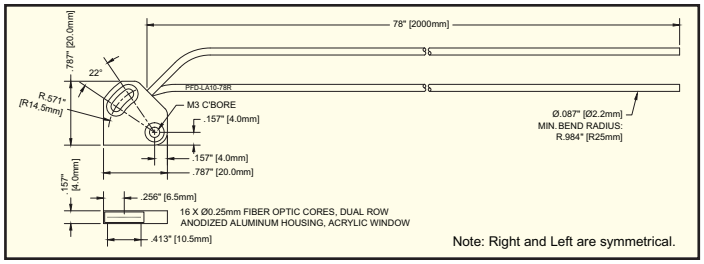
Light Array 10.5mm with 45° Angle Intergraded Bracket

Part Number PFD-LA10-78R

View Window 10.5mm
View Gap 0.08mm

Core Size 16x Ø0.25mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in



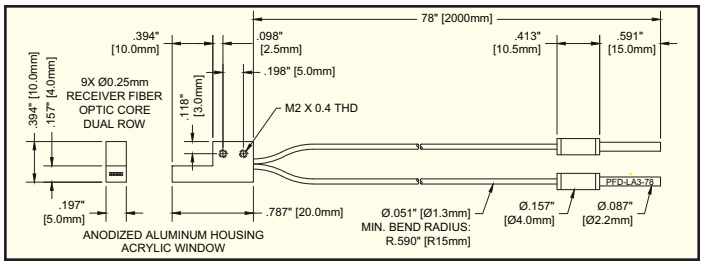
Light Array 3mm with Intergraded Bracket

Part Number PFD-LA3-78

View Window 3mm
View Gap 0.08mm

Core Size 9x Ø0.25mm
Outside Jacket Ø1.3mm

Bend Radius 15mm
Length 2m, 78in



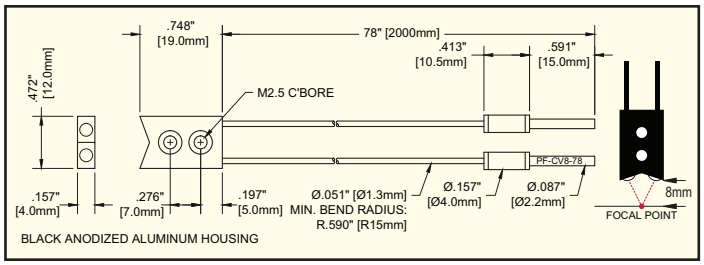
V-Axis Convergent Proximity View 8mm

Part Number PFD-CV8-78

Focal Point 8mm

Core Size Ø0.5mm
Outside Jacket Ø1.3mm

Bend Radius 15mm
Length 2m, 78in



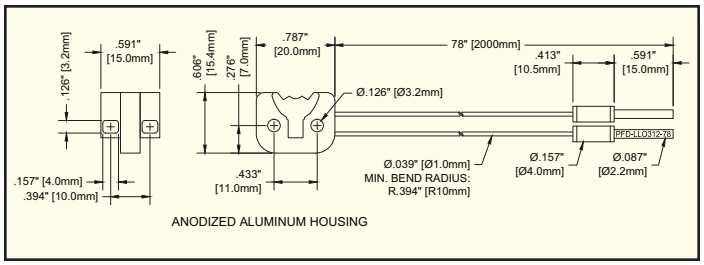
Liquid Level Optical Detection

Part Number PFD-LLO312-78

Fits Tube Sizes Ø3 - 12mm

Core Size Ø0.25mm
Outside Jacket Ø1.0mm

Bend Radius 10mm
Length 2m, 78in



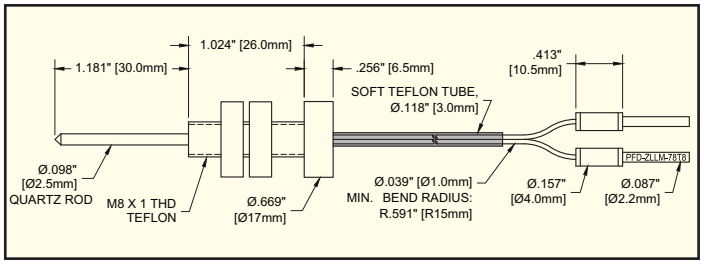
Liquid Level Mechanical Detection

Part Number PFD-ZLLM-78T8

Core Size Ø0.5mm
Outside Jacket Ø1.0mm

Bend Radius 15mm
Length 2m, 78in

Useable in temps up to
200°C / 392°F



Plastic Fiber Optic Light Guides

Through-Beam - Threaded

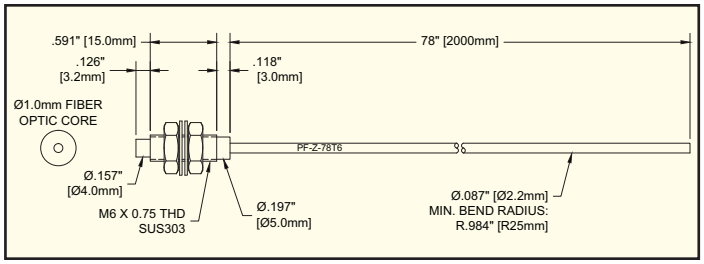
M6 Threaded Straight - Core Size Z

Sold two per package.

Part Number PF-Z-78T6

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in



M4 Threaded Straight - Core Size Z

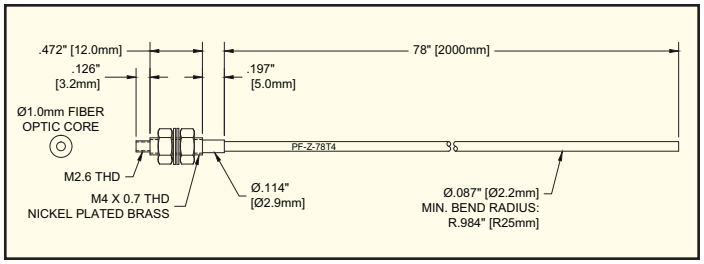
Sold two per package.

Part Number PF-Z-78T4

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in

With smaller threaded tip M2.6



M4 Threaded Straight - Core Size Q

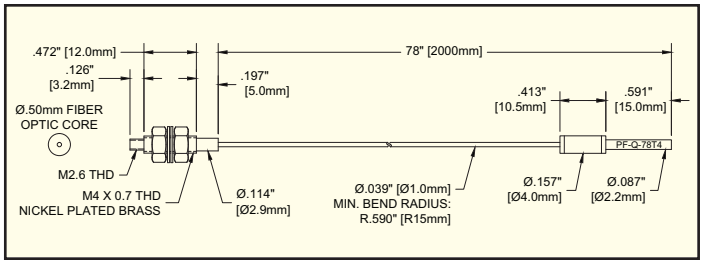
Sold two per package.

Part Number PF-Q-78T4

Core Size Ø0.5mm
Outside Jacket Ø1.0mm

Bend Radius 15mm
Length 2m, 78in

With smaller threaded tip M2.6



M4 Threaded Right - Core Size Z

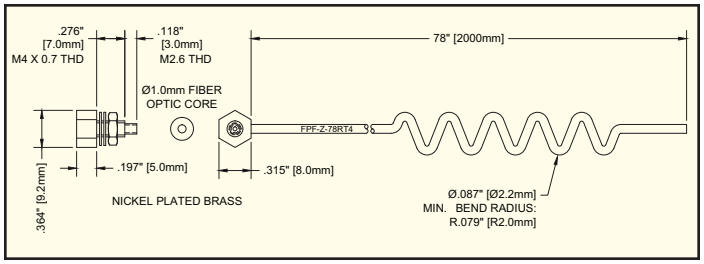
Sold two per package.

Part Number FPF-Z-78RT4

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 2mm
Length 2m, 78in

High Flex



Through-Beam - Threaded

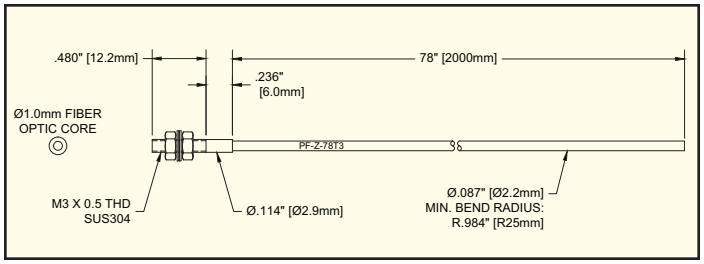
M3 Threaded Straight - Core Size Z

Sold two per package.

Part Number PF-Z-78T3

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in



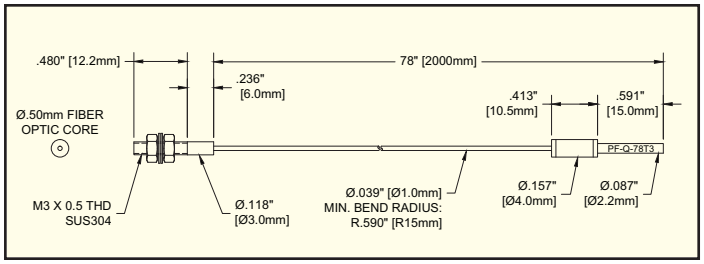
M3 Threaded Right Angle - Core Size Q

Sold two per package.

Part Number PF-Q-78T3

Core Size Ø0.5mm
Outside Jacket Ø1.0mm

Bend Radius 15mm
Length 2m, 78in



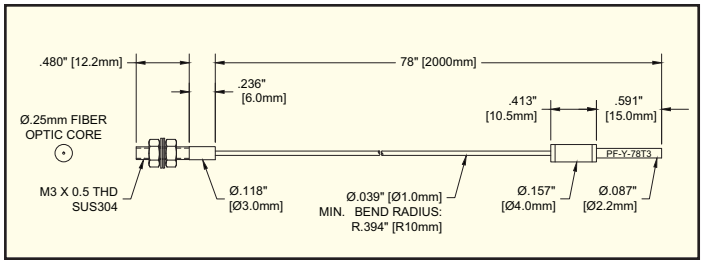
M3 Threaded Straight - Core Size Y

Sold two per package.

Part Number PF-Y-78T3

Core Size Ø0.25mm
Outside Jacket Ø1.0mm

Bend Radius 10mm
Length 2m, 78in



Plastic Fiber Optic Light Guides

Through-Beam - Specialty

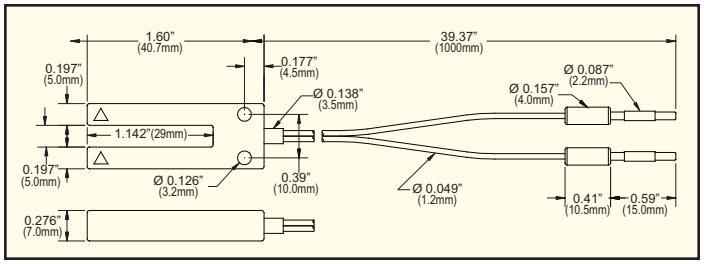
Slot Head 5mm Gap

Sold one per package.

Part Number PF-G-41
Slot Gap 5mm

Core Size Ø0.5mm
Outside Jacket Ø1.2mm

Bend Radius 25mm
Length 1m, 41in



M4 Threaded Straight - Internal Extended Range Lens

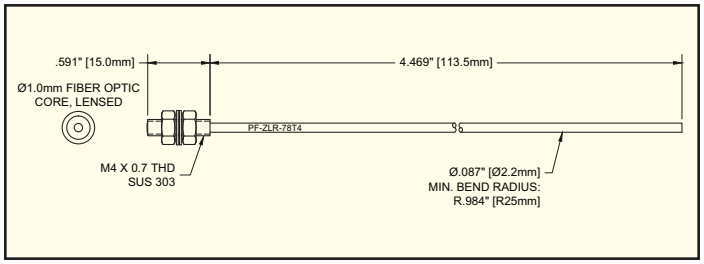
Sold two per package.

Part Number PF-ZLR-78T4

Extended Range

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in



Slip-On Threaded Barrel Head

Sold one per package.

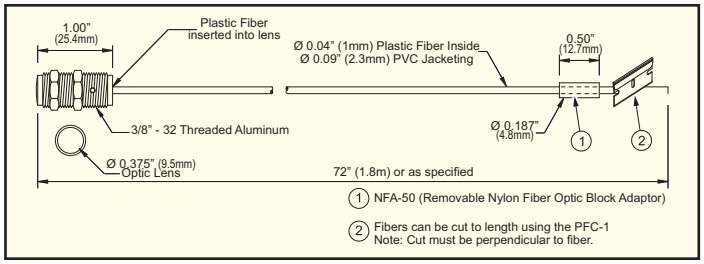
Part Number LF-H-36
Length 0.9m, 36in

Part Number LF-H-72
Length 1.8m, 72in

Extended Range

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm



Side View Rectangular Head With Long Range Lens

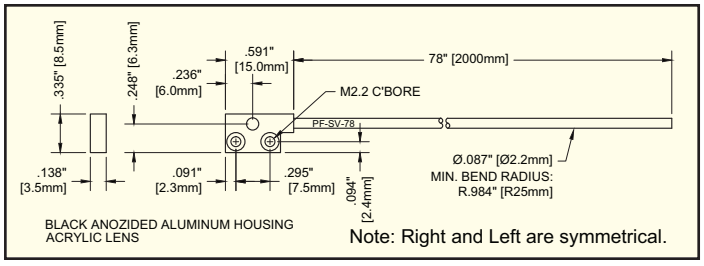
Sold two per package.

Part Number PF-SV-78

Extended Range

Core Size Ø1.0mm
Outside Jacket Ø2.2mm

Bend Radius 25mm
Length 2m, 78in

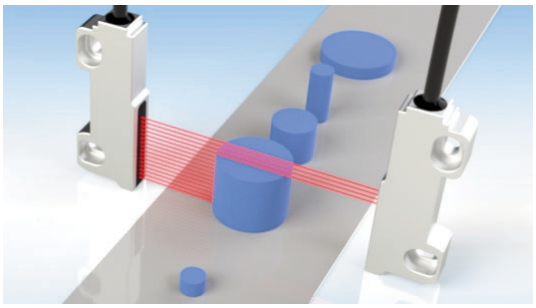


Plastic Fiber Optic Light Guides

Through-Beam Array

Array fibers split the beam of light into a two-dimensional area of detection (rather than just a single beam) allowing the sensor to detect obstructions along the length of the array. This analog sensitivity is ideal for detecting full or partial objects, oddly shaped, or inconsistently sized or positioned objects. Also good for detecting objects with gaps or spaces, or for edge and diameter detection. Array fibers can do the job that would otherwise need to be done with costly multiple sensor pairs.

Arrays come with one transmitter and one receiver. With an intergraded bracket and a variety of shapes and sizes, array fibers can make a complicated application simple.



Slot Array 12mm Gap - Size 5mm

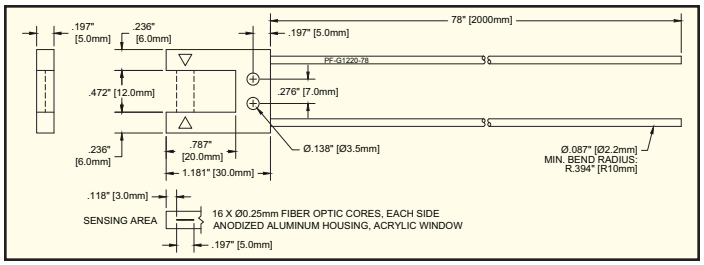
Sold one per package.

Part Number PF-G1220-78
Slot Gap 12mm

View Window 5mm
View Gap 0.066mm

Core Size 16x Ø0.25mm
Outside Jacket Ø2.2mm

Bend Radius 10mm
Length 2m, 78in



Light Array - Size 11mm

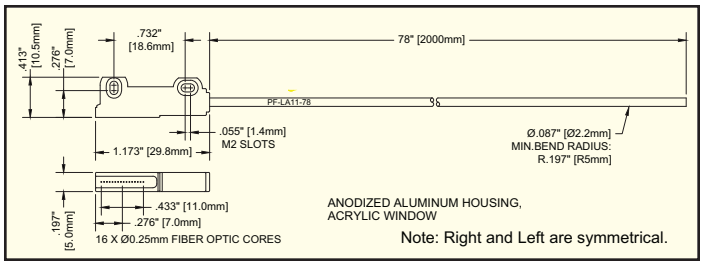
Sold two per package.

Part Number PF-LA11-78

View Window 11mm
View Gap 0.44mm

Core Size 16x Ø0.25mm
Outside Jacket Ø2.2mm

Bend Radius 5mm
Length 2m, 78in



Light Array - Size 40mm

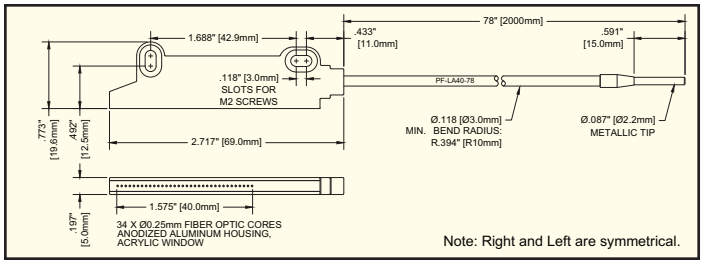
Sold two per package.

Part Number PF-LA40-78

View Window 40mm
View Gap 0.93mm

Core Size 34x Ø0.25mm
Outside Jacket Ø3mm

Bend Radius 10mm
Length 2m, 78in



Light Array - Size 100mm

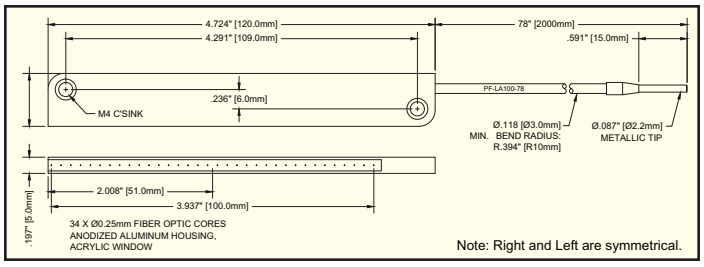
Sold two per package.

Part Number PF-LA100-78

View Window 100mm
View Gap 2.69mm

Core Size 34x Ø0.25mm
Outside Jacket Ø3mm

Bend Radius 10mm
Length 2m, 78in



Plastic Fiber Optic Light Guides

Plastic Fiber Accessories

GLA-1
1/4in X 1in
Slip-on Plastic Lens

GLA-2
M4 Threaded Long Range

HLA-1
3/8in X 1in Threaded
Slip-on Plastic Lens
Assembly

HLA-2
Spot Focus Plastic Lens
Focal Point .50in (12.7mm)

UAC-12
Slip-on Long Range Lens

PLA-M4
M4 Threaded, Spot Focus
1in Focal Point.

PLA-M3
M3 Threaded Spot Focus Lens
1-8mm Focal Point

FMB-2
(5.1mm diam.)
Miniature Glass Fiber Optic
Mounting Bracket

FMB-3
(3.1mm diam.)
Plastic Fiber Optic
Mounting Bracket

PFC-1
Plastic Fiber Cutter