

Plastic Fiber Optic Cables



Glass Fiber Optic Cables



9.1 Plastic Fiber Optic Cables

Product Description	V8-T9-2
Features	V8-T9-2
Product Selection	V8-T9-3
Accessories	V8-T9-4
Technical Data and Specifications	V8-T9-4
Dimensions	V8-T9-5

9.2 Glass Fiber Optic Cables

Product Description	V8-T9-7
Features	V8-T9-7
Product Overview	V8-T9-8
Product Selection	V8-T9-9
Accessories	V8-T9-11
Technical Data and Specifications	V8-T9-11
Dimensions	V8-T9-12



Unless otherwise noted, the products contained in this section should not be used for functional safety applications. These products were not designed or tested to IEC 60947-5-3 or recommended for functional safety.



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in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada
call 1-800-426-9184.

Revision notes

Volume 8—Sensing Solutions, CA08100010E

Tab 9—Fiber Optic Cable

Revision date	Section	Change page(s)	Description
09/08/2017	All	All	Revision date changed to September 2017



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9.1

Fiber Optic Cables

Plastic Fiber Optic Cables

Plastic Fiber Optic Cables



Plastic Fiber Optic Cables

Product Description

Plastic Fiber Optic Cables from Eaton's electrical sector offer a lower-cost alternative to glass fibers. They are available as bulk cable or pre-assembled with sensing tips.

Bulk fiber optic cable is ordered by the foot and can be cut to length by the user with a special cutter accessory. It can be used with lenses, adapters and terminations. Single fiber is normally used for thru-beam sensing and duplex fiber (two isolated cables running in parallel) for diffuse reflective. Order single fiber cable for both source and detector cable runs. Order duplex fiber cable equal to the length of run—separate source and detector cable not required.

Pre-assembled fiber optic cables are special purpose cables to solve a variety of fiber optic sensing applications. A fiber optic cable cutter is included only for 1 mm bundle models. The cables are available in 1 mm and 0.5 mm diameters (0.5 mm cables cannot be cut to length). Single cable is used for thru-beam sensing, duplex for diffuse reflective sensing.

Contents

Description

	<i>Page</i>
Plastic Fiber Optic Cables	
Product Selection	V8-T9-3
Accessories	V8-T9-4
Technical Data and Specifications	V8-T9-4
Dimensions	V8-T9-5

Features

- Fiber optic cables allow remote sensing in areas where space is restricted or tight viewing angles are required
- The economical plastic cable is easy to cut to length during installation for a perfect fit (see cutter accessory, 0.5 mm cable cannot be cut)
- Single cable styles are ideal for thru-beam sensing
- Duplex cable styles are typically used for diffuse reflective sensing
- Pre-assembled cables are available in 0.5 mm for sensing extremely small targets



DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.


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Product Selection

Bulk Fiber Optic Cable





Bulk Fiber Optic Cable

	Fiber Diameter	Cable Style	Catalog Number ^①
	0.039 in (1 mm)	Duplex cable (for diffuse reflective sensing)	6324A-XXX
		Single cable (for thru-beam sensing)	6323A-XXX

Accessories, see Page V8-T9-4.

Pre-Assembled Fiber Optic Cables

Pre-Assembled Duplex Fiber Optic Cables (for Diffuse Reflective Sensing)

	Fiber Diameter	Catalog Number ^②
	Large Diameter, Threaded Tip	
	0.039 in (1.0 mm)	6324A-6501
	0.059 in (1.5 mm)	6324E-6501 ^③
	Small Diameter, Threaded Tip	
	0.020 in (0.5 mm)	6324A-6511
	Large Diameter, Threaded Tip with Bendable Probe	
	0.039 in (1.0 mm)	6324A-6502
	Small Diameter, Threaded Tip with Bendable Probe	
	0.020 in (0.5) mm	6324A-6512

Dimensions, see Page V8-T9-5.

Notes

- ① Quantity ordered indicates length, for example, a quantity of 5 equals five feet of fiber.
- ② One cable.
- ③ Larger diameter (1.5 mm) fibers provide approximately 50% longer sensing range than small diameter (1 mm).
- ④ Set of two.

Pre-Assembled Single Fiber Optic Cables (for Thru-Beam Sensing)

	Fiber Diameter	Catalog Number ^④
	Large Diameter, Threaded Tip	
	0.039 in (1.0 mm)	6323A-6501
	0.059 in (1.5 mm)	6323E-6501 ^③
	Small Diameter, Threaded Tip	
	0.020 in (0.5 mm)	6323A-6511
	Large Diameter, Threaded Tip with Bendable Probe	
	0.039 in (1.0 mm)	6323A-6502
	Small Diameter, Threaded Tip with Bendable Probe	
	0.020 in (0.5) mm	6323A-6512

Dimensions, see Page V8-T9-5.

9.1

Fiber Optic Cables

Plastic Fiber Optic Cables

Accessories

Cable Accessories

Bulk Fiber Optic Cable Accessories

Description	Range Increase	Catalog Number
Fiber Optic Cable Cutter		
For 1 mm diameter fiber, good for six cuts	—	8909A-6501
Fiber Optic Termination		
For mounting of 1 mm diameter bulk fiber. Sensing distance is the same as for bare fibers without lenses	—	6230A-6503
Dimensions, see Page V8-T9-6.		



9

Lenses

For 1 mm diameter bulk cable only. Lenses extend the range of thru-beam sensors. Sold individually—two required for thru-beam sensing.

Lenses

Description	Range Increase	Catalog Number
Thru-Beam Lenses		
0.25 In Diameter Thru-Beam Lens	10X	6230A-6505
0.25 in diameter thru-beam lens		
0.5 In Diameter Thru-Beam Lens	100X	6230A-6509
0.5 in diameter thru-beam lens		
1.0 In Diameter Thru-Beam Lens	200X	6230A-6508
1.0 in diameter thru-beam lens		
Dimensions, see Page V8-T9-6.		



Technical Data and Specifications

Plastic Fiber Optic Cables

Description	Specification
Storage and operating temperature	-22° to 158°F (-30° to 70°C)
Length, pre-assembled cables	6.6 ft (2m)
Sheathing	Polyethylene
Bend radius ^①	1 mm fiber: 2 in; 0.5 mm fiber: 1 in with no loss of optical signal. Tighter bends will result in some signal loss.

Note

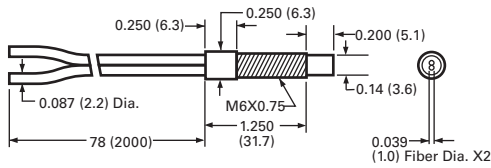
^① **IMPORTANT:** Do not bend fibers within 0.5 in of either end.

Dimensions

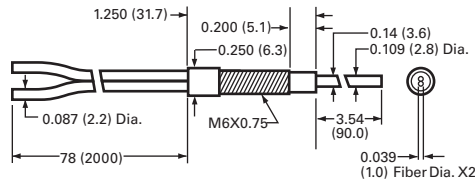
Approximate Dimensions in Inches (mm)

Pre-Assembled Duplex Fiber Optic Cables (for Diffuse Reflective Sensing)

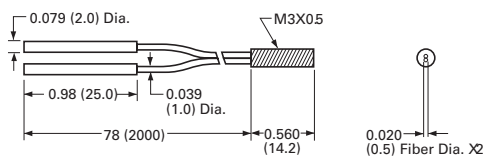
Large Diameter, Threaded Tip



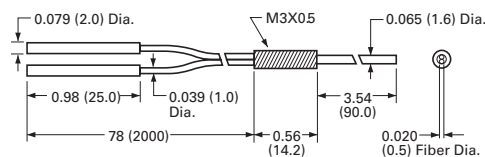
Large Diameter, Threaded Tip with Bendable Probe



Small Diameter, Threaded Tip

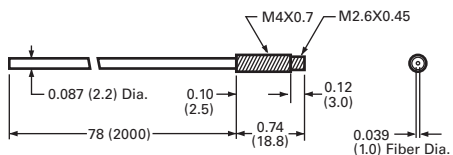


Small Diameter, Threaded Tip with Bendable Probe

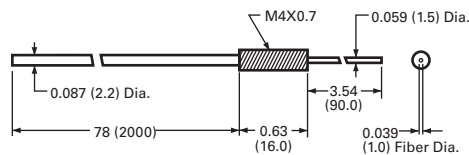


Pre-Assembled Single Fiber Optic Cables (for Thru-Beam Sensing)

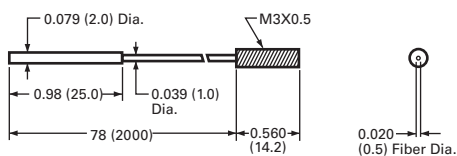
Large Diameter, Threaded Tip



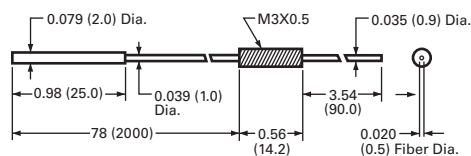
Large Diameter, Threaded Tip with Bendable Probe



Small Diameter, Threaded Tip



Small Diameter, Threaded Tip with Bendable Probe



9.1

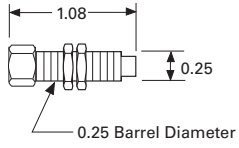
Fiber Optic Cables

Plastic Fiber Optic Cables

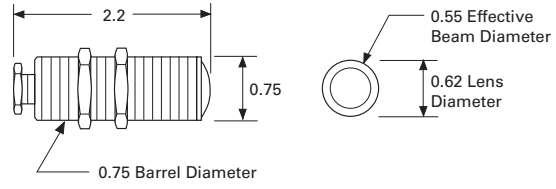
Approximate Dimensions in Inches

Accessories

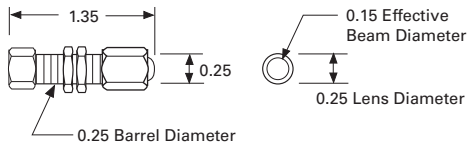
Fiber Optic Termination



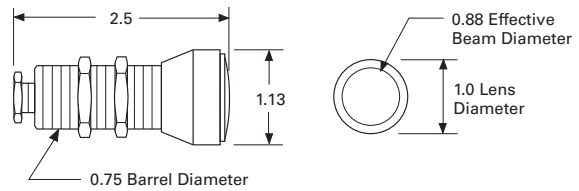
0.5 In Diameter Thru-Beam Lens



0.25 In Diameter Thru-Beam Lens



1.0 In Diameter Thru-Beam Lens



Glass Fiber Optic Cables



Contents

<i>Description</i>	<i>Page</i>
Glass Fiber Optic Cables	
Product Overview	V8-T9-8
Product Selection	V8-T9-9
Accessories	V8-T9-11
Technical Data and Specifications	V8-T9-11
Dimensions	V8-T9-12

Glass Fiber Optic Cables

Product Description

Glass Fiber Optic Cables from Eaton's electrical sector transmit light through a cable containing a bundle of tiny glass fibers. The cable can curve back and forth through equipment to the target and still transmit light with very little signal loss.

Two cable types are available:

Duplex fibers contain both source and detector fibers intermixed at the cable end for diffuse reflective sensing. One cable is required for sensing. (It is also possible to use this style of cable and a retroreflector for reflex sensing.)

Diffuse Reflective Sensing with a Single Duplex Fiber



Single fibers are used for thru-beam sensing. Separate cables are needed to carry the source light and the detector light, respectively. Two cables are required for sensing.

Thru-Beam Sensing with Two Single Fibers



Features

- Fiber optic cables allow remote sensing in areas where space is restricted or tight viewing angles are required
- Ideal for high temperature applications up to 480°F (249°C)
- Choose from many styles and lengths to exactly suit your needs
- Use PVC jacket models for most applications, stainless steel for high temperature and harsh environments
- Larger fiber bundle size offers higher excess gain for longer ranges. Small size is useful for sensing extremely small targets

DANGER

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9.2

Fiber Optic Cables

Glass Fiber Optic Cables



Product Overview

Ordering Information

Mounting End Compatibility

Two mounting end styles are available; standard and collar. Collar mounting cables and standard mounting cables are not interchangeable and must be coupled to the correct sensor.

Mounting Ends


	Description	Compatible Fiber Optic Sensors	Catalog Number
Standard Mounting End 	Standard mounting end	Prism™ Series, Comet® Series, 50 Series, 55 Series, 80 Series, 70 Series and E51 Sensor Heads—Catalog Numbers E51DF1 and E51DF11	Starts with: E51KF_
Collar Mounting End 	Collar mounting end	E51 Sensor Heads—Catalog Numbers E51DF3, E51DF4 and E51DF33	Starts with: E51KT_

9

Non-Standard Cable Lengths

To order fiber optic cable in a non-standard length, replace last digit of listed catalog number with code suffix from table below. Example: For E51KF113 with a 10 ft cable, order E51KF11**10**. Built-to-order. May require minimum order quantity.

Non-Standard Cable Lengths

	Length of Fiber Optic Cable	Code Suffix
Glass Fiber Optic Cables 	18 in (1.5 ft)	15
	24 in (2.0 ft)	2
	48 in (4.0 ft)	4
	72 in (6.0 ft)	6
	120 in (10.0 ft)	10

Product Selection

Duplex Cables (for Diffuse Reflective Sensing)

Duplex Cables

	Fiber Bundle Size A	Mounting End Style ^①	Stainless Steel Jacket Catalog Number	PVC/Monocoil Jacket Catalog Number
	0.125 in (3.2 mm)	Standard	E51KF713	E51KF313
		Collar	E51KT713	E51KT313
	0.125 in (3.2 mm)	Standard	E51KF733	E51KF333
		Collar	E51KT733	E51KT333
	0.125 in (3.2 mm)	Standard	E51KF723	E51KF323
		Collar	E51KT723	E51KT323
	0.020 x 0.154 in (0.5 x 3.9 mm)	Standard	E51KF593	E51KF193
		Collar	E51KT593	E51KT193
	0.125 in (3.2 mm)	Standard	E51KF7A3	E51KF3A3
		Collar	—	—
	0.125 in (3.2 mm)	Standard	E51KF7B3	E51KF3B3
		Collar	—	—
	0.094 in (2.4 mm)	Standard	E51KF563	E51KF163
		Collar	E51KT563	E51KT163
	0.0625 in (1.6 mm)	Standard	E51KF583	E51KF183
		Collar	E51KT583	E51KT183
	0.0625 in (1.6 mm)	Standard	E51KF573	E51KF173
		Collar	E51KT573	E51KT173
	0.032 x 0.382 in (0.8 x 9.7 mm)	Standard	E51KF743	E51KF343
		Collar	—	E51KT343
	0.020 x 0.154 in (0.5 x 3.9 mm)	Standard	E51KF543	E51KF143
		Collar	—	—
	0.020 x 0.154 in (0.5 x 3.9 mm)	Standard	E51KF553	E51KF153
		Collar	—	E51KT153

Dimensions, see **Page V8-T9-12**.

Note

^① Collar mounting cables and standard mounting cables are not interchangeable and must be coupled to the correct sensor. See compatibility chart on **Page V8-T9-8**.

Single Cables (for Thru-Beam Sensing)

Single Cables

	Fiber Bundle Size A	Mounting End Style ①	Stainless Steel Jacket Catalog Number	PVC/Monocoil Jacket Catalog Number
 Forward Viewing, Unthreaded	Forward Viewing, Unthreaded			
	0.125 in (3.2 mm)	Standard	E51KF813	E51KF413
Collar		E51KT813	E51KT413	
 Right-Angle Viewing, Unthreaded	Right-Angle Viewing, Unthreaded			
	0.125 in (3.2 mm)	Standard	E51KF833	E51KF433
Collar		E51KT833	E51KT433	
 Forward Viewing, Threaded	Forward Viewing, Threaded Cable End			
	0.125 in (3.2 mm)	Standard	E51KF823	E51KF423
Collar		E51KT823	E51KT423	
 Forward Viewing, Rectangular	Forward Viewing, Rectangular Fiber Bundle, Threaded Cable End			
	0.020 x 0.154 in (0.5 x 3.9 mm)	Standard	E51KF693	E51KF293
Collar		E51KT693	E51KT293	
 Right-Angle Viewing, Threaded Cable Shaft	Right-Angle Viewing, Threaded Cable Shaft			
	0.125 in (3.2 mm)	Standard	E51KF8A3	E51KF4A3
Collar		E51KT8A3	—	
 Right-Angle Viewing, Threaded Cable End	Right-Angle Viewing, Threaded Cable End			
	0.125 in (3.2 mm)	Standard	E51KF8B3	E51KF4B3
Collar		E51KT8B3	—	
 Right-Angle Viewing, Tight Viewing Angle	Right-Angle Viewing, Tight Viewing Angle, Unthreaded			
	0.094 in (2.4 mm)	Standard	E51KF663	E51KF263
Collar		E51KT663	E51KT263	
 Forward Viewing, Miniature Probe	Forward Viewing, Miniature Probe, Unthreaded			
	0.0625 in (1.6 mm)	Standard	E51KF683	E51KF283
Collar		E51KT683	E51KT283	
 Right-Angle Viewing, Miniature Probe	Right-Angle Viewing, Miniature Probe, Unthreaded			
	0.0625 in (1.6 mm)	Standard	E51KF673	E51KF273
Collar		E51KT673	E51KT273	
 Forward Viewing, Fiber Bundle	Forward Viewing, Rectangular Fiber Bundle, Thru-Hole Mounting			
	0.032 x 0.382 in (0.8 x 9.7 mm)	Standard	E51KF843	E51KF443
		Collar	—	E51KT443
0.020 x 0.154 in (0.5 x 3.9 mm)	Standard	E51KF643	E51KF243	
 Right-Angle Viewing, Fiber Bundle	Right-Angle Viewing, Rectangular Fiber Bundle, Thru-Hole Mounting			
	0.020 x 0.154 in (0.5 x 3.9 mm)	Standard	E51KF653	E51KF253
		Collar	—	E51KT253

Dimensions, see **Page V8-T9-13**.

Note






① Collar mounting cables and standard mounting cables are not interchangeable and must be coupled to the correct sensor. See compatibility chart on **Page V8-T9-8**.

Accessories

Lenses

Provide increased sensing range in thru-beam mode for use with fiber optic cables with threaded tip.

Lenses

	Description	Range Increase ^①	Catalog Number
	0.5 in diameter, threaded	15X	6230A-6501
	1.0 in diameter, threaded	30X	6230A-6502
	0.5 in diameter, smooth	7X	E51KFH1
	0.75 in diameter, smooth	18X	E51KFH2
	1.0 in diameter, smooth	35X	E51KFH3

Dimensions, see [Page V8-T9-14](#).

Technical Data and Specifications

Glass Fiber Optic Cables

Description	PVC/Monocoil Specification	Stainless Steel Specification
Temperature range	-40° to 221°F (-40° to 105°C)	-50° to 480°F (-45° to 249°C)
Bend radius	2.5X sheathing O.D. minimum	2.5X sheathing O.D. minimum
Cable length	3 ft (0.9m) standard; other lengths available, see Page V8-T9-8 .	3 ft (0.9m) standard; other lengths available, see Page V8-T9-8 .

Note

^① Theoretical range increase with lens on both source and detector fiber optic cable.

9.2

Fiber Optic Cables

Glass Fiber Optic Cables

Dimensions

Approximate Dimensions in Inches (mm)

Mounting Ends ①

Standard Mounting End

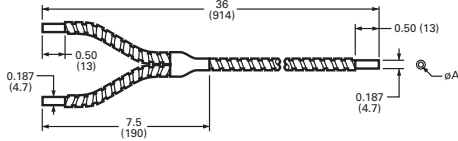


Collar Mounting End

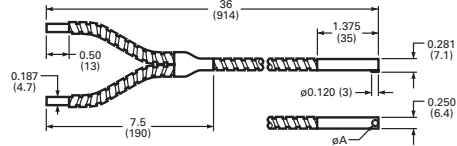


Duplex Cables (for Diffuse Reflective Sensing)

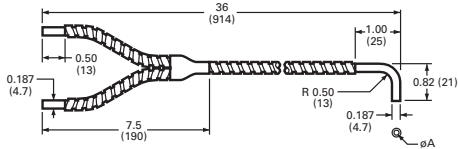
Forward Viewing, Unthreaded



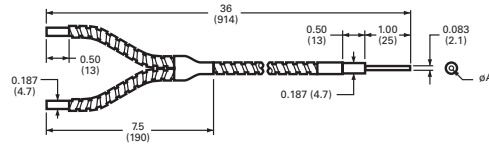
Right-Angle Viewing, Tight Viewing Angle, Unthreaded



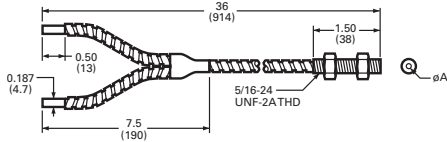
Right-Angle Viewing, Unthreaded



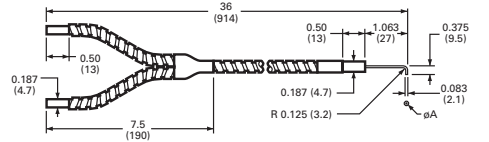
Forward Viewing, Miniature Probe, Unthreaded



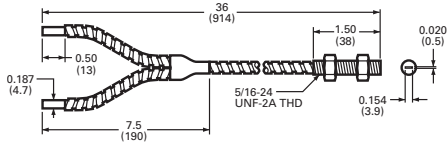
Forward Viewing, Threaded Cable End



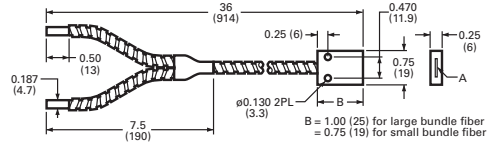
Right-Angle Viewing, Miniature Probe, Unthreaded



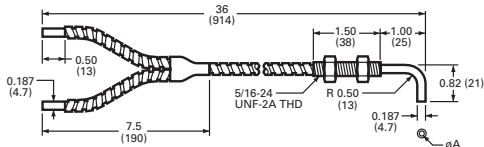
Forward Viewing, Rectangular Fiber Bundle, Threaded Cable End



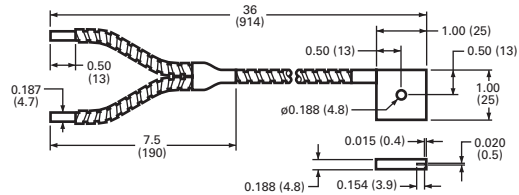
Forward Viewing, Rectangular Fiber Bundle, Thru-Hole Mounting



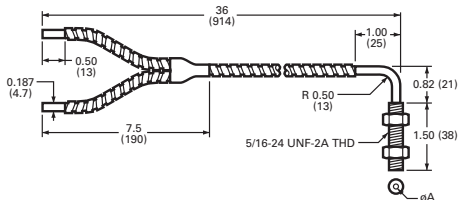
Right-Angle Viewing, Threaded Cable Shaft



Right-Angle Viewing, Rectangular Fiber Bundle, Thru-Hole Mounting



Right-Angle Viewing, Threaded Cable End



Note

① Collar mounting cables and standard mounting cables are not interchangeable and must be coupled to the correct sensor. See compatibility chart on **Page V8-T9-8**.

Approximate Dimensions in Inches (mm)

Mounting Ends ①

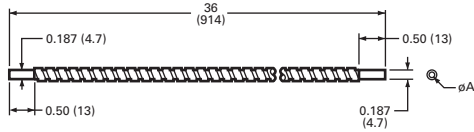
Standard Mounting End

Collar Mounting End

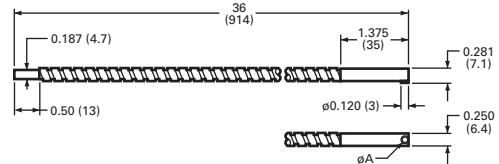


Single Cables (for Thru-Beam Sensing)

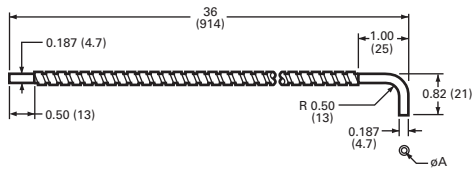
Forward Viewing, Unthreaded



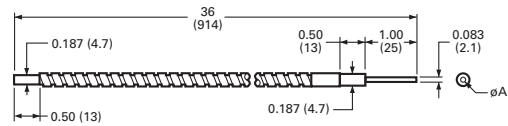
Right-Angle Viewing, Tight Viewing Angle, Unthreaded



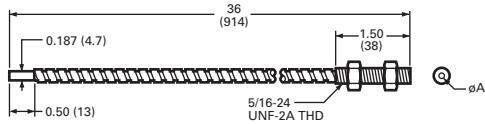
Right-Angle Viewing, Unthreaded



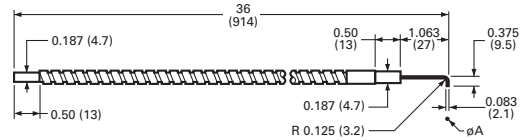
Forward Viewing, Miniature Probe, Unthreaded



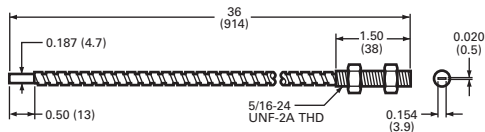
Forward Viewing, Threaded Cable End



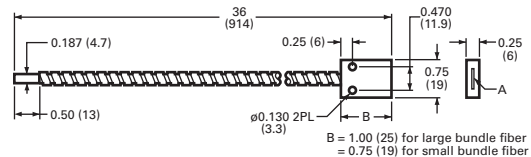
Right-Angle Viewing, Miniature Probe, Unthreaded



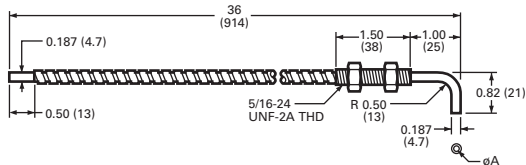
Forward Viewing, Rectangular Fiber Bundle, Threaded Cable End



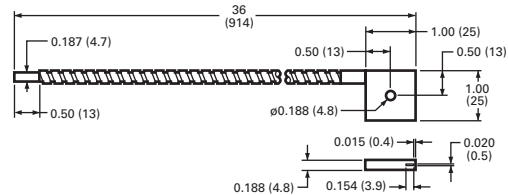
Forward Viewing, Rectangular Fiber Bundle, Thru-Hole Mounting



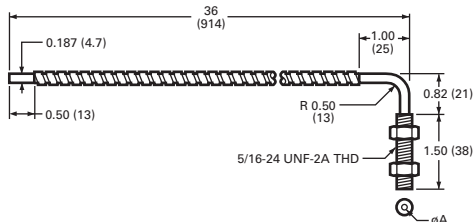
Right-Angle Viewing, Threaded Cable Shaft



Right-Angle Viewing, Rectangular Fiber Bundle, Thru-Hole Mounting



Right-Angle Viewing, Threaded Cable End



Note

① Collar mounting cables and standard mounting cables are not interchangeable and must be coupled to the correct sensor. See compatibility chart on **Page V8-T9-8**.

9.2

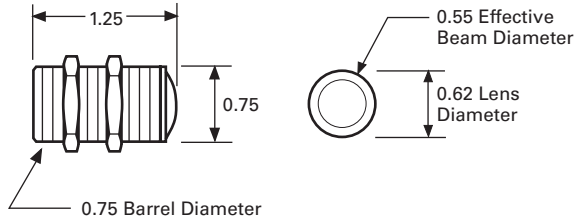
Fiber Optic Cables

Glass Fiber Optic Cables

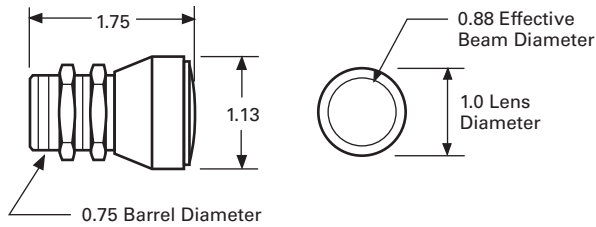
Accessories—Lenses

Approximate Dimensions in Inches

0.5 In Diameter, Threaded

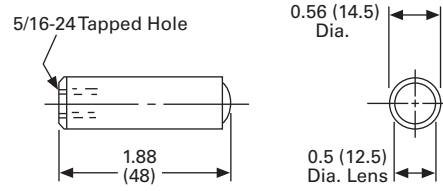


1 In Diameter, Threaded

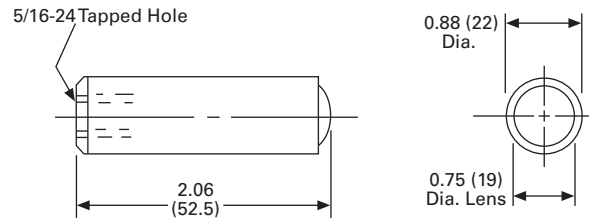


Approximate Dimensions in Inches (mm)

0.5 In Diameter, Smooth



0.75 In Diameter, Smooth



1.0 In Diameter, Smooth

