

Chemical / Oil-resistant



- With the case and fiber sheath made of PFA, the fiber can be used with various types of chemical liquids.
- The fiber core will not harden or break, even in environments where oil is present.

Full-protection type

FT-R60Y (Square head type M6 / thru-beam type)

High environmental resistance

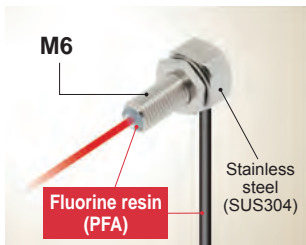
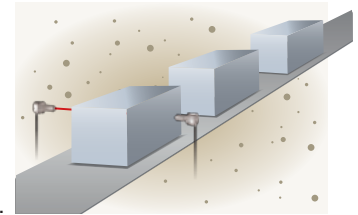
The head, nut, and washer are made from rust-resistant SUS304. The unbreakable tough fiber with high durability is covered in a fluorine resin tube. The fiber head is also covered with a fluorine resin component, achieving a high level of environmental resistance.

Less susceptibility to oil adhesion thanks to fluorine resin

Fibers deliver stable detection, since the sensing part is sealed with fluorine resin, which does not allow oil penetration. Additionally, the detection part features a convex design made of fluorine resin, achieving lower friction than glass.

Resistant to oil and coolant

The fiber head and fiber cable are connected by the "fastening and caulking" method without using adhesives. This method eliminates concerns that adhesives will absorb moisture in high-humidity environments and damage the fiber. The enclosure achieves IP68G protection, so the fiber can be installed around metal processing machines shrouded in the oil mist.



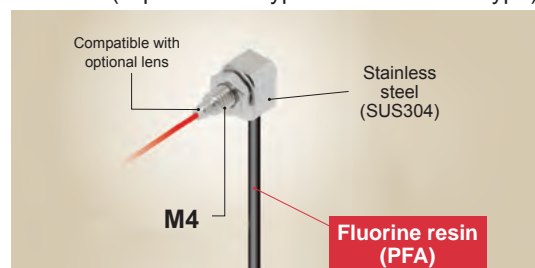
Test oil	Product
Lubricating oil	Velocite Oil No. 3
Non-water-soluble cutting oil	Yushiron Cut Abas KZ201 Yushiron Cut UH75
Water-soluble cutting oil	Syntilo 9954 (10% diluted) Yushiroken S50N (2% diluted)
Alcohol-based neutral detergent	Super Teepol

*Yushiron and Yushiroken are registered trademarks of Yushiro Chemical Industry Co., Ltd.

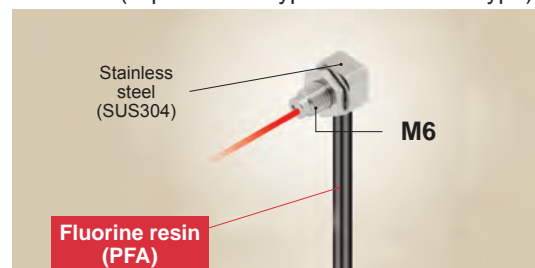
Cable-protection type

FT-R44Y / FD-R61Y

FT-R44Y (Square head type M4 / thru-beam type)



FD-R61Y (Square head type M6 / reflective type)



Full-protection type

FD-S60Y (Cylindrical type / reflective type) Metal-free

Metal-free design

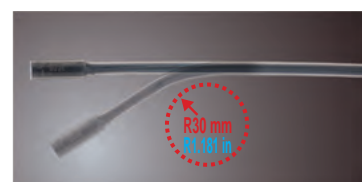
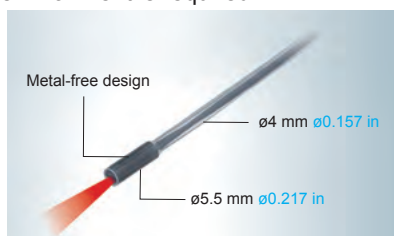
Since no metal components are used, there is no need to worry about metal contamination, even if the protective tube is damaged. It is ideal for use in applications such as semiconductor front-end equipment where a clean environment is required.

Detection in long range and narrow view

A built-in lens achieves narrow-view detection with an aperture angle of 30 degrees.

Improved tip flexibility

The protective tube features a bending radius of R30 mm [R1.181 in](#), which improved the cable arrangement compared to previous (R40 mm [R1.575 in](#)) designs.



LIST OF FIBERS

Thru-beam type (one pair set)

Type	Shape of fiber head (mm)	Model No.	Bending radius (mm)	Fiber cable length (mm) Free-cut	Sensing range (mm in) (Note 1)			Beam axis dia. (mm)	Protection	Ambient temp.	Dimensions
					FX-500 series	U-LG LONG FAST H-SP	FX-101 (Upper value) FX-102 (Lower value)				
Oil-resistant	Square head type M4 Cable-protection type Compatible with lens W7×H9.5×D15.5	Tough NEW FT-R44Y	R4	2 m	STD 720 28.346 HYPR 3,000 118.110	1,600 62.992 1,100 43.307 430 16.929 130 5.118	210 8.268 640 25.197	ø1	IP67 (Note 4)	-55 to +80 °C	P.52
	Square head type M6 Full-protection type W10×H11×D21.2	Tough NEW FT-R60Y	R4	2 m	STD 2,100 82.677 HYPR (Note 2) 3,600 141.732	3,600 141.732 (Note 2) 3,600 141.732 (Note 2) 1,260 49.606 400 15.748	690 27.165 1,890 74.409	ø3.5		-55 to +80 °C	
Chemical-resistant	Flat type Easy mounting • Rectangular head SEMI S2 compliant W7 × H15 × D13 Metal-free	Tough FT-Z802Y	R4	2 m	STD 3,100 122.047 HYPR (Note 2) 3,600 141.732	3,600 141.732 (Note 2) 3,600 141.732 (Note 2) 1,900 74.803 470 18.504	520 20.472 3,100 122.047			0 to +60 °C	P.54
	Cylindrical type	Heat-resistant 115 °C Metal-free ø5.5 -(25)-	FT-HL80Y	R30	2 m (Note 3)	STD (Note 2) 3,600 141.732 HYPR (Note 2) 3,600 141.732	3,600 141.732 (Note 2) 3,600 141.732 (Note 2) 2,300 90.551 740 29.134	990 38.976 2,340 92.126	IP68G	-40 to +115 °C	P.50
		Metal-free ø5.5 -(25)-	FT-L80Y			STD (Note 2) 3,600 141.732 HYPR (Note 2) 3,600 141.732	3,600 141.732 (Note 2) 3,600 141.732 (Note 2) 2,800 110.236 920 36.220	1,100 43.307 2,600 102.362			
		Side-view Metal-free ø5.5 -(25)-	FT-V80Y			STD 1,300 51.181 HYPR (Note 2) 3,600 141.732	2,800 110.236 2,200 86.614 800 31.496 240 9.449	340 13.386 800 31.496			

- Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.
 2) The fiber cable length practically limits the sensing range.
 3) The allowable cutting range is 500 mm 19.685 in from the end that the amplifier inserted.
 4) The fiber part is oil-resistant.

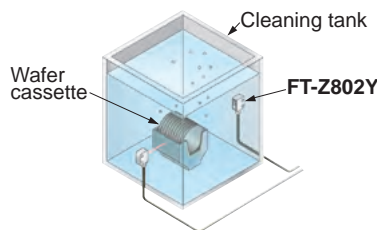
Reflective type

Type	Shape of fiber head (mm)	Model No.	Bending radius (mm)	Fiber cable length (mm) Free-cut	Sensing range (mm in) (Note 1, 2)			Beam axis dia. (mm)	Protection	Ambient temp.	Dimensions
					FX-500 series	U-LG LONG FAST H-SP	FX-101 (Upper value) FX-102 (Lower value)				
Oil-resistant	Square head type M6 Cable-protection type W10×H11×D15.5	Tough NEW FD-R61Y	R4	2 m	STD 280 11.024 HYPR 990 38.976	610 24.016 435 17.126 160 6.299 50 1.969	85 3.346 185 7.283	—	IP67 (Note 3)	-55 to +80 °C	P.63
Chemical-resistant	Cylindrical type Metal-free ø5.5 -(16)-	Tough NEW FD-S60Y	R4	2 m (Note 4)	STD 320 12.598 HYPR 600 23.622	590 23.228 420 16.535 200 7.874 75 2.953	140 5.512 300 11.811	—	IP68G	-40 to +70 °C	P.64

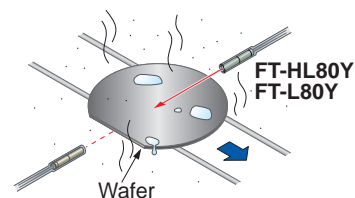
- Notes: 1) Note that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending on how the fiber is cut.
 2) The sensing range is specified for white, non-glossy paper.
 3) The fiber part is oil-resistant.
 4) The allowable cutting range is 500 mm 19.685 in from the end that is inserted to the amplifier.

Applications

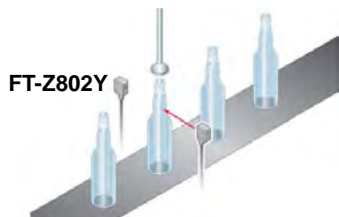
Detecting wafer cassette in cleaning tank



Sensing a wafer in corrosive environment



Detecting a container at a chemical Piller



Tough : Refers to a fiber which possesses both unbreakable (bending radius: R10 mm R0.394 in, reciprocating bending: 180°) and more flexible (bending radius: R4 mm R0.157 in or less) features.

New product introduction

Tough Fiber

Fiber Selection Guide

Model

Choose by shape/application

How to read Model No.

Earlier models comparison table

Fibers

Super Quality

Threaded Type

Square Head Type

Cylindrical Type

Sleeve

Flat Type

Small Spot

Narrow Beam

Wide Beam

Convergent Reflective Type

Retroreflective Type

Chemical / Oil-resistant

Heat-resistant

Vacuum-resistant

Liquid Leak / Liquid Detection

Fiber Options

Semi-custom fibers

Fiber Dimensions

Thru-beam Type

Retroreflective Type

Reflective Type

Others

Amplifiers

FX-500 series

FX-100 series

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