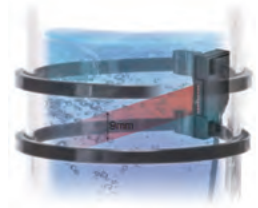


# Liquid Leak / Liquid Detection

It corresponds to various liquid events, from the contact (wetted) type to the pipe mounting type, and up to leak detection.



**For detecting the upper limit of liquid surface level, sensor that receives beam when "liquid is absent" is recommended.**

**The sensor will turn OFF during abnormal conditions (excess fluid, fiber disconnection, etc.)!**

Liquid absent: Beam received (Output ON)

Liquid present / fiber is cutoff: Beam not received (Output OFF)

**FD-FA93** Strong against air bubbles

Applicable pipe: Transparent pipe, Outer diameter  $\varnothing 8$  mm  
 $\varnothing 0.315$  in or more

(When used with the tying bands:  $\varnothing 8$  to  $\varnothing 80$  mm  $\varnothing 0.315$  to  $\varnothing 3.150$  in)

**FD-F41**

Standard type



**FD-F4**

For 1 mm  $0.039$  in thick pipes  
manufactured by PFA

**For detecting the lower limit of liquid surface level, sensor that receives beam when "liquid is present" is recommended.**

**The sensor will turn OFF during abnormal conditions (insufficient liquid, fiber disconnection, etc.) !**

Liquid present: Beam received (Output ON)

Liquid absent / fiber is cutoff: Beam not received (Output OFF)

**FT-F93** Thru-beam



**Full-protection type**

**FD-HF40Y / FD-F41Y (Liquid level sensing) Metal-free**

**Small diameter type**

( $\varnothing 4$  mm  $\varnothing 0.157$  in)

Bends easily with its small bending radius, protective tube is cuttable and extendable

**FD-HF40Y**

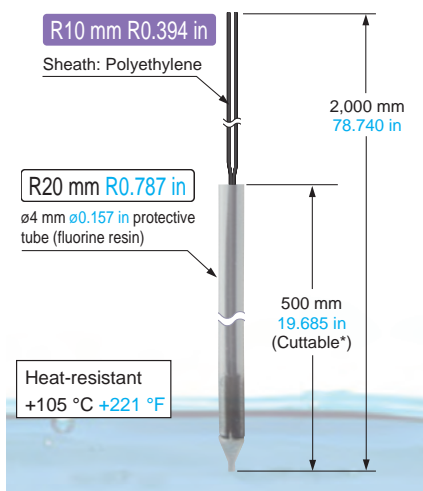
R10 mm R0.394 in

Sheath: Polyethylene

R20 mm R0.787 in

$\varnothing 4$  mm  $\varnothing 0.157$  in protective tube (fluorine resin)

Heat-resistant  
+105 °C +221 °F



**FD-F41Y**

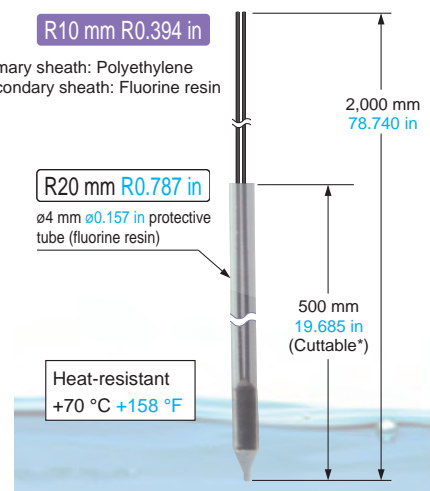
R10 mm R0.394 in

Primary sheath: Polyethylene  
Secondary sheath: Fluorine resin

R20 mm R0.787 in

$\varnothing 4$  mm  $\varnothing 0.157$  in protective tube (fluorine resin)

Heat-resistant  
+70 °C +158 °F



\* The range of 50 mm  $1.969$  in from the fiber tip cannot be cut. Also, fiber length can be extended using **MS-FX-02Y** (optional).

**Full-protection type**

**FD-F71 (Liquid level sensing) SEMI S2 compliant**

Detect chemical leaks in semiconductor and LCD manufacturing processes.

**Compact, space-saving**

Side-mountable fiber head as slim as 10 mm  $0.394$  in is good to use in confined spaces.

**Ideal for use with chemicals and volatile materials**

This fiber type sensor is safer to use with volatile materials (SEMI S2 compliant). The fluorine resin fiber head makes it ideal for use with chemicals.



# LIST OF FIBERS

## Reflective type / Thru-beam type

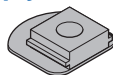
Type	Shape of fiber head (mm)	Model No.	Bending radius (mm)	Fiber cable length Free-cut	Description		Protection	Ambient temp.	Dimensions					
					FX-500 series (STD mode)	FX-101 FX-102								
Contact type	Liquid level sensing 	Heat resistant 125 °C Fluorine resin coating ø6 <b>FD-F8Y</b>	Protective tube R40 Fiber R15	2 m (Note 1)	ø6 mm <b>ø0.236 in</b> Protective tube: Fluorine resin, length 1,000 mm <b>39.370 in</b> (not cuttable) Liquid surface not contacted: Beam received, Liquid surface contacted: Beam not received		IP68	-40 to +125 °C	P.59					
		Heat resistant 105 °C Fluorine resin coating Metal-free ø4 <b>FD-HF40Y</b> (Note 2)	Protective tube R20 Fiber <b>R10</b>							2 m	ø4 mm <b>ø0.157 in</b> Protective tube: Fluorine resin, length 500 mm <b>19.685 in</b> (cuttable) Liquid surface not contacted: Beam received, Liquid surface contacted: Beam not received	IP68G	-40 to +105 °C	P.61
		Heat resistant 70 °C Fluorine resin coating throughout the fiber Metal-free ø4 <b>FD-F41Y</b> (Note 2)												
Liquid leak detection 	SEMI S2 compliant W20 x H30 x D10 <b>Tough</b> <b>FD-F71</b>	<b>R4</b> Bending durability	5 m	Liquid leak detection Leak absent: Beam received, Leak present: Beam interrupted Compatible amplifire: <b>FX500</b> series only	IP67	-20 to +60 °C								
Pipe-mountable type	Liquid level sensing 	Standard W25 x H13 x D20 <b>FD-F41</b>	<b>R10</b>	2 m	Applicable pipe diameter: Outer dia. ø6 to ø26 mm <b>ø0.236 to ø1.024 in</b> transparent pipe [PVC (vinyl chloride), fluorine resin, polycarbonate, acrylic, glass, wall thickness 1 to 3 mm <b>0.039 to 0.118 in</b> ] Liquid absent: Beam received, Liquid present: Beam not received			-40 to +100 °C	P.59					
		For 1 mm thick PFA pipe W25 x H13 x D20 <b>FD-F4</b>								Applicable pipe diameter: Outer dia. ø6 to ø26 mm <b>ø0.236 to ø1.024 in</b> transparent pipe [PFA (fluorine resin) or equivalently transparent pipe, wall thickness 1 mm <b>0.039 in</b> ] Liquid absent: Beam received, Liquid present: Beam not received				
	Liquid sensing 	Mountable on pipe-array fiber W6.5 x H28.3 x D17 <b>Tough</b> <b>FD-FA93</b>	<b>R4</b> Bending durability							Applicable pipe diameter: Outer dia. ø8 mm <b>ø0.315 in</b> or more transparent pipe (When used with the tying bands: ø8 to ø80 mm <b>ø0.315 to ø3.150 in</b> ) [PFA (fluorine resin), including translucent] Liquid absent: Beam received, Liquid present: Beam not received	IP40	-40 to +70 °C		
	Liquid sensing 	SEMI S2 compliant W23 x H20 x D17 <b>Tough</b> <b>FT-F93</b>	Protective tube R20 Fiber <b>R2</b> Bending durability							Applicable pipe diameter: Outer dia. ø3 to ø10 mm <b>ø0.118 to ø0.394 in</b> transparent pipe [PFA (fluorine resin) or equivalently transparent pipe, wall thickness 0.3 to 1 mm <b>0.012 to 0.039 in</b> ] Liquid absent: Beam not received, Liquid present: Beam received Compatible amplifire: <b>FX500</b> series only		-40 to +60 °C	P.49	

Notes: 1) The allowable cutting range is 1,000 mm **39.370 in** from the end that the amplifier inserted.  
2) Liquid inflow prevention joint, protective tube extension joint, fiber mounting joint is available.

### Accessories for additional supply

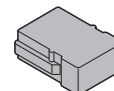
- **MS-FD-F7-1**

(SUS mounting bracket for **FD-F71**)



- **MS-FD-F7-2**

(PVC mounting bracket for **FD-F71**)



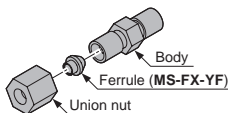
## FIBER OPTIONS

Designation	Model No.	Description	
Liquid inflow prevention joint (Note)	<b>MS-FX-01Y</b>	Applicable fibers <b>FD-HF40Y</b> <b>FD-F41Y</b>	This joint suppresses false operations due to liquid slip-in from the top of the protective tube.
Protective tube extension joint (Note)	<b>MS-FX-02Y</b>		The protective tube can be extended.
Fiber mounting joint (Note)	<b>MS-FX-03Y</b>		The joint is used for mounting fibers on a tank.

Note: The joint internal ferrule (**MS-FX-YF**) is available as a spare part. A distorted ferrule may result in leakage.

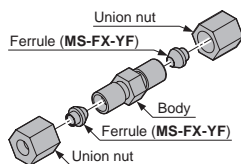
### Liquid inflow prevention joint

- **MS-FX-01Y**



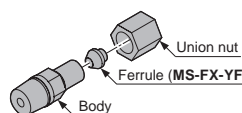
### Protective tube extension joint

- **MS-FX-02Y**



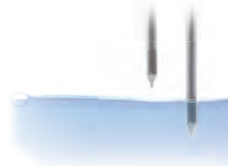
### Fiber mounting joint

- **MS-FX-03Y**



## Applications

### Detecting liquid level in a tank



### Leak detection for use in semiconductor device manufacturing



**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

Retrorreflective Type

Chemical / Oil-resistant

Heat-resistant

Vacuum-resistant

Liquid Leak / Liquid Detection

Fiber Options

Semi-custom fibers

Fiber Dimensions

Thru-beam Type

Retrorreflective Type

Reflective Type

Others

Amplifiers

FX-500 series

FX-100 series

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