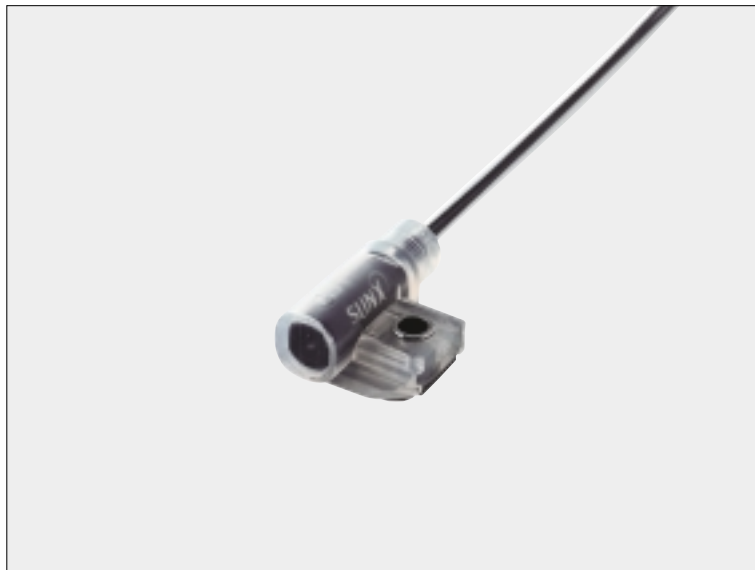


FD-F7 SERIES

New

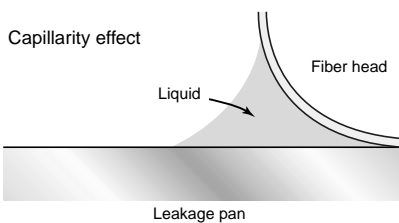
Leak Detection Fiber



A new slim fiber sensor ideal for sensing chemical leaks

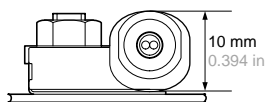
Reliable detection

The unique effect of capillarity enables reliable detection of small leaks and viscous liquids.



Compact, space-saving

This slim (10 mm 0.394 in) side-mounting sensor is especially good for use in confined spaces.



Ideal for chemicals and volatile materials

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

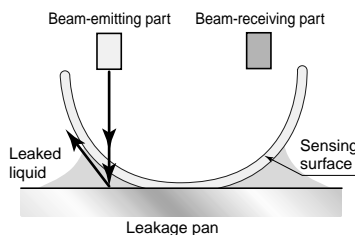
Stable design

When a leak occurs, the beam from the beam-emitting part scatters through the leaked liquid and is not transmitted to the beam-receiving part.

New type of detection method

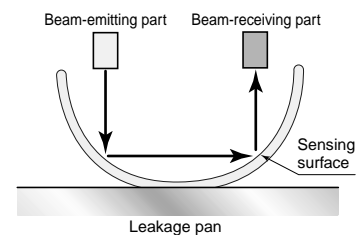
When leakage occurs

The beam from the beam-emitting part scatters through the leaked liquid and is not transmitted to the beam-receiving part.



When there is no leakage

The beam from the beam-emitting part reflects off of the surface of the sensor and is transmitted to the beam-receiving part.



If the fiber is bent or faulty, if the cable is cut or disconnected, or if the sensor is not operating correctly, the output is the same as when the beam is not received (LEAK).

Human error when installing the fiber is also accounted for.

Simple to use

- Bracket mounted with one screw, one-touch fiber head mounting.
- No resetting or component replacement required after leak detection.
- The simple shape of the fiber head makes it easy to wipe off the leaked liquid.

Incorporated emitting indicator

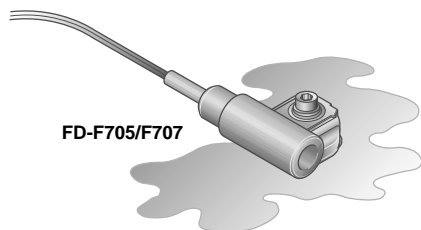
The fiber head is equipped with an emitting indicator so that you can easily check the sensor without having to get close to it.

Two types of mounting brackets are available

Provided with two types of mounting brackets [Stainless steel (SUS) made and PVC made].

APPLICATIONS

Leak detection for use in semiconductor equipment manufacturing



ORDER GUIDE

Fibers

Appearance	Sensing object	Fiber cable length ✂ : Free cut	Allowable bending radius	Model No.
	Liquid (Note)	✂ 5 m 16.404 ft (Protective tube: 3 m 9.843 ft)	Protective tube R20 mm R0.787 in Fiber R4 mm R0.157 in	FD-F705
		✂ 7 m 22.966 ft (Protective tube: 5 m 16.404 ft)		FD-F707

Note: Highly viscous liquid may not be detected stably.

Amplifiers Quick-connection cable is not supplied with the amplifier. Please order it separately.

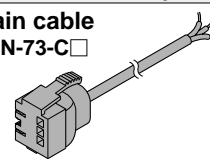
Type	Appearance	Model No.	Emitting element	Output
NPN output		FX-301-F	Red LED	NPN open-collector transistor
PNP output		FX-301P-F		PNP open-collector transistor

Quick-connection cable Quick-connection cable is not supplied with the amplifier. Please order it separately.

Type	Model No.	Description
Main cable	CN-73-C1	Length: 1 m 3.281 ft
	CN-73-C2	Length: 2 m 6.562 ft
	CN-73-C5	Length: 5 m 16.404 ft
Sub cable	CN-71-C1	Length: 1 m 3.281 ft
	CN-71-C2	Length: 2 m 6.562 ft
	CN-71-C5	Length: 5 m 16.404 ft

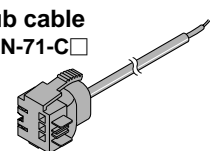
Main cable

• CN-73-C□



Sub cable

• CN-71-C□



End plates End plates are not supplied with the amplifier. Please order it separately when the amplifiers are mounted in cascade.

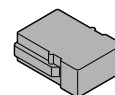
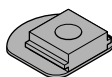
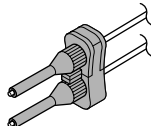
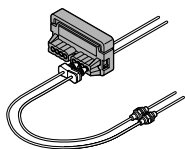
Appearance	Model No.	Description
	MS-DIN-E	When cascading multiple amplifiers, or when it moves depending on the way it is installed on a DIN rail, these end plates ensure that all amplifiers are mounted together in a secure and fully connected manner. Two pcs. per set

FD-F7

ORDER GUIDE

Accessories

- **FX-CT2** (Fiber cutter)
- **FX-AT4** ($\phi 1$ mm $\phi 0.039$ in fiber attachment)
- **MS-FD-F7-1** (SUS mounting bracket)
- **MS-FD-F7-2** (PVC mounting bracket)



SPECIFICATIONS

Refer to [p.600](#) for amplifier specifications.

Type	5 m 16.404 ft fiber cable length	7 m 22.966 ft fiber cable length
Item Model No.	FD-F705	FD-F707
Applicable amplifiers	FX-301-F, FX-301P-F	
Sensing object	Liquid (Note 1)	
Fiber cable length	5 m 16.404 ft (Free-cut)	7 m 22.966 ft (Free-cut)
Protective tube length	3 m 9.843 ft	5 m 16.404 ft
Allowable bending radius	Protective tube: R20 mm R0.787 in or more, Fiber cable: R4 mm R0.157 in or more.	
Bending durability	Fiber cable: 1,000,000 times or more (at R4 mm R0.157 in)	
Emission indicator	Incorporated	
Tensile strength	19.6 N or less (PFA protective tube)	
Ambient temperature	- 20 to + 50 °C - 4 to + 122 °F (No dew condensation or icing allowed)(Note 2), Storage: - 20 to + 50 °C - 4 to + 122 °F	
Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH	
Material	Fiber core: Acrylic, Fiber sheath: Vinyl chloride, Protective tube: PFA (Fluorine resin)	
	Outer casing: PFA (Fluorine resin), Interior: Heat-resistant ABS, Acrylic	
Accessories	MS-FD-F7-1 (SUS mounting bracket): 1 pc., MS-FD-F7-2 (PVC mounting bracket): 1 pc., FX-CT2 (Fiber cutter): 1 pc., FX-AT4 ($\phi 1$ mm $\phi 0.039$ in fiber attachment): 1 set (Note 3)	

- Notes: 1) Highly viscous liquid may not be detected stably.
 2) Liquid being detected should also be kept within the rated ambient temperature range.
 3) Fiber attachments provided include **FX-AT4**, made for the **FX-301-F**, and **FX-D1-F** attachments.

PRECAUTIONS FOR PROPER USE

Refer to [p.1135~](#) for general precautions and [p.602~](#) for amplifier precautions.



This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

Cautions

- There is a white stripe on the beam-emitting fiber cable. When setting the amplifier, put the fiber cable with white stripe into the beam-emitting side. The sensor will not operate correctly if the beam-emitting fiber and the beam-receiving fiber are not connected correctly.
- Do not scratch the sensing surface. If it is scratched, the detectability will deteriorate. When conducting maintenance after operation, wipe all liquid from the fiber head and the mounting bracket with a soft cloth. Further, take sufficient care against dew condensation on the sensing surface.
- Do not apply excessive tensile force to the fiber cable.
- Bending radius of the fiber cable must be R4 mm R0.157 in or more. If the bending radius is smaller than the specified value, the sensing performance will deteriorate.
- Ensure that any strong extraneous light is not incident on the sensing surface.
- The fiber cable can be cut for adjustment using the attached fiber cutter (**FX-CT2**), however, the sensing performance may decrease depending on the cut condition of the fiber cable and the connection to the amplifier.

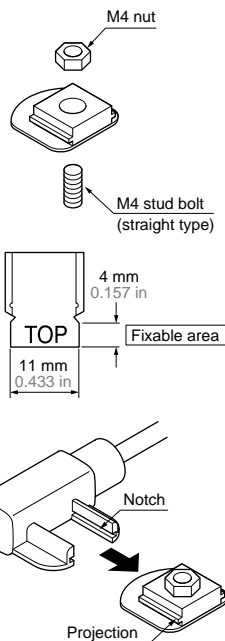
- Take care that shortening the fiber cable excessively may result in loss of reliable detection due to an insufficient light intensity difference. (As a reference, adjust the length of the fiber cable to 2 m 6.562 ft and when mounted on the exclusive bracket, the displayed digit value of the amplifier in liquid absent condition should be 4,000 or less.)
- Make sure to use the exclusive mounting bracket when installing the sensor head to avoid human error. Reliable detection cannot be guaranteed when this mounting bracket is not used. However, in case the PVC mounting bracket is mounted on the dark and mat surface, human error may not be detected. Make sure to check it prior to use.
- Take care not to scratch the fiber sheath while cutting the protective tube.
- Make sure to adjust the sensitivity of the amplifier after mounting the fiber head in the exclusive mounting bracket with no-liquid condition, completing layout and wiring the fiber cable in actual working conditions. Changes in layout or installation after completing sensitivity adjustment may result in the loss of reliable detection due to the change of incident light intensity. In case of re-mounting the fiber to the pipe or change in layout, adjust the sensitivity of the amplifier again.
- Note that the light intensity may decrease when used under high temperature and high humidity for long period.
- A liquid having poor affinity to the material of the sensor head (PFA) may create air bubbles, and if those are drawn in the sensing part, it takes some time for sensing to stabilize, or sensing may even become unstable.

PRECAUTIONS FOR PROPER USE

Refer to p.1135~ for general precautions and p.602~ for amplifier precautions.

Mounting

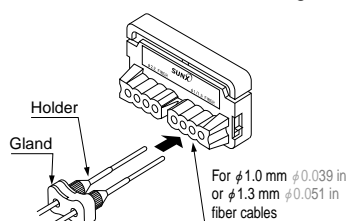
- In case of using the SUS mounting bracket, insert the M4 stud-bolt (straight type) welded on the customer's facilities into the mounting hole of the mounting bracket and screw with M4 nut (please arrange separately). The tightening torque should be 0.98 N·m or less.
- In case the PVC mounting bracket is used, face the 'TOP' inscribed side up and use adhesive to stick fast the mounting bracket on the mounting surface. Make sure that the adhesive does not stick out from the fixable area as shown in the figure right.
- Match the notch in the sensor body with the projection of the exclusive mounting bracket and slide till a click is felt.



Mounting of fiber attachments (FX-AT4)

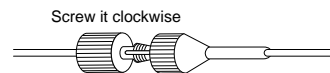
For FX-301-F

- When using the fiber attachment, mount as per the steps below.
- ① Mount the holders on the gland lightly.
- Note: If both long holders and short holders are enclosed with the fiber cable, use the short holders.
- ② Insert the fiber cables into the holders, in condition ①.
 - ③ Tighten the holders to fix the fiber cables at the desired length.
 - ④ Insert the fiber cables, in condition ③, into the holes for $\phi 1.0$ mm $\phi 0.039$ in or $\phi 1.3$ mm $\phi 0.051$ in fiber cables of the fiber cutter (FX-CT2) from direction shown in the figure right.
 - ⑤ Cut both fiber cables simultaneously. (At this time, insert the attachment to a position at which it stops. The fiber cables will be cut at a position approx. 0.5 mm 0.020 in from the holder.)
 - ⑥ After cutting, insert the fiber cables to the fiber sensor amplifier immediately.

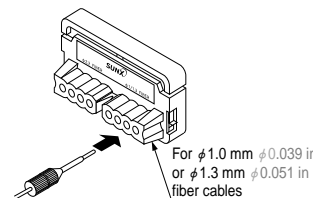


For FX-D1-F

- ① Thread the fiber cable through the gland and holder separately, and screw the gland into the holder clockwise.



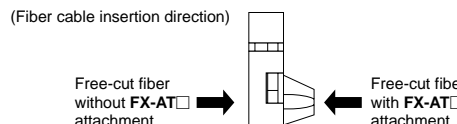
- ② Insert the fiber cables one by one into the holes for $\phi 1.0$ mm $\phi 0.039$ in or $\phi 1.3$ mm $\phi 0.051$ in fiber cable of the fiber cutter (FX-CT2) from the direction shown in the figure right.



(At this time, insert the attachment to a position at which it stops. The fiber cables will be cut at a position approx. 0.5 mm 0.020 in from the holder.)

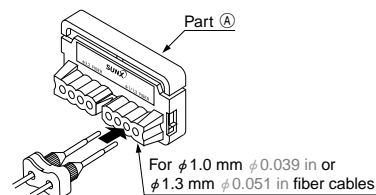
Fiber cutter (FX-CT2)

- To cut the fiber cables, insert them from the direction shown below.



How to use fiber cutter (FX-CT2)

- ① Slide part (A) of the fiber cutter fully upward till it stops.
- ② Insert the fiber cables, mounted in the attachment, till they stop. (Take care that there are separate fiber insertion holes for $\phi 2.2$ mm $\phi 0.087$ in and $\phi 1.0$ mm $\phi 0.039$ in or $\phi 1.3$ mm $\phi 0.051$ in fiber cables.)
- ③ Slide part (A) of the fiber cutter down to cut the fiber cables.

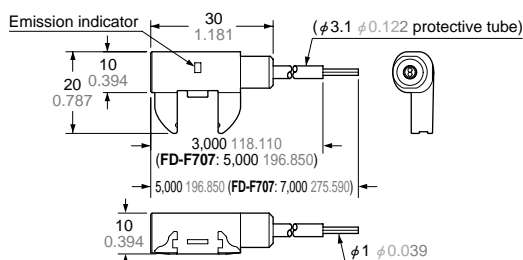


- Notes:
- 1) The fiber cables should be cut in one stroke.
 - 2) Once a fiber cable is cut off at a hole, do not use the hole again. If used, it degrades the cut surface quality and the detectability may deteriorate.
 - 3) The blade cannot be replaced. Please purchase an additional fiber cutter, if required.
 - 4) Note that the sensing range may be reduced by up to 20 % depending on the cut condition. Hence, decide the setting distance by taking sufficient margin.

DIMENSIONS (Unit: mm in)

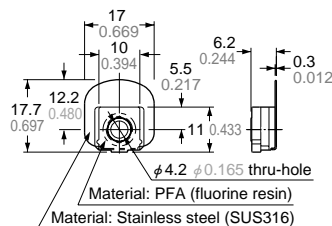
The CAD data in the dimensions can be downloaded from the SUNX website: <http://www.sunx.co.jp/>. Refer to p.607 for amplifier dimensions.

FD-F705 FD-F707

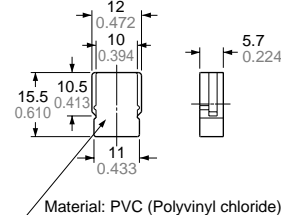


Mounting bracket

SUS mounting bracket



PVC mounting bracket



Glass Substrate / Wafer Sensing
M-DW1
FD-L43
SH-72
M
HD-T1
EX-F70/F60
FD-F7
FT-F9
FX-301-F