

# FD-L43

**New**

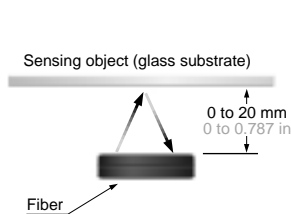
## Glass Substrate Alignment & Seating Confirmation Fiber



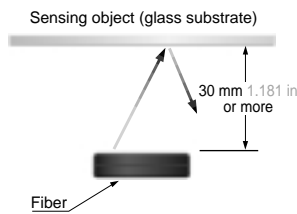
**High accuracy & stable sensing even for deflected glass substrates**

### Long-range sensing capability

The sensing range is as long as 0 to 20 mm 0 to 0.787 in. In addition, the fiber will not detect a glass substrate 30 mm 1.181 in or more away achieving outstanding detecting characteristics for limited distance.



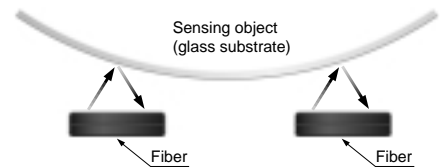
Senses up to 20 mm 0.787 in from seating position.



Does not sense when the distance is 30 mm 1.181 in or more.

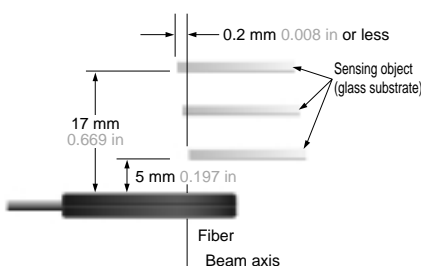
### Stable detection of crosswise deflection

It is possible for the fiber to sense the glass substrate even if it bends by  $\pm 6^\circ$ . Furthermore, this single type can handle both right and left side bending.



### High accuracy sensing

Even with variation among glass substrates, the positioning error is 0.2 mm 0.008 in or less (at sensing range 5 to 17 mm 0.197 to 0.669 in).



### Single type serving two applications

As the fiber can sense an object located even at 0 mm 0 in, it can be used for sensing, as well as alignment checking of the glass substrate (at sensing range 5 to 17 mm 0.197 to 0.669 in).

### Compact design allows easy, flexible positioning

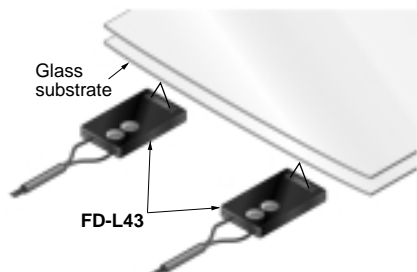
Compact size of W17 × H29 × D3.8 mm W0.669 × H1.142 × D0.150 in.

The outer diameter of the fiber is  $\phi 1.3$  mm 0.051 in, enabling the fiber to be routed with R4 mm R0.157 in bending radius.

## APPLICATIONS

### Glass substrate alignment and seating confirmation

Alignment and seating confirmation can be effectuated with just one fiber sensor.



### Glass substrate detection on a conveyor

Long-distance sensing of 0 to 20 mm  
0 to 0.787 in possible.



## ORDER GUIDE

### Fiber

Shape of fiber head (mm in)	Sensing range (mm in)(Note 1)	Sensing object	Fiber cable length ✂️ : Free cut	Allowable bending radius	Model No.
 W17 × H29 × D3.8 W0.669 × H1.142 × D0.150	 0 to 20 mm 0 to 0.787 in	LCD glass	 2 m 6.562 ft	 R4 mm R0.157 in	<b>FD-L43</b>

Notes: 1) The sensing range is specified for glass substrate 76 × 52 × t 1.1 mm 2.992 × 2.047 × t 0.043 in as the object in STD mode.  
2) Please take care that the sensing range of the free-cut type fiber may be reduced by 20 % max. depending upon how the fiber is cut.

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

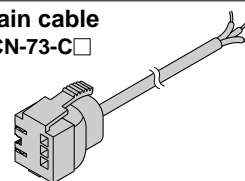
Type	Appearance	Model No.	Emitting element	Output
Digital		<b>FX-301</b>	Red LED	NPN open-collector transistor
		<b>FX-301P</b>		PNP open-collector transistor
High-functional digital		<b>FX-302</b>		NPN open-collector transistor
		<b>FX-302P</b>		PNP open-collector transistor
Manually set		<b>FX-311</b>		NPN open-collector transistor
		<b>FX-311P</b>		PNP open-collector transistor

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

Type	Model No.	Description	
Main cable	<b>CN-73-C1</b>	Length: 1 m 3.281 ft	0.15 mm <sup>2</sup> 3-core cabtyre cable, with connector on one end Cable outer diameter: φ3.0 mm 0.118 in
	<b>CN-73-C2</b>	Length: 2 m 6.562 ft	
	<b>CN-73-C5</b>	Length: 5 m 16.404 ft	
Sub cable	<b>CN-71-C1</b>	Length: 1 m 3.281 ft	0.15 mm <sup>2</sup> 1-core cabtyre cable, with connector on one end Cable outer diameter: φ3.0 mm 0.118 in
	<b>CN-71-C2</b>	Length: 2 m 6.562 ft	
	<b>CN-71-C5</b>	Length: 5 m 16.404 ft	

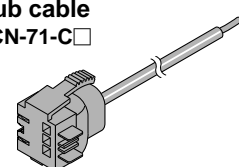
#### Main cable

• **CN-73-C** □



#### Sub cable

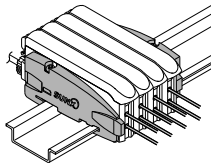
• **CN-71-C** □



# FD-L43

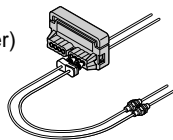
## ORDER GUIDE

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

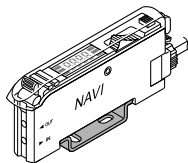
Appearance	Model No.	Description
	<b>MS-DIN-E</b>	When cascading multiple amplifiers, or when it moves depending on the way it is installed on a DIN rail, these end plates ensure that all amplifiers are mounted together in secure and fully connected manner. <span style="border: 1px solid black; padding: 2px;">Two pcs. per set</span>

### Accessories

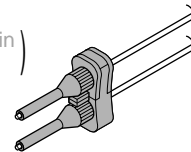
• **FX-CT2**  
(Fiber cutter)



• **MS-DIN-2**  
(Amplifier mounting bracket)



• **FX-AT5**  
( $\phi 1.3$  mm  $\phi 0.051$  in fiber attachment)



## SPECIFICATIONS

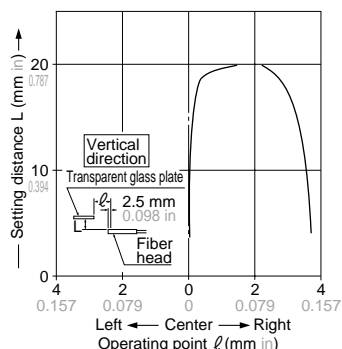
Refer to [p.77/p.119/p.166](#) for amplifier specifications.

Model No.	FD-L43
Item	
Applicable amplifier	<b>FX-301(P), FX-302(P), FX-311(P)</b>
Sensing range (Note 1, 2)	0 to 20 mm 0 to 0.787 in
Sensing object	LCD glass
Angular deviation (Note 1)	Right and left side inclination of the sensing object: $\pm 6^\circ$ (at sensing range 5 to 17 mm 0.197 to 0.669 in)
Position sensing accuracy (Note 1)	0.2 mm 0.008 in or less (at sensing range 5 to 17 mm 0.197 to 0.669 in)
Allowable bending radius	R4 mm R0.157 in or more
Fiber cable length	2 m 6.562 ft free-cut
Bending durability	100,000 times or more (at R4 mm R0.157 in)
Ambient temperature	0 to +70 °C +32 to +158 °F (No dew condensation or icing allowed), Storage: 0 to +70 °C +32 to +158 °F
Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
Material	Fiber cable
	Fiber head
Accessories	<b>FX-CT2</b> (Fiber cutter): 1 pc., <b>FX-AT5</b> ( $\phi 1.3$ mm $\phi 0.051$ in fiber attachment): 1 set (Note 3)


Notes: 1) The sensing range, the angular deviation and the position sensing accuracy are specified for the standard sensing object (glass substrate  $76 \times 52 \times 1.1$  mm  $2.992 \times 2.047 \times 0.043$  in, edge-ground).  
 2) Note that the sensing range may be reduced up to 20 % depending on the cut condition. Hence, decide the setting distance by taking sufficient margin. The sensing range is the amplifier's STD (standard) mode value.  
 3) Fiber attachments provided include **FX-AT5**, made for the **FX-301/302/311** series, and conventional amplifier attachments.

## SENSING CHARACTERISTICS (TYPICAL)

### Sensing field



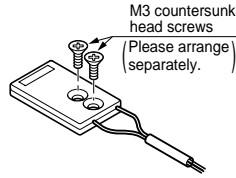
## PRECAUTIONS FOR PROPER USE Refer to p.1135~ for general precautions and p.90/p.121/p.168~ for amplifier precautions.



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.

### Mounting

- Mount using M3 countersunk head screws. The tightening torque should be 0.3 N·m or less.

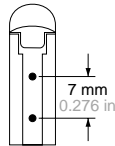


### Fiber attachment (FX-AT5)

- When the beam-emitting and the beam-receiving fiber cables are inserted into the fiber sensor amplifier for FX-301/302/311, the enclosed fiber attachment facilitates insertion of the fiber cables and reduces the possibility of incorrect fiber cable insertion.

### Cautions

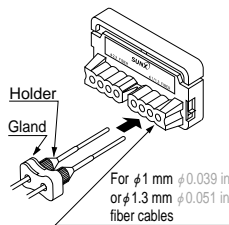
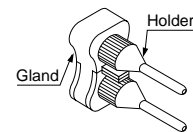
- Take care that FX-AT5 cannot be used with fiber sensor amplifiers having a pitch, between the beam-emitting and the beam-receiving fiber cables, other than 7 mm 0.276 in. In case of fiber sensor amplifiers having a pitch other than 7 mm 0.276 in, please use attachment FX-AT13.



### Mounting of fiber attachment (FX-AT5)

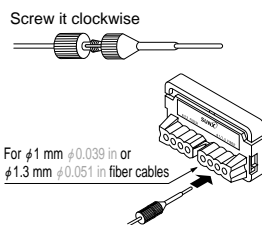
#### For FX-301/302/311

- Mount the holders on the gland lightly.  
Note: If both long holders and short holders are enclosed with the fiber, use the short holders.
- Insert the fiber cables into the holders, in condition ①.
- Tighten the holders to fix the fiber cables at the desired length.
- Insert the fiber cables, in condition ③, into the holes for  $\phi 1 \text{ mm } \phi 0.039 \text{ in}$  or  $\phi 1.3 \text{ mm } \phi 0.051 \text{ in}$  fiber cables of the fiber cutter (FX-CT2) from direction shown in the figure right.
- 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.)
- After cutting, insert the fiber cables to the fiber sensor amplifier immediately.



#### For conventional amplifier

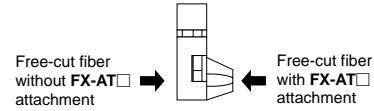
- Thread the fiber through the gland and holder separately, and screw the gland into the holder clockwise.
- Insert the fiber cables one by one into the holes for  $\phi 1 \text{ mm } \phi 0.039 \text{ in}$  or  $\phi 1.3 \text{ mm } \phi 0.051 \text{ in}$  fiber cable of the fiber cutter (FX-CT2) from 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)

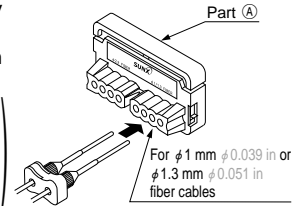
- To cut the fiber cables, insert them from the direction shown below.

(Fiber cable insertion direction)



### How to use fiber cutter (FX-CT2)

- Slide part ④ of the fiber cutter fully upward till it stops.
- Insert the fiber cables, mounted in the attachment, till they stop.  
Take care that there are separate fiber cable insertion holes for  $\phi 2.2 \text{ mm } \phi 0.087 \text{ in}$  and  $\phi 1 \text{ mm } \phi 0.039 \text{ in}$  or  $\phi 1.3 \text{ mm } \phi 0.051 \text{ in}$  fiber cables.
- Slide part ④ of the fiber cutter down to cut the fiber cables.



- Notes:
- The fiber cables should be cut in one stroke.
  - 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.
  - The blade cannot be replaced. Please purchase an additional fiber cutter, if required.
  - 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.

### Cautions

- There is white dots on the beam-emitting fiber cable. When setting the amplifier, put the fiber cable with white dots into the beam-emitting side.
- Keep the fiber head surface intact. If it is scratched or spoiled, the detectability will deteriorate.
- If the fiber head surface is dirty, wipe off the dirt with a clean soft cloth moistened with water. (Do not use any organic solvents.)
- Do not expose the fiber to any organic solvents.
- Do not use the fiber head surface in places where it may come in direct contact with water. A water drop on the fiber head surface deteriorates the sensing. No dew or liquid drop is present on surface of fiber head surface or sensing object.
- Do not apply excessive tensile force of 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 may deteriorate.
- Ensure that any strong extraneous light is not incident on the receiving face of the fiber head.
- The fiber cables should be cut off at the ends with the fiber cutter FX-CT2 (accessory) before insertion into the amplifier. Carefully cut and connect the fiber cable, as the sensing performance may deteriorate depending on the conditions of the cut part and/or of the connection to the amplifier.
- Shortening the fiber cable may result in loss of reliable detection due to an insufficient light intensity difference.
- Note that the sensing may not be stable if the sensing object is specially processed, e.g., if light does not reflect regularly on its surface.

## 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.102/p.127/p.170 for dimensions of amplifier.

