

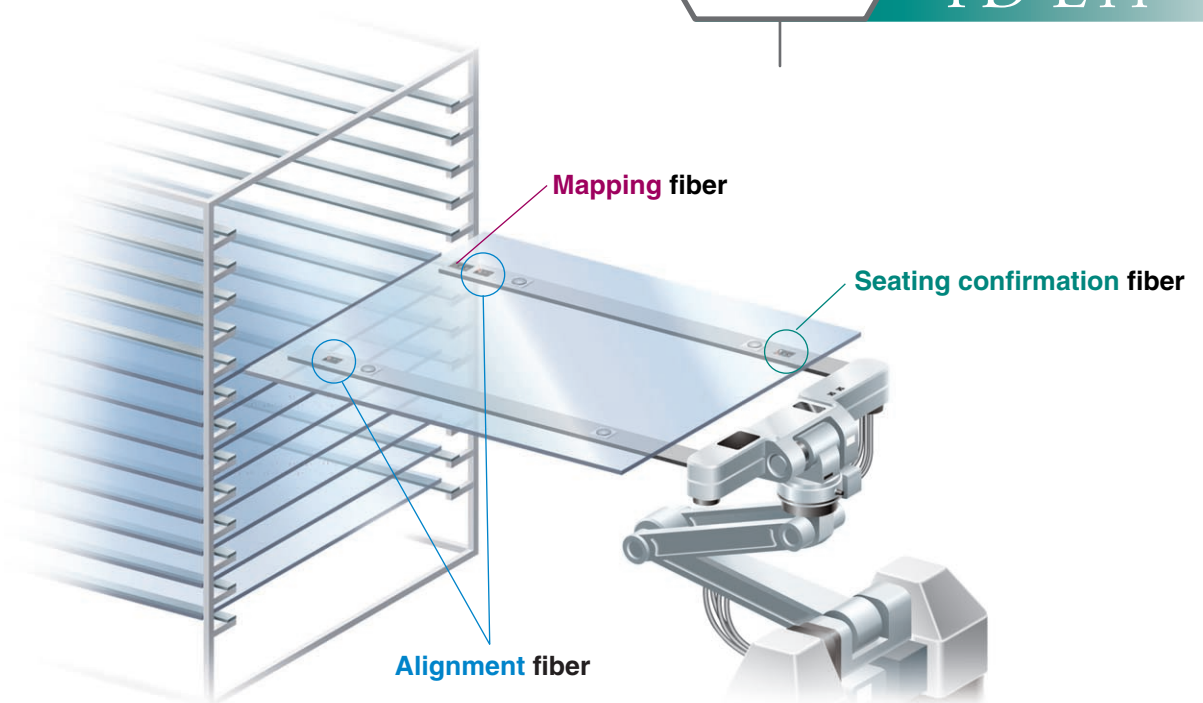


FIBERS FOR LIQUID CRYSTAL DISPLAY INDUSTRY Fixed-focus Reflective Type

New

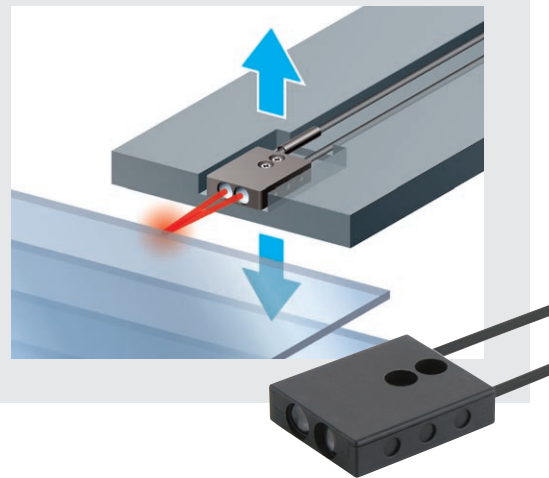
FD-L40 SERIES

3 types of fiber for glass substrate conveyors



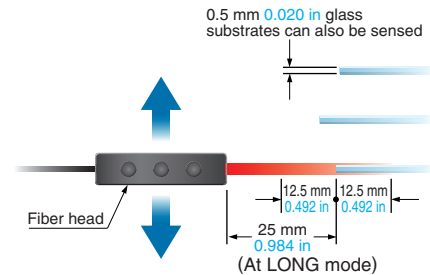
Mapping fiber

FD-L46 *New*



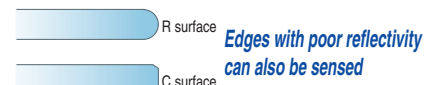
Accurate mapping even for thin glass substrates

The adoption of a unique large lens allows even thin glass substrates to be sensed directly from the side. In addition, because the sensing range is wide (25 ± 12.5 mm 0.984 ± 0.492 in), stable mapping is possible even if glass substrates are in irregular positions.

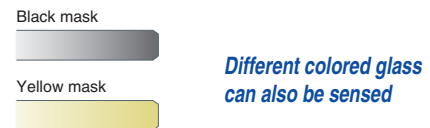


Can be used for a variety of glass substrates

Large light amounts can be obtained for a variety of glass edge shapes such as R surfaces and C surfaces, so that accurate mapping of glass substrates inside cassettes is possible.

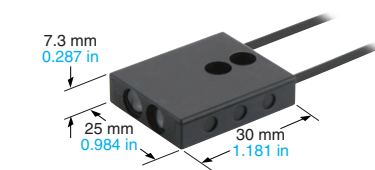


Glass that has received black or yellow masking can also be sensed in addition to clear glass.

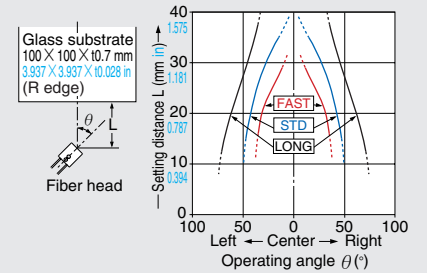


Light and compact

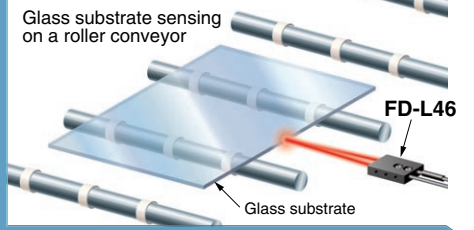
A compact size of $W25 \times H30 \times D7.3$ mm $0.984 \times 1.181 \times 0.287$ in allows installation to the ends of robotic hands. In addition, the adoption of a resin case means weight is light at about 39 g.



Angular deviation (Typical)



Other application



Alignment fiber

FD-L43

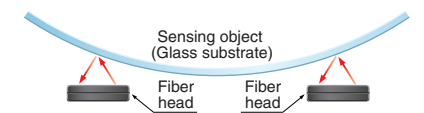


Increased sensing performance

Minor modifications allow sensing range to be further increased so that even more stable and high-precision alignments are possible.

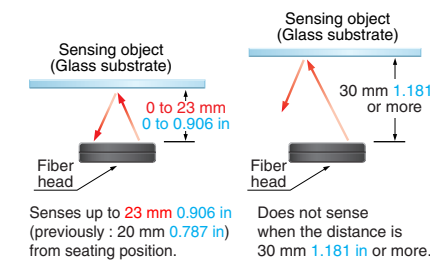
Stable and greater performance in sensing of glass with $\pm 8^\circ$ flexure

Increases in sizes of glass substrates mean greater amounts of flexure, but a single fiber can sense glass even if horizontal flexure is within $\pm 8^\circ$ (previously $\pm 6^\circ$).



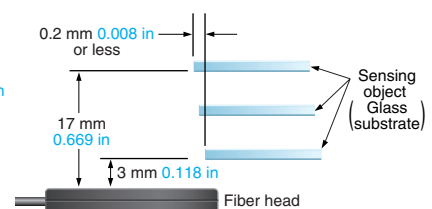
Sensing range 0 to 23 mm 0 to 0.906 in

Stable sensing is possible over even longer sensing ranges. 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.

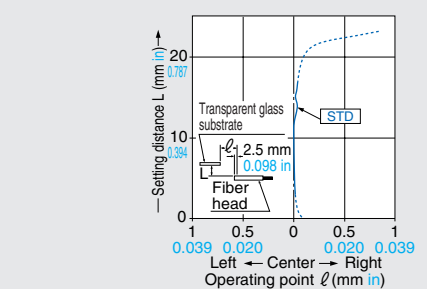


Improved high-precision sensing over wide ranges

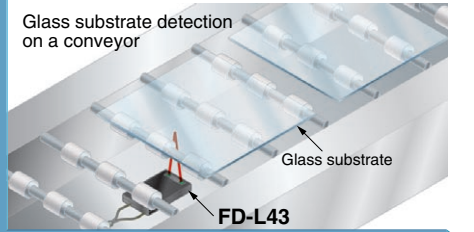
A sensing range of 3 to 17 mm 0.118 to 0.669 in (previously 5 to 17 mm 0.197 to 0.669 in) and a positioning error of 0.2 mm 0.008 in or less makes higher precision sensing possible.



Positioning characteristics (Typical)



Other application



Seating confirmation fiber

FD-L44 *New*

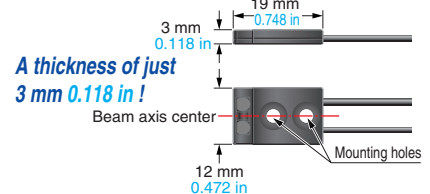


Sensing range 0 to 7 mm 0 to 0.276 in

Longest sensing range in the industry for seating confirmation. Sensing is even possible if absorption pads are presented.

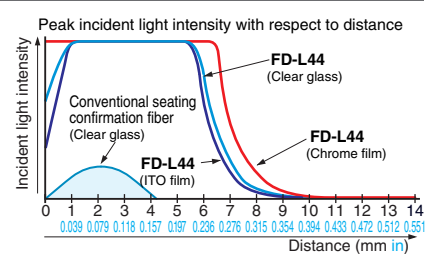
Ultra-thin head with thickness of 3 mm 0.118 in

Ultra-thin and compact size, so takes up less space for mounting. Also, the center of the beam axis and the center of the mounting hole are directly aligned rendering system designing simple.



Stable sensing of colored glass substrates

Independent, large-scale lenses is built-in. Large amounts of light can be received, enabling stable sensing even of glass substrates that have been colored (with low reflectivity) by their treatment conditions.



The short range type FD-L44S is also available

- Can sense small glass substrates with narrow pitch and wafers.
- Same large amounts of light as the FD-L44 can be obtained.

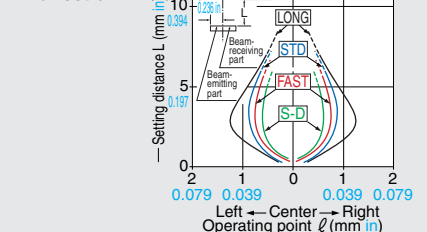
Sensing range: 0 to 4 mm 0 to 0.157 in (at STD mode)
Dimensions: $W12 \times H19 \times D3$ mm
 $W0.472 \times H0.748 \times D0.118$ in

Heat-resistant fibers FD-H30-L32, FD-H18-L31 are also available

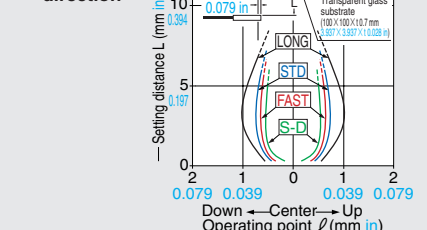
- 180 °C 356 °F heat-resistant type / FD-H18-L31**
Fiber cable length: 2 m 6.562 ft free-cut
Allowable bending radius: R25 mm
RO.984 in or more
- 300 °C 572 °F heat-resistant type / FD-H30-L32**
Fiber cable length: 2 m 6.562 ft fixed
Allowable bending radius: R25 mm
RO.984 in or more

Sensing characteristics (Typical)

Horizontal direction



Vertical direction



SPECIFICATIONS

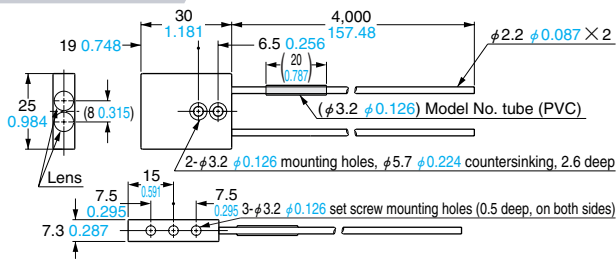
Item	Type	For mapping	For alignment	For seating confirmation	
	Model No.	FD-L46	FD-L43	FD-L44	FD-L44S
Applicable amplifiers (Note 1)		FX-301(P), FX-302(P), FX-311(P)			
Sensing range (Note 2)	LONG	12.5 to 37.5 mm 0.492 to 1.476 in		0 to 7 mm 0 to 0.276 in	0 to 4.5 mm 0 to 0.177 in
	STD	15 to 35 mm 0.591 to 1.378 in	0 to 23mm 0 to 0.906 in	0 to 6 mm 0 to 0.236 in	0 to 4 mm 0 to 0.157 in
	FAST (Note 3)	16 to 29 mm 0.63 to 1.142 in		0 to 5.7 mm 0 to 0.224 in	0 to 3.8 mm 0 to 0.150 in
	S-D			0 to 5.2 mm 0 to 0.205 in	0 to 3.5 mm 0 to 0.138 in
Min. sensing object (Note 4)		φ0.3 mm φ0.012 in gold wire		φ0.03 mm φ0.001 in gold wire	
Allowable bending radius		R25 mm R0.984 in or more	R4 mm R0.157 in or more	R10 mm R0.394 in or more	
Fiber cable length		4 m 13.123 ft free cut		2 m 6.562 ft free cut	
Ambient temperature		-40 to +60 °C -40 to +140 °F, Strage: -40 to +60 °C -40 to +140 °F	0 to +70 °C 32 to +158 °F, Strage: 0 to +70 °C 32 to +158 °F	-40 to +60 °C -40 to +140 °F, Strage: -40 to +60 °C -40 to +140 °F	
Ambient humidity		35 to 85 %RH (No dew condensation or icing allowed), Strage: 35 to 85 %RH			
Material	Fiber	Fiber core: Acrylic, Sheath: Polyethylene			
	Fiber head	Case: ABS, Lens: Norbornene resin	Case: Heat-resistant ABS, Lens: Acrylic, Slit mask (FD-L44S only): Stainless steel (SUS304)	Case: Polycarbonate, Lens: Acrylic, Slit mask (FD-L44S only): Stainless steel (SUS304)	
Weight		39 g Approx.	7.3 g Approx.	5 g Approx.	
Accessories		FX-AT3 (Attachment for φ2.2 mm fiber φ0.087 in): 1 set, FX-CT2 (Fiber cutter): 1 pc.	FX-AT5 (Attachment for φ1.3 mm fiber φ0.051 in): 1 set, FX-CT2 (Fiber cutter): 1 pc.	FX-AT6 (Attachment for φ1 mm φ0.039 in / φ1.3 mm φ0.051 in mixed fiber): 1 set, FX-CT2 (Fiber cutter): 1 pc.	

Notes: 1) Refer to the sensor general catalog 2003-2004, catalog of each amplifier (FX-301/311 series) or dedicated homepage for fiber sensor (<http://www.fiber-sensor.com>) for details about the applicable amplifier.

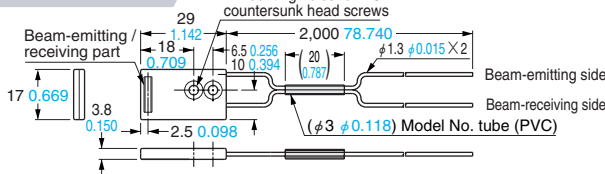
- The values for the FD-L46 are for R edge of glass substrate (100 × 100 × 0.7 mm 3.937 × 3.937 × 0.028 in) for LCDs; the values for the FD-L43 and FD-L44 are for glass substrate (100 × 100 × 0.7 mm 3.937 × 3.937 × 0.028 in) for LCD, and the values for the FD-L44S are for silicon wafer (polished surfaces).
- FX-311(P) does not have a FAST mode.
- The minimum sensing object size is the value at maximum sensitivity. Also, note that the corresponding setting distance is different from the rated sensing distance.

DIMENSIONS (Unit : mm in)

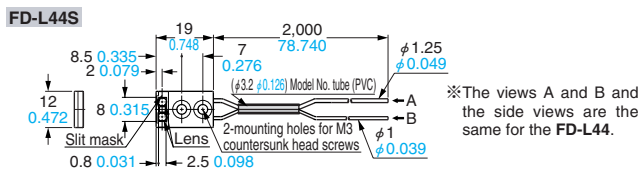
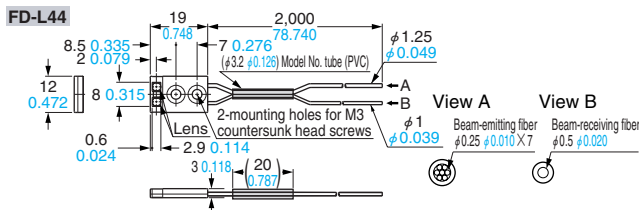
FD-L46



FD-L43



FD-L44 FD-L44S



※The views A and B and the side views are the same for the FD-L44.

All information is subject to change without prior notice.

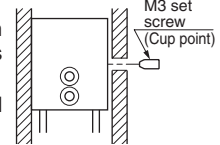
PRECAUTIONS FOR PROPOSER USE



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 (FD-L46: M3 pan head screws. Please arrange separately). The tightening torque should be 0.3 N·m or less (FD-L46: 0.5 N·m or less).
- The FD-L46 can be mounted as shown in the figure at right using M3 set screws (Please arrange separately). The tightening torque at this time should be 0.5 N·m or less.



Cautions

- FD-L43: 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.
- Do not use the fiber at places having intense vibrations, as this can cause malfunction.
- Keep the fiber head surface intact. If it is scratched or spoiled, the detectability will deteriorate.
- If the sensing surface gets dirty, wipe dirt or stains from the sensing faces with a soft cloth moistened with water. (Do not use 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.
- Ensure that any strong extraneous light is not incident on the receiving face of the fiber head.
- Do not apply excessive tensile force to the fiber cable.
- Take care that the fiber is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- There is white dots (FD-L43) or white line (FD-L44/L44S) on the beam-emitting fiber cable. When setting the amplifier, put the fiber cable with white dots into the beam-emitting side.



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