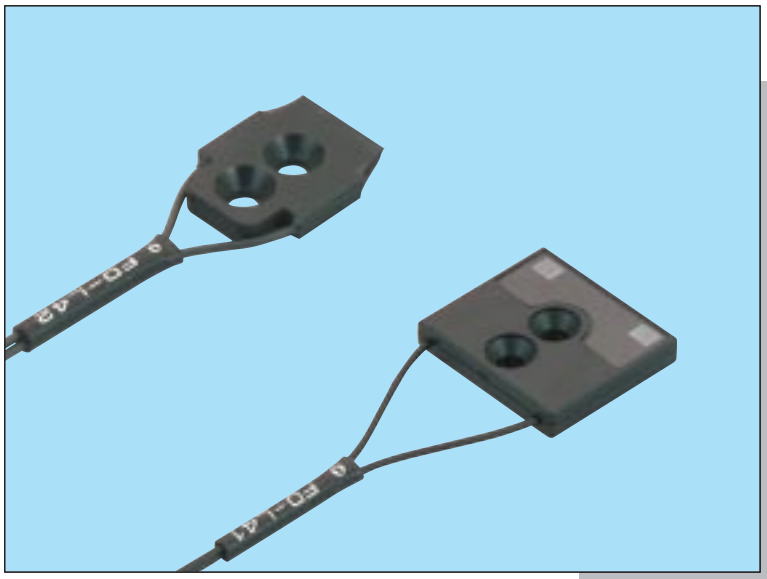
FD-L41/L42

NEW

Glass Sheet Specular Object Detection Fiber

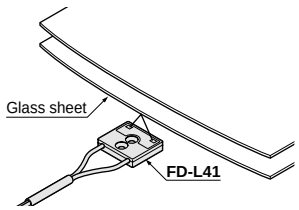


Reliable Glass Sheet/ Wafer Detection by Excellent Fixed-focus Reflection Characteristics

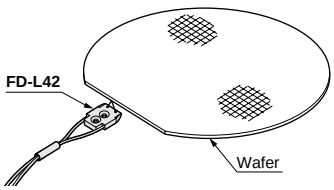
Excellent Fixed-focus Reflection Characteristics

Glass sheets/wafers which are at the desired location inside a cassette can be reliably detected by its excellent fixed-focus reflection characteristics.

Glass sheet detection fiber/FD-L41

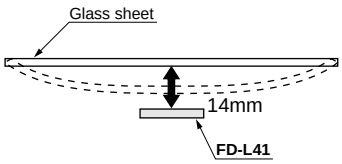


Specular object detection fiber/FD-L42



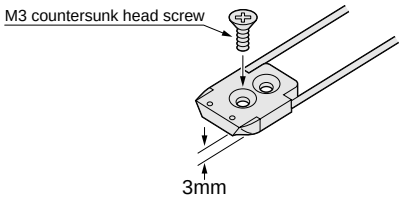
Long sensing Range

FD-L41 features 14mm long sensing range. It can reliably detect even glass sheets which have got bent, under their own weight, in the cassette.



Ultra-slim

FD-L42 is extremely slim, just 3mm (**FD-L41**: 4mm) thick. It can fit in any place, including a robot arm.
Further, since it is mountable by an M3 countersunk head screw, flat mounting is possible.

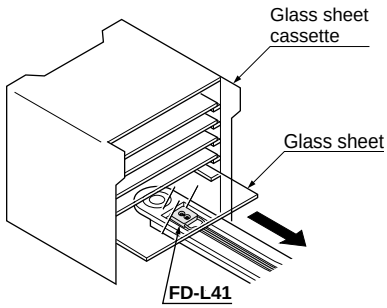


2m Long Free-cut Type

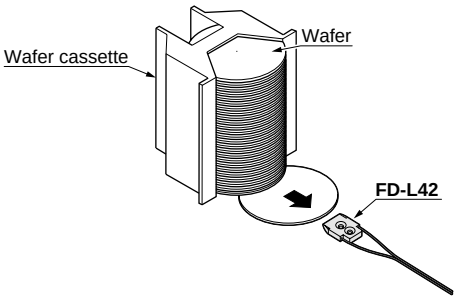
The fiber can be cut to the desired length, according to the application, since it is free-cut type.

APPLICATIONS

Detecting glass sheets in a cassette

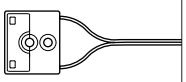
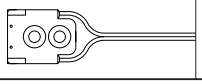


Detecting wafers in a cassette



ORDER GUIDE

Fibers

Type	Shape of fiber head (mm)	Sensing range (Note 1)	Minimum sensing object [at max. sensitivity (Note 2)]	Fiber cable length	Model No.
Glass sheet detection	24×21 	3 to 14mm (Convergent point: 8mm) 	ϕ0.2mm copper wire	Free Cut 2m	**FD-L41**
Specular object detection	15×19 	1.3 to 3mm (Convergent point: 2mm) 			**FD-L42**

Notes: 1) The sensing range of **FD-L41** is specified for glass sheet (25×25× t1.3mm) and the sensing range of **FD-L42** is specified for white non-glossy paper (50×50mm).
2) The minimum sensing object is specified for maximum sensitivity. Also, note that the corresponding setting distance is different from the rated sensing distance.

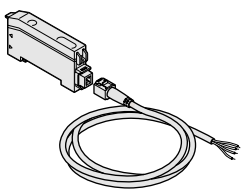
Amplifiers

Type	Appearance	Display	Model No.	Output	Emitting element	Timer function
Digital setting			**FX-D1**	NPN open-collector transistor (Output 1, Output 2)	Red LED	Incorporated with ON-delay timer/ OFF-delay timer (Note)
			FX-D1P	PNP open-collector transistor (Output 1, Output 2)		
Auto-setting			**FX-A1**	NPN open-collector transistor (Sensing output, self-diagnosis output)		Incorporated with approx. 40ms OFF-delay timer
			FX-A1P	PNP open-collector transistor (Sensing output, self-diagnosis output)		
Manual setting			**FX-M1**	NPN open-collector transistor (Sensing output, self-diagnosis output)		
			FX-M1P	PNP open-collector transistor (Sensing output, self-diagnosis output)		

Note: The time period of the ON-delay timer and the OFF-delay timer can be selectable from 40ms, 100ms, 200ms or 500ms.

Plug-in connector type

Plug-in connector type is available. (Standard: cable type)
When ordering the plug-in connector type, add suffix '**J**' to the model No.
(e.g.) Plug-in connector type of **FX-D1P** is '**FX-D1PJ**'.



Connector attached cable
CN-54-C2 (2m long)
CN-54-C5 (5m long)

FD-L41/L42

SPECIFICATIONS

Refer to P.76 for amplifier specifications.

Fibers

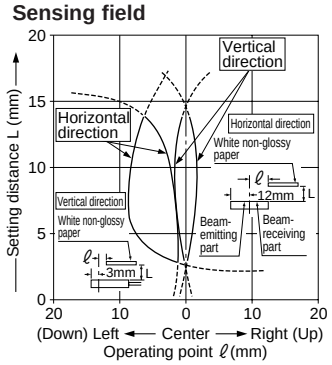
Item \ Designation / Model No.	Glass sheet detection fiber	Specular object detection fiber
	FD-L41	**FD-L42**
Applicable amplifier	Red LED type of **FX-D1/A1/M1** series	
Sensing object (Note 1)	Glass sheet	Wafer, transparent glass sheet
Sensing range (Note 2)	3 to 14mm (Convergent point: 8mm)	1.3 to 3mm (Convergent point: 2mm)
Min. sensing object	ϕ0.2mm copper wire (at convergent point)	
Repeatability (perpendicular to sensing axis)	0.2mm or less	0.06mm or less
Allowable bending radius	R10mm or more	
Fiber cable length	2m (free-cut) (Note 3)	
Ambient temperature	−40 to +60°C (No dew condensation or icing allowed), Storage: −40 to +60°C	
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH	
Material	Fiber head: ABS, Front face film: Polyester Fiber core: Acrylic, Sheath: Polyethylene	Fiber head: Aluminum, Fiber core: Acrylic Sheath: Polyethylene
Accessories	**FX-CT1** (Fiber cutter): 1 No., **FX-AT10** (ϕ1mm fiber attachment): 1 set	

Notes: 1) Detection may not be possible depending on the work-piece surface conditions (poor reflectivity).
2) The sensing range of **FD-L41** is specified for glass sheet (25 × 25 × t1.3mm) and the sensing range of **FD-L42** is specified for white non-glossy paper (50 × 50mm) as the object.
3) Please take care that the sensing range will reduce depending on the fiber end processing.

SENSING CHARACTERISTICS (TYPICAL)

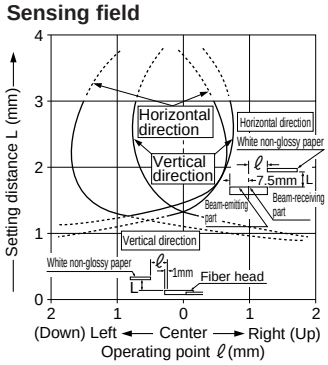
FD-L41

Sensing field



FD-L42

Sensing field



PRECAUTIONS FOR PROPER USE

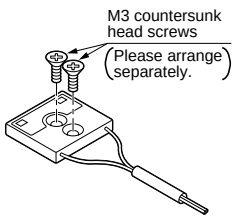
Refer to P.820～ for general precautions and P.92～ for amplifier precautions.

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.

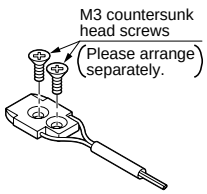
Mounting

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

FD-L41



FD-L42



Cutting fiber cable

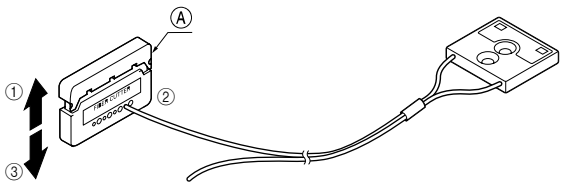
- The fiber cables should be cut off at the ends with the fiber cutter **FX-CT1** (accessory) before insertion into the amplifier.

Cutting procedure

① Slide the blade Ⓐ of fiber cutter **FX-CT1** upward fully.

② Insert the fiber cable into the hole which matches its diameter and set at the prescribed length.

③ Slide the blade Ⓐ down to cut the fiber cable.



Notes: 1) The fiber cable should be cut in one stroke.
2) After it is cut off, mount the fiber attachment immediately and connect it to the amplifier.
3) Cut only one fiber cable at a time. Do not cut two or more fiber cables simultaneously.
4) Once a fiber cable is cut off at a hole, do not use that hole again. If used, it degrades the cut surface quality and the detectability may deteriorate.
5) The blade cannot be replaced. Please purchase an additional fiber cutter, if required.

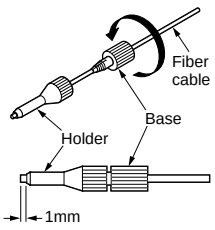
Mounting of fiber attachments

- Before connecting fiber cables to the amplifier, mount the fiber attachments on their ends.

Connecting procedure

① Thread the fiber cable through the base and the holder separately, and screw the base into the holder until they are tightly coupled.

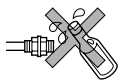
② The fiber end should protrude from the holder by 1mm approx.



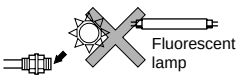
Others

- Bending radius of the fiber cable must be R10mm or more. If the bending radius is smaller than the specified value, the sensing performance may deteriorate.
- 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.

- Do not expose the fiber cable to any organic solvents.
- Do not use the fiber head in places where it may come in direct contact with water. A water drop on the fiber head deteriorates the sensing.



- Ensure that any strong extraneous light is not incident on the receiving face of the fiber head.

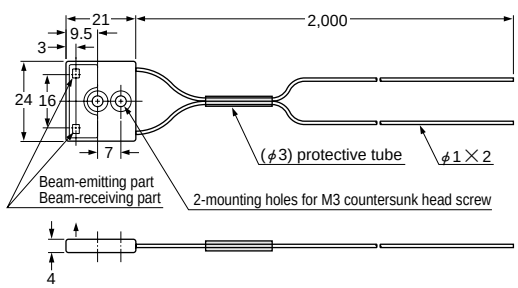


- Do not apply excessive tensile force to the fiber cable.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.

DIMENSIONS (Unit: mm)

Refer to P.117 for amplifier dimensions.

FD-L41 Free-cut With attachment



FD-L42 Free-cut With attachment