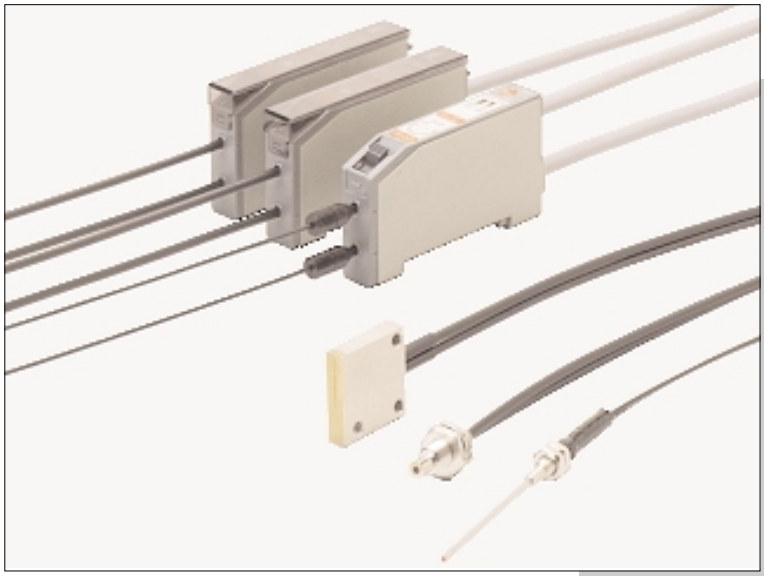
FX-11A

Slim Body Analog Fiber Sensor

Interference prevention



Analog output type for diverse applications

Analog voltage output

It incorporates an analog voltage output of 1 to 5 V.

Various uses

In combination with various types of fibers and the ultra-compact digital panel controller, **CA2** series or the digital panel controller **CA** series, **FX-11A** can be used for various applications, such as, height evaluation, level detection by differential sensing, etc.

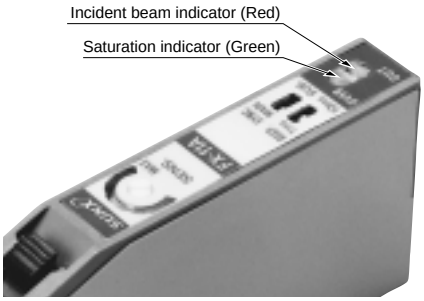
CA2 series

CA series

Digital panel controller

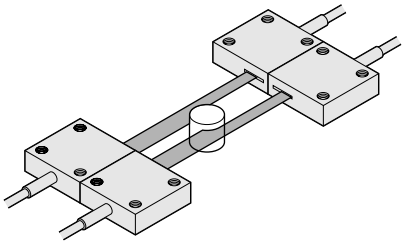
Saturation indicator

The saturation indicator lights up when the output reaches 5 V. Hence, the sensitivity can be easily adjusted even without using a tester.
Moreover, an incident beam indicator which brightens up in proportion to the amount of incident beam (output voltage) is also incorporated.



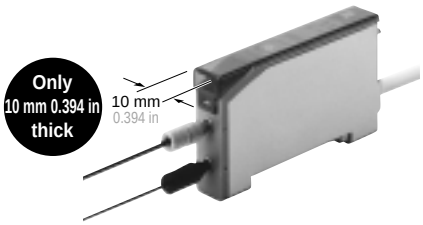
Interference prevention function

Two sets of fibers can be mounted close together or face to face.



Slim size

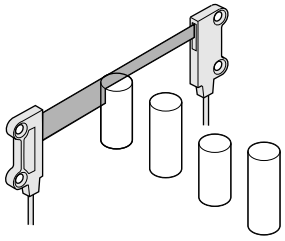
Being only 10 mm 0.394 in thick, it can be mounted in a narrow space.



APPLICATIONS

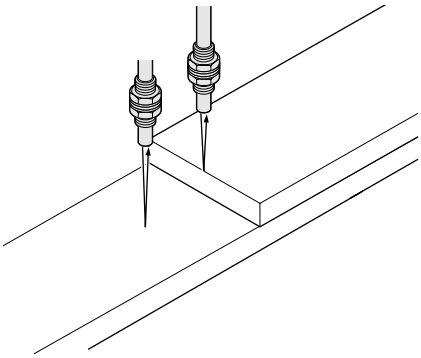
Evaluating height of traveling objects

Objects can be sorted according to their height.



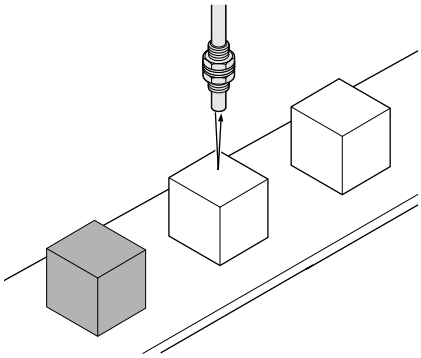
Detecting level difference

When differential sensing is used, no sensitivity readjustment is required even if the reflectivity of the objects changes.



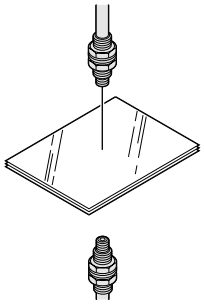
Detecting product mix-up

Mixed-up products that differ in color (reflectivity) can be sorted out from normal products.



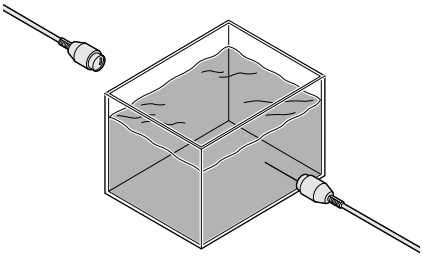
Ascertaining the number of translucent films

The number of overlapping translucent films can be ascertained.



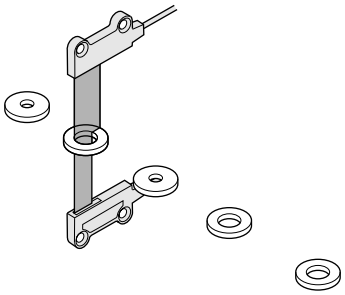
Sensing turbidity of liquid

The turbidity of a liquid inside a clear-wall tank can be sensed in an analog manner.



Measuring inner diameter of rings

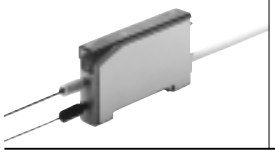
Rings can be sorted according to their inner diameter.



FX-11A

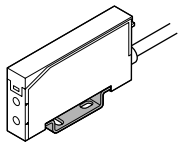
ORDER GUIDE

Amplifier

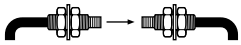
Appearance	Model No.	Supply voltage	Analog output
	**FX-11A**	12 to 24 V DC ± 10 %	Analog voltage • Output voltage: 1 to 5 V

Accessory

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



Fibers

[Thru-beam type (one pair set)] 

Type			Shape of fiber head (mm in)	Sensing range (Note 1)	Features	Fiber cable length ✂ : free cut	Model No.
Thru-beam	Long sensing range		Lens mountable, M4	160 mm 6.299 in	• Twice the sensing range for the same diameter	✂ 2 m 6.562 ft	**FT-B8**
Thru-beam	Long sensing range		With lens, ϕ2.5 ϕ0.098	125 mm 4.921 in	• Long sensing range with small fiber heads of ϕ2.5 mm ϕ0.098 in	✂ 2 m 6.562 ft	**FT-SFM2L**
Thru-beam	Standard		Lens mountable, M4	85 mm 3.346 in	• Free-cut type	✂ 2 m 6.562 ft	**FT-FM2**
Thru-beam	Standard		With sleeve, M4, ϕ1.48 ϕ0.058				**FT-FM2S** With sleeve 90 mm 3.543 in
Thru-beam	Standard						**FT-FM2S4** With sleeve 40 mm 1.575 in
Thru-beam	Standard		ϕ2.5 ϕ0.098				**FT-SFM2**
Thru-beam	Standard		Lens mountable, M3	85 mm 3.346 in	• Miniature head but having the same sensing range as the standard type fiber	✂ 2 m 6.562 ft	**FT-T80**
Thru-beam	Standard		M3	23 mm 0.906 in	• Suitable for detection in a congested equipment • Free-cut type	✂ 2 m 6.562 ft	**FT-NFM2**
Thru-beam	Standard		With sleeve, M3, ϕ0.88 ϕ0.035				**FT-NFM2S** With sleeve 90 mm 3.543 in
Thru-beam	Standard						**FT-NFM2S4** With sleeve 40 mm 1.575 in
Thru-beam	Standard		ϕ1.5 ϕ0.059				**FT-SNFM2**
Thru-beam	Sharp bend	Long sensing range	With lens, ϕ3 ϕ0.118	100 mm 3.937 in	• The fiber can be bent sharply, like an electric wire, to avoid space wastage in installation because of its small allowable bending radius of R1 mm R0.039 in or more.	✂ 2 m 6.562 ft	**FT-WS8L**
Thru-beam	Sharp bend	Standard	Lens mountable, M4	35 mm 1.378 in			**FT-W8**
Thru-beam	Sharp bend	Standard	ϕ2.5 ϕ0.098				**FT-WS8**
Thru-beam	Sharp bend	Small diameter	M3	8 mm 0.315 in			**FT-W4**
Thru-beam	Sharp bend	Small diameter	ϕ1.5 ϕ0.059				**FT-WS4**
Thru-beam	Special use	Wide beam	W4.2 × H31 × D13.5 W0.165 × H1.220 × D0.531	100 mm 3.937 in	• The wide beam detects an object at any place within the range.	✂ 2 m 6.562 ft	**FT-A8**
Thru-beam	Special use	Array	Top sensing, □15 □0.591	65 mm 2.559 in	• The wide beam detects an object at any place within the range.	✂ 2 m 6.562 ft	**FT-AFM2**
Thru-beam	Special use	Array	Side sensing, □15 □0.591				**FT-AFM2E**

Note: The sensing range is defined as the range until the saturation indicator lights up.

ORDER GUIDE

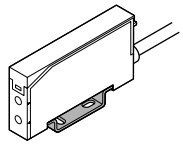
Fibers [Reflective type]

Type			Shape of fiber head (mm in)	Sensing range (Note 1)	Features	Fiber cable length ✂: free cut	Model No.
Reflective	Long sensing range		M6	31 mm 1.220 in	• Long sensing range	✂ 2 m 6.562 ft	**FD-B8**
Reflective	Standard		Coaxial M6	22 mm 0.866 in	• Free-cut type	✂ 2 m 6.562 ft	**FD-FM2**
Reflective	Standard		With sleeve M6 ϕ2.5 ϕ0.098	22 mm 0.866 in	• Free-cut type	✂ 2 m 6.562 ft	**FD-FM2S** With sleeve 90 mm 3.543 in
Reflective	Standard		With sleeve M6 ϕ2.5 ϕ0.098	22 mm 0.866 in	• Free-cut type	✂ 2 m 6.562 ft	**FD-FM2S4** With sleeve 40 mm 1.575 in
Reflective	Standard		M4	22 mm 0.866 in	• Miniature head but having the same sensing range as the standard type fiber	✂ 2 m 6.562 ft	**FD-T80**
Reflective	Standard		M3 Small diameter	7 mm 0.276 in	• Miniature head but having the same sensing range as the standard type fiber	✂ 2 m 6.562 ft	**FD-T40**
Reflective	Standard		ϕ3 ϕ0.118	22 mm 0.866 in	• Miniature head but having the same sensing range as the standard type fiber	✂ 2 m 6.562 ft	**FD-S80**
Reflective	Standard		M4	7 mm 0.276 in	• Suitable for detection in a congested equipment • Free-cut type	✂ 2 m 6.562 ft	**FD-NFM2**
Reflective	Standard		With sleeve M4 ϕ1.48 ϕ0.058	7 mm 0.276 in	• Suitable for detection in a congested equipment • Free-cut type	✂ 2 m 6.562 ft	**FD-NFM2S** With sleeve 90 mm 3.543 in
Reflective	Standard		With sleeve M4 ϕ1.48 ϕ0.058	7 mm 0.276 in	• Suitable for detection in a congested equipment • Free-cut type	✂ 2 m 6.562 ft	**FD-NFM2S4** With sleeve 40 mm 1.575 in
Reflective	Standard		ϕ2.5 ϕ0.098	7 mm 0.276 in	• Suitable for detection in a congested equipment • Free-cut type	✂ 2 m 6.562 ft	**FD-SNFM2**
Reflective	Sharp bend	Standard	M6	8 mm 0.315 in	• The fiber can be bent sharply, like an electric wire, to avoid space wastage in installation because of its small allowable bending radius of R1 mm R0.039 in or more (**FD-WG4**, **FD-WSG4**: R2 mm R0.079 in or more).	✂ 2 m 6.562 ft	**FD-W8**
Reflective	Sharp bend	Standard	M4	8 mm 0.315 in	• The fiber can be bent sharply, like an electric wire, to avoid space wastage in installation because of its small allowable bending radius of R1 mm R0.039 in or more (**FD-WG4**, **FD-WSG4**: R2 mm R0.079 in or more).	✂ 2 m 6.562 ft	**FD-WT8**
Reflective	Sharp bend	Standard	ϕ3 ϕ0.118	8 mm 0.315 in	• The fiber can be bent sharply, like an electric wire, to avoid space wastage in installation because of its small allowable bending radius of R1 mm R0.039 in or more (**FD-WG4**, **FD-WSG4**: R2 mm R0.079 in or more).	✂ 2 m 6.562 ft	**FD-WS8**
Reflective	Sharp bend	High precision	Coaxial M4 Lens mountable	3 mm 0.118 in	• The fiber can be bent sharply, like an electric wire, to avoid space wastage in installation because of its small allowable bending radius of R1 mm R0.039 in or more (**FD-WG4**, **FD-WSG4**: R2 mm R0.079 in or more).	✂ 2 m 6.562 ft	**FD-WG4**
Reflective	Sharp bend	High precision	Coaxial ϕ3 ϕ0.118	3 mm 0.118 in	• The fiber can be bent sharply, like an electric wire, to avoid space wastage in installation because of its small allowable bending radius of R1 mm R0.039 in or more (**FD-WG4**, **FD-WSG4**: R2 mm R0.079 in or more).	✂ 2 m 6.562 ft	**FD-WSG4**
Reflective	Special use	Array	Top sensing □20 □0.787	13 mm 0.512 in	• Its wide beam meets various needs.	✂ 2 m 6.562 ft	**FD-AFM2**
Reflective	Special use	Array	Side sensing □20 □0.787	13 mm 0.512 in	• Its wide beam meets various needs.	✂ 2 m 6.562 ft	**FD-AFM2E**
Reflective	Special use	High precision	Coaxial M4 Lens mountable	10 mm 0.394 in	• Precise position sensing with coaxial fiber	✂ 2 m 6.562 ft	**FD-G4**
Reflective	Special use	High precision	Coaxial • Small head Lens mountable M3	3 mm 0.118 in	• Combination with the **FX-MR3** lens gives an extremely small spot diameter of ϕ0.3 mm ϕ0.012 in approx.	500 mm 19.685 in	**FD-EG1**

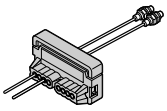
Notes: 1) The sensing range is defined as the range until the saturation indicator lights up.
Further, for the reflective type fibers, it is specified for white non-glossy paper [50 × 50 mm 1.969 × 1.969 in (**FD-B8**: 100 × 100 mm 3.937 × 3.937 in)] as the object.
2) Please take care that the sensing range of free-cut type fiber may be reduced by 20 % max.

Accessories

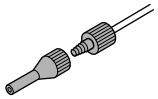
• **MS-DIN-2**
(Amplifier mounting bracket)



• **FX-CT2**
(Fiber cutter)



• **FX-AT10**
(ϕ1 mm ϕ0.039 in fiber attachment)
• **FX-AT13**
(ϕ1.3 mm ϕ0.051 in fiber attachment)



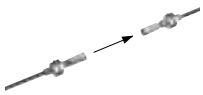
FX-11A

OPTIONS

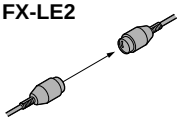
Designation		Model No.	Description
For thru-beam type fiber	Expansion lens	**FX-LE1**	Increases the sensing range by 6 times or more. • Sensing range (Lens on both sides) (Note 1): 900 mm 35.433 in (**FT-B8**), 750 mm 29.528 in (**FT-FM2**, **FT-T80**), 350 mm 13.780 in (**FT-W8**)
For thru-beam type fiber	Super-expansion lens	**FX-LE2**	Tremendously increases the sensing range with large aperture lenses. • Sensing range (Lens on both sides) (Note 1): 3,000 mm 118.110 in (**FT-B8**), 2,500 mm 98.425 in (**FT-FM2**), 3,000 mm 118.110 in (**FT-W8**)
For thru-beam type fiber	Side-view lens	**FX-SV1**	Beam axis is bent by 90°. • Sensing range (Lenses on both sides) (Note 1) : 220 mm 8.661 in (**FT-B8**), 200 mm 7.874 in (**FT-FM2**, **FT-T80**), 25 mm 0.984 in (**FT-W8**)
For reflective type fiber	Pinpoint spot lens	**FX-MR1**	Pinpoint spot of ϕ0.5 mm ϕ0.020 in. • Applicable fiber: **FD-WG4**, **FD-G4** • Distance to focal point: 6 ± 1 mm 0.236 ± 0.039 in
For reflective type fiber	Zoom lens	**FX-MR2**	The spot diameter is adjustable from ϕ0.7 to ϕ2 mm ϕ0.028 to ϕ0.079 in according to how much the fiber is screwed in. • Applicable fiber: **FD-WG4**, **FD-G4** • Distance to focal point: 18.5 to 43 mm 0.728 to 1.693 in approx. (Screw-in depth: 7 to 14 mm 0.276 to 0.551 in) • Spot diameter: ϕ0.7 to ϕ2 mm ϕ0.028 to ϕ0.079 in (Screw-in depth: 7 to 14 mm ϕ0.276 to ϕ0.551 in)
For reflective type fiber	Finest spot lens	**FX-MR3**	Extremely fine spot of ϕ0.3 mm ϕ0.012 in is achieved. • Applicable fiber: **FD-WG4**, **FD-EG1**, **FD-G4** • Distance to focal point: 7.5 ± 0.5 mm 0.295 ± 0.020 in • Spot diameter: ϕ0.3 mm ϕ0.012 in (**FD-EG1**), ϕ0.5 mm ϕ0.020 in (**FD-WG4**, **FD-G4**)
Digital panel controller (Note 2)		**CA2-T2**	NPN open-collector transistor This is a very small controller which allows two independent threshold level settings. • Supply voltage: 24 V DC ± 10 % • No. of inputs: 1 No. (sensor input) • Input range: 1 to 5 V DC • Main functions: Threshold level setting function, zero-adjust function, scale setting function, hysteresis setting function, start / hold function, auto-reference function, power supply ON-delay function, etc.
Digital panel controller (Note 2)		**CA-R2**	Relay contact This is a multi-functional controller having mathematical functions, hold function, etc. • Supply voltage: 100 to 240 V AC ± 10 % • No. of inputs: 2 Nos. (sensor inputs) • Input range: 1 to 5 V DC • Power supply for sensor: 12 V DC, 150 mA • Main functions: Mathematical functions, process number selection function, hold function, scaling function, auto-reference function, power supply ON-delay function, measurement start delay function, hysteresis setting function, etc.
Digital panel controller (Note 2)		**CA-T2**	NPN open-collector transistor
Digital panel controller (Note 2)		**CA-B2**	NPN open-collector transistor With BCD output
Protective tube (For thru-beam type fiber)		**FTP-500** (0.5 m 1.640 ft) **FTP-1000** (1 m 3.281 ft) **FTP-1500** (1.5 m 4.921 ft)	For M4 thread Applicable fibers: **FT-B8**, **FT-FM2**, **FT-FM2S**, **FT-FM2S4** The protective tube, made of non-corrosive stainless steel, protects the inner fiber cable from any external forces.
Protective tube (For thru-beam type fiber)		**FTP-N500** (0.5 m 1.640 ft) **FTP-N1000** (1 m 3.281 ft) **FTP-N1500** (1.5 m 4.921 ft)	For M3 thread Applicable fibers: **FT-T80**, **FD-T40**, **FT-NFM2**, **FT-NFM2S**, **FT-NFM2S4** The protective tube, made of non-corrosive stainless steel, protects the inner fiber cable from any external forces.
Protective tube (For reflective type fiber)		**FDP-500** (0.5 m 1.640 ft) **FDP-1000** (1 m 3.281 ft) **FDP-1500** (1.5 m 4.921 ft)	For M6 thread Applicable fibers: **FD-B8**, **FD-FM2**, **FD-FM2S**, **FD-FM2S4** The protective tube, made of non-corrosive stainless steel, protects the inner fiber cable from any external forces.
Protective tube (For reflective type fiber)		**FDP-N500** (0.5 m 1.640 ft) **FDP-N1000** (1 m 3.281 ft) **FDP-N1500** (1.5 m 4.921 ft)	For M4 thread Applicable fibers: **FD-T80**, **FD-NFM2**, **FD-NFM2S**, **FD-NFM2S4** The protective tube, made of non-corrosive stainless steel, protects the inner fiber cable from any external forces.
Fiber bender		**FB-1**	The fiber bender bends the sleeve part of the fiber head at the proper radius.
Universal sensor mounting stand (Note 3)		**MS-AJ1-F**	Horizontal mounting type Mounting stand assembly for fiber (For M3, M4 or M6 threaded head fibers)
Universal sensor mounting stand (Note 3)		**MS-AJ2-F**	Vertical mounting type Mounting stand assembly for fiber (For M3, M4 or M6 threaded head fibers)

Notes: 1) The sensing range is defined as the range until the saturation indicator lights up.
2) For further details, refer to p.864～ for the ultra-compact digital panel controller **CA2** series, and to p.854～ for the digital panel controller **CA** series.
3) Refer to P.332～ for the universal sensor mounting stand.

Expansion lens
• **FX-LE1**



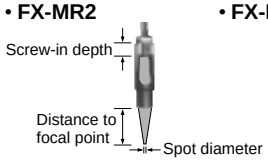
Super-expansion lens
• **FX-LE2**



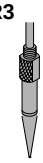
Side-view lens
• **FX-SV1**

Pinpoint spot lens
• **FX-MR1**

Zoom lens
• **FX-MR2**



Finest spot lens
• **FX-MR3**

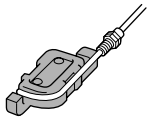


Digital panel controller
• **CA2** series

• **CA** series

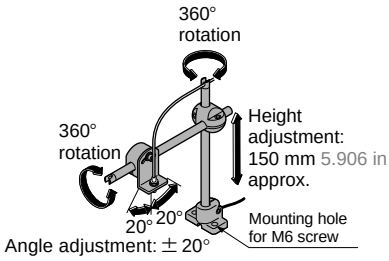
Protective tube
• **FTP-□**
• **FDP-□**

Fiber bender
• **FB-1**

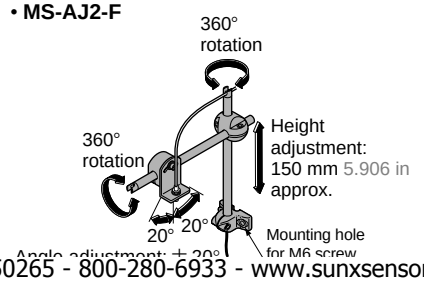


Universal sensor mounting stand
Using the arm which enables adjustment in the horizontal direction, sensing can also be done from above an assembly line.

• **MS-AJ1-F**



• **MS-AJ2-F**



SPECIFICATIONS

Fibers

Item \ Type	Standard, small fiber head, small diameter, sharp bend, long sensing range with lens, wide beam, array, high precision
Allowable bending radius	R25 mm R0.984 in or more [Sharp bend: R1 mm R0.039 in or more (**FD-WG4**, **FD-WSG4**: R2 mm R0.079 in or more)]
Ambient temperature	−40 to +70 °C −40 to +158 °F (Sharp bend: −40 to +60 °C −40 to +140 °F, **FD-EG1**: −20 to +60 °C −4 to +140 °F) (No dew condensation or icing allowed), Storage: −40 to +70 °C −40 to +158 °F (Sharp bend: −40 to +60 °C −40 to +140 °F, **FD-EG1**: −20 to +60 °C −4 to +140 °F)
Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
Material	Fiber core: Acrylic Sheath: Polyethylene Fiber head: Brass (Nickel-plated) (Threaded part of standard, threaded part of small diameter, threaded type of sharp bend, high precision, array) Stainless steel (SUS) (**FT-SFM2**, small fiber head, **FT-SNFM2**, **FD-SNFM2**, non-threaded type of sharp bend, **FT-SFM2L**, sleeve part of sleeve-attached fiber) Polycarbonate (**FT-A8**, Lens of **FT-WS8L**), Polyolefin (Lens of **FT-A8**)
Accessories	All fibers: 1 fiber attachment set Free-cut type fibers:**FX-CT2** 1pc. (Fiber cutter) Threaded head fibers:nuts 2 pcs. (thru-beam type: 4 pcs.) and toothed lock washer 1 pc. (thru-beam type: 2 pcs.) **FT-A8**: 0.5 × 12 mm 0.020 × 0.472 in seal type slit mask 2 pcs. and 1 × 12 mm 0.039 × 0.472 in seal type slit mask 2 pcs.

Amplifier

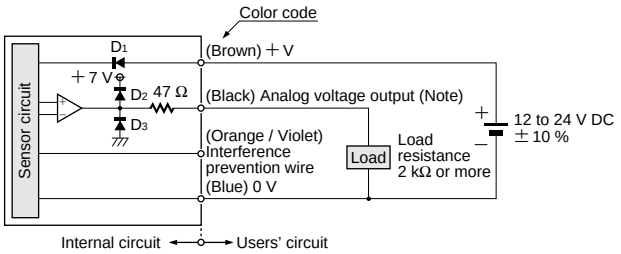
Item \ Model No.		FX-11A
Supply voltage		12 to 24 V DC ± 10 % Ripple P-P 10 % or less
Current consumption		35 mA or less
Analog output		Analog voltage • Output voltage: 1 to 5 V (proportional to incident light intensity) • Output current: 5 mA or less • Output impedance: 47 Ω • Load resistance: 2 kΩ or more • Temperature characteristics: 0.3 % F.S./°C or less
Response time		Switchable either 1 ms or less, or 10 ms or less
Incident beam indicator		Red LED (brightens up in proportion to analog output voltage)
Saturation indicator		Green LED (lights up when the analog output voltage reaches 5 V)
Sensitivity adjuster		8-turn potentiometer with indicator
Interference prevention function		Incorporated
Environmental resistance	Ambient temperature	−10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: −20 to +70 °C −4 to +158 °F
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
	Ambient illuminance	Sunlight: 1,000 ℓx at the light-receiving face, Incandescent light: 1,000 ℓx at the light-receiving face
	Noise immunity	Power line: 240 Vp, 10 ms cycle, and 0.5 μs pulse width; Radiation: 300 Vp, 10 ms cycle, and 0.5 μs pulse width (with noise simulator)
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure (Note 1)
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure (Note 1)
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm, 0.030 in amplitude in X, Y and Z directions for two hours each
	Shock resistance	100 m/s² acceleration (10 G approx.) in X, Y and Z directions for five times each
Emitting element		Red LED (modulated)
Material		Enclosure: Heat-resistant ABS, Cover: Polycarbonate, Fiber lock lever: PES
Cable		0.2 mm² 4-core cabtyre cable, 2 m 6.562 ft long
Cable extension		Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable. (Note 2)
Weight		60 g approx.
Accessories		**MS-DIN-2** (Amplifier mounting bracket): 1 pc., Adjusting screwdriver: 1 pc.

Notes: 1) The voltage withstandability and the insulation resistance values given in the above table are for the amplifier only.
2) Take care that the output voltage drops when the cable is extended.

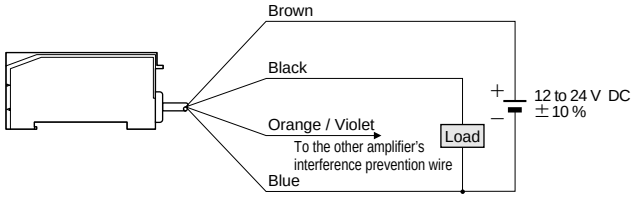
FX-11A

I/O CIRCUIT AND WIRING DIAGRAMS

I/O circuit diagram



Wiring diagram



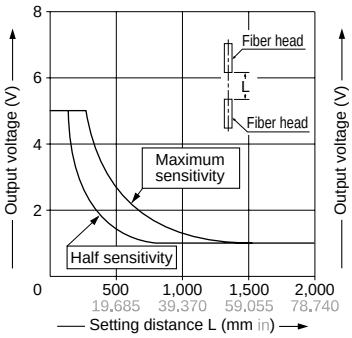
Note: The analog voltage output is not incorporated with a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

Symbols ... D1: Reverse supply polarity protection diode
D2, D3: Surge absorption diode

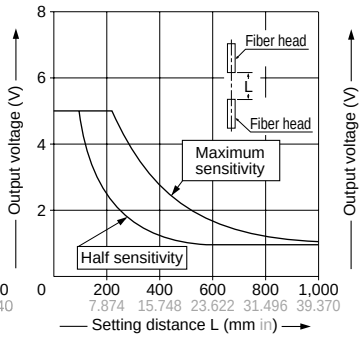
SENSING CHARACTERISTICS (TYPICAL)

Correlation between setting distance and output voltage

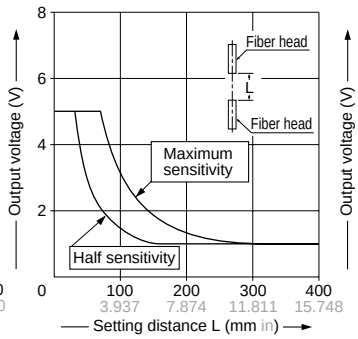
FT-B8 Thru-beam type



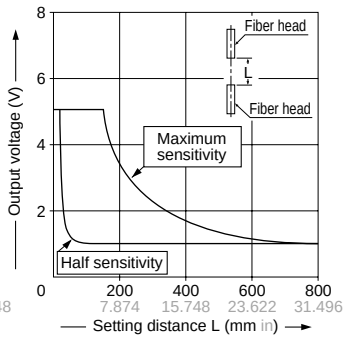
FT-FM2 FT-FM2S FT-FM2S4 FT-SFM2 FT-T80 Thru-beam type



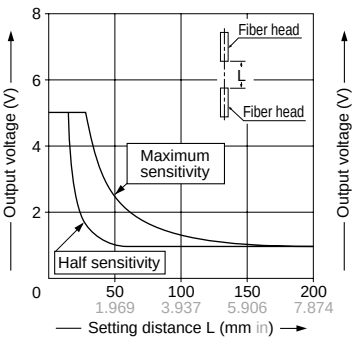
FT-NFM2 FT-NFM2S FT-NFM2S4 FT-SNFM2 Thru-beam type



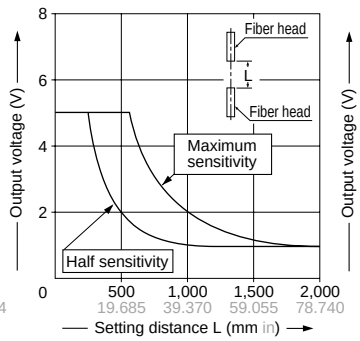
FT-W8 FT-WS8 Thru-beam type



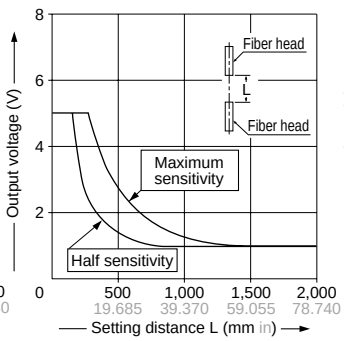
FT-W4 FT-WS4 Thru-beam type



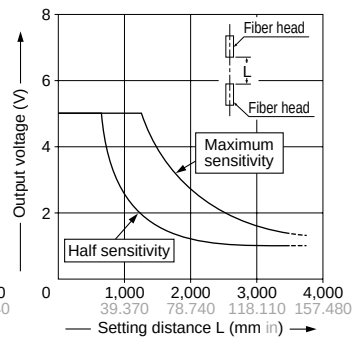
FT-WS8L Thru-beam type



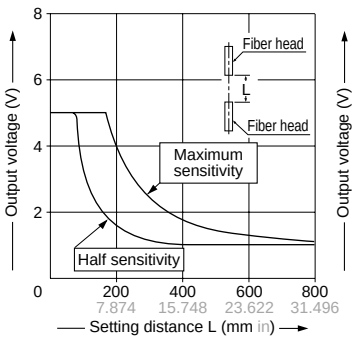
FT-SFM2L Thru-beam type



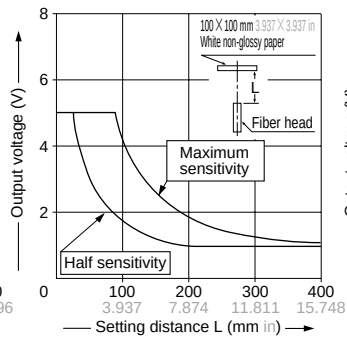
FT-A8 Thru-beam type



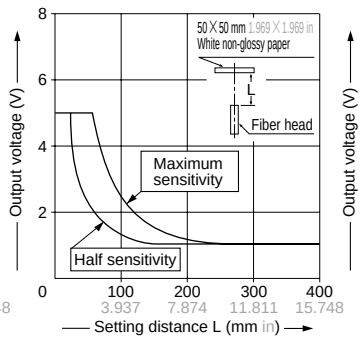
FT-AFM2 FT-AFM2E Thru-beam type



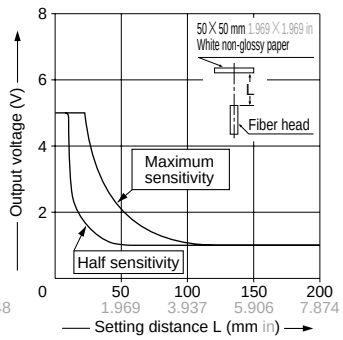
FD-B8 Reflective type



FD-FM2 FD-FM2S FD-FM2S4 FD-T80 FD-S80 Reflective type



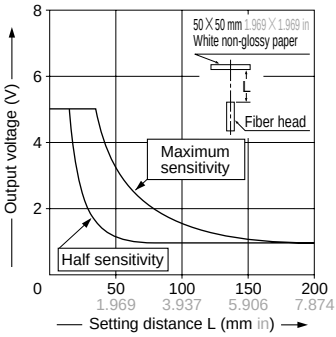
FD-NFM2 FD-NFM2S FD-T40 FD-NFM2S4 FD-SNFM2 Reflective type



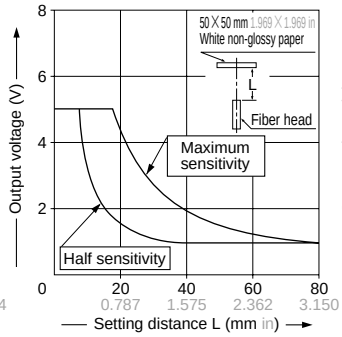
SENSING CHARACTERISTICS (TYPICAL)

Correlation between setting distance and output voltage

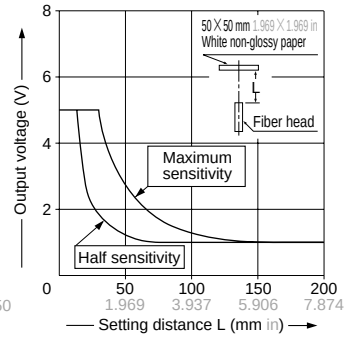
FD-W8 FD-WT8 FD-WS8 Reflective type



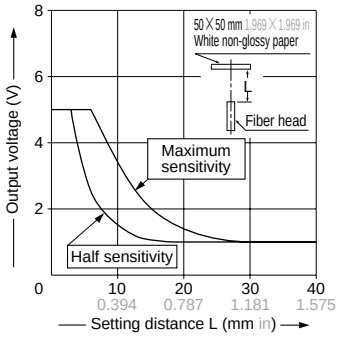
FD-WG4 FD-WSG4 Reflective type



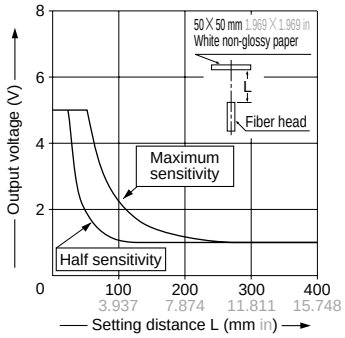
FD-G4 Reflective type



FD-EG1 Reflective type



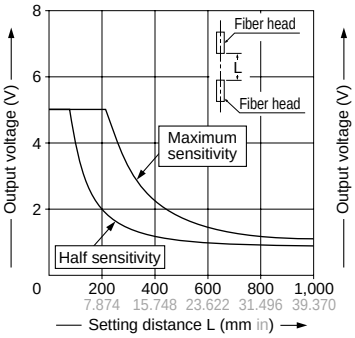
FD-AFM2 FD-AFM2E Reflective type



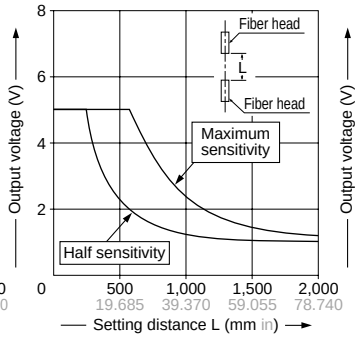
Correlation between setting distance and output voltage when using seal type slit masks

FT-A8 Thru-beam type

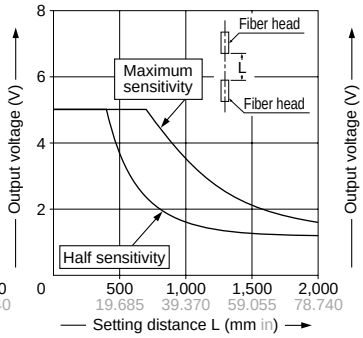
With slit mask (0.5 X 12 mm 0.020 X 0.472 in) on one side



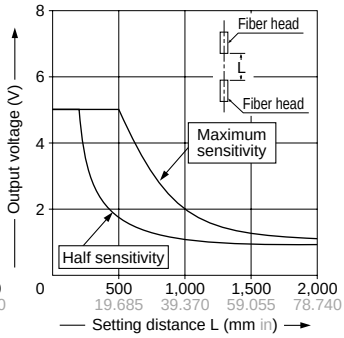
With slit masks (0.5 X 12 mm 0.020 X 0.472 in) on both sides



With slit mask (1 X 12 mm 0.039 X 0.472 in) on one side



With slit masks (1 X 12 mm 0.039 X 0.472 in) on both sides



FX-11A

PRECAUTIONS FOR PROPER USE

Refer to p.1135～ for general precautions and p.94～ for fiber precautions.

Amplifier

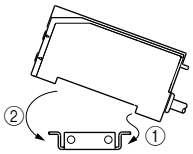
⚠ This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

Mounting

How to mount the amplifier

① Fit the rear part of the amplifier on the attached amplifier mounting bracket (**MS-DIN-2**) or a 35 mm 1.378 in width DIN rail.

② Press down the front part of the amplifier on the amplifier mounting bracket (**MS-DIN-2**) or DIN rail to fit it.

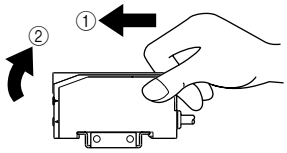


Attached amplifier mounting bracket or 35 mm 1.378 in width DIN rail

How to remove the amplifier

① Push the amplifier forward.

② Lift up the front part of the amplifier to remove it.

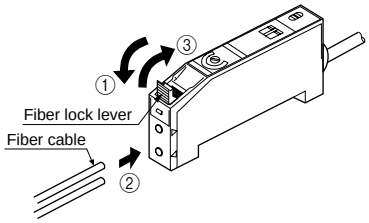


How to connect the fiber cables

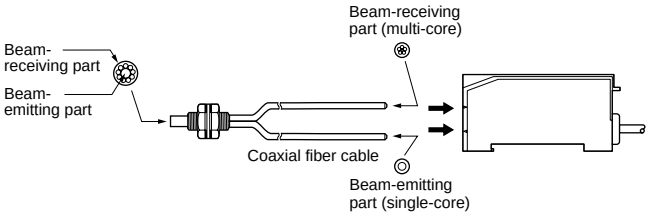
① Unlock the fiber lock lever.

② Insert the fiber cables slowly into the inlets until they stop. (Note 1)

③ Lock the fiber lock lever in the original position.

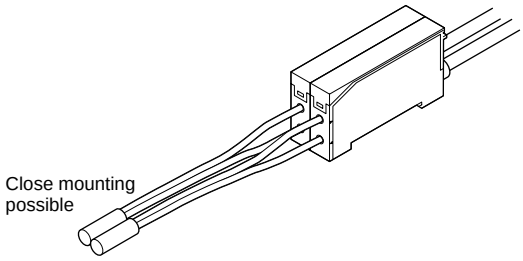


Notes: 1) In case the fiber cables are not inserted to a position where they stop, the sensing range reduces.
2) With the coaxial reflective type fiber, such as, **FD-G4** or **FD-FM2**, insert the center fiber cable (single-core) into the beam-emitting inlet and the outer fiber cable (multi-core) into the beam-receiving inlet. If they are inserted in reverse, the sensing accuracy will deteriorate.



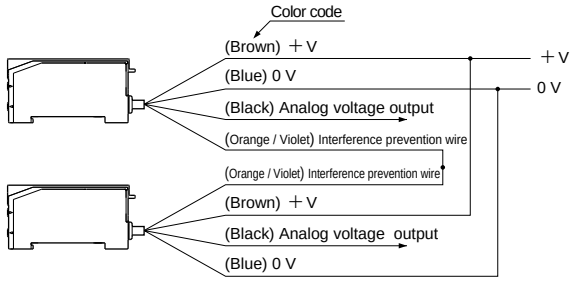
Interference prevention function

• Two sets of fibers can be mounted close together because an interference prevention function has been incorporated in **FX-11A**.
The wiring and the setting of the interference prevention selection switch should be done as follows.



① **Wiring**

• Connect together the interference prevention wires and the 0 V wires of the two **FX-11A** amplifiers, respectively.



② **Interference prevention selection switch**

• Set the interference prevention selection switch to 'MAIN' for one amplifier and to 'SUB' for the other amplifier.

※ **In case interference function is not used**

• Make sure to set the interference prevention selection switch to 'MAIN'. If it is set to 'SUB', the sensor will not work.

• Insulate the interference prevention wire.

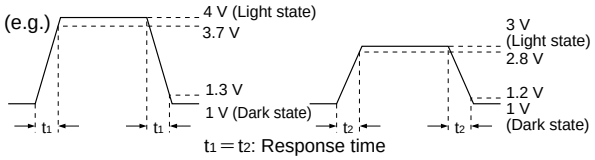
PRECAUTIONS FOR PROPER USE

Refer to p.1135～ for general precautions and p.94～ for fiber precautions.

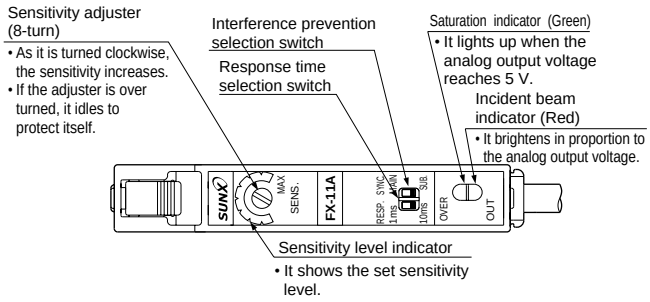
Amplifier

Response time selection

- The response time of **FX-11A** can be selected either '1 ms' or '10 ms'. If your detecting application does not need a quick response, '10 ms' is recommended as it makes the detection secure against inductive noise and ambient light. If you choose '1 ms', pay attention to electromagnetic noise and ambient light.
- The response time of **FX-11A** is the time required for the output voltage to rise from 1 V (dark state voltage) to [90 % of {light state voltage − 1 V (dark state voltage)} + 1 V (dark state voltage)] or the time required for the output voltage to fall from the light state voltage to [10 % of {light state voltage − 1 V (dark state voltage)} + 1 V (dark state voltage)]. The response time of **FX-11A** is constant regardless of the amplitude of the output voltage.



Part description



Sensitivity adjustment

Step	Operation	Sensitivity adjuster
①	Turn the sensitivity adjuster fully counterclockwise (minimum sensitivity).	MAX. SENS.
②	Adjust the relative positions of the fiber heads or the fiber head and the object so as to receive as much incident beam as possible. **Thru-beam type** / **Reflective type** Perfect beam-alignment Maximum reflected beam	—
③	Turn the sensitivity adjuster clockwise until the saturation indicator lights up. Once it lights up, turn the sensitivity adjuster counterclockwise until the saturation indicator lights off. This is the most sensitive point before saturation.	MAX. SENS.

Others

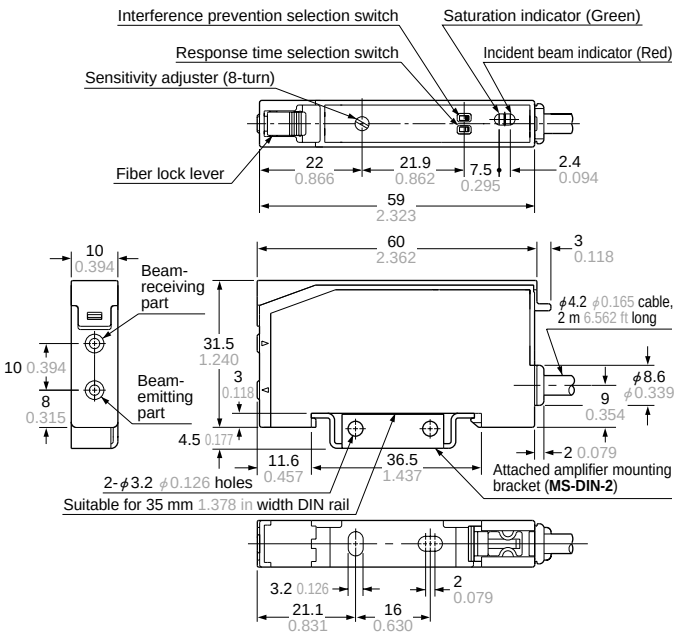
- Do not use during the initial transient time (50 ms) after the power supply is switched on.
- The analog output is not incorporated with a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

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.103～ for dimensions other than those given in the figures below.

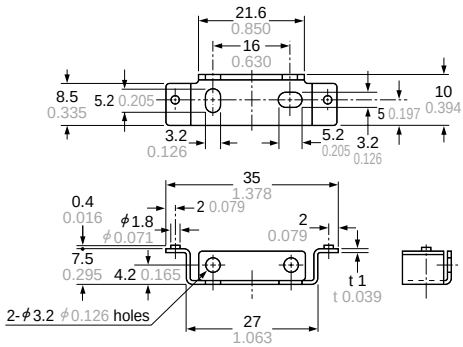
FX-11A Amplifier

Assembly dimensions with attached amplifier mounting bracket



Note: The top view is shown without the cover.

MS-DIN-2 Amplifier mounting bracket (Accessory for **FX-11A**)



Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)