

# INSTRUCTION MANUAL

## Slim Body Analog Fiber Sensor FX-11A



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.

### 1 SPECIFICATIONS

Designation	Slim body analog fiber sensor
Item	Model No.
	<b>FX-11A</b>
Supply voltage	12 to 24V DC $\pm 10\%$ Ripple P-P 10% or less
Current consumption	35mA or less
Analog output	Analog voltage • Output voltage: 1 to 5V (proportional to incident light intensity) • Output current: 5mA or less • Output impedance: 47 $\Omega$ • Load resistance: 2k $\Omega$ or more • Temperature characteristics: 0.3% F.S. / $^{\circ}\text{C}$ or less
Response time	Switchable either 1ms or less, or 10ms or less
Interference prevention function	Incorporated
Ambient temperature	- 10 to +55 $^{\circ}\text{C}$ (No dew condensation or icing allowed) Storage: - 20 to +70 $^{\circ}\text{C}$
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH
Emitting element	Red LED (modulated)
Material	Enclosure: Heat-resistant ABS Cover: Polycarbonate, Fiber lock lever: PES
Cable	0.2mm <sup>2</sup> 4-core cabtyre cable, 2m long
Weight	60g approx.
Accessories	<b>MS-DIN-2</b> (Amplifier mounting bracket): 1 No., Adjusting screwdriver: 1 No.

Thank you very much for using SUNX sensors. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this sensor. Kindly keep this instruction manual in a convenient place for quick reference.

### 2 CAUTIONS

- Make sure to carry out the wiring in the power supply off condition.
- Verify that supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (50ms) after the power supply is switched on.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- Extension up to total 100m is possible with 0.3mm<sup>2</sup>, or more, cable. However, take care that the output voltage drops when the cable is extended.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in direct contact with water, oil, grease or organic solvents, such as, thinner, etc.

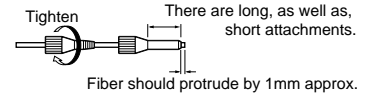
#### ● Precautions for fiber

- Do not expose the fiber cable to any organic solvent.
- Do not apply excessive tensile force to the fiber cable.
- Wipe dirt or stains from the sensing faces with a soft cloth.
- The bending radius of the fiber cable must be R25mm or more. If the bending radius is smaller, the sensing ability is decreased. However, as there are fibers which can be bent at less than R25mm, their bending radius should be equal to, or more, than the value specified in their catalog.
- The free-cut fiber cables must be cut with a fiber cutter before insertion into the amplifier.

Note: Cut only one fiber cable at a time.

Once a fiber cable is cut off at a hole, do not use that hole again.

- The sleeve part bending radius of fiber with sleeve must be R10mm or more.
- Fiber attachments are enclosed with the small diameter free-cut fiber. Use the shorter attachment.
- 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.
- The tightening torque must not exceed the values given below.



#### Mounting with a nut (threaded head type)

	Tightening torque
M3	0.39N·m
M4	0.58N·m
M5	0.98N·m
M6	0.98N·m
M14	1.47N·m

#### Mounting with a set screw

	Tightening torque
General fiber	0.29N·m
<b>FT-SFM2L</b>	0.19N·m

Note: For fibers other than those given in the above table, refer to the instruction manual enclosed with the fiber.

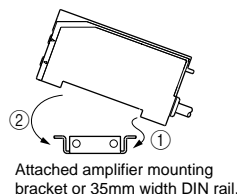
#### Mounting with a M3 screw

	Tightening torque
<b>FT-AFM2(E)</b> <b>FD-AFM2(E)</b>	0.58N·m

### 3 MOUNTING

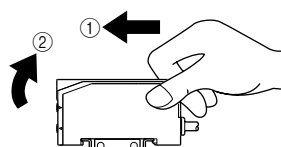
#### How to mount the amplifier

- ① Fit the rear part of the amplifier on the attached amplifier mounting bracket (**MS-DIN-2**) or a 35mm width DIN rail.
- ② Press down the front part of the amplifier on the amplifier mounting bracket (**MS-DIN-2**) or the DIN rail to fit it.



#### How to remove the amplifier

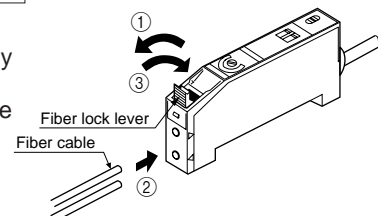
- ① Push the amplifier forward.
- ② Lift up the front part of the amplifier to remove it.



Note: Please take care that if the front part is lifted without pushing the amplifier forwards, the hooks on the rear portion of the mounting section are likely to break.

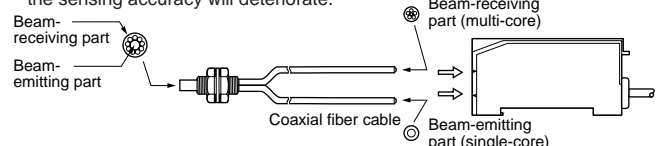
#### How to connect the fiber cables

- ① Unlock the fiber lock lever.
- ② Insert the fiber cables slowly into the inlets until they stop.
- ③ Lock the fiber lock lever in the original position.



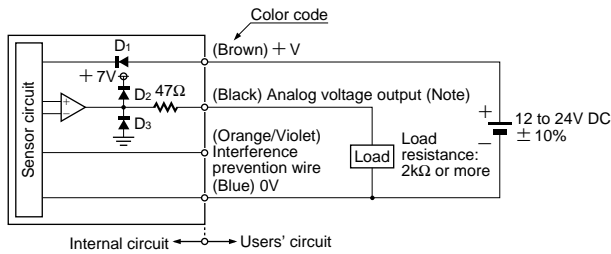
Note: 1) In case the fiber cables are not inserted to a position where they stop, the sensing range reduces.

- 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.



## 4 CONNECTION

### I/O circuit diagram

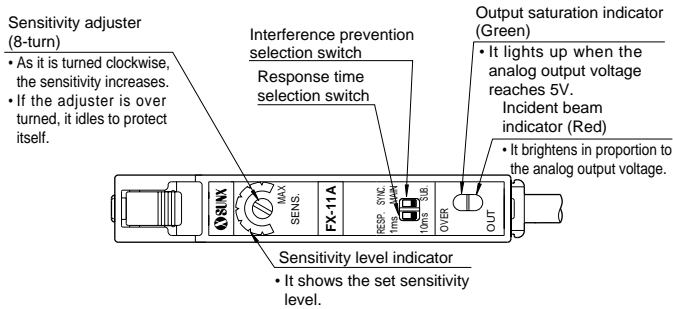


Note: The output is not incorporated with a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

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

## 5 ADJUSTMENT

### Part description

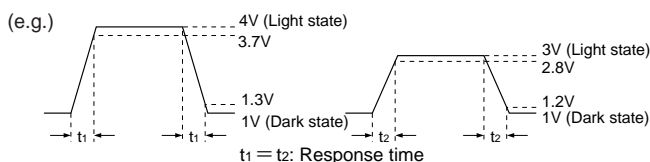


### Sensitivity adjustment

Step	Operation	Sensitivity adjuster
①	Turn the sensitivity adjuster fully counterclockwise (minimum sensitivity).	
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.  <div style="display: flex; justify-content: space-around;"> <div> <p><b>Thru-beam type</b></p> </div> <div> <p><b>Reflective type</b></p> </div> </div>	
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.	

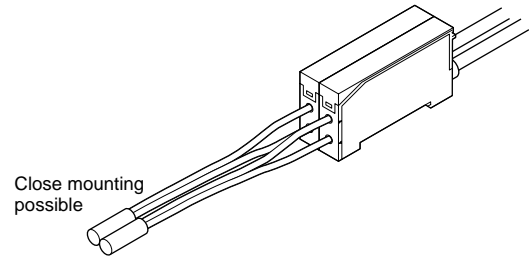
## 6 RESPONSE TIME SELECTION

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



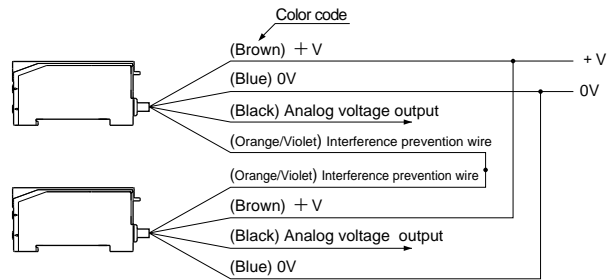
## 7 INTERFERENCE PREVENTION FUNCTION

- 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.



### Wiring

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



### Interference prevention selection switch

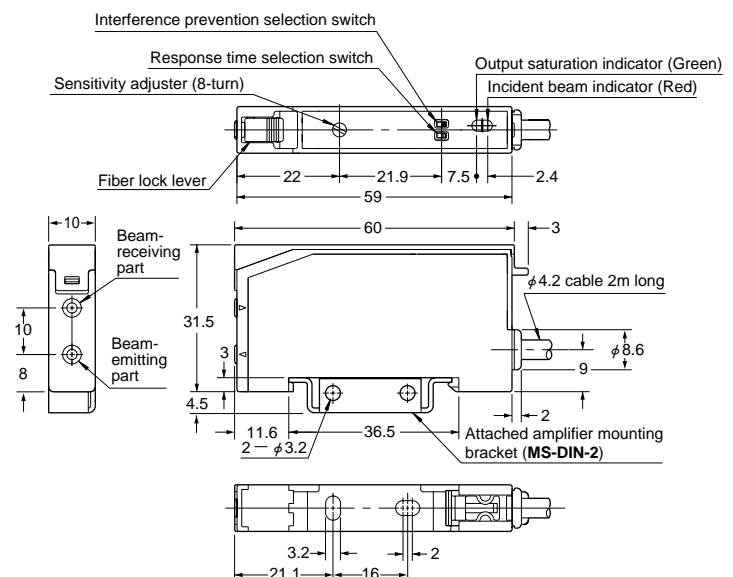
- Set the interference prevention selection switch to 'MAIN' for one amplifier and to 'SUB' for the other amplifier.

### ※ In case interference prevention 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.

## 8 DIMENSIONS (Unit: mm)

### Assembly dimensions with attached amplifier mounting bracket



Note: The top view is shown without the cover.



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