

Thank you very much for purchasing Panasonic products. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.



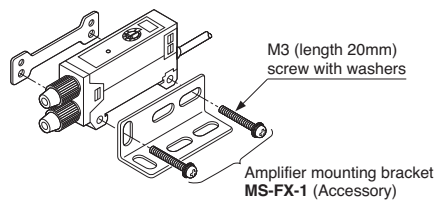
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

## 1 MOUNTING

### How to mount the amplifier

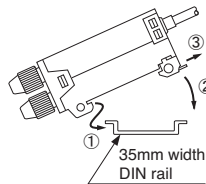
#### <Using MS-FX-1 (Amplifier mounting bracket)>

- The tightening torque should be 0.78N·m or less.



#### <Using DIN rail>

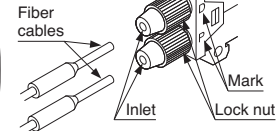
- ① Fit the front part of the amplifier mounting section on the 35mm width DIN rail.
- ② Press down the rear part of the amplifier mounting section on the DIN rail to fit it.
- ③ In order to remove the amplifier, insert a flathead screwdriver into the groove of the stopper at the rear part of the amplifier mounting section and pull out the stopper.



### How to connect the fiber cable

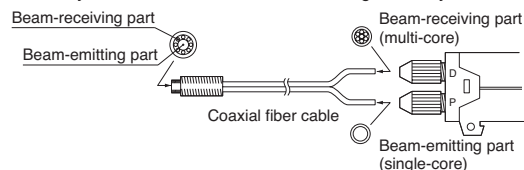
Insert the fiber cable into the inlet slowly without any excessive force, because a receiving element having a thin glass film is used at the receiving part.

- ① Loosen the lock nut.
- ② Insert the fiber cable slowly into the inlet of the lock nut.



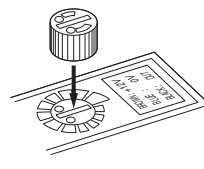
- ③ Tighten up the lock nut.

Note: Such as, **FD-G500**, insert the single-core fiber cable into the beam-emitting inlet and the multi-core fiber cable into the beam-receiving inlet. If they are inserted in reverse, the sensing accuracy will deteriorate.



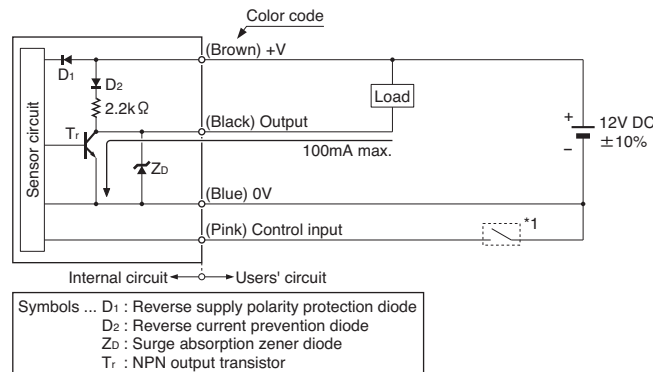
## 2 HOW TO CONNECT THE ADJUSTER KNOB

- It is used for manual sensitivity adjustment. The adjuster knob cannot be detached once it is fitted on the amplifier.



Aligning the marks accurately, press in the knob with force.

## 3 I/O CIRCUIT DIAGRAM

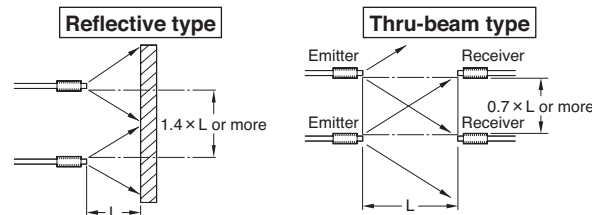


\*1: Connection of control input and output operation

Connection	Output operation
Connection to +V, or open	Light-ON
Connection to 0V	Dark-ON

## 4 INTERFERENCE

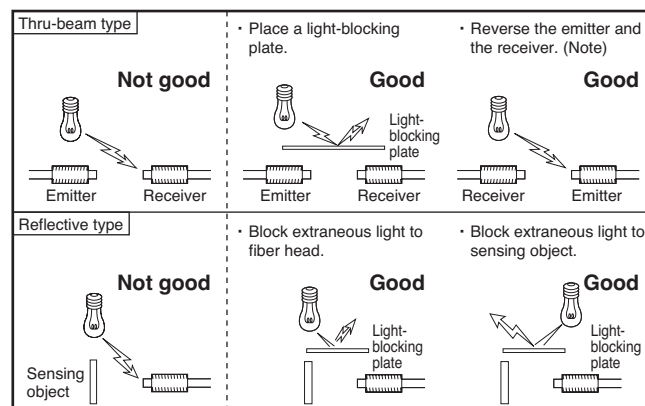
- If several fibers are used together, keep the minimum separation distance specified below in order to avoid mutual interference.



Keep a separation distance of 1.4 times, or more, of the setting distance.

Keep a separation distance of 0.7 times, or more, of the setting distance.

- Since the **FX2-A3R** is unmodulated type, take sufficient care against extraneous light (Ambient illuminance: 500 lx or less). Do not install at places where extraneous light may be directly incident on the receiver or the sensing object. In such cases use a light blocking plate.



Note: Take care that extraneous light does not enter the receiver after being reflected from the sensing object.

## 5 SENSITIVITY ADJUSTMENT

As the sensing sensitivity changes after the power supply is switched on, in case of fine sensing, adjust the sensitivity after warming-up for 15 min. approx.

### ● Sensitivity adjuster

- The sensitivity adjuster is of 3-turn type. (The adjuster can be rotated more than 3 times, as it has no stoppers.)

For maximum sensitivity:

Rotate the adjuster clockwise for more than 3 rotations.

For minimum sensitivity:

Rotate the adjuster counterclockwise for more than 3 rotations.

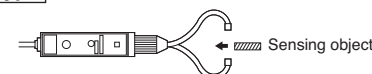
- Adjust the sensitivity while observing the operation indicator (red). However, since the lighting up of the operation indicator depends upon the combination of the sensing condition and the selected output operation, verify it from the table on the right.

☼ : Lights up ● : Turns off

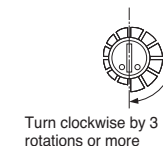
Sensing condition	Output operation	Operation indicator
Light	Light-ON	☼
	Dark-ON	●
Dark	Light-ON	●
	Dark-ON	☼

### ● Sensitivity adjustment

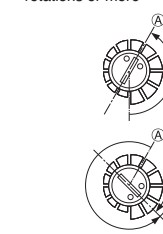
#### Thru-beam type



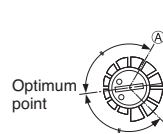
- ① Make the sensitivity maximum.
- ② Confirm that the sensor is in light received state when the sensing object is absent.
- ③ Gradually turn the sensitivity adjuster counterclockwise to determine point A where the sensor enters the dark state operation.



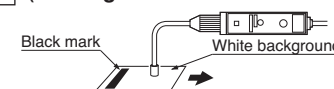
- ④ Next, placing the sensing object, gradually turn the sensitivity adjuster clockwise to determine point B where the sensor enters the light received state operation. (If the sensor does not enter the light received state operation, the maximum sensitivity position is point B.)



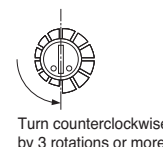
- ⑤ The optimum sensitivity adjuster position is at the middle of points A and B.



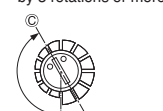
#### Reflective type (Sensing a black mark on a white background)



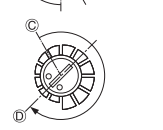
- ① Make the sensitivity minimum.



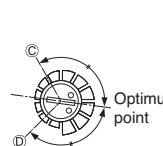
- ② Gradually turn the sensitivity adjuster clockwise to determine point C where the sensor enters the light received state operation with the white background.



- ③ Next, making the sensor detect the black mark, turn the sensitivity adjuster further clockwise to determine point D where the sensor enters the light received state operation. (If the sensor does not enter the light received state operation, the maximum sensitivity position is point D.)



- ④ The optimum sensitivity adjuster position is at the middle of points C and D.

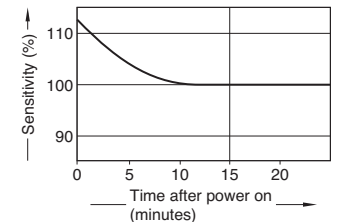


## 6 SPECIFICATIONS

Type	High-speed sensing
Item	Model No. <b>FX2-A3R</b>
Supply voltage	12V DC±10% Ripple P-P 10% or less
Current consumption	55mA or less
Output	NPN transistor universal • Maximum sink current: 100mA • Residual voltage: 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)
Response time	15 μs or less when light is received 35 μs or less when light is interrupted
Ambient temperature	-10 to +50°C (No dew condensation or icing allowed) Storage: -30 to +70°C
Ambient humidity	35 to 85% RH, Storage: 35 to 95% RH
Material	Polycarbonate
Cable	0.2mm <sup>2</sup> 4-core cabtyre cable, 3m long
Weight	120g approx.
Accessories	<b>MS-FX-1</b> (Amplifier mounting bracket): 1 set Adjusting screwdriver: 1 pc., Adjusting knob: 1 pc.

## 7 CAUTIONS

- If slight difference between light and dark levels is to be sensed, supply the power 15 min. before commencing the sensing. When power is just supplied, the sensitivity (sensing distance) is approx. 10% higher.
- The sensing sensitivity is affected by the amplifier's ambient temperature fluctuation. Avoid use of the amplifier where the temperature fluctuation is large and the sensing tolerance is small.
- Make sure that the power supply is off while wiring.
- Take care that wrong wiring will damage the sensor.
- Verify that the 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 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.
- Do not use during the initial transient time (30ms) after the power supply is switched on.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance.
- Extension up to total 10m, or less, is possible with 0.3mm<sup>2</sup>, or more, cable.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.
- This sensor is suitable for indoor use only.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in direct contact with water, or corrosive gas.
- Take care that the sensor does not come in direct contact with water, oil, grease, organic solvents, such as, thinner etc., strong acid or alkaline.



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