

Specifications (Amplifier unit)

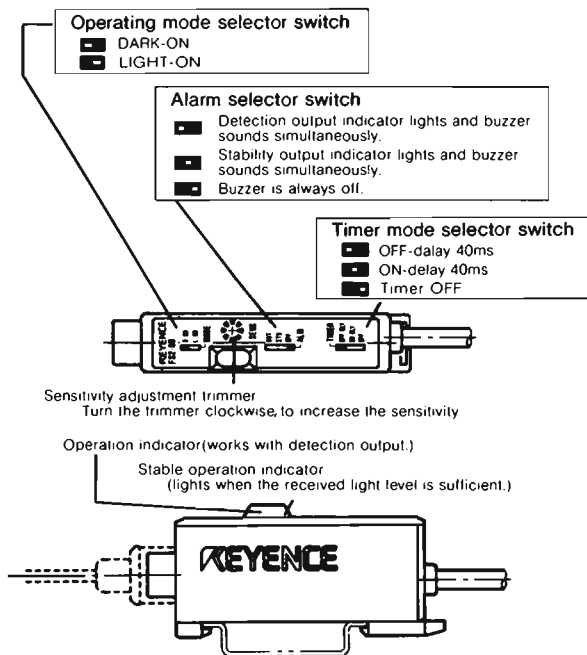
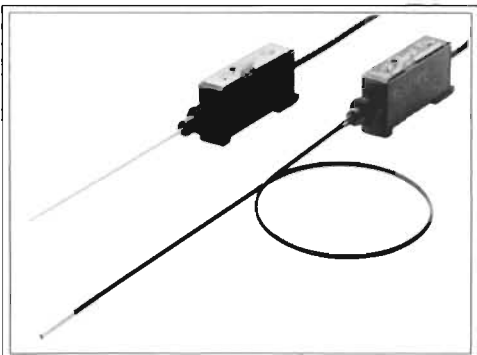
Type	Long-distance type	Super long distance type	High-speed response type
Model	FS2-60	FS2-62	FS2-65
Light source	Red LED		
Sensitivity adjustment	8-turn trimmer		
Response time	250 $\mu$ s	500 $\mu$ s	50 $\mu$ s
Operation mode	LIGHT-ON/DARK-ON (Selectable)		
Indicator	Output indication---Red LED Stable operation---Green LED		
Timer mode	ON-delay 40ms/OFF-delay 40ms/Timer OFF (selectable)		
Alarm mode(buzzer)	Buzzer ON when control output turns ON Buzzer ON when stability output turns ON/Buzzer OFF (selectable)		
Output	Control	* NPN open collector 100mA max. (40V max) and residual voltage 1Vmax.	
	Alarm	* NPN open collector 50mA max. (40V max) and residual voltage 1V max.	
Protection circuit	Reversed polarity, overcurrent protection, surge protection		
Power supply	12 to 24VDC $\pm$ 10% Ripple(P-P) : 10%max.		
Current consumption	35mA max		
Rated environmental durability	Ambient illumination	Incandescent lamp : 10,000 lx max. Sunlight : 20,000 lx max	
	Ambient temperature	- 10 to +55°C (14 to 131°F), No freezing	
	Relative humidity	35 to 85%, No condensation	
	Vibration	Mechanical durability : 10 to 55Hz, 1.5mm double amplitude in X, Y, and Z directions for 2 hours respectively	
Shock	Mechanical durability : 500m/s <sup>2</sup> in X, Y, and Z directions, 3 times respectively		
Case materials	Polycarbonate		
Weight	Approx. 61g		

\* \*P\* following the model number indicates PNP-output type.

Fiber Photoelectric Sensors

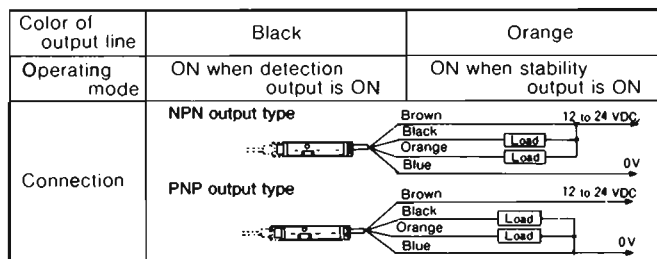
FS2-60  
FS2-62  
FS2-65

Instruction Manual

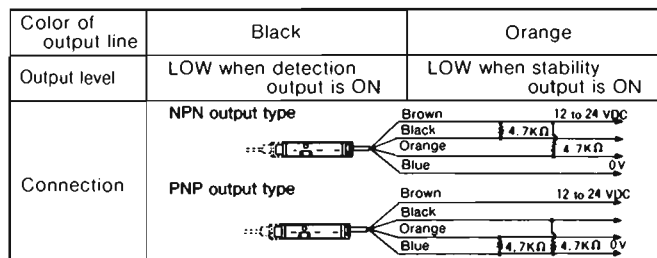


Connection diagrams

● To drive current load



● To connect to voltage input device (Low level when output is ON)



Adjustment

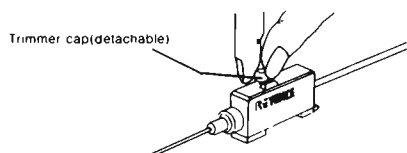
● LIGHT-ON mode (When DARK-ON mode is specified, refer to signs and words in parentheses< >.)

	Order	Operation	Trimmer	Indicators	Adjustment
Reflective type	①			Green ● < (●) Red ○ < (○)	In the absence of the object to be detected, turn the trimmer clockwise and find point A at which the red LED indicator lights(goes off)
	②			Green ● < (●) Red ● < (●)	In the presence of the object, turn the trimmer counter-clockwise to find point B at which the green LED goes off
	③			Green ○ < (○) Red ● < (●)	Set the trimmer midway between points A and B. Check operation of sensor.

● DARK-ON mode (When LIGHT-ON mode is specified, refer to signs and words in parentheses< >.)

	Order	Operation	Trimmer	Indicators	Adjustment
Throughbeam type	①			Green ● < (●) Red ● < (●)	In the presence of the object to be detected, turn the trimmer clockwise and find point A at which the red LED goes off(lights)
	②			Green ● < (●) Red ● < (●)	In the absence of the object, turn the trimmer counter-clockwise to find point B at which the green LED goes off
	③			Green ● < (●) Red ○ < (○)	Set the trimmer midway between points A and B. Check operation of sensor.

Operate the trimmer with the accessory trimmer cap or a screwdriver.



● How to use alarm(buzzer)

When the ALM selection switch on the top face of the sensor is set to OUT, the operation indicator and buzzer are synchronized. Using this setting, you can make fine adjustments by noting when the buzzer turns on and off.

When the ALM selection switch is set to STB, you can confirm the decrease in light due to adhered dust or a misaligned optical axis, as well as disconnection of the sensor cable, by listening for the buzzer.

\* To silence the buzzer (for normal operation), set the ALM selection switch to OFF.

## Stability

If the light quantity reduces to less than 120% of the operating level because of contamination of the lens or misalignment of the optical axis, the stability indicator (green LED) goes off. The stability signal and the detection signal are output at the same time.

Relationship between light quantity, LEDs and outputs (in LIGHT-ON mode)

Light quantity (ratio to operating level 100%)	120%			100%		
	(Operation level)					
Red LED	Lit	Lit	Lit	Unlit	Unlit	Unlit
Green LED	Lit	Unlit	Unlit	Unlit	Unlit	Unlit
Detection output	ON	ON	ON	OFF	OFF	OFF
Stability output	OFF	ON*	ON*	ON*	ON*	ON*
				Until being reset		

\* When not being reset, stability output remains ON even if the light quantity is below the operating level.

When the stability output is ON, clean the lens or realign the optical axis to cause the stability output indicator to be turned ON again. (Continue the sensor operation so that detection output is ON. Then the stability output is reset.)

\* In the DARK-ON mode, the red LED ON/OFF is reversed.

## Hints on correct use



### Warning

Do not use this product for the purpose of protecting the human body.

### Attaching the amplifier unit

#### Attaching to DIN rail

- Hook the claw (marked with ▲) on the amplifier bottom to the DIN rail as shown in the figure and push down the amplifier in the direction of the arrow.
- To detach the amplifier from the rail lift the amplifier while pulling the rail securing portion (marked with ▲) at the side of the amplifier cable in the direction of the arrow.

#### Mounting on other objects

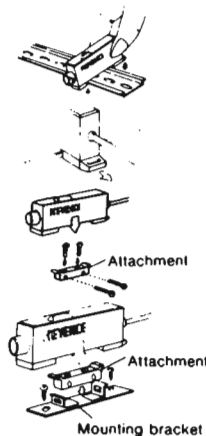
- Place the attachment on the object. Insert two screws into the holes of the attachment and secure them. Then, mount the amplifier unit onto the attachment in the same manner when mounting it onto DIN rail. The amplifier can be mounted vertically as well as horizontally. (See the illustration on the right.)

#### Replacing FS-17 with FS2 series

The FS2-60/62/65 are different in attachment pitch from the FS-17.

Follow the steps below :

1. Screw the mounting bracket (optional) in a given position.
2. Engage the resin attachment with the mounting bracket (without screws), then mount the amplifier unit onto the mounting it onto the DIN rail.



### Amplifier unit

- When using a commercially available switching regulator, ground its frame and ground terminals.
- Keep the wiring of the amplifier away from power lines and high-tension lines; otherwise, the amplifier may malfunction due to noise.
- To extend the cable of the amplifier, use a wire having a conductor cross-section area of 0.3mm<sup>2</sup>. Limit the length of the extension to within 100m.

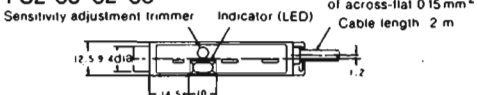
### Fiber unit

- Do not hit the surface of the fiber unit's head.
- Do not bend the sleeve of the heat resistant type fiber unit after heated.
- Cut the plastic fiber unit to the desired length with the accessory cutter.
- The fiber unit may deteriorate in the presence of organic solvent vapor.
- To detect precise step difference or color difference, secure the fiber unit.

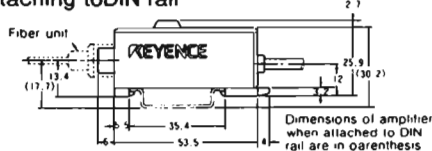
## Dimensions of amplifier

### Amplifier unit

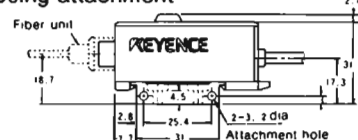
#### FS2-60·62·65



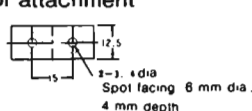
### Attaching to DIN rail



### Using attachment

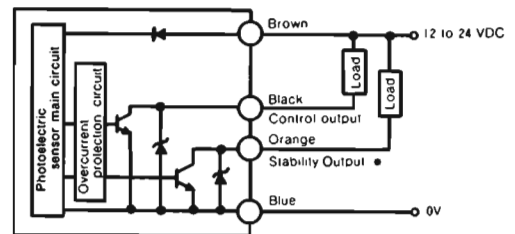


### Rear view of attachment



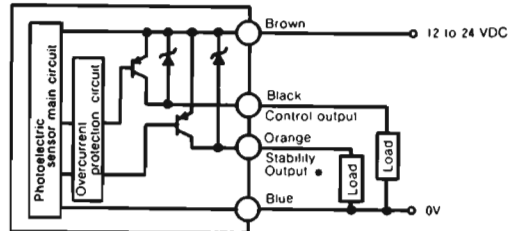
## Output Circuit

### NPN output



\* When the stability output is not used, cut the orange cable very short or connect it to the ground terminal of the power supply.

### PNP output



\* When the stability output is not used, cut the orange cable very short or connect it to the positive(+) terminal of the power supply. When cutting the cable at the root, be sure not to contact other cables.

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