

Panasonic

INSTRUCTION MANUAL

Amplifier Built-in Type Photoelectric Sensor  
RX Series

MJE-RXJ No.0034-76V

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.

WARNING

● Never use this product as a sensing device for personnel protection.

● In case of using sensing devices for personnel protection, use products which meet standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

## 1 SPECIFICATIONS

Type	Thru-beam				Retroreflective			Diffuse reflective										
	Infrared	Red	Green		Red (with polarizing filters)	Infrared	Infrared	Red										
Item	Model No. (Note 1)	RX-M10	RX-M50	RX-M2R	RX-500G	RX-PRVM3	RX-PRV500	RX-RVM5	RX-D700	RX-D200R								
Sensing range	10m	50m	2m	500mm	0.1 to 3m (Note 3)	500mm (Note 3)	0.1 to 5m (Note 3)	700mm (Note 4)	200mm (Note 4)									
Hysteresis	—				—				15% or less of operation distance									
Supply voltage	12 to 24V DC ±10% Ripple P-P 10% or less																	
Current consumption	Emitter: 20mA or less (RX-M50: 25mA or less) Receiver: 25mA or less				40mA or less													
Sensing output	NPN open-collector transistor • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between sensing output and 0V) • Residual voltage: 2V or less (at 100mA sink current) 1V or less (at 16mA sink current)																	
Output operation	Switchable either Light-ON or Dark-ON																	
Short-circuit protection	Incorporated																	
Self-diagnosis output	NPN open-collector transistor • Maximum sink current: 50mA • Applied voltage: 30V DC or less (between self-diagnosis output and 0V) • Residual voltage: 1.5V or less (at 50mA sink current) 1V or less (at 16mA sink current)																	
Output operation	ON under unstable sensing condition																	
Short-circuit protection	—																	
Response time	1ms or less																	
Test input (emission halt) function	Incorporated																	
Automatic interference prevention function	—				Incorporated (Two units of sensors can be mounted close together.)													
Protection	IP67 (IEC)																	
Ambient temperature	-25 to +60°C (No dew condensation or icing allowed), Storage: -30 to +70°C																	
Ambient humidity	35 to 85% RH, Storage: 35 to 85% RH																	
Emitting element	Infrared LED (modulated)	Red LED (modulated)	Green LED (modulated)	Red LED (modulated)														
Material	Enclosure: Die-cast zinc alloy, Indicator cover: Polyethersulphone, Lens: Polycarbonate (retroreflective type: Acrylic)																	
Cable	0.15mm <sup>2</sup> 4-core (emitter: 3-core) oil, heat and cold resistant cabtyre cable, 2m long				0.15mm <sup>2</sup> 5-core oil, heat and cold resistant cabtyre cable, 2m long													
Weight	Emitter: 70g approx. (RX-M50: 75g approx.) Receiver: 70g approx. (RX-M50: 75g approx.)				75g approx.													
Accessories	MS-RX-1 (Sensor mounting bracket): 1 set for emitter and receiver Adjusting screwdriver: 1 pc.				MS-RX-1 (Sensor mounting bracket): 1 sets RF-230 (Reflector): 1 pc. Adjusting screwdriver: 1 pc.				MS-RX-1 (Sensor mounting bracket): 1 sets Adjusting screwdriver: 1 pc.									

Notes: 1) The model No. with suffix 'C5' stands for the 5m cable length type.  
(e.g.) As for the 5m cable length type of **RX-M10** 'RX-M10-C5'  
The model No. with suffix 'P' shown on the label affixed to the thru-beam type sensor is the emitter, 'D' shown on the label is the receiver.  
Thru-beam type sensor emitter: **RX-M10P**, Thru-beam type sensor receiver: **RX-M10D**  
2) The retroreflective type sensor with polarizing filters may not stably detect specular or glossy objects through transparent film since light is polarized by the transparent film. For details, refer to ' **RETROREFLECTIVE TYPE SENSOR WITH POLARIZING FILTERS (RX-PRVM3, RX-PRV500)** '.  
3) The sensing range for the retroreflective type sensor is specified for the **RF-230** reflector. Further, the sensing range is the possible setting range for the reflector. The sensor can detect an object less than 0.1m away.  
4) The sensing range of the diffuse reflective type sensor is specified for white non-glossy paper (200 × 200mm) as the object.

## 2 CAUTIONS

- This product has been developed / produced for industrial use only.
- 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.
- Extension up to total 100m, is possible with 0.3mm<sup>2</sup>, or more, cable. However, in order to reduce noise, make the wiring as short as possible.
- Do not use during the initial transient time (50ms) after the power supply is switched on.

- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.
- The self-diagnosis output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.
- When the self-diagnosis output or the test input is not used, make them to be in the open state by insulating them.
- After sensitivity adjustment is made, close the front panel completely and tighten the panel securing screw firmly so that the protective structure could be maintained.
- Avoid dust, dirt, and steam.
- Take care that the sensor does not come in contact with water, oil, grease, or organic solvents, such as, thinner etc.
- Make sure that stress by forcible bend or pulling is not applied to the sensor cable joint.

## 3 MOUNTING

- The tightening torque should be 1.17N·m or less.

## 4 I/O CIRCUIT DIAGRAMS

Notes: 1) The receiver of the thru-beam type sensor does not incorporate the test input (emission halt input).  
2) The emitter of the thru-beam type sensor does not incorporate the sensing output and the self-diagnosis output.  
3) The self-diagnosis output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

## 5 ADJUSTMENTS

- Part description

Notes: 1) This is for the sensor checker **CHX-SC1**. Note that **CHX-SC1** has been with down since Feb. 2001.  
2) Not incorporated on the thru-beam type sensor emitter.  
3) It is the emission halt indicator (lights up when emission halts) for the thru-beam type sensor emitter.

- Sensitivity adjustment

Step	Sensitivity adjuster	Description
①		Turn the sensitivity adjuster fully counter-clockwise to the minimum sensitivity position, Min.
②		In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point ④ where the sensor enters the 'Light' state operation.
③		In the dark condition, turn the sensitivity adjuster further clockwise until the sensor enters the 'Light' state operation and then bring it back to confirm point ④ where the sensor just returns to the 'Dark' state operation. (If the sensor does not enter the 'Light' state operation even when the sensitivity adjuster is turned fully clockwise, the position is point ⑤.)
④		The position at the middle of points ④ and ⑤ is the optimum sensing position.

Note: Use the accessory adjuster screwdriver to turn the adjuster slowly. Turning with excessive strength will cause damage to the adjuster.

	Light received condition		Dark condition	
Thru-beam type	Emitter → Receiver		Emitter → Sensing object → Receiver	
Retroreflective type	Sensor ↔ Reflector		Sensor → Sensing object → Reflector	
Diffuse reflective type	Sensor ↔ Sensing object		Sensor → Sensing object	

- Beam alignment

### Thru-beam type sensor

- ① Set the operation mode switch to the Light-ON mode position (MODE L side).
- ② Placing the emitter and the receiver face to face along a straight line, move the emitter in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (red). Then, set the emitter at the center of this range.
- ③ Similarly, adjust for up, down, left and right angular movement of the emitter.
- ④ Further, perform the angular adjustment for the receiver also.
- ⑤ Check that the stability indicator (green) lights up.
- ⑥ Choose the operation mode, Light-ON or Dark-ON, as per your requirement, with the operation mode switch.

### Retroreflective type sensor

- ① Set the operation mode switch to the Light-ON mode position (MODE L side).
- ② Placing the sensor and the reflector face to face along a straight line, move the reflector in the up, down, left and right directions, in order to determine the range of the light received condition with the help of the operation indicator (red). Then, set the reflector at the center of this range.
- ③ Similarly, adjust for up, down, left and right angular movement of the reflector.
- ④ Further, perform the angular adjustment for the sensor also.
- ⑤ Check that the stability indicator (green) lights up.
- ⑥ Choose the operation mode, Light-ON or Dark-ON, as per your requirement, with the operation mode switch.

Relation between sensing output and indicators						
In case of Light-ON			In case of Dark-ON			
Stability indicator	Operation indicator	Sensing output	Sensing condition	Sensing output	Operation indicator	Stability indicator
☀	☀	ON	Stable light receiving	OFF	●	☀
●	●	OFF	Unstable light receiving	ON	☀	●
☀	●	OFF	Unstable dark receiving	ON	☀	☀
☀	●	OFF	Stable dark receiving	ON	☀	☀

## 6 TEST INPUT (EMISSION HALT INPUT)

- When the test input (emission halt input) is connected to 0V, the emission stops. This function can be used for operation check before start the operation, and also for synchronization input.

- ① Operation check (Thru-beam type, Retroreflective type)  
The emission is done intermittently for confirming that the output follows and checking the operation.
- ② Synchronization input (Diffuse reflective type)  
When inputting to the test input, this can be used as a synchronization input.

## 7 SELF-DIAGNOSIS

- The sensor diagnosis the incident light intensity, and if it is reduced due to dirt or dust, or beam misalignment an output is generated.

- ① The self-diagnosis output transistor stays in the 'OFF' state during stable sensing.
- ② When the sensing output changes, if the incident light intensity does not reach the stable light received level or the stable dark level, the self-diagnosis output becomes ON. Further, the self-diagnosis output changes state when the sensing output changes from Light to Dark state. (It is not affected by the operation mode switch.)
- ③ In case of insufficient beam interruption, there will be a time lag before the self-diagnosis output turns ON.

## 8 SLIT MASK (OPTIONAL) (Exclusively for thru-beam type sensor)

- With the slit mask, the sensor can detect a small object. However, the sensing range is reduced when the slit mask is mounted.

### How to mount

- ① Insert the fixing tab into the fixing groove.
- ② Then, pressing the slit mask against the main unit, insert the fixing tab into the fixing groove.

### How to remove

- ① Insert a screwdriver into the removing tab.
- ② Pull forward while lifting the removing tab.

## 9 AUTOMATIC INTERFERENCE PREVENTION FUNCTION

- Retroreflective type sensor and diffuse reflective type sensor are incorporated with this function. Up to two sets of sensors can be installed close together. (Thru-beam type sensor does not have this function.)

### <Diffuse reflective type sensor>

## 10 LONG SENSING RANGE RETROREFLECTIVE TYPE SENSOR (RX-RVM5)

- Please take care of the following points when detecting materials having a gloss.

- ① Make L, shown in the diagram, sufficiently long.
- ② Install at an angle of 10 to 30 degrees to the sensing object.

\* **RX-PRVM3, RX-PRV500** does not need the above adjustment.

## 11 RETROREFLECTIVE TYPE SENSOR WITH POLARIZING FILTERS (RX-PRVM3, RX-PRV500)

- If a shiny object is covered or wrapped with a transparent film, such as those described below, the retroreflective type sensor with polarizing filters may not be able to detect it. In that case, take the following measures given below.

### <Example of sensing objects>

- Can wrapped by clear film
- Aluminum sheet covered by plastic film
- Gold or silver color (specular) label or wrapping paper

### <Measures>

- Tilt the sensor with respect to the sensing object while fitting.
- Reduce the sensitivity.
- Increase the distance between the sensor and the sensing object.

## 12 INTENDED PRODUCTS FOR CE MARKING

- The models listed under “ **SPECIFICATIONS** ” come with CE Marking. As for all other models, please contact our office.

- Contact for CE  
<Until June 30 ,2013>  
Panasonic Electric Works Europe AG  
Rudolf-Diesel-Ring 2, D-83607 Holzkirchen, Germany  
<From July 1 ,2013>  
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