# Panasonic INSTRUCTION MANUAL

Amplifier Built-in Type Heavy duty Photoelectric Sensor **RX4** Series

MJE-RX4 No.0033-68V

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 standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

#### 1 SPECIFICATIONS

Туре		Thru-beam						
		Cable length 2m	Cable length 3m	Cable length 5m				
Item	Model No. (Note)	RX4-M5	RX4-M5-C3	RX4-M5-C5				
Sensing range		5m						
Sensing object		φ 10mm or more opaque object						
Repeatability		Perpendicular to sensing axis: 0.05mm or more						
Supply voltage		12 to 24V DC±10% Ripple P-P 10% or less						
Current consumption		Emitter: 20mA or less, Receiver: 25mA 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)						
0	utput operation	Switchable either Light-ON or Dark-ON						
Sh	hort-circuit protection	Ÿ						
Self-diagnosis output		NPN open-collector transistor						
Output operation		ON under unstable sensing condition						
Sł	hort-circuit protection							
Response time		1ms or less						
Test input (emission halt) function		Incorporated						
Operation indicator		Red LED (lights up when the sensing output is ON)						
Stabili	ty indicator	Green LED (lights up under stable light received condition or stable dark condition)						
Emittir	ng indicator	Red LED (lights up during beam emission)						
Sensit	tivity adjuster	Continuously variable adjuster						
Protec	ction	IP67 (IEC), IP67g (JEM)						
	ent 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)						
Materi	ial	Enclosure: Die-cast zinc alloy (Fluorine resin coating), Indicator cover: Polyethersulphone, Lens: Polyalylate, Protective tube sheath: Oil resistant PVC						
Cable		0.15mm <sup>2</sup> 4-core (emitter: 3-core) oil, heat and cold resistant cabtyre cable						
Protective tube length		1m	2m 4m					
Weigh	nt	Emitter: 175g approx., Receiver: 175g approx.	Emitter: 265g approx., Receiver: 265g approx. Emitter: 495g approx., Receiver: 4					
Λοοοο	sories	MS-RX-2 (Sensor mounting bracket): 1 set for emitter and receiver, Adjusting screwdriver: 1 pc.						

Note: The model No. with suffix 'P' shown on the label affixed to the sensor is the emitter, 'D' shown on the label is the receiver. Emitter: RX4-M5P, Receiver: RX4-M5D

#### 2 CAUTIONS

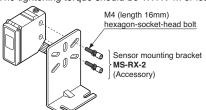
- Make sure that the power supply is off while wiring.
- Take care that wrong wiring will damage the sensor.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply 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.

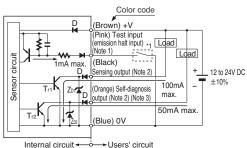
  Avoid dust, dirt, and steam.
- Take care that the sensor does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner etc.
- Make sure that stress by forcible bend or pulling is not applied directly to the sensor cable joint.

#### 3 MOUNTING

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



## **4 I/O CIRCUIT DIAGRAMS**



Non-voltage contact or NPN open-collector transistor

or

[(Supply voltage -2.5V) or more]: Emission
[(Supply voltage -3.3V) or less]: Emission halt

Symbols...D: Reverse supply polarity protection diode

Z<sub>D1</sub>, Z<sub>D2</sub>: Surge absorption zener diode

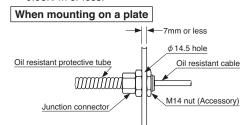
Tr<sub>1</sub>, Tr<sub>2</sub>: NPN output transistor

Notes: 1) The receiver of the thru-beam type sensor does not incorporate the test input (emission halt input).

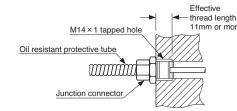
- The emitter of the thru-beam type sensor does not incorporate the sensing output and the self-diagnosis output.
- The self-diagnosis output does not incorporate a short-circuit protection circuit. Do not connect it directly to a power supply or a capacitive load.

# 5 CONNECTION OF PROTECTIVE TUBE CONNECTOR

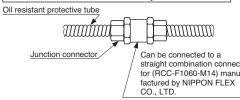
 Connect the junction connector securely as shown below. The tightening torque should be 0.98N•m or less.



#### When mounted with a female screw

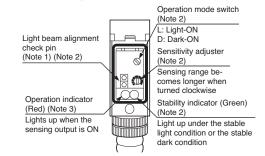


# When connected to another protective tube



### **6** ADJUSTMENTS

#### Part description

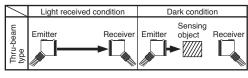


- Notes: 1) This is for the sensor checker **CHX-SC1**. Note that **CHX-SC1** has been with down since Feb. 2001.
  - 2) Not incorporated on the thru-beam type sensor emitter.
  - 3) It is the emission halt indicator (lights up when emission halts) for the thru-beam type sensor emitter.

#### Sensitivity adjustment

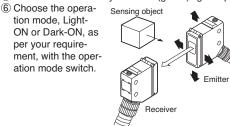
Step	Sensitivity adjuster	Description
1	MIN. MAX.	Turn the sensitivity adjuster fully counter- clockwise to the minimum sensitivity posi- tion, Min.
2	MIN. MAX.	In the light received condition, turn the sensitivity adjuster slowly clockwise and confirm the point (a) where the sensor enters the 'Light' state operation.
3	A B MAX.	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@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 <sup>®</sup> .
4	Optimum position  B  MIN. MAX.	The position at the middle of points (a) and (b) 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.



#### Beam alignment

- 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.

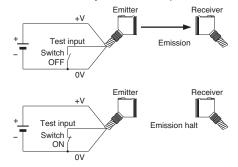


#### Relation between sensing output and indicators

				<u>-</u>	- ap	runno on
In case of Light-ON			]	In case of Dark-ON		
Stability indicator	Operation indicator	Sensing output	Sensing condition		Operation indicator	Stability indicator
≎	÷	ON	Stable light receiving	OFF	•	₽
•			Unstable light receiving			
		OFF	Unstable dark receiving	ON	¢	
			Stable dark receiving			¢

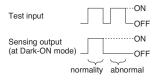
### 7 TEST INPUT (EMISSION HALT INPUT)

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.



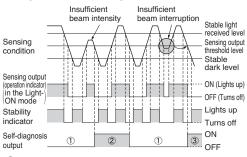
#### (1) Operation check

The emission is done intermittently for confirming that the output follows and checking the operation.



# 8 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.



- The self-diagnosis output transistor stays in the 'OFF' state during stable sensing.
- 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.

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