Photo sensor

PR series

INSTRUCTION MANUAL

We appreciate you for purchasing HanYoung NUX Co.,Ltd product. Before using the product you have purchased, check to make sure that it is exactly what you ordered. Then, please use it following the instructions below.

MAIN PRODUCTS
- DIGITAL : Temperature Controller, Counter, Timer,Speedmeter, Tachometer, Panel Meter, Recorder
- SENSOR : Proximity Switch/Photo Electric Sensor, Rotary Encoder, Optical Fiber Sensor, Pressure Sensor
- ANALOG : Timer, Temperature Controller

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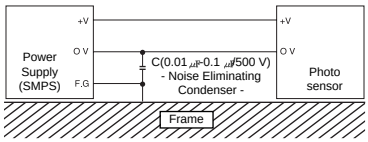
HANYOUNG

■ Safety Information

⚠ CAUTION

1. The contents of this manual may be changed without prior notification.
2. If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
3. Avoid continuously switching the power source On and Off.
4. Use a dry cloth to wipe off the substance when cleaning the lens or cases. Never use thinner or organic solvents.
5. Do not use this product at any place with much dust, vibration or impact.
6. Before inserting power source, make sure that the circuit wiring is properly connected.
7. In the case of wiring loaded inductors such as DC Relay and others to output, use diode, varistor and others to prevent surge.
8. To avoid malfunction caused by noise, do not put high voltage or power line with sensor wire in a same conduit
9. Make its wiring be shorter as possible and wire extension shall be within 100 m.
10. Consider the fact that the sensing distance may be varied in accordance with the size, color, surface condition, material, glossy, non-glossy or others of a sensing object.
11. Prevent strong disturbance light such as sunlight and others which directly enter into the directional angle of the sensor by putting a glare shield.
12. In the case of using multiple sensors (more than 2 sensors), there is a possibility of malfunction caused by mutual interference so, for Through-Beam type, sensors shall be installed in a divergent way or there shall be proper distance between them.
13. When using the Switching Power Supply as the power source, earth the Frame Ground (F.G) terminal and be sure to connect the noise-eliminating condenser between 0 V and F.G.



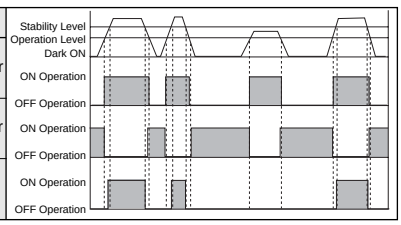
※ If you do not follow the contents described in the safety information then it is possible to be a cause of the product's malfunction so please follow them.

■ Product Classification

Sensing Method	Model	Sensing Distance	Applied Power Source	Operation Mode	Output
Diffuse Reflection	PR-R300NC	300 mm	12-24 V DC	Light ON Dark ON Selectable by Control Line	NPN voltage output
	PR-R300NP				
Retro Reflection	PR-M1NC	0.1 - 1 m			
	PR-M1NP				
	PR-M2NC	0.1 - 2 m			
	PR-M2NP				
Through-Beam	PR-T10NC	10 m			
	PR-T10NP				

■ Operation Chart

Operation \ Mode	Sensing Status
Light ON (Light On Operation)	TR Output and Light ON Indicator (Red LED)
Dark ON (Dark On Operation)	TR Output and Light ON Indicator (Red LED)
Stability Indicator (Green LED) (Except Through-Beam)	



■ Ratings

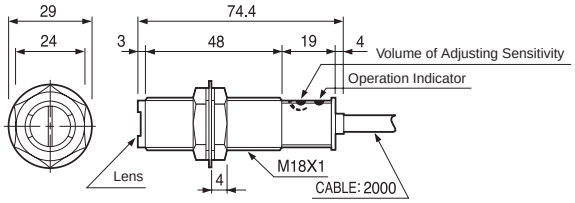
Item \ Model	Diffusion Reflection		Retro Reflection		Through-Beam	
	PR-R300NC	PR-R300NP	PR-M1NC PR-M1NP	PR-M2NC PR-M2NP	PR-T10NC	PR-T10NP
Sensing Distance	300 mm		1 m(0.1-1 m)	2 m(0.1-2 m)	10 m	
Sensing Object	non-glossy and white paper above 200 × 200 mm		transparent, translucent, opaque object above Ø25 mm		opaque object above Ø10 mm	
Hysteresis	Below 20 % of sensing distance					
Response Time	Below 1 ms					
Rated Voltage	12 - 24 V DC (±10 %)					
Current Consumption	Below 35 mA				Transmitter:15 mA Receiver:20 mA	
Light Source	Infrared LED (Modulation Method)					
Adjusting Sensitivity	Built-in Adjusting Sensitivity Volume (but, Through-Beam has only in the receiver)					
Control Output	NPN Voltage Output, Loaded Voltage: below 30 V DC, Loaded Current:below Max. 200 mA, Residual Voltage:below 1 V					
Operation Mode	By control line, Light ON/ Dark ON Selecting Mode Switching (but, Through-Beam has only in the receiver)					
Operation Indicator	Operation Indicator (Red LED), Stability Indicator (Green LED) (but, the transmitter (Red LED) of Through-Beam is Power Indicator)					
Protection Circuit	Built-in Protection Circuit from reversed power supply connection, Output Short-Circuit Overcurrent circuit protection					
Operating Ambient temp.	Operating: -10 ~ 60 ℃, Storage: -25 ~ 70 ℃ (without freezing)					
Operating Ambient Humidity	35 - 85 % R.H.					
Operating Ambient Illumination	Sunlight: below 11000 Lux, Incandescent lamp: below 3000 Lux					
Case Protection	IP67 (IEC Standard)					
Vibration Resistance	10 ~ 50 Hz (cycle for 1 minute), double amplitude: 1.5 mm, in each direction X · Y · Z for 2 hours					
Shock Resistance	500 m/s² (approx. 50 G), X · Y · Z for 3 times					
Dielectric Strength	500 V AC (at 50/60 Hz for 1 minute)					
Insulation Resistance	Above 20 MΩ (500 V DC)					
Connection Method	Cable Length: 2 m (Ø4 mm, 4P) but, the length of the transmitter of Through-Beam: 2 m (Ø 4 mm, 3P)					
Acce-ssories: Individual	—		Reflector (Mirror 50 × 50)		—	
Acce-ssories: Common	Screw driver for adjusting sensitivity, nuts, washers (But, the nuts of Plastic Type are injection molding products. (except washers))					

※ · Sensing distance can be varied with size, surface condition, glossy, non-glossy or others of sensing object so that consider these facts.
· The Sensing Distance of PR-300NC, PR-R300NP is the distance of when using non-glossy white paper 200 mm × 200 mm.
· The Sensing Distance of PR-M1NC, PR-M1NP, PR-M2NC and PR-M2NP is the distance of when using MIRROR 50 × 50.
· PR-T10NC is one set of PR-TL10NC (transmitter) and PR-TR10NC (receiver).
· PR-T10NP is one set of PR-TL10NP (transmitter) and PR-TR10NP (receiver).

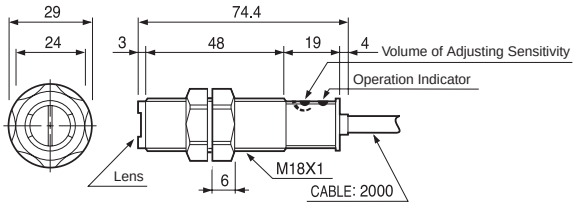
■ Dimension

■ Brass CASE TYPE

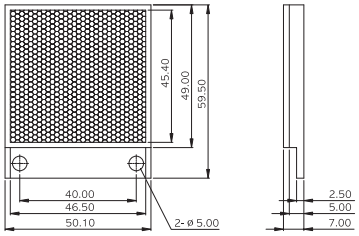
[Unit: mm]



■ Plastic CASE TYPE

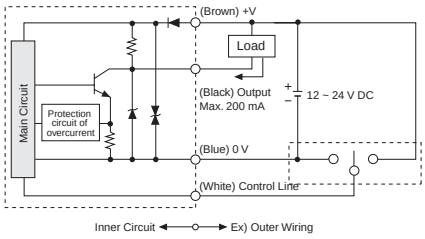


■ Reflector (MIRROR 50 × 50)



■ Control Output Circuit

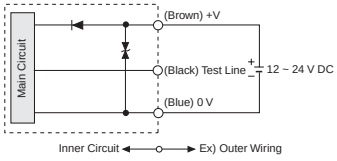
■ Receiver Circuit Diagram of Diffusion Reflective, Retro Reflective and Through-Beam



(Note) Wiring method of selecting Light ON/Dark ON mode

- Light ON: Connecting Control line to +V or OPEN
- Dark ON: Connecting Control line to 0 V

■ Transmitter of Through-Beam

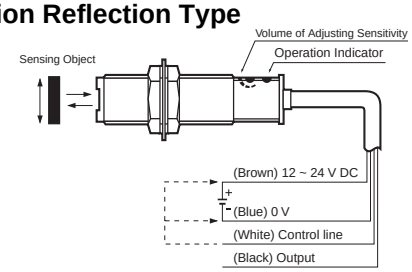


(Note)

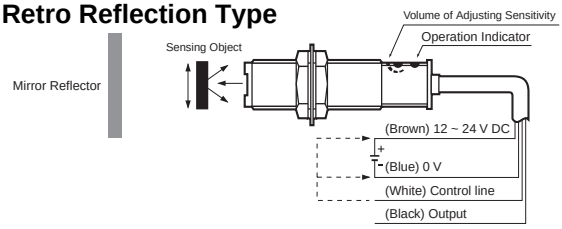
1. If you connect Test line to 0 V then POWER LED is OFF and if you do not connect Test line then it will operate normally so that the product can be tested.
2. During the operation, Test line should be OFF.
3. If there are unused wires then they should be insulated.

■ Wiring Diagram

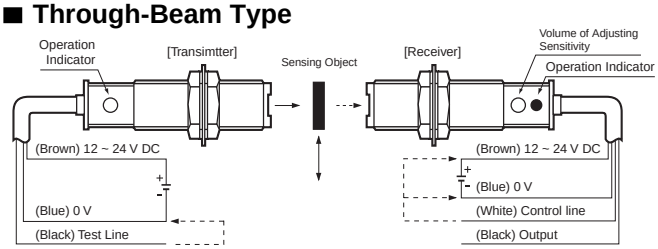
■ Diffusion Reflection Type



■ Retro Reflection Type



■ Through-Beam Type



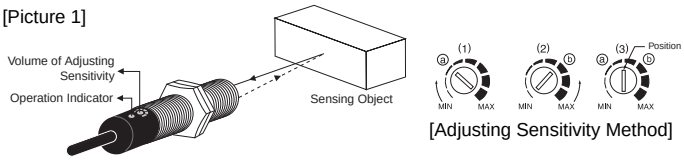
※ Unused wires should be insulated.

■ How to Install

■ Diffusion Reflection Type

1. Normally, it is used after setting sensitivity to the maximum but without a sensing object it may be affected by walls, supporters and others so please adjust it with considering this fact.
2. In the case of setting sensitivity to be higher level unreasonably there is a possibility of not working properly so please pay attention.
3. After placing a sensing object in the sensing place, gradually increase the sensitivity. Let's say Position ⓐ, where the operation indicator lights.
4. After removing the sensing object in the sensing place, gradually decrease the sensitivity from the maximum. Let's say Position ⓑ, where the operation indicator turns off. If the operation indicator turns off at the maximum of the sensitivity then the maximum point will be ⓑ.
5. Let the middle point between ⓐ and ⓑ be the best suitable position.

[Picture 1]

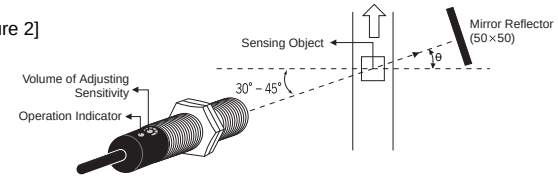


[Adjusting Sensitivity Method]

■ Retro Reflection Type

1. After placing the sensor and mirror reflector to be face to face, adjust the position of the mirror reflector in the direction of top, bottom, left and right. After confirming the range of where the operation indicator turns off, place it in the middle.
2. After considering the sensing distance, sensing object and others, adjust the volume of adjusting sensitivity in the best suitable position.
3. In the case of installing multiple sensors (more than 2 sensors), place them with a distance of longer than 30 cm.
4. In the case of sensing a glossy surfaced object, install it with tilting 30 ~ 45 ℃ from the moving direction of the sensing object to avoid its malfunction.

[Picture 2]



■ Through-Beam Type

1. After placing the transmitter and receiver to be face to face in the straight line and confirming the wires have been connected properly then turn the power on.
2. Pick either transmitter or receiver then fix it. As adjusting the other one in the direction of top, bottom, left and right, confirm the range of where the operation indicator turns off then place it in the middle.
3. If you finish the set-up, confirm whether it is properly operating or not after placing a sensing object in the optical axis of the sensing place.
4. Pay attention the case of not sensing a sensing object because the object is translucent or small object, below ø8 mm.
5. Use it in the range of 95 % of the maximum operation distance.
6. After considering the sensing distance, sensing object and others, adjust the volume of adjusting sensitivity in the best suitable position.

[Picture 3]