Round type Photo Sensor

PR series

INSTRUCTION MANUAL

Thank you for purchasing Hanyoung Nux products.
Please read the instruction manual
carefully before using this product, and use the product correctly.
Also, please keep this instruction manual where you can see it any time.

HANYOUNG NUX

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Safety information

Please read the safety information carefully before use, and use the product correctly.
The alerts declared in the manual are classified into **Danger**, **Warning** and **Caution** according to their importance

⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or property damage

⚠ DANGER

- The input/output terminals are subject to electric shock risk. Never let the input/output terminals come in contact with your body or conductive substances.

⚠ WARNING

- This product is not for outdoor use (it may shorten the product lifetime and cause electric shock)
- Do not use this product in places with flammable or explosive gases (it does not have an explosion-proof structure, so there are fire or explosion risks)
- Do not use the product in places where vibrations or shocks exceed the reference values (it has a double insulation structure, but the components may be damaged)

⚠ CAUTION

- Never use it on AC power.
- Be careful of wiring. It may cause explosion, fire, or machine breakdown.
- Do not use the product in a state where the product body or cable is crashed.
- Do not disassemble, repair or modify the product.
- When the lens of the photo sensor is contaminated by foreign substances, use a dry piece of cloth and wipe off the substance lightly. Never use thinner or organic solvents.
- Separate high voltage cable and power line from the sensor wire. Be cautious since using the same pipe during wiring could cause malfunction.
- If the cable needs to be extended, use over 0.3 ㎟ and be cautious because of a possible sudden voltage drop.
- When using the sensor under lights with high frequency, such as fluorescent lamps or mercury lamps, block it with a light shading plate and avoid the lens from facing the light directly.
- If multiple through-beam type photoelectric sensors are installed close together, malfunction may happen due to the mutual interference.
- Using inductive load (relay, coil) for the output can cause an instantaneous increase in load by more than two times and damage the TR of the output. Therefore, please set half of the maximum load.
- There is an over-current protecting circuit within the output side that breaks the output when the current is higher than the rated load current. Therefore, please set within 70% of the maximum load.
- Do not use the product in places with heavy dust or debris that can contaminate the lenses and consequently cause malfunctions.
- The contents of this manual may be changed without prior notification
- Any use of the product other than those specified by the manufacturer may result in personal injury or property damage.
- When using the Switching Power Supply as power source, ground the Frame Ground (F.G.) terminal and be sure to connect the noise-cancelling condenser between OV and F.G. terminals

Specification

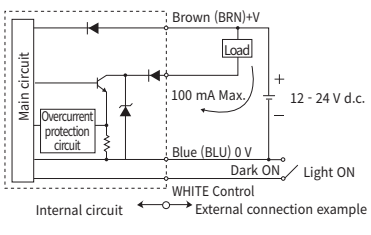
Model	Metal	NPN	PR-T10NC	PRM-M2N	PRM-R01N	PRM-R04N
		PNP	PR-T10PC	PRM-M2P	PRM-R01P	PRM-R04P
	Plastic	NPN	PR-T10NP	PRP-M2N	PRP-R01N	PRP-R04N
		PNP	PR-T10PP	PRP-M2P	PRP-R01P	PRP-R04P
Sensing mode			Through-beam	Retroreflective (mirror)	Diffuse-reflective	
Sensing distance			10m	0.1 ~ 2m (**Note 1**)	0.1m	0.4m
Hysteresis distance			—		Less than 20% of the sensing range	
Detecting object			Ø10mm more (Opaque)	Ø25mm more (Opaque)	White non-glossy paper (100 x 100 mm)	
Light source (Wavelength)			Infrared LED (890nm)	Infrared LED (860 nm)		
Current consumption			Emitter : 15 mA Receiver : 20 mA	Max. 30 mA		
Power voltage			12 - 24 V d.c. ±10 % Ripple (p-p) max. 10 %			
Control output			• NPN or PNP open collector output • Load current - max. 100 mA (26.4 V d.c. standard) • Residual voltage - NPN: max. 1V, PNP: max. 1V			
Operation mode			Light ON / Dark ON (By white cable) ※ In terms of through-beam type, receiver only			
Protective circuit		Common	• Power reverse connection protection • Output reverse connection protection • Output short-circuit over-current protection • Output short-circuit alarm (**Note 2**)			
		Individual	—	Mutual interference prevention function		
Response time			1 ㎳ max			
Insulation resistance			More than 20MΩ (500 V d.c. mega)			
Noise immunity			Square wave noise by noise simulator (pulse width 1μs) ±240V			
Dielectric strength			1,000 V a.c. (50/60 Hz for 1 minute)			
Vibration resistance			10 ~ 55 Hz, Double amplitude : 1.5mm, X·Y·Z 2 in each direction for 2 hours			
Shock resistance			500 m/s², X·Y·Z each direction 3 times			
Ambient illumination			Sunlight : max. 11,000 lx / Incandescent: max 3,000 lx (Light receiving surface illuminance)			
Ambient temperature range			During operation : -25 ~ +55 °C, During storage : -40 ~ +70 °C (Without condensation or icing)			
Ambient humidity			35 ~ 85 % RH (Without condensation)			
Protection			IP66 (IEC standard)			
Certification			CE			
Texture		Case	Metal : Chrome plating / Plastic: Plastic			
		Display	PC			
		Lens	PC			
Accessory		Common	• Metal : 2 fixing nuts, 1 washer, V / R adjustment screwdriver • Plastic : 2 fixing nuts, V / R adjustment screwdriver			
		Individual	-	Mirror(HY-M5)	-	-
Weight (g)			Metal : Approx. 320g Plastic : Approx. 280g	Metal : Approx. 160g Plastic : Approx. 140g		

- (**Note 1**) HY-M5S when using 0.1~3m
- (**Note 2**) Red LED flashes when overloaded. (ON Time : 200μs, OFF Time : 40μs)
- Please note that the sensing distance may vary with the size, surface condition and luster of the detected object.
- PR-T10NC is a set of PR-TL10NC (emitter) and PR-TR10NC (receiver).
- PR-T10NP is a set of PR-TL10NP (emitter) and PR-TR10NP (receiver).

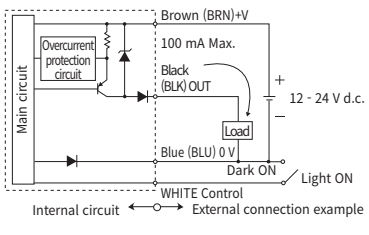
Output circuit

※ Diffuse-reflective, distance-settable, retro-reflective, receiver of through-beam types only
(However, the emiiter of through-beam type has 12 - 24 V d.c. power input only.)

■ NPN TYPE



■ PNP TYPE



How to set sensitivity and operation mode

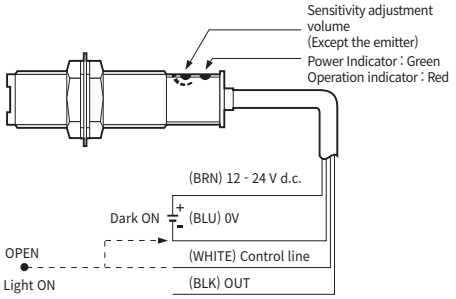
■ Sensitivity adjustment

- MIN. rotation direction (counterclockwise) : Minimum sensitivity
- MAX rotation direction (clockwise): Maximum sensitivity

■ Operation mode

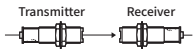
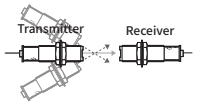
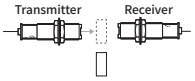
- Control line OPEN : Light ON
- Control wire to 0 V : Dark ON

※ Single emitter has one red power indicator

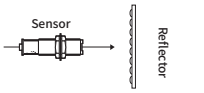
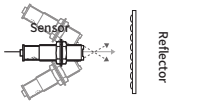
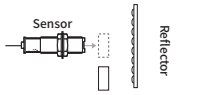


Installation and Adjustment

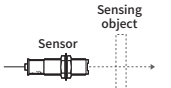
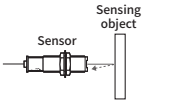
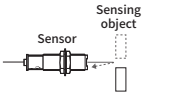
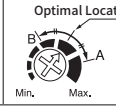
■ Through-beam type

Sequence	How to install	Picture
1	Supply in the power after placing the transmitter and receiver face to face each other.	
2	Fix either the transmitter or receiver and check for the range where the operation indicator becomes turned ON or turned OFF by controlling in the direction of up, down, left and right. After finishing the confirmation, place it in the middle and fix it.	
3	Place the sensing object within the setting range and confirm the condition of proper operation.	

■ Retro-reflective type

Sequence	How to install	Picture
1	Supply in the power after placing the sensor and mirror face to face each other in the straight line.	
2	Fix either the sensor or mirror and check for the range where the operation indicator becomes turned OFF by controlling in the direction of up, down, left and right. After finishing the confirmation, place it in the middle and fix it.	
3	Place the sensing object within the setting range and confirm the condition of proper operation and once the confirmation is finished, fix the sensor. ※ Please refer to the How to install for the diffuse reflection type Regarding the sensitivity adjustment, please refer to the 'How to install' for the diffuse reflection type	

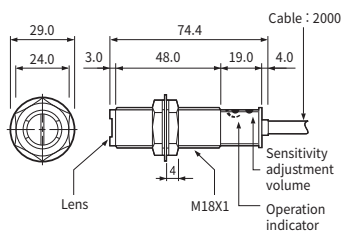
■ Diffuse-reflective type

Sequence	How to install	Picture	Sensitivity Volume
1	After removing the sensing object, turn sensitivity volume gradually to the max direction and once indicator lights up, that position will be referred as 'A' from now on. (If indicator does not get turned ON (OFF) even in the position of maximum then it is indicating the max position).		
2	Place the sensing object in the desirable setting position and gradually turn the sensitivity volume from 'A' to the 'min' direction and once the indicator gets to turned OFF than that position will be referred as 'B'.		
3	Place the sensitivity volume in the middle of the sensitivity A and B, And then confirm the operation condition of sensing object that occurs within the setting range.		

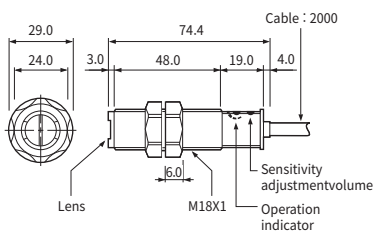
Dimensions

Unit:mm

■ Metal case (M)



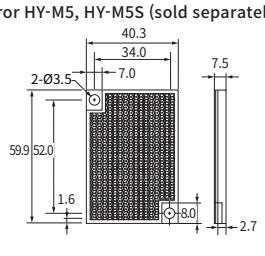
■ Plastic case (P)



Accessory

Unit:mm

■ Mirror HY-M5, HY-M5S (sold separately)



■ Volume driver