

Photo sensor

PN series

INSTRUCTION MANUAL

Thank you for purchasing HANYOUNG product.
Please check whether the product is the exactly same as you ordered.
Before using the product, please read this instruction manual carefully.
Please keep this manual where you can view at any time

HANYOUNG NUX



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Safety information

Alerts declared in the manual are classified to Danger, Warning and Caution by their criticality

	DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
	WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
	CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury

Danger

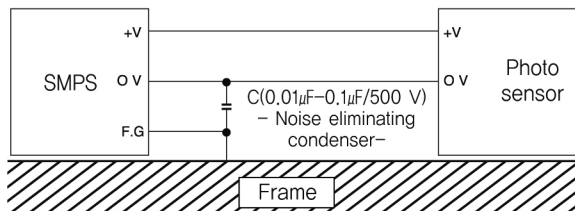
- There is a danger of occurring electric shock in the input/output terminals so please never let your body or conductive substance is touched.

Warning

- Please install an appropriate protective circuit on the outside if a malfunction or an incorrect operation may be a cause of leading to a serious accident.
- If the product is used with methods other than specified by the manufacturer, then it may lead to injury or property damage.
- Please do not use outdoor
(It may cause of shorten the life of the product or electric shock).
- Do not use flammable, explosive gas environments.
(Since it is not explosion-proof structure there is a risk of fire and explosion.)
- Please do not use this product at any place where the level of vibration or shock is higher than the specification.
(This is a double insulated structure, but the parts may be damaged.)

Caution

- When cleaning the lens and the case, please use a dry cloth and gently wipe the surface. Must not use solvents such as thinner or alcohol.
- The sensor wire should be separated from high voltage line or power line. Having the same pipe for wiring can be cause of malfunction.
- When extending the cable, please use thick wire (at least thickness 0.3 mm²) and consider the fact that the voltage will be dropped.
- When using the sensor under the light such as fluorescent lighting or mercury lamp with high frequency, please use a light block panel and avoid the lens from facing the light directly.
- When 2 units of through beam type of photo sensor are used, it can be cause of malfunction due to interference. Please make enough space and please install the receiver and emitter positions are crossed.
- In case of using an inductive load (relay, coil) as an output, the instantaneous load increases 2 times and it may break TR of the output. So, please set maximum load at half.
- A lot of dusts pollute lens and it may cause of malfunction so please avoid using this product dust area.
- Information in the manual may changed without prior notice.
- 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.
- Avoid continuously switching the power source ON and OFF.
- Please do not use this unit in the place that is affected by vibration, a lot of shock and water.
- Sensing distance is based on standard object (white non-glossy paper 200 mm x 200 mm) so it may be differ depending on size, color and material of object.



※ Please keep the contents mentioned above as cautions for safety since they can cause the product to breakdown.

Suffix code

Model	Code	Description
PN-	<input type="checkbox"/> <input type="checkbox"/>	Photo sensor
Sensing method and Sensing distance	T 3	Through beam
	M 1	Retro reflection
Sensing distance	R 02	Diffuse reflection
	Power supply voltage	12 - 24 V d.c ±10%

Characteristic

- Built in the reverse connection of power protecting circuit and built in the output break protecting circuit.
- Operation LED attached
- Sensitivity adjusting volume attached
- L,ON : light on /D,ON : dark on selection by the external wire

Specification

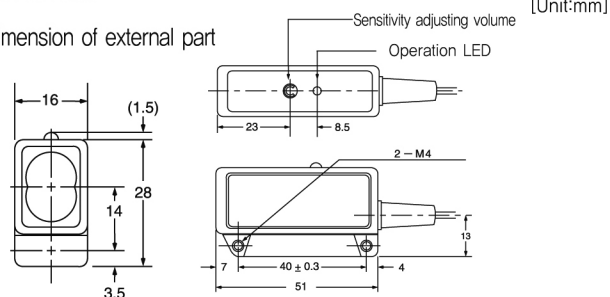
Model	PN-T3	PN-M1	PN-R02
Sensing method	Through beam	Retro reflection	Diffuse reflection
Sensing distance	3 m	0.1 - 1 m	200 mm
Sensing object	Opaque object above Ø8 mm	Opaque object above Ø48 mm	White paper with no gloss 200 × 200
Power supply voltage	12-24 V d.c (±10 %)		
Current consumption	Emitter	20 mA d.c	30 mA d.c max
	Receiver	18 mA d.c	
Control output	NPN voltage output, Less than 200 mA (Load voltage : 30 V d.c), Remaining voltage : 1 V d.c max		
Output action	Selection of L, ON/D, ON by the control line (Through beam is only with the receiver)		
Response time	3 ms max		
Hysteresis	-		less than 20% of the sensing distance
Light source (wave length)	Infrared lightening LED (850 nm)		
LED	Control output indicator : Red LED (But emitter of the through beam indicates the power with red LED)		
Sensitivity adjustment	By the sensitivity adjusting volume (Exclude the emitter of through beam type)		
Protective circuit	Power reverse connection protecting circuit and output break protecting circuit		
Ambient illumination	Sunlight : max 11,000 Lux, incandescent lamp : max 3,000 Lux		
Ambient temperature	Operating : -25 ~ 55 °C, Storage : -40 ~ 70 °C (Without condensation)		
Ambient humidity	35 ~ 85 % R.H. (With no condensation)		
Insulation resistance	20 MΩ min(500 V d.c)		
Dielectric strength	1,000 V a.c, for 1 min		
Vibration resistance	10 - 55 Hz double amplitude : 1.5 mm, for 2 hours each in X, Y and Z direction		
Shock resistance	500 %, 3 times each in X, Y and Z directions		
Connection method	Cable extended type, Cable : 4P, Diameter Ø4 mm, Length : 1.5 m (but transmitter is 3P)		
Material	Case and lens : PC		
Weight	Approx. 250 g (included the weight of box)	Approx. 150 g (included the weight of box)	Approx. 100 g (included the weight of box)

(Note 1) The sensing distance can be varied depending on the size, surface condition, glossy, non-glossy of the sensing object

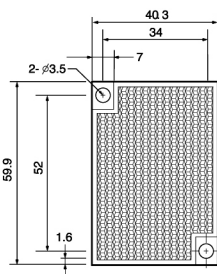
(Note 2) PN-TL3 is emitter and PN-TR3 is receiver when it is through beam type

Dimension

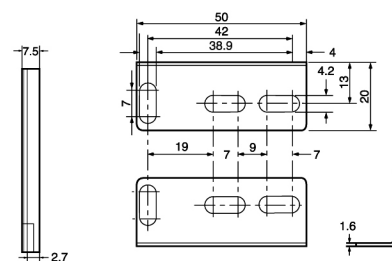
■ Dimension of external part



■ Mirror (HY-M5)

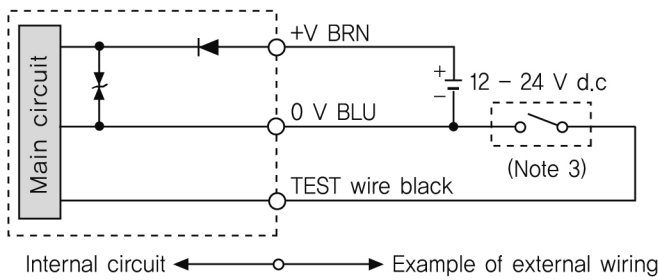


■ Product holder



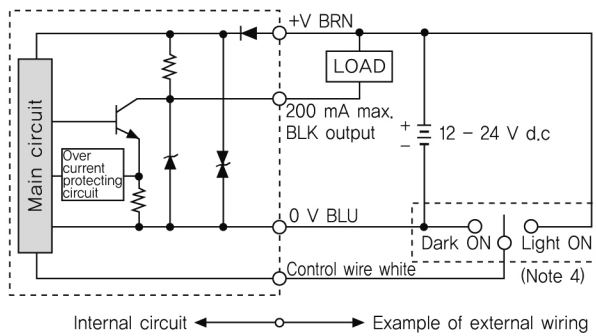
Output circuit diagram

Emitter of through beam type



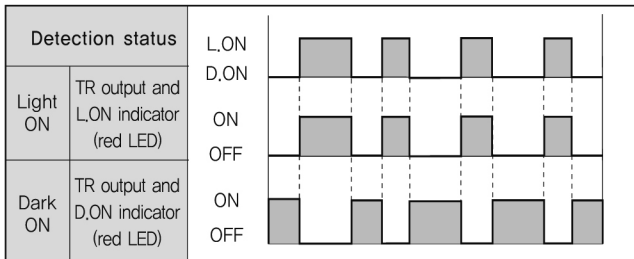
- Note 3) ① Make the emitter electronically dark on as turning off the LED of the emitter with connecting TEST wire (Black) to 0 V (Blue) of the emitter. It is useful when the sensor is far away from the controller since making TEST wire ON/OFF is like an object to be detected is passing through the optical axis between the emitter and the receiver. Without the object, the sensor can be tested before installation.
- ② Please make TEST wire off while it is operating.
- ③ Please insulate the unused wires.

Receiver of diffuse reflection type, retro reflection type, and through beam type



- (Note 4) Display the Light ON/Dark ON mode selection wiring method
- └ Light ON : Open or connect the control wire to +V
 - └ Dark ON : When connecting the control wire to 0V

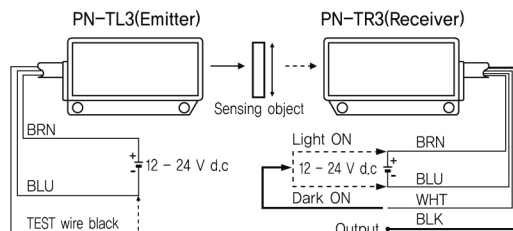
Operation chart



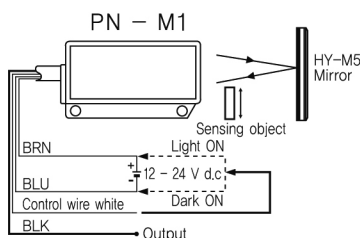
Connection diagram

※ Control D.on or L.on by white color control wire.

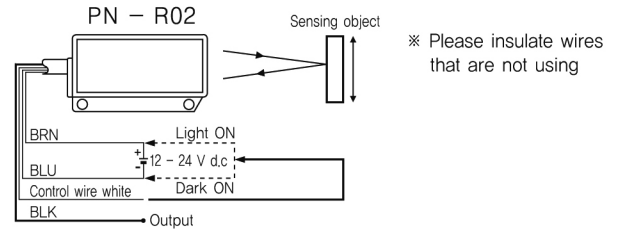
Through beam (PN-T3)



Retro reflection



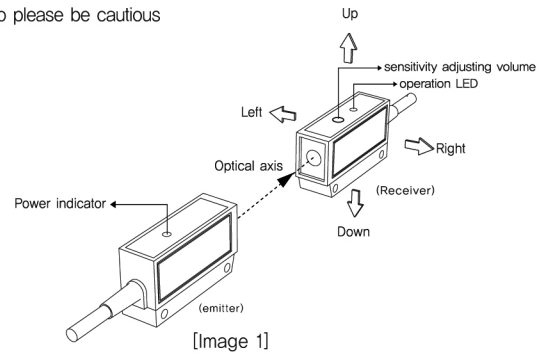
Diffuse reflection



Installation method

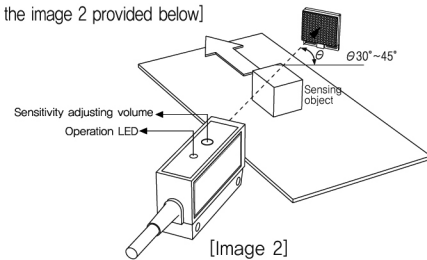
Through beam type (PN-T3)

- Install the emitter and receiver face to face in the straight line and check for the proper wiring. After finishing confirmation, supply the power.
- Fix either the emitter or receiver and check for the range where operation indicator becomes OFF by controlling the other in the direction of up, down, left and right. After finishing the confirmation, place it in the middle and fix it.
- After finishing the installation, place a sensing object at the optic axis and check whether it is operated or not.
- If the sensing objects are semitransparent or too small (less than $\varnothing 8$ mm) then there is possibility that sensor will not detect any objects because they just pass through so please be cautious



Retro reflection type (PN-M1)

- Install the sensor and mirror face to face. After that, adjust the position of mirror to up, down, left and right direction and confirm the range where operation LED light becomes OFF. Install it at the center of position where the light becomes OFF.
- Adjust the sensitivity adjusting volume at the most suitable position according to the sensing range, sensing object and etc.
- When installing more than 1 sensor, please keep the distance (gap) more than 30 cm due to the possibility of malfunction occurrence.
- When the sensing object is glossy or highly reflective, please install at 30 ~ 45 degree angle according to the moving direction of sensing object in order to prevent malfunction. [refer to the image 2 provided below]



Diffuse reflection type (PN-R02)

- (Light on operation when there is a light reflective object in background)
- Generally it is used with the max sensitivity setting (PN-R02) but it may be affected by the front side wall, building columns and etc so please be cautious when adjusting.
 - Increasing the sensitivity too much may end up with malfunction so please be cautious
- (1) With the sensing object in the position, increase the volume gradually from the min sensitivity to the state when operation LED becomes ON and that position will be referred as point ㊸.
 - (2) With the sensing object not in the position, decrease the volume gradually from the max to the state when operation LED becomes OFF and that position will be referred as point ㊹.
- If the operation LED is OFF when even the volume points to MAX, the MAX is point ㊹.
- (3) The halfway point between point ㊸ and point ㊹ is the most suitable point.

