

PN Series

Voltage output type photo sensor

- 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/D.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 DC, ± 10 %		
Current consumption	Emitter	20 mA DC	max 30 mA DC
	Receiver	18 mA DC	
Control output	NPN voltage output, Less than 200 mA (Load voltage : 30 V DC)		
Output action	Selection of L. ON/D. ON by the control line (Through beam is only with the receiver)		
Response time	max 3 ms		
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	-10 ~ 60 °C(surrounding storage temperature : -25~70 °C)		
Ambient humidity	35 ~ 85 % RH (With no condensation)		
Protective structure	IP 66 (IEC)		
Insulation resistance	min 20 MΩ(500 V DC. between the code and case)		
Dielectric strength	1,000 V AC, 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	Code extended type 1.5 m		
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)

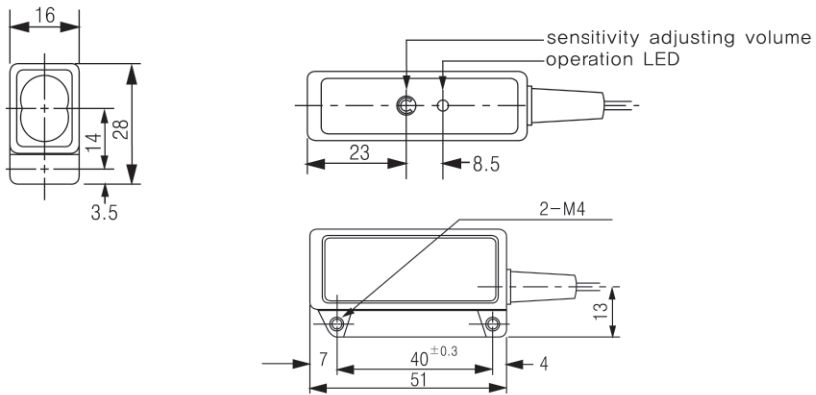
(Note 1) The sensing distance can be varied depending on the size, surface condition, glossy, non-glossy of the sensing object

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

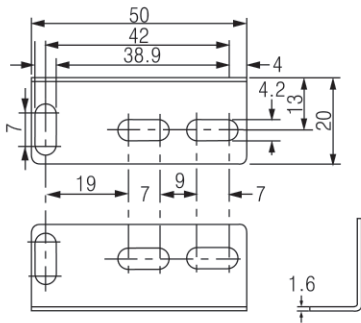


Dimension (unit : mm)

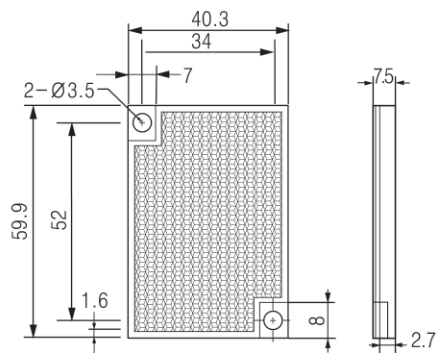
Dimension of external part



Product holder



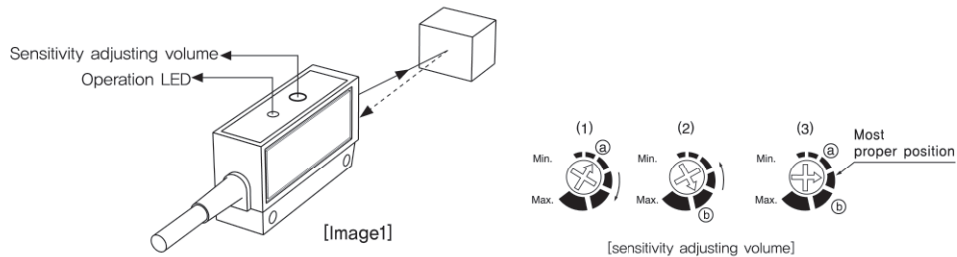
Mirror (HY-M5)



●● Installation method

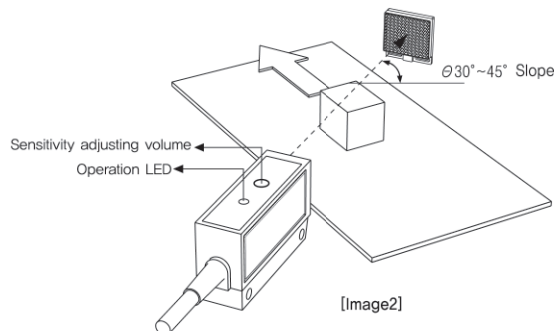
■ Diffuse reflection type (PN-R02)

- Generally it is used with the max sensitivity setting (PN-RD1) but it may be affected by the front side wall, pole 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 ㉓.
 - (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 ㉔.
 - (3) The position halfway between point ㉓ and ㉔ is the most suitable position



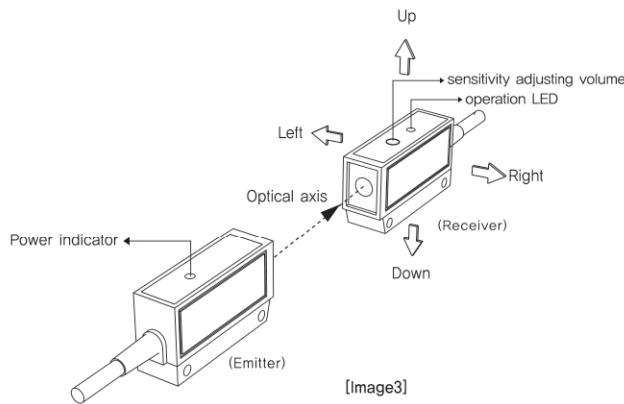
■ Retro reflection type (PN-M1)

- 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 turned OFF. Install it at the center of position where the light became turned OFF.
- Adjust the sensitivity adjustment 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 30cm due to the possibility of malfunction occurrence.
- When the sensing object is glossy or highly reflective, please install at an angle of 30~45degree according to the moving direction of sensing object in order to prevent malfunction from occurring [refer to the image 2 provided below]



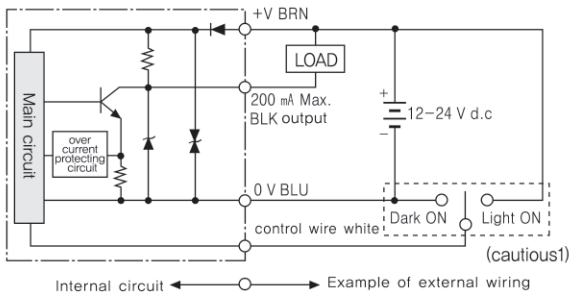
■ Through beam type (PN-T3)

- Install the emitter and receiver face to face in the straight line and check for the proper wiring. After finishing confirmation, supply in the power.
- Fix either the emitter or receiver and check for the range where operation indicator becomes turned OFF by controlling the others 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 sensing object at the optic part and check whether it is operated or not.
- If the sensing objects are semitransparent or too small (Less than 8 mm) then there is possibility that sensor will not detect any objects because they just pass through so please be cautious



⦿ Output circuit diagram

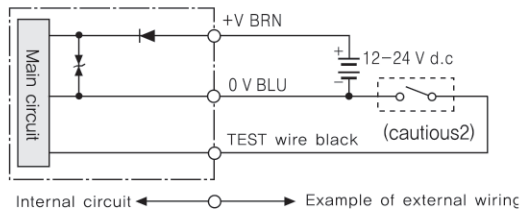
Receiver of diffuse reflection type, retro reflection type, and through beam type



(Cautious 1) 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

■ Emitter of through beam type



Note 2)

- ① Transmitting LED and power indicator become OFF when connecting to the TEST wire 0V. (TEST operation state) Transmitting LED and power indicator become ON when connecting to the TEST wire 0V. (Normal operation state)
- ② Maintain the TEST wire in an OFF state when operating
- ③ Insulated the wires that are not used.

●● Operation chart

Detection status		L-ON	D-ON
Light ON	TR output and L.ON indicator (red LED)	ON	OFF
	TR output and D.ON indicator (red LED)	OFF	ON
Dark ON	TR output and L.ON indicator (red LED)	ON	OFF
	TR output and D.ON indicator (red LED)	OFF	ON



●● Graphic characteristic

Diffuse reflection type

Sensing range characteristic	
Sensing method	Data characteristic
<p>Standard sensing object : white non-glossy paper Diffuse reflection type : 200X200 mm</p>	

■ Retro reflection type characteristic

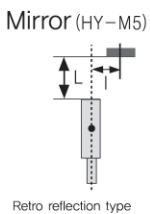
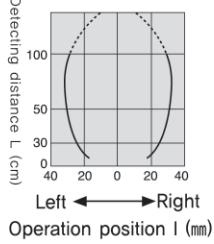
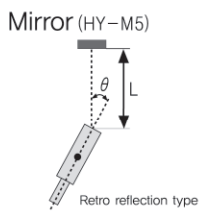
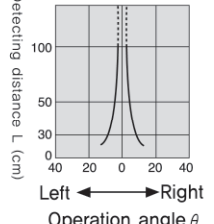
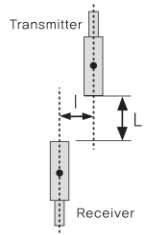
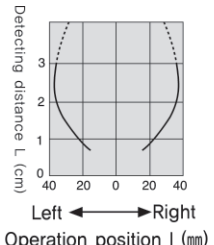
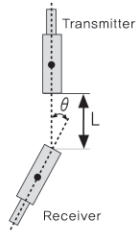
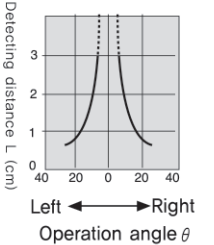
Parallel movement characteristic	
Sensing method	Data characteristic
 <p>Mirror (HY-M5)</p> <p>Retro reflection type</p>	 <p>Detecting distance L (cm)</p> <p>Left ← → Right</p> <p>Operation position l (mm)</p>
Sensor angle characteristic	
Sensing method	Data characteristic
 <p>Mirror (HY-M5)</p> <p>Retro reflection type</p>	 <p>Detecting distance L (cm)</p> <p>Left ← → Right</p> <p>Operation angle θ</p>



Photo Sensor

■ Through beam characteristic

Parallel movement characteristic	
Sensing method	Data characteristic
 <p>Transmitter</p> <p>Receiver</p>	 <p>Detecting distance L (cm)</p> <p>Left ← → Right</p> <p>Operation position l (mm)</p>
Sensor angle characteristic	
Sensing method	Data characteristic
 <p>Transmitter</p> <p>Receiver</p>	 <p>Detecting distance L (cm)</p> <p>Left ← → Right</p> <p>Operation angle θ</p>