Photo sensor

PS 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

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Safety information

Before using the product, please read the safety information thoroughly and use it properly.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

- Since this product is not designed for explosion-protective structure, do not use it at any place with flammable or explosive gas.
- Never disassemble, modify, or repair the product. There is a possibility of malfunction or a risk of fire.

⚠ Warning

- If the user use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- If there is a possibility of an accident caused by errors or malfunctions of this product, install external protection circuit to prevent the accident.
- To prevent damage or failure of this product, please supply the rated power voltage.
- Remove this product while the power is off. Otherwise, it may cause malfunction.

⚠ Caution

- The contents of this manual may be changed without prior notification.
- Please do not turn ON and OFF the power continuously. It may shorten life span of the product and cause malfunction.
- Check the connection of the item before the power source on.
- Please use an insulating transformer in order to maintain a stable power supply voltage of the product.
- If the cable needs to be extended, please use a cable that has a thickness more than 0.3 ㎟ and be cautious of the sudden voltage drop down.
- Do not make high-tension wiring together with sensor product in the same pipe or duct to avoid malfunction caused by noise.
- When using the sensor under the light such as fluorescent lighting or mercury lamp with high frequency, it causes malfunction.
- When cleaning the lens of photo sensor, use dry cloth only. Do not use thinner or organic solvents.
- In case of using SMPS, please be sure to earth frame ground terminal (FG). Then install the noise preventing condenser between O V and FG.
- This product is equipped with a structure (IP67), which allows partial waterproof but do not use this product under water at all times.

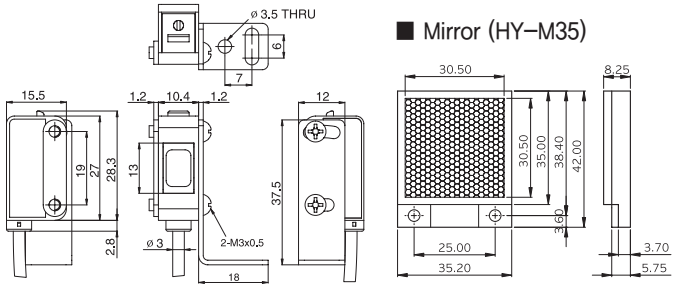
Suffix code

Model	Code		Information	
PS			Small size photosensor	
Sensing method and Sensing distance	T	1	1 m	Through-beam
		7	7 m	
		10R	10 m	
	M	2R	0.1 ~ 2 m	Retro-reflective
	R	7	70 mm	Diffuse-reflective
		30	300 mm	
		40R	400 mm	
	Z	4	1 ~ 40 mm	Limited-reflective
		3R	3 ~ 30 mm	
	D	3R	10 ~ 30 mm	Distance-settable
		4R	10 ~ 40 mm	
		5R	10 ~ 50 mm	
Output		N	NPN open collector output	
		P	PNP open collector output	

Specification

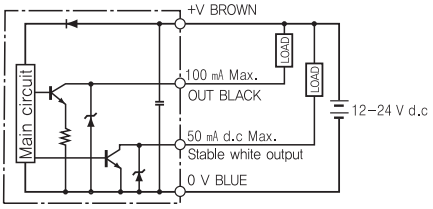
Model													
	NPN Type	PS-T1N	PS-T7N	PS-T10RN	PS-M2RN	PS-R7N	PS-R30N	PS-R40RN	PS-Z4N	PS-Z3RN	PS-D3RN	PS-D4RN	PS-D5RN
	PNP Type	PS-T1P	PS-T7P	PS-T10RP	PS-M2RP	PS-R7P	PS-R30P	PS-R40RP	PS-Z4P	PS-Z3RP	PS-D3RP	PS-D4RP	PS-D5RP
Type		Through beam			Retro reflection	Diffuse reflective			Limited reflective		Distance settable		
Sensing distance		1 m	7 m	10 m	0.1 ~ 2 m	70 mm	300 mm	400 mm	1~40 mm	3~30 mm	10~30 mm	10~40 mm	10~50 mm
Detecting object		Opaque above Ø6 mm			Opaque above Ø20 mm	White no-glossy paper 100×100 mm	White no-glossy paper 200×200 mm		White no-glossy paper 100×100 mm		White no-glossy paper 50×50 mm		
Power supply voltage		12 – 24 V d.c ±10 %											
Current Consumption	Emitter	23 mA d.c max	20 mA d.c max	23 mA d.c max	23 mA d.c max	28 mA d.c max	23 mA d.c max	25 mA d.c max		23 mA d.c max	30 mA d.c max		
	Receiver	20 mA d.c max	20 mA d.c max	20 mA d.c max									
Output	Control output	NPN / PNP open collector output , Load current : 100 ㎃ (30 V d.c) max, Residual voltage : 1 V d.c max											
	Stability output	NPN open collector output, Load current : 50 ㎃ (30 V d.c) max, Residual voltage : 1 V d.c max (But, there is no stable output with PNP output type)											
Operating mode		Light ON / Dark ON selsction by switch Volume built-in type											
Response time		0.7 ms max											
Hysteresis		–				Within 20 % of operating distance			Within 10 % of operating distance				
Light source		Infrared LED (900 nm)		Red LED (700 nm)		Infrared LED (900 nm)		Red LED (700 nm)	Infrared LED (900 nm)	Red LED (700 nm)	Red LED (700 nm)		
Operation Lamp		Operation indicator : Red LED, Stable output indicator : Green LED (Red LED of through beam type emitter is the power indicator)											
Ambient illumination		Sunlight : 5,000 lx max											
Ambient temperature		Operation : –20 ~ 60 ℃, Storage : –25 ~ 70 ℃ (No condensation)											
Ambient humidity		35 ~ 85 % R.H. (No condensation)											
Protective structure		IP67											
Insulation resistance		20 ㏁ min (500 V d.c mega)											
Dielectric strength		1,000 V a.c, for 1 minute											
Vibration resistance		10 – 55 Hz (Cycle for 1 min.), Double amplitude : 1.5 mm, each X, Y, Z direction for 2 hr.											
Shock resistance		500 ㎨, each X, Y, Z direction for 3 time											
Connection method		NPN : 4P, PNP : 3P, Ø3 mm, Length : 2 m (Transmitter of through beam type is 2P)											
Material		Case and lens cover : Polycarbonate											
Weight		Approx. 50g											

Dimension



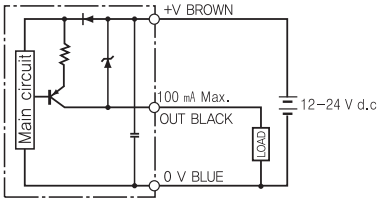
Output circuit

■ NPN output circuit



Internal circuit ◄—○—► Example of external connection

■ PNP output circuit

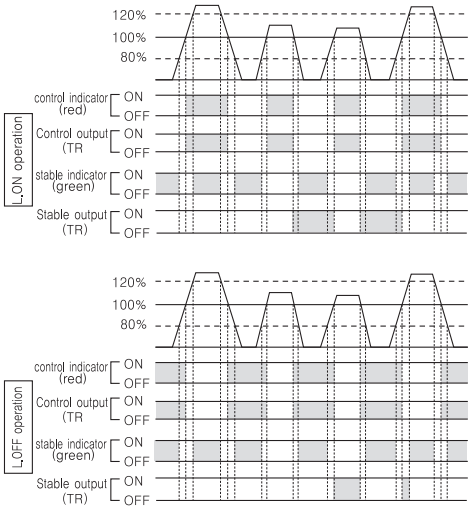


Internal circuit ◄—○—► Example of external connection

※ Only power input is available in the transmitter of through-beam (NPN/PNP common)

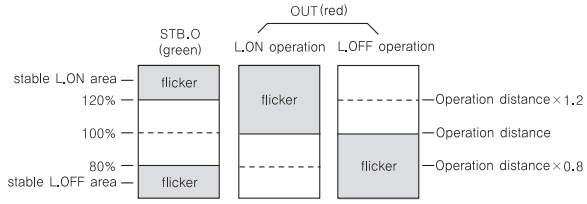
Regarding the stable output

It can be used as check the initial movement, check environmental changes after set up or level dropping during use. When it does not reach 120 % (stable light penetration area) after passing the operating level, the control output will see it as OFF and generate power. (However, there is no stability output of power for the PNP output type.)



Regarding the indicator

- Operation indicator (red LED) and stability indicator (green LED) indicate the level of operation.
- After completing the optical axis adjustment or sensitivity adjustment, repeat the L.ON/D.ON operation and check whether they are in the area of stable L.ON/D.ON area.
- Setting as a stable area will provide the high reliability regarding the environmental changes or etc after setting up is completed.



When using the selecting switch as L.ON, the red LED will be lighted once the light is turned ON. When using the selecting switch as D.ON, the red LED will be lighted once the light is turned OFF.

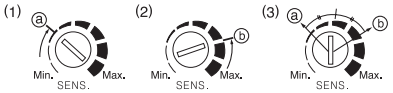
How to adjust the sensitivity

(When the L.ON action is operated-adjustment performed when reflective object is presence in the background.)

(1) After placing the sensing object at the designated location, gradually increases the sensitivity adjustment volume and once the operation LED is lighted then that position will be referred as point ⓐ.

(2) Gradually decrease the sensitivity adjustment volume from max to min with the absence of sensing object and once the operation indicator is turned off then that position will be referred as point ⓑ. (If the operation LED of max adjustment does not get turned ON then assume that point ⓑ is the Max.

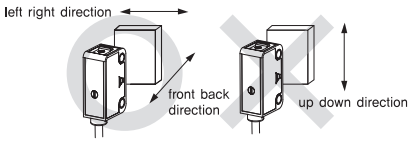
(3) Set the volume halfway between the point ⓐ and ⓑ then adjustment is completed.



Regarding the detecting direction

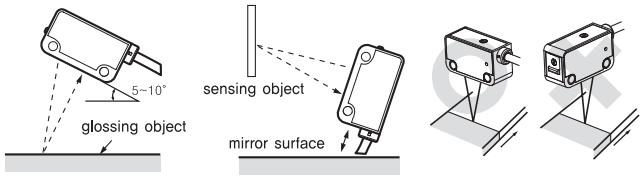
There is directional matter in the dual photo diode so there are directions that cannot be detected so please be cautious.

※ The product can be used for the up and down directions of the surface within the distance that had been set up by the sensing range adjusting volume.



Regarding the background object

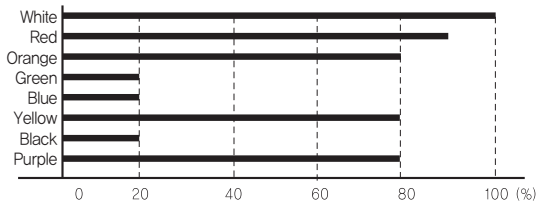
- Presence of objects with gloss and mirror surface can cause malfunction depending on the angle of background objects so slant the sensor when installing it.
- When detecting the gloss object (surface with shine), please slant the sensor about 5-10degree and install it.
- If there is a mirror surface on the bottom side of the sensor, movement may become unstable therefore either slant the sensor or maintain a certain distance (distance that will prevent getting affected by the bottom side) and install it.
- In case of when color and quality of sensor change dramatically, the detecting side and the surface of the detecting object must be in parallel direction when installing it.



[Image1] [Image2] [Image3]

Comparing the sensing distance (Typical example of Diffuse reflection type)

■ Red LED



■ Infrared LED