

# PS Series

Compact photo sensor with high accuracy

- Built in the reverse connection of power protecting circuit and built in the output disconnected over current protecting circuit.
- Flexible installation due to the compact size
- Fast response time Approx. 0.7 ms max)
- IP67 protective structure



## ●● Suffix code

Model	Code	Description	
PS	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Small size photosensor	
Sensing method and Sensing distance	1	1 m	Through-beam
	T 7	7 m	
	10R	10 m	
	M 2R	0.1-2 m	Retro-reflective
	7	70 mm	Diffuse-reflective
	R 30	300 mm	
	40R	400 mm	
	Z 4	1-40 mm	Limited-reflective
	3R	3-30 mm	
	D	3R	10-30 mm
4R		10-40 mm	
5R		10-50 mm	
Output	N	NPN open collector output	
	P	PNP open collector output	



## Specification

Model	NPN	PS-T1N	PS-T7N	PS-T10RN	PS-M2RN
	PNP	PS-T1P	PS-T7P	PS-T10RP	PS-M2RP
Sensing method		Through beam type			Retro reflection type
Sensing distance		1 m	7 m	10 m	0.1 – 2 m
Sensing object		Opaque above $\varnothing 6$ mm			Opaque above $\varnothing 20$ mm
Power supply voltage		12 – 24 V DC $\pm 10$ %			
Current consumption	Emitter	max 23 mA	max 20 mA	max 23 mA	max 23 mA
	Receiver	max 20 mA	max 20 mA	max 23 mA	
Control output	Control	NPN / PNP open collector output max 100 mA (30 V DC)			
	Stable	NPN open collector output max 50 mA (30 V DC)			
Output action		L.ON/D.ON (Switch operation)			
Response time		max 0.7ms			
Hysteresis		—			
Light source (wave length)		Infrared light LED (900 nm)		Red light LED (700 nm)	
LED		Control output indicator : Red LED, stable output indicator : green LED (Red LED of through beam type emitter is the power indicator)			
Ambient illumination		Sunlight : max 5,000 lx			
Ambient temperature		Operation : $-25 \sim 55$ °C, Storage : $-25 \sim 70$ °C (With no icing)			
Ambient humidity		Operation : 35 ~ 85 % RH, Storage : 35 ~ 85 % RH (With no condensation)			
Protective structure		IP 67			
Insulation resistance		min 20 M $\Omega$ (500 V DC)			
Dielectric strength		1,000 V AC, for 1 min			
Vibration resistance		10 – 55 Hz (for 1 min), Double amplitude: 1.5 mm for 2 hours each in X, Y and Z direction			
Shock resistance		500 % $g$ , 3 times each in X, Y and Z directions			
Connection method		NPN : 4P, PNP : 3P, $\varnothing 3$ mm, Length : 2 m (Emitter of through beam type is 2P)			
Material		Case and lens cover : Polycarbonate			
Weight		Tms and Rcvr each About 50 g			Approx. 50 g



Model	NPN	PS-R7N	PS-R30N	PS-R40RN	PS-Z4N	PS-Z3RN
	PNP	PS-R7P	PS-R30P	PS-R40RP	PS-Z4P	PS-Z3RP
Sensing method	Diffuse reflective			Limited reflective		
Sensing distance	70 mm	300 mm	400 mm	1 – 40 mm	3 – 30 mm	
Sensing object	White non-glossing paper 100×100 mm	White non-glossing paper 200×200 mm		White non-glossing paper 100×100 mm		
Power supply voltage	12 – 24 V DC ± 10 %					
Current consumption	max 28 mA	max 23 mA	max 25 mA		max 23 mA	
Control output	Control	NPN / PNP open collector output max 100 mA (30 V DC)				
	Stable	NPN open collector output max 50 mA (30 V DC)				
Output action	L.ON/D.ON (Switch operation)					
Response time	max 0.7 ms					
Hysteresis	Within 20 % of the operation distance			Within 10 % of the operation distance		
Light source (wave length)	Infrared light LED (900 nm)	Red light LED (880 nm)	Infrared light LED (900 nm)	Red light LED (700 nm)		
LED	Control output indicator : Red LED, Stable output indicator : Green LED					
Ambient illumination	Sunlight : max 5,000 lx					
Ambient temperature	-25 ~ 55 °C (Surrounding storage temperature : -25 ~ 70 °C)					
Ambient humidity	35 ~ 85 % RH (With no condensation)					
Protective structure	IP 67					
Insulation resistance	min 20 MΩ (500 V DC)					
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 ㉮ (About 50 G), 3 times each in X, Y and Z directions					
Connection method	NPN : 4P, PNP 3P, Ø3 mm, Length : 2 m					
Material	Case and lens cover : Polycarbonate					
Weight	About 50 g					

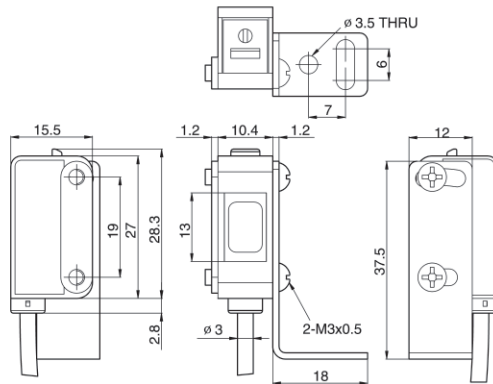


Photo Sensor

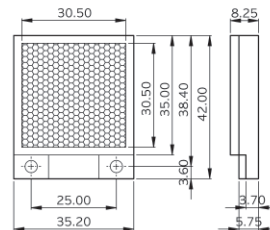
Model	NPN	PS-D3RN	PS-D4RN	PS-D5RN
	PNP	PS-D3RP	PS-D4RP	PS-D5RP
Sensing method	Distance-settable			
Sensing distance	10 – 30 mm	10 – 40 mm	10 – 50 mm	
Sensing object	50 × 50 mm white non-glossing paper			
Power supply voltage	12 – 24 V DC ±10 %			
Current consumption	max 30 mA			
Control output	Control	NPN / PNP open collector output max 100 mA (30 V DC)		
	Stable	NPN open collector output max 50 mA (30 V DC)		
Output action	L.ON/D.ON (switch operation)			
Response time	max 0.7 ms			
Hysteresis	Within 10 % of the operation distance			
Light source (wave length)	Red light LED (700 nm)			
LED	Control output indicator : Red LED, Stable output indicator : green LED			
Ambient illumination	Sunlight : max 5,000 lx			
Ambient temperature	-25 ~ 55 °C (Surrounding storage temperature : -25 ~ 70 °C)			
Ambient humidity	35 ~ 85 % RH (With no condensation)			
Protective structure	IP 67			
Insulation resistance	min 20 MΩ (500 V DC)			
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	NPN : 4P, PNP : 3P, Ø3 mm, Length : 2 m			
Material	Case and lens cover : Polycarbonate			
Weight	About 50 g			



Dimension (unit : mm)

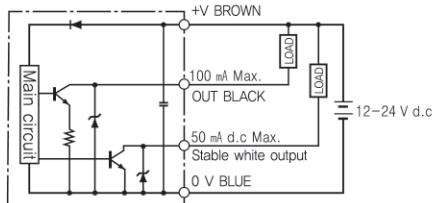


Mirror (HY-M35)



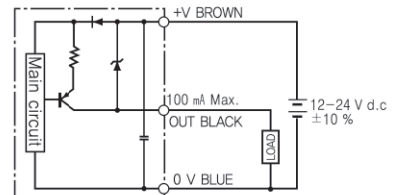
Output circuit

NPN output circuit



Internal circuit ← Example of external connection

PNP output circuit



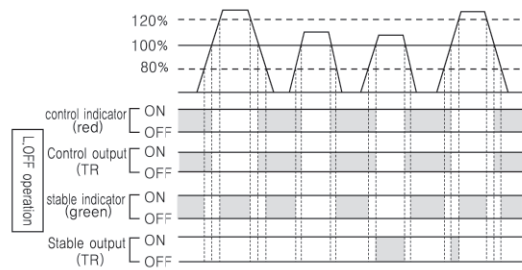
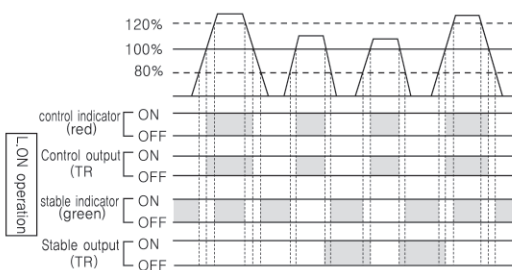
Internal circuit ← Example of external connection

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

Regarding the stable output

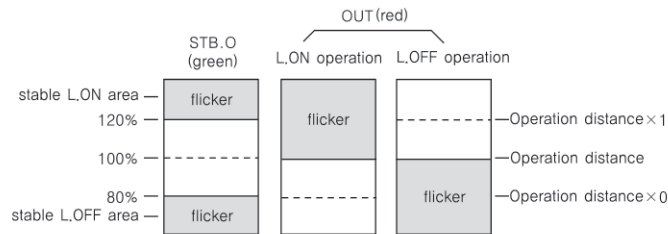
It can be used as checking the initial movement, checking the environmental changes after setting up or level dropping during the usage. If it does not reach 120% (stable light penetration area) when it has passed the operation level, the control output will decide it as OFF and generate the output.

(But there is no stable output I the PNP output type)



## Regarding the indicator

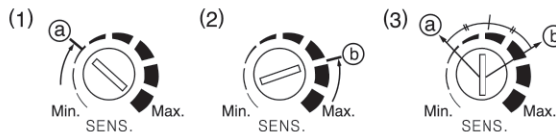
- Operation indicator (red LED) and stability indicator (green LED) indicate the level of operation.
- After completing the optical axis adjustment or sensitivity adjustment, repeat the L.ON/D.ON operation and check whether they are in the area of stable L.ON/D.ON area.
- Setting as a stable area will 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.)

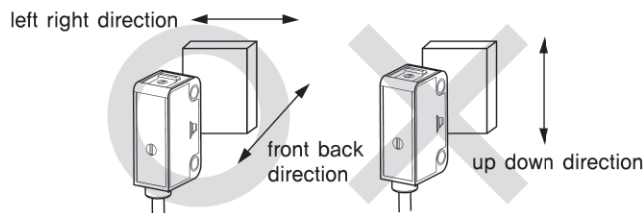
- (1) After placing the sensing object at the designated location, gradually increases the sensitivity adjustment volume and once the operation LED is lighted then that position will be referred as point ①.
- (2) Gradually decrease the sensitivity adjustment volume from max to min with the absence of sensing object and once the operation indicator is turned off then that position will be referred as point ②.
- (If the operation LED of max adjustment does not get turned ON then assume that point ② is the Max.)
- (3) Set the volume halfway between the point ① and ② then adjustment is completed.



## Regarding the detecting direction

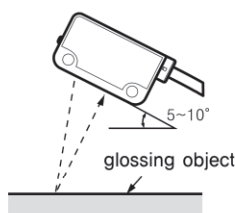
There is directional matter in the dual photo diode so there are directions that cannot be detected so please be cautious.

- ※ 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.

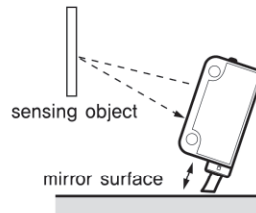


## ●● Regarding the background object

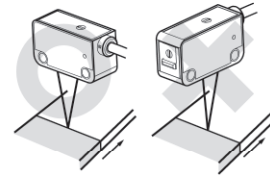
- Presence of objects with gloss and mirror surface can cause malfunction depending on the angle of background objects so slant the sensor when installing it.
- When detecting the gloss object (surface with shine), please slant the sensor about 5~10degree and install it.
- If there is a mirror surface 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]



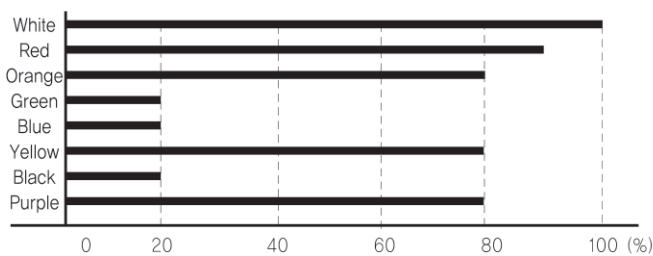
[Image3]



Photo Sensor

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

### ■ Red LED (R40N)



### ■ Infrared ray LED (R30)

