

Photo Sensor

# PS/PW series

## INSTRUCTION MANUAL

We appreciate you for purchasing HanYoung NUX Co.,Ltd product. Before using the product you have purchased, check to make sure that it is exactly what you ordered. Then, please use it following the instructions below.

### MAIN PRODUCTS

- DIGITAL : Temperature Controller, Counter, Timer, Speedmeter, Tachometer, Panel Meter, Recorder
- SENSOR : Proximity Switch/Photo Electric Sensor, Rotary Encoder, Optical Fiber Sensor, Pressure Sensor
- ANALOG : Timer, Temperature Controller

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**HANYOUNG**

## ■ Safety information

Before you use, read safety precautions carefully, and use this product properly. The precautions described in this manual contains important contents related with safety; therefore, please follow the instructions accordingly. The precautions are composed of DANGER, WARNING and CAUTION.

### ⚠ DANGER

Do not touch or contact the input/output terminals because they may cause electric shock.

### ⚠ WARNING

1. To prevent deflection or malfunction of this product, supply proper power voltage in accordance with the rating.
2. Since this product is not designed with explosion-protective structure, do not use it at any place with flammable or explosive gas.
3. Remove this product while the power is off. Otherwise, it may cause malfunction or electric shock.
4. Due to the danger of electric shock, use this product installed onto a panel while an electric current is applied.

### ⚠ CAUTION

1. Earth the Frame Ground(FG.) in case of using the switching regulator. Otherwise, they may cause wrong operating.
2. When using the sensor under the light such as fluorescent lighting or mercury lamp with high frequency, block it with a light trap and avoid the lens from facing the light directly.
3. Do not use an auto transformer. Use an insulating transformer.
4. If the cable needs to be extended, use over 0.3 mm<sup>2</sup> and be cautious of a possible sudden drop in voltage.
5. Separate high voltage cable and power line from sensor wire. Be cautious since using a same pipe arrangement for the wire could cause malfunction.
6. Avoid continuously switching the power source On and Off.
7. This product is equipped with a structure (IP67), which allows partial waterproof but do not use this product under water at all times.
8. When the lens of the photo sensor is contaminated by foreign substance, use a dry cloth to wipe off the substance. Never use thinner or organic solvents.

## ■ Ordering Information

MODEL	Suffix Code	Description		
P □	□ □ □ □	PS : Photo Sensor Small size PW : Photo Sensor Small Wide Type		
	T	Through Beam Type		
	M	Retro reflection Type		
	R	Diffuse reflection Type		
Detection	Z	Convergent Beam Type		
	D	Distance Convergent Beam Type		
	1	Through Beam	1 m	
			7 m	
10 m				
2	Retro reflection	2 m		
		7	Diffuse reflection	70 mm
				300 mm
40	400 mm			
Sensing distance	4	Convergent Beam	1 ~ 40 mm	
			3 ~ 30 mm	
	3	Distance Convergent Beam	10 ~ 30 mm	
			10 ~ 40 mm	
			10 ~ 50 mm	
	10	Distance Convergent Beam	10 ~ 100 mm (Only for PW series)	
			10 ~ 150 mm (Only for PW series)	
			10 ~ 200 mm (Only for PW series)	
			10 ~ 200 mm (Only for PW series)	
	LED indicator	N	Infrared LED	
R		Red LED		
Output	N	NPN output		
	P	PNP output		

## ■ Specification

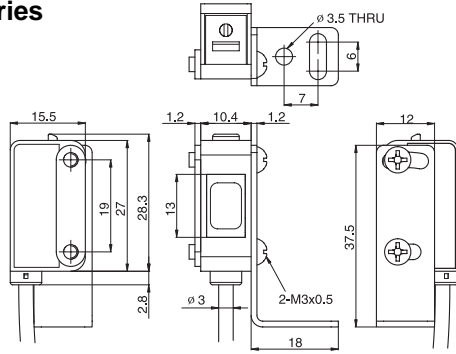
Type	Through beam			Retro reflection	Diffuse reflection			Convergent beam		Distance convergent beam								
Model	NPN type	PS-T1N	PS-T7N	PS-T10RN	PS-M2RN	PS-R7N	PS-R30N	PS-R40RN	PS-Z4N	PS-Z3RN	PS-D3RN	PS-D4RN	PS-D5RN	PW-D10RN	PW-D10N	PW-D15N	PW-D20N	
	PNP type	PS-T1P	PS-T7P	PS-T10RP	PS-M2RP	PS-R7P	PS-R30P	PS-R40RP	PS-Z4P	PS-Z3RP	PS-D3RP	PS-D4RP	PS-D5RP	PW-D10RP	PW-D10P	PW-D15P	PW-D20P	
Range	1 m	7 m	10 m	0.1~2 m	70 mm	300 mm	400 mm	1~40 mm	3~30 mm	10~30mm	10~40mm	10~50mm	10~100 mm	10~150 mm	10~200 mm			
Detectable object	∅6 mm			∅20 mm	* White paper 100 × 100 mm	* White paper 200 × 200 mm		* White paper 100 × 100 mm		* White paper 50 × 50 mm			* White paper 100 × 100 mm					
Power supply	+12 ~ +24 V DC ±10 % (Ripple ±10 % (Max.))																	
Current Consumption	Trns	Max.23mA	Max.20 mA	Max.23 mA	Max.	Max.	Max.	Max. 25 mA	Max.	Max. 30 mA			Max. 30 mA					
	Rcvr	Max.20mA	Max.20 mA	Max.20 mA	23 mA	28 mA	23 mA		23 mA									
Output mode	Control output	NPN Open collector / PNP Open collector output, Sink current 100 mA, 30 V DC Max. , Short protection circuit																
	Stability output	NPN Open collector output, Sink current 50 mA, 30 V DC Max. (except for PNP type)																
Output mode	Light ON or Dark ON selectable by convert switch																	
Response time	Max. 0.7 ms																	
Hysteresis	—			Max. 20 % of operating distance						Max. 10 % of operating distance								
Light source	Infrared LED		Red LED		Infrared LED		Red LED		Infrared LED			Red LED				Infrared LED		
LED indicator	Control output indicator : Red LED, Stability output : Green LED (Power : Red LED in Through beam type) (except PW series)																	
Ambient light	Sun lights : Max. 5000 lux																	
Ambient temperature	-25 ~ +55 ℃																	
Ambient humidity	35 ~ 85 % RH																	
Case protection	IP 67																	
Vibration	10 ~ 55 Hz, Double amplitude : 1.5 mm, X · Y · Z each directions for 2 hours																	
Impact	500 m/s <sup>2</sup> (50 G), X · Y · Z each directions for 3 times																	
Cable	Trns : ∅3/2C(length : 2 m)						NPN type : ∅3/4C (length : 2 m)					NPN type : ∅4/4C (length : 2 m)						
	Rcvr : ∅3/4C(length : 2 m) (PNP type Rcvr ∅3/3C)						PNP type : ∅3/3C (length : 2 m)					PNP type : ∅4/3C (length : 2 m)						
Material	CASE : PC, Lens Cover : PC																	
Weight	Trns. & Rcvr. : 50 g each			Approx. 50 g										Approx. 80 g				

\* non-glossy and white paper

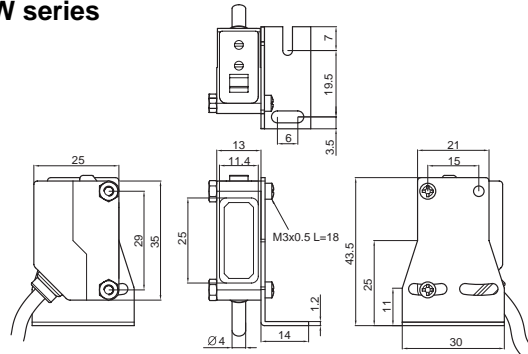
# Dimension

Unit: mm

## PS series

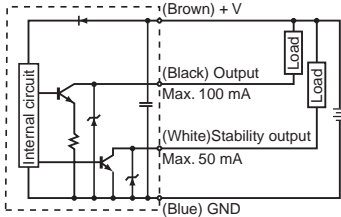


## PW series

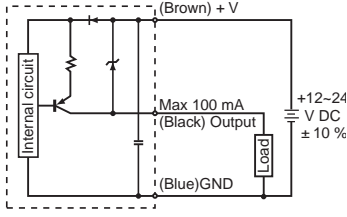


## Control Output

### NPN



### PNP



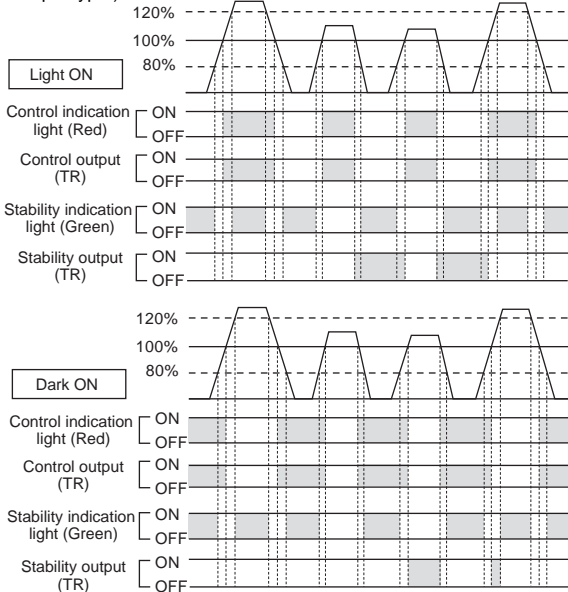
Internal circuit → External connection

Internal circuit → External connection

※ In the transmitter of Through-Beam, only power input is available. (For, PW series, only distance convergent Beam is available)

## About the stability output

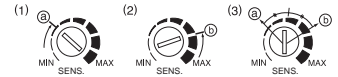
It can be used as check the initial movement, check environmental changes after set up or level dropping during use. When it does not reach 120 % (stable light penetration area) after passing the operating level, the control output will see it as OFF and generate power. (However, there is no stability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



## How to adjust the sensitivity

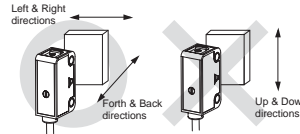
(During the light penetration operating - adjustment for reflective object in background)

1. First, place the object at the designated location and set the location of the operating indication light to point (a) while gradually increasing the volume for the sensitivity adjustment.
2. In the absence of an object, gradually lower the volume of sensitivity adjustment from the maximum and set point (b) at the point which is light off. (When the movement indication light does not light on even at the maximum sensitivity level, point (b) will be the maximum point.)
3. Adjustment completes when setting the volume between the points (a) and (b).



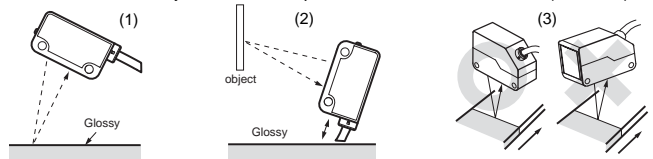
## About the detecting direction (Distance Convergent Beam type)

There is directional in the divided photo diode. So, be cautious of not available detecting direction. Impossible directions for use: The product can be used for the up and down directions of the surface within the distance set up by the volume for detecting distance adjustment.



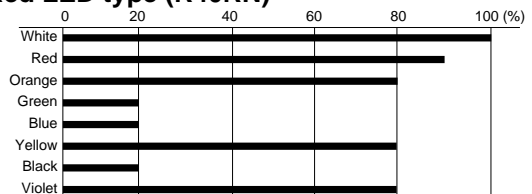
## About the background object (Distance Convergent Beam type)

1. In case of malfunction can be occurred due to the angle of the background object, establish aslant the sensor for the object with gloss or frontal form.
2. When detecting a glossy object (surface with shine), slant the sensor about 5 - 10° in the set up. (Picture 1)
3. If there is a frontal form on the bottom of the sensor, movements might be unstable. Therefore either slant the sensor or maintain a certain distance within the set up to avoid being affected by the bottom side. (Picture 2)
4. In case of the color or quality of sensor changing extremely, the detecting side and the surface of the object must be set parallel to one another for use. (Picture 3)

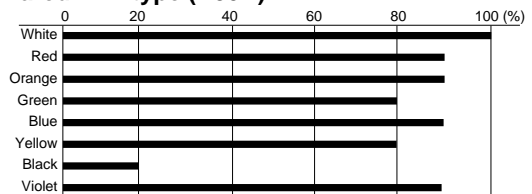


## Sensing Distance (Diffuse reflection type)

### Red LED type (R40RN)

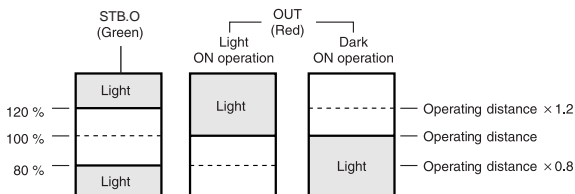


### Infrared LED type (R30N)



## Indicators

- The output indication light (red LED) and the stability indication light (green LED) are indicate the level of the picture.
- Detect object must be in the stable light penetration and shield. It can be check by repeating the light penetration and shield after adjusting the optical axis or sensitivity.
- When setting up in the stable area, high reliability can be obtained in regards



to changes such as environmental changes after the set up. When using SELECT S/W as L.ON, red LED will go on for light penetration. When using it as D.ON, the red LED will go off for light shielding.

광전자 센서

# PS / PW series

(주)한영닉스의 제품을 구입하여 주셔서 대단히 감사합니다.  
제품이 맞는지 확인하시고 아래의 항목에 따라 사용하십시오.

(주)한영닉스 인증현황



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HANYOUNG NUX

## 안전상 주의사항

사용전에 안전상의 주의를 잘 읽어 주시고 올바르게 사용하여 주십시오.  
여기에 표시된 주의사항은 안전에 관한 중요한 내용을 기재하고 있으므로 필히 지켜주십시오. 안전주의사항은 위험, 경고, 주의로 구분하고 있습니다.

### ⚠ 위험

입력 단자는 감전의 위험이 있으니 신체 및 통전물이 절대로 접촉되지 않도록 하십시오.

### ⚠ 경고

- 본기기의 파손방지 및 고장방지를 위하여 정격에 맞는 전원전압을 공급하여 주십시오.
- 방폭 구조가 아니므로 가연성, 폭발성 가스가 있는 장소에서는 사용하지 마십시오.
- 본기기의 탈착은 전원을 OFF한 후 조치하여 주십시오. 감전, 오동작, 고장의 원인이 됩니다.
- 감전될 위험이 있으므로 통전 중 본기기를 판넬에 설치된 상태로 사용하여 주십시오.

### ⚠ 주의

- Switching Regulator를 사용하는 경우에는 반드시, 프레임 그라운드(F.G)단자를 접지하여 주시고, 접지하지 않으면 전원의 스위칭 노이즈로 인한 오동작이 발생할 수 있으므로 주의하여 주십시오.
- 형광등이나 인버터등의 주변에는 설치를 삼가하여 주시고, 고주파 점등형의 기기는 광전자 센서의 번조 주파수에 가까운 광이나 노이즈를 발생시켜 제품의 오동작을 하게 하는 원인이 되오니 주의하십시오.
- 제품의 인가전원의 안정성을 유지하기 위해서는 오토트랜스를 사용하지 마시고, 반드시 절연트랜스를 사용하여 주십시오.
- Cable을 연결시킬때에는 가능한 굵은 선 (0.3mm 이상)을 사용하여 주시고, 이때 전압 강하에 주의하여 주십시오.
- 고압선 및 동력선과 센서의 배선은 반드시 분리해서 따로 배선하여 주십시오.
- 제품의 전원을 연속적으로 ON/OFF하면 제품의 수명이 단축되거나 오동작의 원인이 되오니 주의하십시오.
- 본제품은 IP67의 방수구조이나 항상 물이 있는 장소나 수중에서는 사용하지 않습니다.
- 제품의 렌즈나 CASE의 청소는 마른 천등을 사용하여 가볍게 닦아주시고, 신나나 알콜 등의 유기용제는 사용하지 마십시오.

## 형명구성

형명	형번	내용			
P□	□□□□	PS : Photo Sensor Small Type PW : Photo Sensor Small Wide Type			
	T	Through Beam (투과형)			
	M	Retro reflection (Mirror반사형)			
	R	Difuse reflection (확산반사형)			
검출방식	Z	Convergent Beam (한정반사형)			
	D	Distance Convergent Beam [측거형 (거리조정반사형)]			
	검출거리	1	투과형	1 m	
		7		7 m	
		10		10 m	
검출거리	2	미러반사형	2 m		
			7	확산반사형	70 mm
					30
	40	400 mm			
	측거형 (거리조정반사형)	4	한정반사형	1 ~ 40 mm	
				3	3 ~ 30 mm
		3	측거형 (거리조정반사형)	10 ~ 30 mm	
				4	10 ~ 40 mm
				5	10 ~ 50 mm
		10	10 ~ 100 mm (PW series에 한함)		
15		10 ~ 150 mm (PW series에 한함)			
20	10 ~ 200 mm (PW series에 한함)				
발광소자	無	Infrared LED (적외선)			
	R	Red LED(적색)			
출력	N	NPN output type			
	P	PNP output type			

## 정격

형식	투과형			미러반사형			확산반사형			한정반사형			측거식(거리조정반사형)				
모델명 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	PW-D10RN	PW-D10N	PW-D15N	PW-D20N	
모델명 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	PW-D10RP	PW-D10P	PW-D15P	PW-D20P	
검출거리	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	10~100 mm		10~150 mm	10~200 mm	
표준검출체	Ø6 mm			Ø20 mm	백색무광택지 100×100mm			백색무광택지 200×200mm			백색무광택지 100×100mm			백색무광택지 100×100 mm			
정격전압	+12 ~ +24 V DC ±10% (Ripple ±10% 이하)																
소비전력	23mA이하	20mA이하	23mA이하	23mA 이하	28mA이하	23mA이하	25mA 이하	23mA 이하	30mA 이하			30mA 이하					
전류수광부	20mA이하	20mA이하	20mA이하														
출력제어출력	NPN 오픈콜렉터 출력 / PNP 오픈콜렉터 출력, 부하전압 : Max. 30 V DC, 저항부하 : 100mA 이하, 유도부하 : 50 mA 이하, 잔류전압 : 1 V 이하																
동작인정출력	NPN 오픈콜렉터 출력, 부하전압 : Max. 30 V DC, 저항부하 : 50 mA 이하, 잔류전압 : 1 V 이하																
출력모드	입광(L.ON)/차광(D.ON) 전원스위치로 선택, 볼륨 내장																
응답속도	Max. 0.7 ms																
움차거리							동작거리의 20% 이내			동작거리의 10% 이내							
사용광원	적외 발광 다이오드			적외 발광 다이오드			적외 발광 다이오드			적외 발광 다이오드			적외 발광 다이오드				
동작표시등	제어출력 표시등 : 적색 LED, 안정출력 표시등 : 녹색 LED (단, 투과형의 발광부 적색 LED는 전원 표시등임 - PW series는 제외)																
사용주위조건	태양광 : 5000lx 이하																
사용주위온도	동작시 : -25 ~ +55 ℃, 보존시 : -25 ~ +70 ℃ (단, 결빙, 결로하지 않을 것)																
사용주위습도	동작시 : 35 ~ 85 % RH, 보존시 : 35 ~ 85 % RH (단, 결로하지 않을 것)																
보호구조	IP 67구조																
내진동	10 ~ 55 Hz (주기 1분간), 복진폭 : 1.5 mm, X · Y · Z 각방향 2시간																
내전압	1000 V AC (50 / 60 Hz 1분간)																
내충격	500 m/s <sup>2</sup> (약 50 G), X · Y · Z 각방향 3회																
접속방법	코드인출식 NPN 4P(투과 2P) / PNP 3P(투과 2P), Ø3 mm, 길이 2 m			코드인출식 NPN 4P / PNP 3P, Ø3 mm, 길이 2 m									코드인출식 NPN 4P / PNP 3P, Ø4 mm, 길이 2 m				
재질	CASE : PC, Lens Cover : PC																
중량	발 · 수광부 : 각각 약 50 g (포장 BOX 무게 제외)			약 50 g (포장 BOX 무게 제외)									약 80 g (포장 BOX 무게 제외)				

