Built-in Amplifier Photo Sensor

PQ series

INSTRUCTION MANUAL

Thank you for purchasing Hanyoung Nux products.
Please read the instruction manual
carefully before using this product, and use the product correctly.
Also, please keep this instruction manual where you can see it any time.

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Safety information

Please read the safety information carefully before use, and use the product correctly.
The alerts declared in the manual are classified into **Danger**, **Warning** and **Caution** according to their importance

⚠ **DANGER**	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury
⚠ **WARNING**	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ **CAUTION**	Indicates a potentially hazardous situation which, if not avoided, may result in minor injury or property damage

⚠ DANGER

- The input/output terminals are subject to electric shock risk.
  Never let the input/output terminals come in contact with your body or conductive substances.

⚠ WARNING

- This product is not for outdoor use (it may shorten the product lifetime and cause electric shock)
- Do not use this product in places with flammable or explosive gases
  (it does not have an explosion-proof structure, so there are fire or explosion risks)
- Do not use the product in places where vibrations or shocks exceed the reference values
  (it has a double insulation structure, but the components may be damaged)

⚠ CAUTION

- Applicable Pollution degree 3 of intended environment.
- Never use it on AC power.
- Be careful of wiring. It may cause explosion, fire, or machine breakdown.
- Do not use the product in a state where the product body or cable is crashed.
- Do not disassemble, repair or modify the product.
- When the lens of the photo sensor is contaminated by foreign substances, use a dry piece of cloth and wipe off the substance lightly. Never use thinner or organic solvents.
- Separate high voltage cable and power line from the sensor wire. Be cautious since using the same pipe during wiring could cause malfunction.
- If the cable needs to be extended, use over 0.3 ㎟ and be cautious because of a possible sudden voltage drop.
- When using the sensor under lights with high frequency, such as fluorescent lamps or mercury lamps, block it with a light shading plate and avoid the lens from facing the light directly.
- If multiple through-beam type photoelectric sensors are installed close together, malfunction may happen due to the mutual interference.
- Using inductive load (relay, coil) for the output can cause an instantaneous increase in load by more than two times and damage the TR of the output. Therefore, please set half of the maximum load.
- There is an over-current protecting circuit within the output side that breaks the output when the current is higher than the rated load current. Therefore, please set within 70% of the maximum load.
- Do not use the product in places with heavy dust or debris that can contaminate the lenses and consequently cause malfunctions.
- The contents of this manual may be changed without prior notification
- Any use of the product other than those specified by the manufacturer may result in personal injury or property damage.
- When using the Switching Power Supply as power source, ground the Frame Ground (F.G.) terminal and be sure to connect the noise-cancelling condenser between 0V and F.G. terminals
- The power supply should be insulated and limited voltage/current or Class 2, SELV power.

Specification

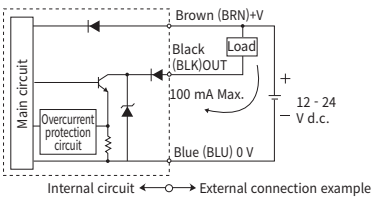
Sensing mode		Through-beam	Retroreflective (M.S.R.)	Diffuse-reflective
Cable type	NPN	PQ-T30N	PQ-M4N	PQ-R1N
	PNP	PQ-T30P	PQ-M4P	PQ-R1P
Connector type	NPN	PQ-T30NC	PQ-M4NC	PQ-R1NC
	PNP	PQ-T30PC	PQ-M4PC	PQ-R1PC
Sensing distance		30 m	0.1 ~ 4 m	1 m
Hysteresis distance		-		20% or less of detection distance
Detecting object		Ø12 mm or more (Opaque)	Ø75 mm more (Opaque)	White paper (100 x 100 mm)
Light source (wavelength)		Infrared LED (855 nm)	Red LED (660 nm)	Infrared LED (855 nm)
Current consumption		Emitter: max. 15 mA, Receiver: max. 20 mA	Max. 30 mA	
Power voltage		12 - 24 V d.c. Class 2 ±10 % (Ripple max. 10 %)		
Control output		• NPN or PNP open collector output		
		• Load current - max. 100 mA (26.4 V d.c. standard		
		• Residual voltage - NPN: max. 1.5 V, PNP: max. 1.5 V		
Operation mode		Light ON / Dark ON button switch type		
Indicator light		Control output indicator light : Red LED, Stability indicator light : Green LED (However, the red LED of the through-type emitter is a power indicator)		
Auto teaching		See How to set sensitivity and operation mode → Section ③.		
AGC		After 20 seconds of unstable light entering on button locked state to stable light entering state.		
Sensitivity adjustment		B1 increases the sensitivity and B2 decreases the sensitivity		
Protection circuit	Common	Power reverse connection protection, Output short-circuit over-current protection, Output reverse connection protection, Output short-circuit alarm		
	Individual	-	Mutual interference prevention function	
Response time		Max. 1 ms		
Insulation Resistance		More than 20 MΩ (500 V d.c. mega)		
Noise immunity		Square wave noise by noise simulator (pulse width 1μs) ±240 V		
Dielectric strength		1,000 V a.c. (50/60 Hz for 1 minute)		
Vibration resistance		10-55Hz, sweep: 1.5mm, X·Y·Z 2 in each direction for 2 hours		
Shock resistance		500 m/s², X·Y·Z each direction 3 times		
Ambient illumination		Sunlight : max. 11,000 lx / Incandescent: max 3,000 lx		
Ambient temperature range		operating temperature : -20 ~ +55 °C During storage : -40 ~ +70°C (Without condensation or icing)		
Ambient humidity		35 ~ 85 % RH (Without condensation or icing)		
Pollution degree		3 rating		
Protection		IP67 (IEC standard)		
Certification		CE cULus RoHS2 (The connector type is currently undergoing CE and UL certification)		
Weight (Packing)	Cable type	100 g (160 g)	55 g (115 g)	55 g (100 g)
	Connector type	20 g (80 g)	10 g (70 g)	10 g (55 g)
Texture	Case	NYLON		
	Display	PC		
	Lens	PMMA		
Accessory	Common	Instructions manual, bracket A, bolt (M3 X 12 mm)		
	Individual	-	Mirror (HY-M5)	-
Connection method	Cable type	Number of wires - 3P, Outer diameter - 4 Ø, Length - 2 m (however, the emiiter of through-beam type has 2P)		
	Connector type	M8 Connector Wiring (M8 relay cable sold separately)		

- Mutual interference prevention function
- Resistant to noise by adopting digital signal processing
- M.S.R. that receives only the light reflected from the mirror
- Easy setting by using buttons
- IP67 (IEC standard) protection structure with excellent water resistance
- Realization of long-distance detection by adopting high-performance lens
- Easy to install with screw fixing method

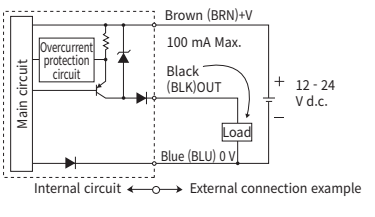
Output circuit

※ Diffuse-reflective, retro-reflective, receiver of through-beam types only (however, the emiiter of through-beam type has 12 - 24 V d.c. power input only.)

■ NPN TYPE



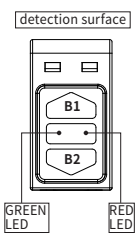
■ PNP TYPE



How to set sensitivity and operation mode

NO	Function		Information
①	Button lock & unlock		Press the B1 ( ) button for more than 3 seconds to change (lock or unlock).
③	Auto teaching	Through-beam	If the B2 ( ) button is pressed for more than 3 seconds in the absence (stable light incident) of a detection object, the sensitivity is automatically set.
		Retroreflective (M.S.R.)	
		Diffuse-reflective	1) In the presence of a detection object (stable light incident) 2) Release the B2 ( ) button after pressing it for more than 3 seconds. 3) Check the green + red LED cross blinking (try again if either side is not blinking) 4) Press the B2 ( ) button once after removing the detected object (0.5 seconds)
④	Increase sensitivity		Press the B1 ( ) button for less than 3 seconds to increase the fine sensitivity (1 STEP)
⑤	Decrease sensitivity		If the B2 ( ) button is pressed for less than 3 seconds, the fine sensitivity decreases (1STEP)
⑥	Operation mode change		Press the B1( ) +B2 ( ) buttons simultaneously for 5 seconds or longer to change the operation mode (Light ON↔Dark ON)
⑦	Factory reset		After pressing the B1( ) +B2 ( ) buttons together for more than 5 seconds, release only B1 ( ) After 5 seconds, release the B2 ( ) button to reset. (Dark ON, sensitivity maximum, button unlock changes, and diffuse reflection type becomes Light ON.)
⑧	AGC		Unstable light if it lasts more than 20 seconds, it is adjusted to stable light incident state.

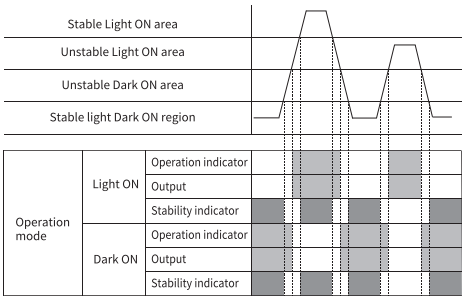
Operation in button unlocked state



■ Indicator light state

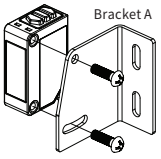
①	Button lock		Within 3 seconds (green blinking) → After 3 seconds (red ON), release the B1 button, green + red blinking (2 seconds) ※ Setting value cannot be changed when button locking or unlocking is operated
②	Button unlock		Within 3 seconds (Green + Red blinks) → After 3 seconds (Red ON), release the B1 button, Green + Red blinks (2 seconds)
③	Auto teaching	Through-beam	Within 3 seconds (Green blinking) → After 3 seconds (Red ON) →
		Retroreflective (M.S.R.)	When the B2 button is released, green + red blinks alternately (5 seconds) → green blinks (2 seconds)
		Diffuse-reflective	If you press the B2 button once when there is green + red blinking (0.5 seconds), green blinks 6 times.
	※ If auto-teach is attempted while the light from the emitter does not enter the receiver, the red blinks (Error displayed for 2 seconds)		
④	Increase sensitivity		Within 3 seconds (green blinking)
⑤	Decrease sensitivity		Within 3 seconds (green blinking)
⑥	Operation mode change		Within 5 sec (Green + Red OFF) → After 5 sec (Green + Red ON) → Release B1 + B2 button to blink green (2 sec)
⑦	Factory reset		Within 5 sec (Green+Red OFF) → After 5 sec (Green+Red ON) → Release B1 button to blink green + Red ON (5 sec) → After 5 seconds (green ON) → B2 button is released, green blinks (2 seconds)
Etc	Save previous execution value		① ~ ⑦ Saved after a certain period of time after performing the operation (no arbitrary operation), blinking green (1 time) After saving the operation value, even if the power is turned off and on, the previous operation value is saved (automatically saved even in case of power failure)

Motion chart

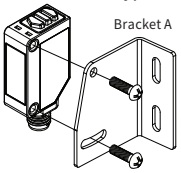


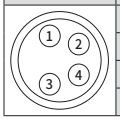
How to install

■ Cable type



■ Connector type



Connector type	pin	Color	Function
	①	Brown	+V
	②	-	-
	③	Blue	0 V
	④	Black	OUT

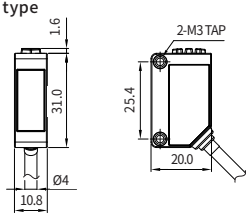
• M3 X12mm The tightening torque should be 0.5 N · m or less.

• Connector pin ④ is N.C (not connected) for the emiiter of through-beam type.

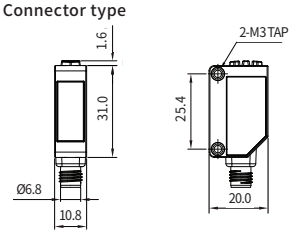
Dimensions

[unit : mm]

■ Cable type

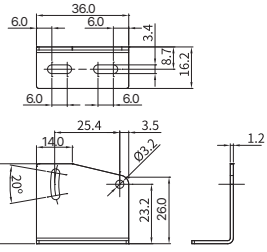


■ Connector type

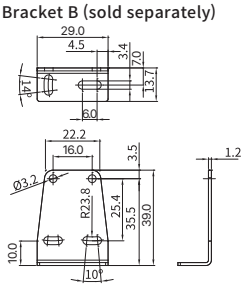


Accessory

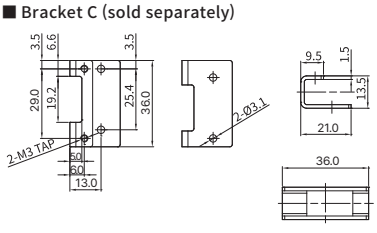
■ Bracket A



■ Bracket B (sold separately)



■ Bracket C (sold separately)



■ Mirror HY-M5