

PZ1 Series

Mini photo sensor

- Built in the protecting circuit for reverse power connection and for output break.
- Flexible installation due to the compact size
- 1 ms response time
- Time function (OFF Delay, 0.1 – 2 sec)



☉ Suffix code

Model	Code		Description	
PZ1-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Small size photo sensor
Sensing method and sensing distance	T	1	1 m	Through-beam
		5	5 m	
		7	7 m	
	M	1	0.1 – 1 m	Retro-reflective
		2	0.1 – 2 m	
	R	10	100 mm	Diffuse-reflective
		30	30 – 300 mm	
		40	40 – 400 mm	
	Z	3	10 – 30 mm	Limited-reflective
		4	10 – 40 mm	
		T3	10 – 30 mm	Limited-reflective ※ OFF Delay, 0.1 – 2 sec.
		T4	10 – 40 mm	
Output		N	NPN open collector output	
		P	PNP open collector output	
Protective structure (cautious 1)			IP 65 : Standard type	
			IP 67 : Optional (No volume, setting switch)	

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Specification

Model	NPN	PZ1-T1N	PZ1-T5N	PZ1-T7N	PZ1-M1N	PZ1-M2N
	PNP	PZ1-T1P	PZ1-T5P	PZ1-T7P	PZ1-M1P	PZ1-M2P
Sensing method	Through beam type				Retro reflection type	
Sensing distance	1 m		5 m	7 m	0.1 – 1 m	0.1 – 2 m
Sensing object	opaque above Ø6 mm				opaque above Ø48 mm	
Power supply voltage	12 – 24 V DC, ±10 %					
Current	Emitter	20 mA max.			30 mA max.	
consumption	Receiver	18 mA max.				
Control output	NPN/PNP open collector output max 100 mA (30 V DC)					
Output operation	L.ON / D.ON ※ switch operation					
Response time	1 ms max					
Hysteresis	—					
Light source (wave length)	infrared lightening LED (880 nm)					
LED	Control output indicator : Red LED					
	Red LED for(through beam type emitter is the power indicator)					
Sensitivity adjustment	built in the sensitivity control V/R (rotation angle : 220°)					
Protective circuit	Built in the reversed power supply connection protective circuit and output short protective circuit.					
Ambient illumination	Sunlight : 11,000 Lux max, Incandescent lamp : max 3,000 Lux					
Ambient temperature	-25 ~ 55 °C (surrounding storage temperature : -25 ~ 70 °C)					
Ambient humidity	35 ~ 85 % RH (with no condensation)					
Protective structure	IP 65 (IP 67 is optional)					
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 directions					
Shock resistance	500 ㎉, 3 times each in X, Y and Z directions					
Connection method	Number of wires : 3P, thickness : Ø3.8 mm, length : 2 m (but, the emitter : 2P)					
Material	Case and lens: polycarbonate					
Weight	Tms and Rcvr each About 50 g				Approx. 60 g	

(Note 1) IP67 protection structure is optional and there are no V/R and setting switch

(Note 2) The sensing distance can be varied depending on the size, surface condition, glossy, non-glossy of the sensing object

(Note 3) In case of the through beam type, emitter (PZ1-TL□□) and receiver (PZ1-TR□□) are one set of item

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Model	NPN	PZ1-R10N	PZ1-R30N	PZ1-R40N
	PNP	PZ1-R10P	PZ1-R30P	PZ1-R40P
Sensing method	Diffuse reflection type			
Sensing distance	100 mm	30 – 300 mm	40 – 400 mm	
Sensing object	200 × 200 mm non-glossy and white paper			
Power supply voltage	12 – 24 V DC ±10 %			
Current consumption	max 30 mA			
Control output	NPN / PNP open collector output 100 mA (30 V DC) max			
Output operation	L.ON / D.ON ※ switch operation			
Response time	max 1 ms			
Hysteresis	Within 20 % of the sensing distance.			
Light source (wave length)	Infrared lightening LED (880 nm)			
LED	Control output : red LED			
Sensitivity adjustment	built in the sensitivity control V/R (rotation angle : 220°)			
Protective circuit	Built in the reversed power supply connection protective circuit and output short protective circuit.			
Ambient illumination	Sunlight : max 11,000 Lux, Incandescent lamp : max 3,000 Lux			
Ambient temperature	-25 ~ 55 °C (surrounding storage temperature : -25 ~ 70 °C)			
Ambient humidity	35 ~ 85 % RH (with no condensation)			
Protective structure	IP 65 (IP 67 is optional)			
Insulation resistance	min 20 MΩ (500 V DC)			
Dielectric strength	1,000 V AC, for 1 min			
Vibration resistance	10-55 Hz double amplitude 1.5mm, for 2 hours each in X, Y and Z directions			
Shock resistance	500 %, 3 times each in X, Y and Z directions			
Connection method	Number of wires : 3P, Thickness : Ø3.8 mm, Length : 2 m			
Material	Case and lens : polycarbonate			
Weight	Approx. 60 g			



Model	NPN	PZ1-Z3N	PZ1-Z4N	PZ1-ZT3N	PZ1-ZT4N
	PNP	PZ1-Z3P	PZ1-Z4P	PZ1-ZT3P	PZ1-ZT4P
Sensing method	Limited-reflective type			Limited-reflective type (Timer function)	
Sensing distance	10-30 mm		10-40 mm	10-30 mm	10-40 mm
Sensing object	50 × 50 mm non-glossy and white paper				
Power supply voltage	12 - 24 V DC ±10 %				
Current consumption	max 30 mA DC				
Control output	NPN/PNP open collector output 100 mA (30 V DC) max				
Output operation	L.ON / D.ON ※ switch operation			L.ON, D.ON (optional)	
Response time	max 1 ms			When operating : 3 ms, when returning : 100 ms when timer setting is in the minimum value	
Hysteresis	Within 20 % of the sensing distance.				
Light source (wave length)	Infrared lightening LED (880 nm)				
LED	Control output : red LED				
Sensitivity adjustment	built in the sensitivity control V/R (rotation angle: 220°)				
Protective circuit	Built in the reversed power supply connection protective circuit and output short protective circuit.				
Ambient illumination	Sunlight : max 11,000 Lux, Incandescent lamp : max 3,000 Lux				
Ambient temperature	-25 ~ 55 °C (surrounding storage temperature : -25 ~ 70 °C)				
Ambient humidity	35 ~ 85 % RH (with no condensation)				
Protective structure	IP 65 (IP 67 is optional)				
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 directions				
Shock resistance	500 %, 3 times each in X, Y and Z directions				
Connection method	Number of wires : 3P, Thickness : Ø3.8 mm, Length : 2 m				
Material	Case and lens : Polycarbonate				
Weight	Approx. 60 g				

(Note1) Setting range of convergent beam type : 0.1 ~ 0.2 sec(OFF Delay time)

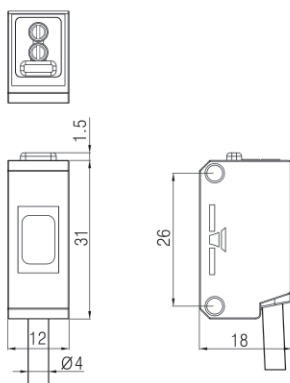
(Note2) In case of the convergent beam's time function built-in, Dark ON(DO) is optional

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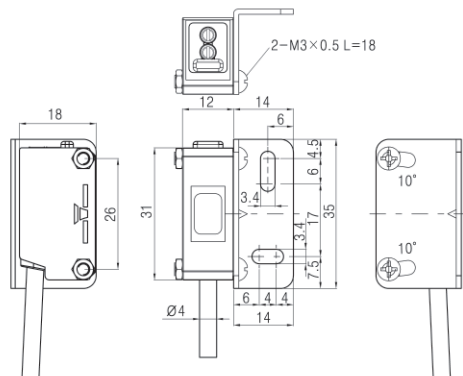
Photo
Sensor

Dimension (unit : mm)

Body

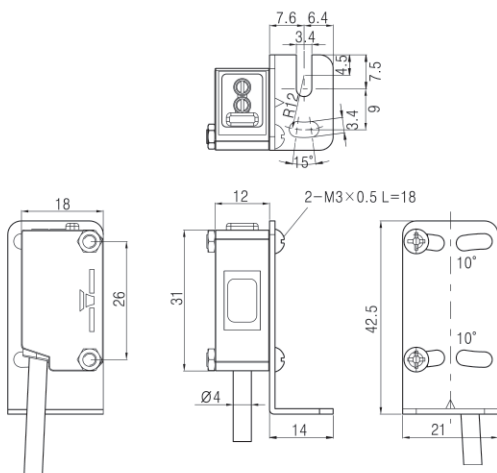


Bracket A installation

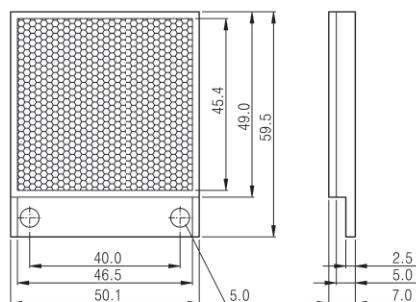


Bracket B installation

※ Bracket B is optional



Mirror(HY-M50)

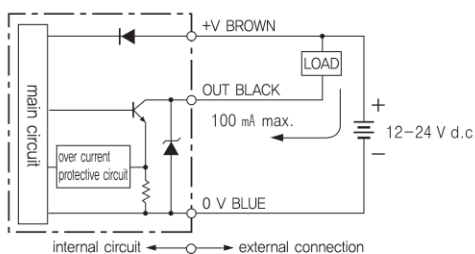


Output circuit

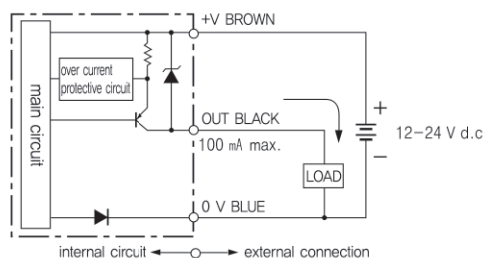
※ For Diffuse reflection, convergent reflection, retro reflection and receiver of through beam type.

(Note that emitter of through beam type only has the power supply (12 – 24V DC))

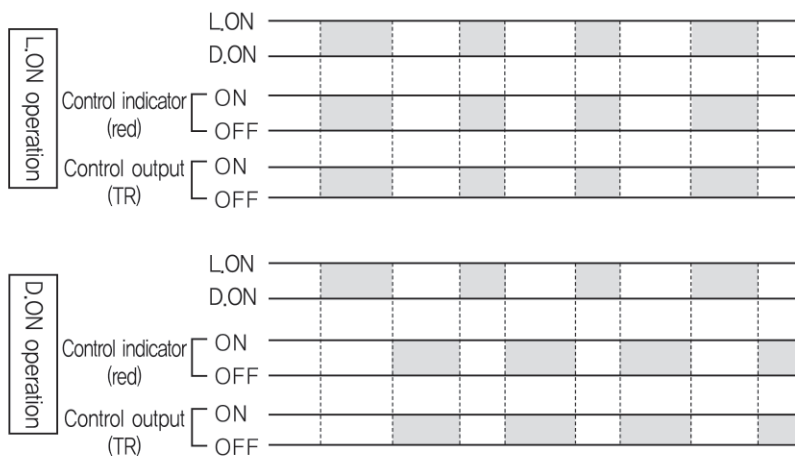
NPN output circuit



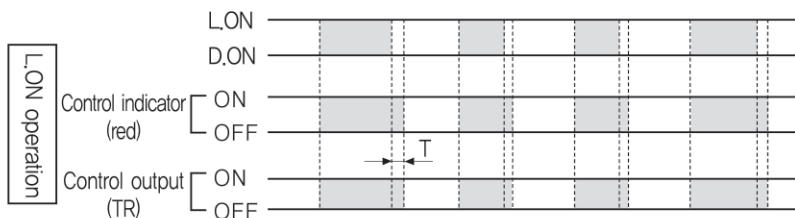
PNP output circuit



Operation chart



※ Through beam type is for Dark on operation

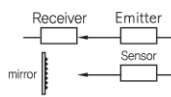




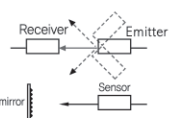




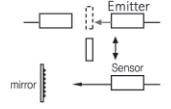






※ For convergent beam type (Time function) – Off delay

T : Set the time by time controlling VR

How to install



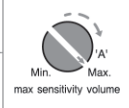


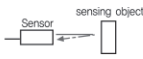

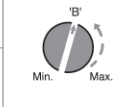


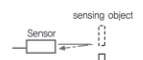

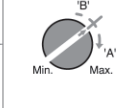

Through-beam type/retro reflection type

Order	Installation method	Operation	Operation mode	Sensitivity volume	Indicator
1	Supply in the power after placing the emitter and receiver face to face. (Retro reflection type uses the mirror and sensor instead of using emitter and receiver)			no	
				yes	
2	Fix either the emitter or receiver and check for the range where operation indicator becomes turned ON or turned OFF by controlling the other in the direction of up, down, left and right. After finishing the confirmation, place it in the middle and fix it.			no	
				yes	
3	Place the sensing object within the setting range and confirm the condition of proper operation			no	
				yes	

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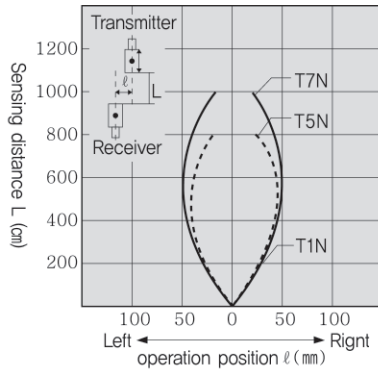
Diffusion reflection type

Order	Installation method	Operation	Operation mode	Sensitivity volume	Indicator
1	After removing the sensing object, turn sensitivity volume gradually to the max direction and once indicator lights up, (light on) that position will be referred as 'A' from now on. (If indicator does not get turned ON (OFF) even in the position of maximum then it is max)				
					
2	Place the sensing object in the desirable setting position and gradually turn the sensitivity volume from 'A' to the 'min' direction and once the indicator gets to turned ON (OFF) than that position will be referred as 'B'				
					
3	Place the sensitivity volume in the middle of max sensitivity and 'A' and 'B' and confirm the operation condition of sensing object that occurs within the setting range.				

Graphic characteristic

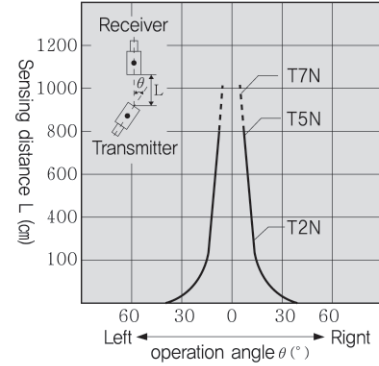
Parallel movement characteristic

- Through beam type



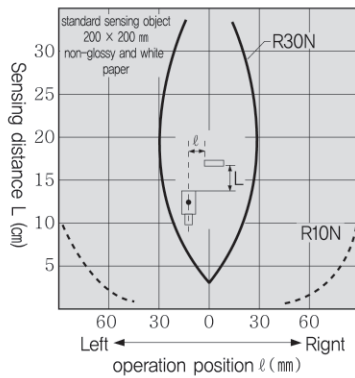
Pointing angle characteristic

- Through beam type

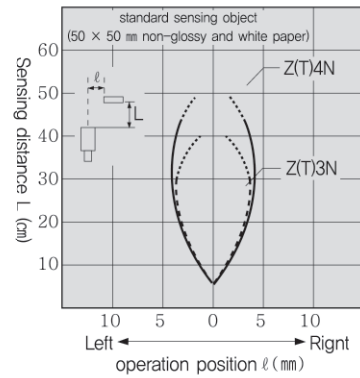


Detecting range characteristic

- Diffuse reflection type

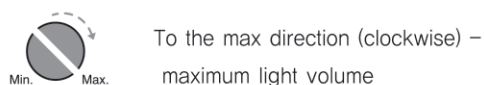
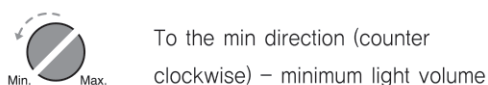


- Diffuse reflection type

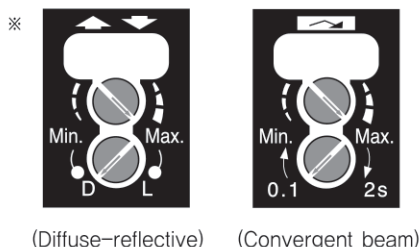
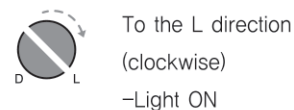
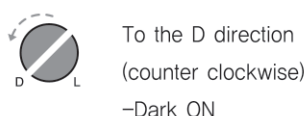


⦿ Operation mode and sensitivity setting

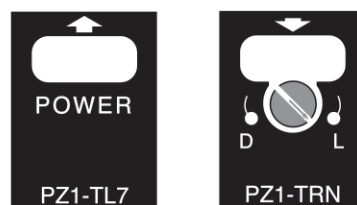
● Sensitivity setting



● operation mode



(Diffuse-reflective) (Convergent beam)



Through-beam emitter Through-beam receiver

※ In case of convergent beam type (PZ1-ZT), there is a time adjusting switch (OFF Delay Time) instead of having an operation mode switch.

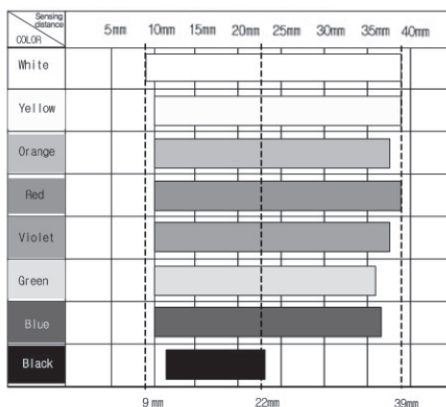
※ In case of through beam type, emitter has no operation mode switch and sensitivity adjusting switch. Receiver only has the mode switch.

Ex) Example of setting (diffuse reflection type) : Sensitivity – max operation mode–Dark ON

⦿ Characteristic of sensing distance according to the colors

■ Convergent beam type Z3N

Characteristic of sensing distance according to the colors
(Convergent beam type Z3N)



■ Convergent beam type Z4N

Characteristic of sensing distance according to the colors
(Convergent beam type Z4N)

