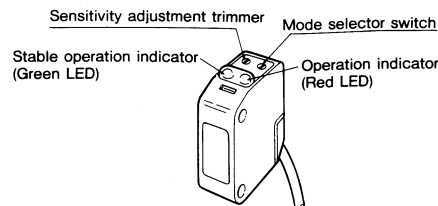
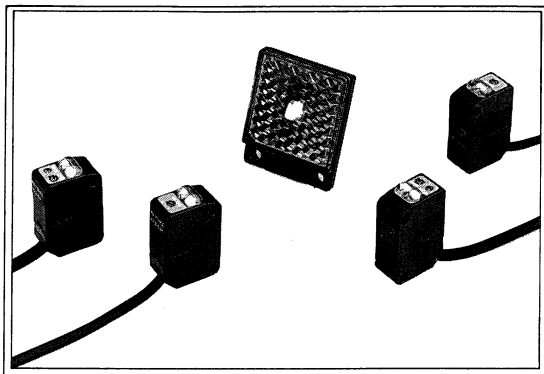
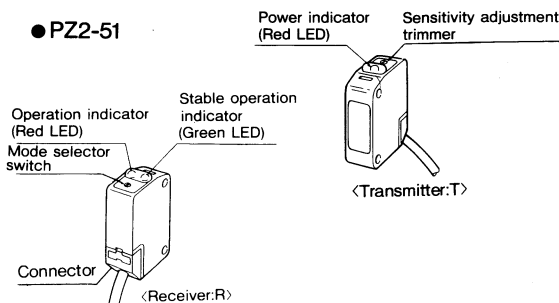


Micro Optical Sensor

PZ2 Series
Instruction Manual

●PZ2-51



Adjustment

Selecting LIGHT-ON/DARK-ON modes

Turn the mode selector clockwise to position L for the LIGHT-ON mode, and counterclockwise to position D for the DARK-ON mode.

Sensitivity adjustment

DARK-ON mode (when LIGHT-ON mode is specified, refer to symbols and words in parentheses.)

		Order	Operation	Trimmer	Indicators	Adjustment
Through-beam type	①				Green Red	With the target removed, set the trimmer to Max. With the receiver in place, move the transmitter up/down and right/left. Then set and secure the trimmer at the midpoint of the range in which the green LED indicator lights. Follow the same procedure to set and secure the trimmer of the receiver.
	②				Green Red	Turn the trimmer counterclockwise from the position of Max. and find point A at which the green LED turns off.
	③				Green Red	Set the trimmer midway between points A and B. Confirm sensor operation.

LIGHT-ON mode (When DARK-ON mode is specified, refer to symbols and words in parentheses.)

		Order	Operation	Trimmer	Indicators	Adjustment
Reflective type	①				Green Red	With the target removed, turn the trimmer clockwise and find point A at which the red LED indicator lights (turns off). [If the red LED does not light (turn off) even when the trimmer is turned to Max. take the position of Max. as point A.]
	②				Green Red	With the target in place, turn the trimmer counterclockwise and find point B at which the green LED turns off.
	③				Green Red	Set the trimmer midway between points A and B. Confirm sensor operation.

The optical system of the retro-reflective type sensor can be adjusted in the same manner as the through-beam type.

Specifications

Type	Through-beam	Retro-reflective (Polarized)	Retro-reflective (Transparent)	Diffuse-reflective (Long detecting distance)	Diffuse-reflective (Short detecting distance)
Model	PZ2-51	PZ2-61	PZ2-62	PZ2-41	PZ2-42
Detecting distance	7,000mm	2,500mm (with R-2)	500mm (with R-2)	600mm (200×200mm white mat paper)	100mm (100×100mm white mat paper)
Light source	Red LED				
Detectable object	Opaque materials (8mm×8mm max.)		Transparent and opaque materials		
Hysteresis				20% max. of detecting distance	
Sensitivity adjustment	By 1-turn trimmer (240°)				
Response time	1.5ms max.	1ms max.		1ms max. (2ms with different frequency*1 type)	
Operation mode	LIGHT-ON/DARK-ON (switch selectable)				
Indicators	Output, power supply*2: Red LED; Stable operation; Green LED				
Control output	NPN open-collector (PNP open-collector*3) 100mA max. (40V max.); Residual voltage: 1V max.				
Protective circuit	Reversed polarity, overcurrent protection, surge absorber				
Ratings	Power supply	12 to 24 VDC ±10% Ripple (p-p); 10% max.			
	Current consumption	Transmitter: 20mA max. Receiver: 25mA max.	35mA max.		
Environmental resistance	Degree of protection	IP-67			
	Operating illumination	Incandescent lamp: 5,000lux max. Sunlight: 20,000lux max.			
	Operating temperature	- 20 to + 55°C (no freezing)			
	Operating humidity	35 to 85%RH			
	Vibration resistance	10 to 55Hz, 1.5mm double amplitude in X,Y, and Z directions, 2 hours respectively			
	Shock immunity	1000m/s ² in X, Y, and Z directions, 6 times respectively			
Housing material	Reinforced glass resin				
Weight (including connector and 2-m cable)		Transmitter: Approx. 50g Receiver: Approx. 50g		Approx. 50g	

*1. "D" following the model number indicates different-frequency type. (Ex: PZ2-41D)

*2. The power indicator is equipped on the transmitter of the PZ2-51 only.

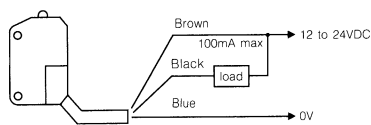
*3. "P" following the model number indicates PNP-output type. (Ex: PZ2-51P, PZ2-41DP)

Connections

Through-beam (receiver) retro-reflective, and diffuse-reflective types

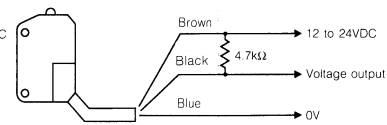
● NPN output

To drive current load



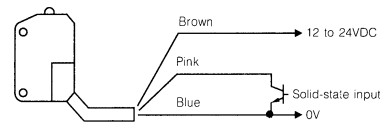
To drive voltage load

(low voltage for both LIGHT-ON and DARK-ON modes)



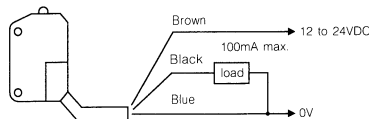
Through-beam type (transmitter)

Test input



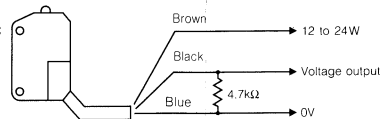
● PNP output

To drive current load



To drive voltage load

(at ON : high voltage)
(high voltage for both LIGHT-ON and DARK-ON modes)



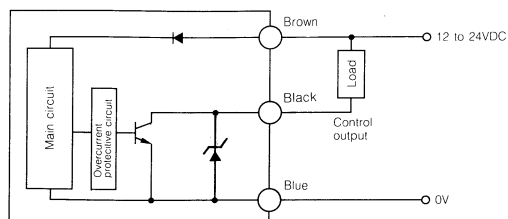
* The test input signal cannot be input with the PNP open-collector.

* If test input is not going to be used, cut off the yellow wire or connect it to the brown wire.

Output circuit

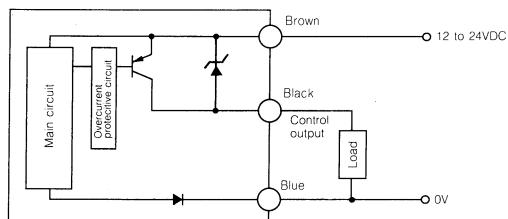
Through-beam type (receiver): PZ2-51
Retro-reflective type: PZ2-61, PZ-2-62
Diffuse-reflective type: PZ2-41, PZ2-42

NPN output

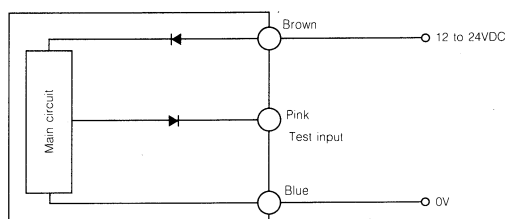


PZ2-51P, PZ2-61P, PZ2-62P, PZ2-41P, PZ2-42P

PNP output.



Through-beam type (transmitter): PZ2-51



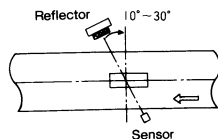
**Warning**

Do not use this product for the purpose of protecting the human body.

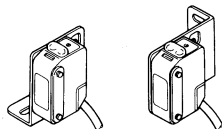
Transparent object detection (PZ2-62)

- When the surface of object is highly reflective and the detection is unstable or when detecting a highly transparent object, tilt the sensor and the reflector at the angle of 10° to 30° to the object surface as shown below.

- Be sure to fix the reflector tightly.



- Use the attached mounting bracket to mount the sensor. The sensor can be mounted in various ways depending on the installation site.

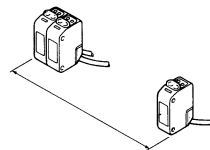


- Mount the sensor at a tightening torque of 0.5 Nm max.

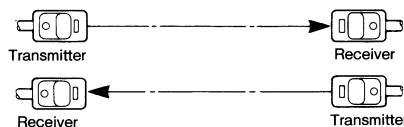
- Two diffuse-reflective type sensors (one a normal-frequency type, and the other a different-frequency type) can be installed side by side.

(The response speed of the different-frequency type is 2 ms.)

- Only two sensors can be installed side by side. To install three or more sensors, provide enough distance between the first and third sensors so that they do not interfere with each other.



- To install two or more through-beam type sensors side by side, alternate the transmitter and receiver. This limits the range of interference and stabilizes detection. If the detecting distance is short (2.5m max), interference can also be eliminated by using a slit plate.

**Polarized type (PZ2-61)**

- When the detection is unstable due to the object surface reflectiveness or the object reflector at the angle of 10° to 30° to the object surface as shown above.

Connections

- To ensure waterproofing, make sure that the cable connector is properly inserted and locked in the sensor head.

<To disconnect the cable connector>

- Release the locking device by pulling it up with a screwdriver.
- Remove the connector from the sensor head.

**<To connect the cable connector>**

- Insert the connector in the sensor head.
- Push down the locking device to secure the connector.



- Do not connect and disconnect the cable connector more than 15 times as this will not only damage the packing of the connector but also affect its waterproof capabilities.
- Do not apply undue force to the sensor cable. The sensor cable has a tensile strength of 50N per second.
- To extend the sensor cable, use a wire with a nominal cross-section of 0.3mm² or more. Limit the length of extension to within 100m.

Slit plate and polarizing filter (options) (A-3)

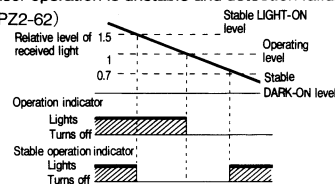
- The slit plate and polarizing filter are available as options for model PZ2-51 (P) through-beam type sensors. The slit plate is used to detect or position thin or small objects, while the polarizing filter prevents interference when sensors are installed side by side. The slit plate and polarizing filter may be mounted together on single sensor head.

- Three slit plates of different slit widths are included. Choose the correct slit plate according to the application.

Configuration	Slit plate only			Slit plate and polarizing filter		
Slit width (mm)	0.5	1	2	No slit plate	0.5	1
Detecting distance	500mm	800mm	1500mm	2500mm	200mm	400mm
Minimum detectable object	0.5×5mm	1×5mm	2×5mm	6×6mm	0.5×5mm	1×5mm

Stable operation indicator

When the received light quantity falls to between 70% and 150% of the operating level, the stable operation indicator (green LED) turns off to indicate that sensor operation is unstable and detection failure may occur. (Except for PZ2-62)

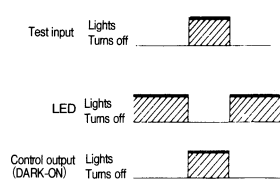


- If the stable operation indicator turns off, clean the lens surface and/or realign the optical axis so that the stable operation indicator lights again.
- Be sure to adjust the sensitivity so that the stability indicator (Green LED) lights when detecting a transparent object with PZ2-62.

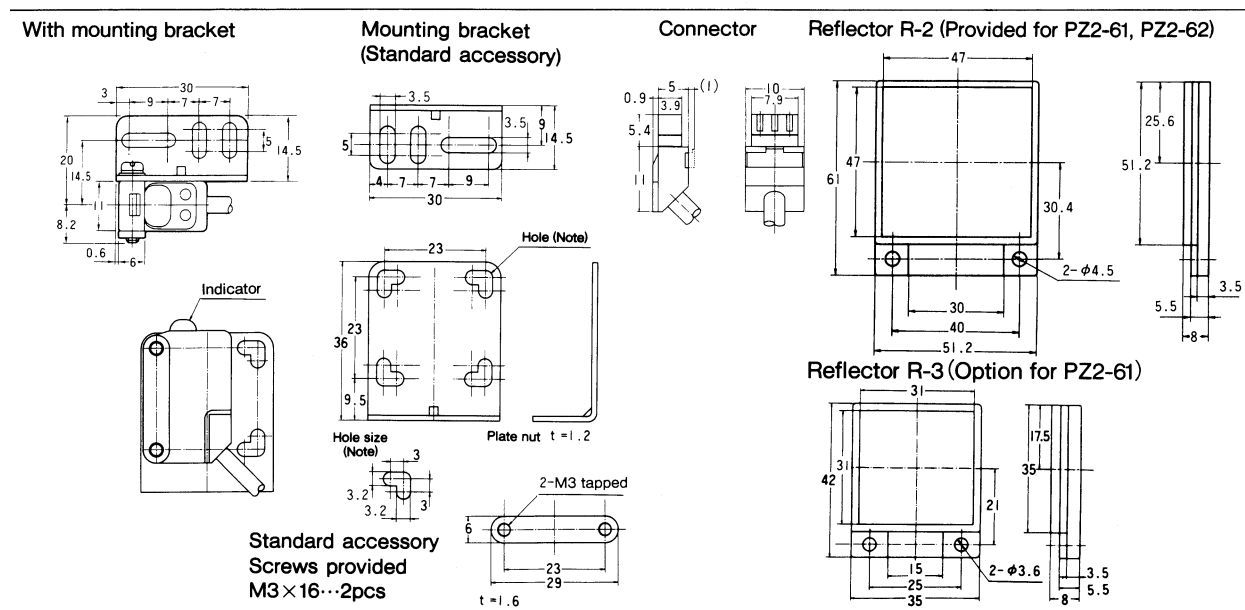
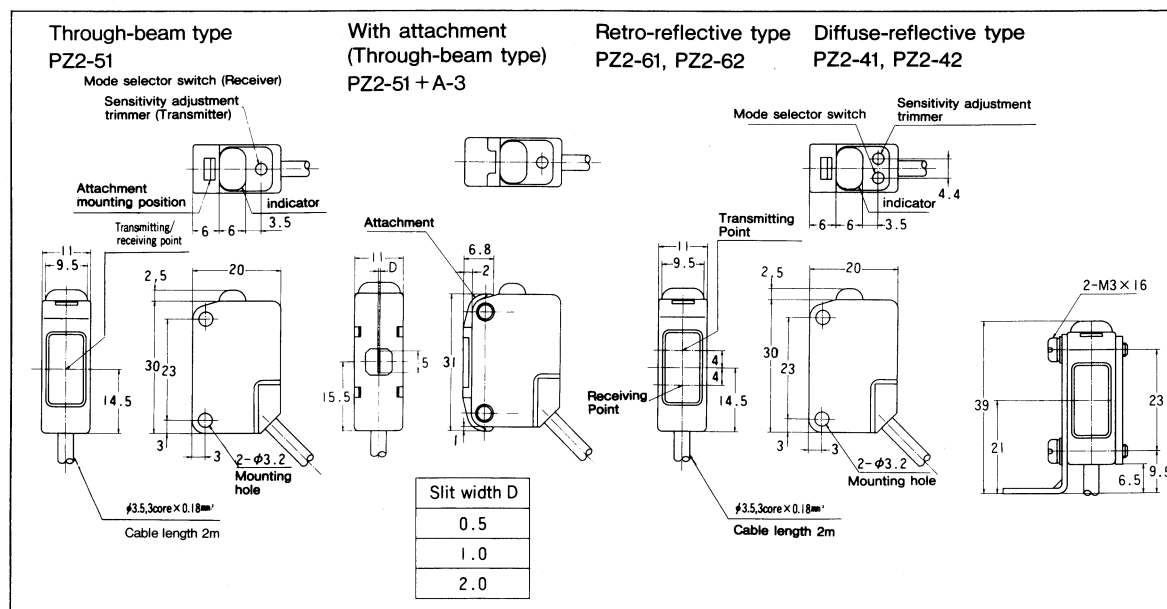
Test input

The beam of the PZ2-51 (P) sensor head can be interrupted by short-circuiting the pink (yellow) and blue (black) wires. This feature can be used to precheck the sensor's DARK-ON operation.

(The input signal must be at least 1.5ms.)

**Other**

- Handle the sensor carefully when mounting. Strong impact to the sensor may damage its operation, including its waterproof capabilities.
- Be sure to turn the sensitivity adjustment trimmer only within the specified range; otherwise its mechanism may be damaged.
- When using a commercially available switching regulator, ground its chassis grounding and earth grounding terminals independent of the PZ2 series sensor.
- Isolate the sensor wiring from power lines and high-voltage lines; otherwise the sensor may malfunction due to noise interference.



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Specifications are subject to change without notice.

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