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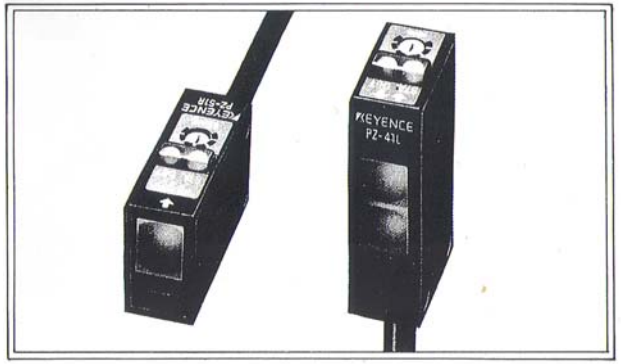
Find the *Keyence PZ-101* at our website: *Click HERE*

KEYENCE

**BUILT-IN AMPLIFIER PHOTOELECTRIC SENSORS**

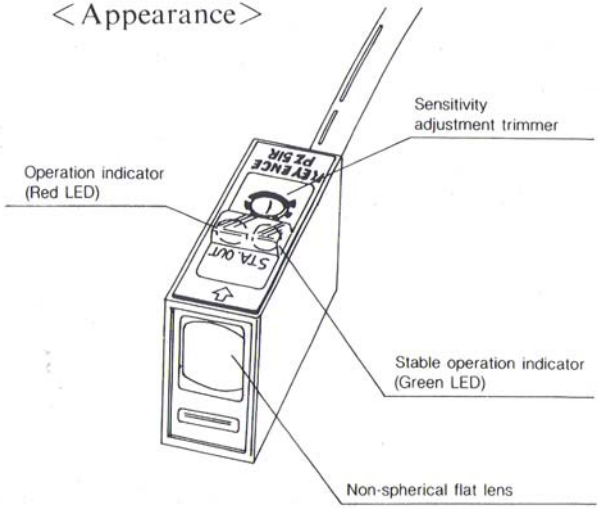
# PZ series

## INSTRUCTION MANUAL




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

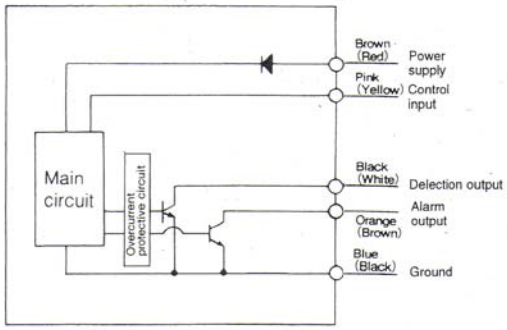
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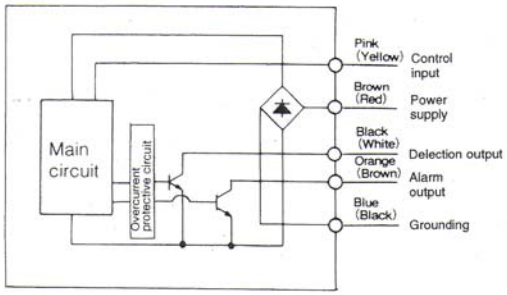

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## Circuit diagram

PZ-51 (L)




PZ-41 (L) • PZ-61 (L)
PZ-42 (L) • PZ-101




**CAUTION**

The color of sensor wire is changed according to the International Electro-technical Commission standards (IEC). Pay attention to the wire color when wiring.
Previous wire colors are shown below in ( ).

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# Hints on correct use

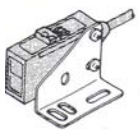
## Connections

- When using a commercially available switching regulator, ground its frame ground terminals.
- As generated noise may cause the sensor to malfunction, keep the sensor's wiring away from power lines and high-tension lines.
- To extend the sensor cable, use a wire having a conductor cross-section area of 0.3mm² (0.005 in²). Limit the length of the extension to within 100 m (109.4yd).

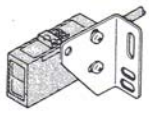
## Mounting

- Use the exclusive mounting bracket to install and mount the sensor. The sensor can be mounted in various ways depending on the installation site or the type of sensor.

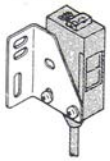
Example of mounting 1



Example of mounting 2

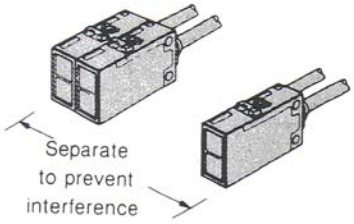


Example of mounting 3



- Mount the housing at a clamping torque of 0.5Nm {Approx. 5kgf·cm} max.
- Two diffuse reflection type or two retroreflective type sensors can be mounted side by side. Perform the wiring by referring to the Connection Diagrams.

* Note: Only two sensors can be mounted side by side. To mount three or more sensors, provide enough distance between the first and the third sensors so that they do not interfere with each other.



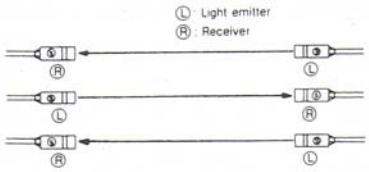

Note that if the sensor used is a different-frequency type, the response speed will be 2ms.

- When installing two or more through-beam type sensors side by side, position the light emitter and receiver alternately. This shortens the interference distance and stabilizes the detection.

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# Hints on correct use

If the detecting distance is short (within 50cm (2.0 ft)), mutual interference can also be eliminated by using a slit.



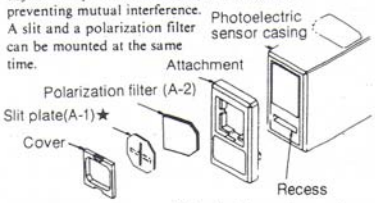

- The sensor (receiver) may be influenced by a strong light such as sunlight or a spotlight, or by a fluorescent light with a high-frequency ballast. Keep such light away from the directional angle of the sensor (receiver).

## Stable Operation Indicator

The stable operation indicator (green LED) lights when the amount of received light exceeds the operation level by 150%. If this indicator goes out, an erroneous detection may have occurred. When the amount of received light decreases below the operation level by 150% due to a stained lens or deviation of the optional axis, the stable operation indicator goes out. At the same time, an alarm signal is output.

## Slit(A-1), and Polarization filter(A-2)

A slit and a polarization filter come as options with the through-beam types, PZ-51 and PZ-51L. The slit (A-1) is used when detecting or positioning a thin or small object. The polarization filter (A-2) is used for preventing mutual interference. A slit and a polarization filter can be mounted at the same time.




Mount the attachment, polarization filter and cover in order shown in the above figure. The slit plate can be mounted such that the slit is positioned either vertically or horizontally.

★Three slit plates of varying slit width are included as standard. They are color-coded as follows: Select the appropriate plate for the detection being performed.

| Color | Slit width |
|---|---|
| Black | 0.5mm |
| Blue | 1.0mm |
| Gray | 2.0mm |

## CAUTIONS

- All models are waterproof (IP-67). However this does not mean that detection is possible under water or in rain.
- The housing and lens are made of policarbonate. Consult KEYENCE or our nearest distributor regarding the chemical resistance of the sensor.
- Do not turn the trimmer beyond the specified range (0 to 270°). Otherwise, it may cause malfunction in sensitivity adjustment.

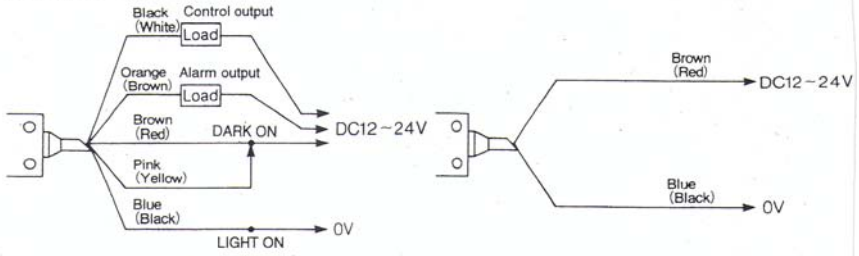
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# Connection diagram

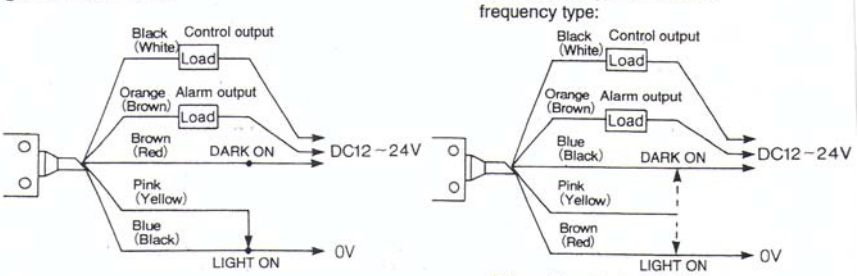
Through-beam type, receiver (R); Diffuse reflection type; Retroreflective type

Through-beam type, light emitter (T)

① DARK-ON Mode




② LIGHT-ON Mode




▶ When using diffuse reflection type or retroreflective type as different frequency type:



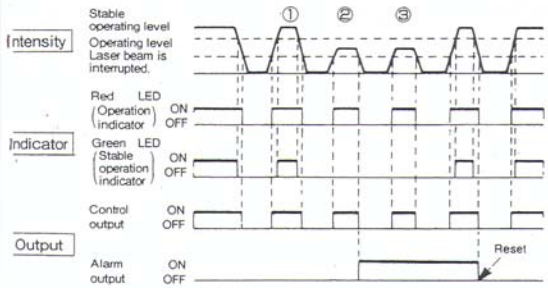

▶ Connect the pink wire to the blue wire to set the Dark-ON mode

▶ Connect the pink wire to the brown wire to set the Light-ON mode

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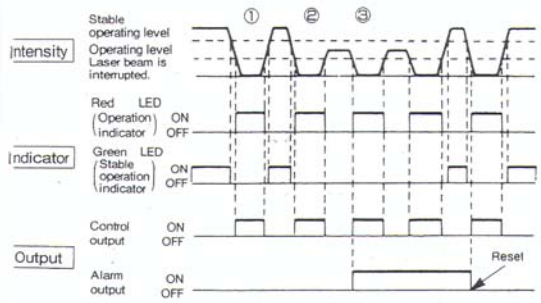
# Time Chart

Time chart (LIGHT-ON mode)




A sufficient amount of light is obtained for detecting the signal ①.
However, to detect the signal ②, the amount of light is insufficient. Accordingly, in this case, the Alarm output is activated.

Time chart (DARK-ON mode)




After detecting the signal ②, the signal ③ is detected below the stable operation level. In this mode, the Alarm output is activated.

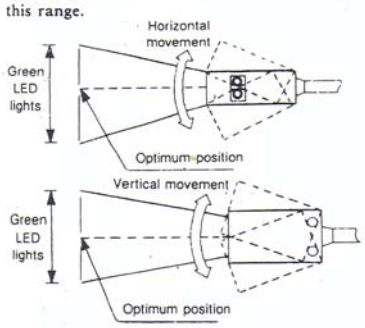
When the alarm output turns ON, clean the lens surface and/or realign the optical axis so that the stable operation indicator lights again. When the stable operation indicator lights, the alarm resets.

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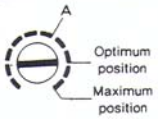
# Adjustment

## Through-beam type

① Turn the SENS. trimmer on the receiver clockwise to the maximum position (i.e., the rightmost position).
② Place the light emitter and receiver opposite each other at the specified distance between them. Secure the light emitter first so that the optical axis between them is aligned in a straight line.
③ Move the receiver horizontally and vertically to find the angular range within which the STA, indicator (green LED) lights. Fix the receiver at the center of this range.

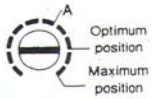



④ Gradually turn the SENS. trimmer counterclockwise until you locate position A, at which point the STA. indicator goes off.
⑤ Set the trimmer midway between position A and the maximum position.



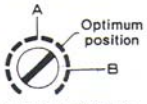

## Diffuse reflection type

① Place the object to be detected at the specified distance from the sensor head. Gradually turn the SENS. trimmer counterclockwise from the maximum position to find position A, at which point the STA. indicator goes off.
② Set the trimmer midway between position A and the maximum position.




**<With presence of background object behind object to be detected>**

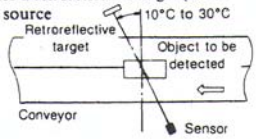
① Place the object to be detected at the specified distance from the sensor head. Gradually turn the trimmer clockwise from the minimum position (i.e., leftmost position) until you locate position A, at which point the STA. indicator lights.
② In the absence of the object to be detected, turn the trimmer further clockwise from position A unitl you locate position B, at which point the OUT indicator lights. If the OUT indicator does not light even when the trimmer is turned to the maximum position, assume the maximum position of the trimmer to be position B.




③ Set the trimmer midway between positions A and B.

## Retroreflective type

▶ The optical system of the retroreflective type sensor can be adjusted in the same manner as the through-beam type. When doing so, use a retroreflective target (reflective tape) as the light source with the sensor head serving as the receiver.




* If the object to be detected is glossy and thus causing excessive surface reflection, install the sensor titled 10° to 30° with respect to the vertical surface of the object.

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# Specifications

| Type | Through-beam | | Retro-reflective | | Diffuse-reflective (long detecting distance) | | Diffuse-reflective (short detecting distance) | | Diffuse-reflective (focused-beam) |
|---|---|---|---|---|---|---|---|---|---|
| | Straight | L-type | Straight | L-type | Straight | L-type | Straight | L-type | Straight |
| Model | PZ-51 | PZ-51L | PZ-61 | PZ-61L | PZ-41 | PZ-41L | PZ-42 | PZ-42L | PZ-101 |
| Maximum detecting distance | 7m | | 2.5m (with R-1) ※1 | | 60cm (20×20cm white mat paper) | | 8cm (10×10cm white mat paper) | | 100mm ※2 |
| Power supply | 12 to 24 VDC ±10%, Ripple(p-p):10% max. | | | | | | | | |
| Current consumption | Transmitter:20mA max. Receiver:25mA max. | | 30mA max. | | | | | | |
| Response time | 1.5ms max. | | 1ms max. (2ms when the PZ operates at a different frequency) | | | | | | |
| Operation mode | LIGHT-ON/DARK-ON(selectable by wiring) | | | | | | | | |
| Control output | NPN open-collector:100mA(40V) max.※5 (with overcurrent protective circuit) | | | | | | | | |
| Alarm output | NPN open-collector:50mA(40V) max. (with overcurrent protective circuit) | | | | | | | | |
| Light source | Infrared LED | | | | | | | | Red LED |
| Indicators | Output:Red LED, Stable operation:Green LED, Power supply:Red LED※3 | | | | | | | | |
| Degree of protection | IP-67 | | | | | | | | |
| Operating temperature | −20 to +55°C (no freezing) | | | | | | | | |
| Operating humidity | 35 to 85%RH | | | | | | | | |
| Housing material | Grass-fiber reinforced resin | | | | | | | | |
| Weight ※4 | Transmitter:approx. 60g Receiver:approx. 70g | | Approx. 75g | | | | | | |

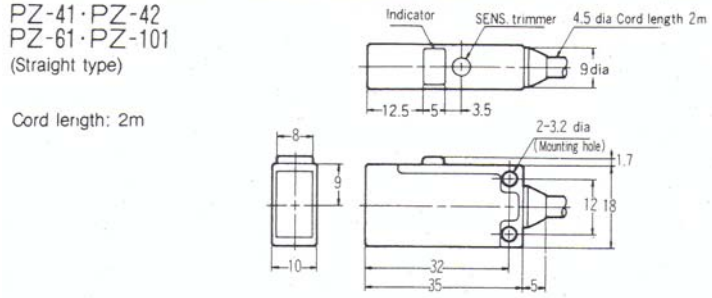
※1 The reflector must be placed at least 10cm from the sensor head.
※2 When the detecting distance is 50mm and 100mm, the beam diameter is 5mm and 7mm respectively.
※3 A power indicator is built-in to the transmitter of the through-beam type only.
※4 Includes a 2-m cable.
※5 PNP open-collector type is also available. For specifications, contact your nearest KEYENCE dealer.

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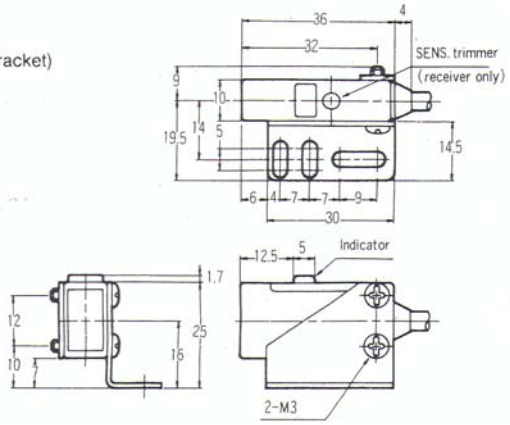
# Dimensions (Diffuse reflection and retroreflective types)

PZ-41·PZ-42
PZ-61·PZ-101
(Straight type)

Cord length: 2m




(With mounting bracket)





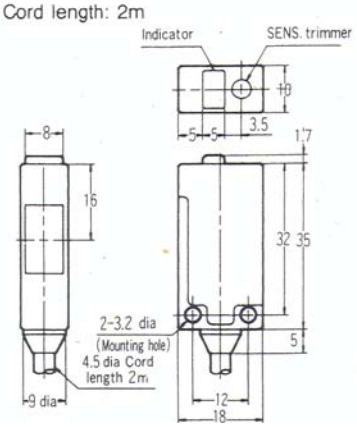


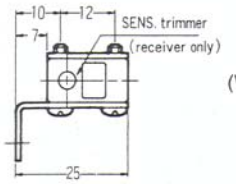
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# Dimensions (Diffuse reflection and retroreflective types)

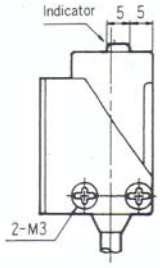
PZ-41L·PZ-42L
PZ-61L
(L-shaped type)

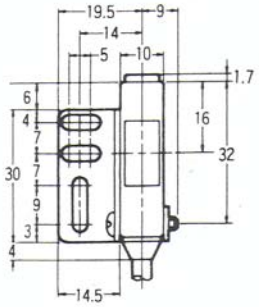
Cord length: 2m




(With mounting bracket)



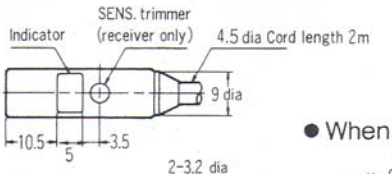




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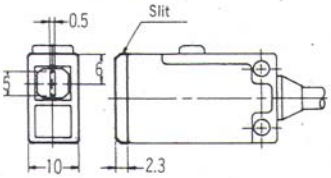
# Dimensions (Through-beam type)

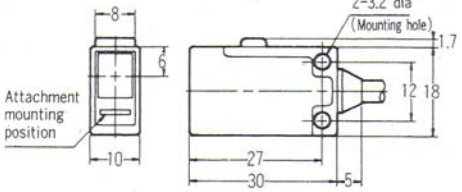
**PZ-51**
(Straight type)

Cord length: 2m

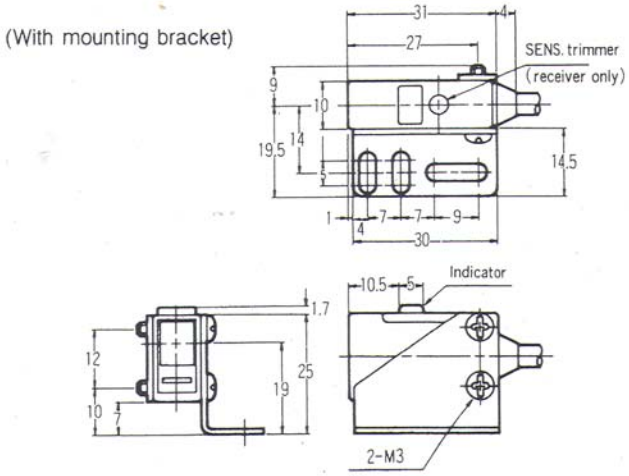



● When slit is mounted




(With mounting bracket)

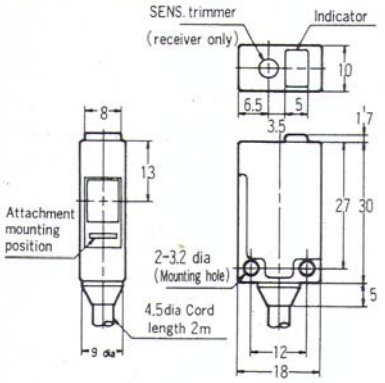



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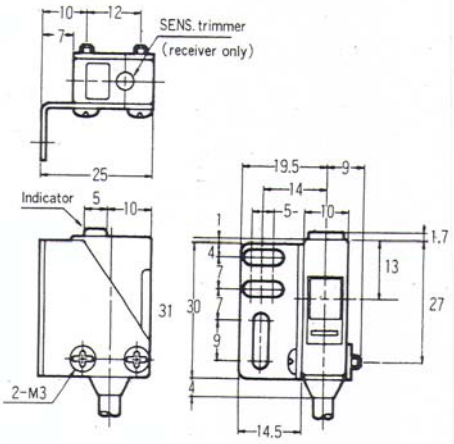
# Dimensions (Through-beam type)

## PZ-51L
(L-shaped type)

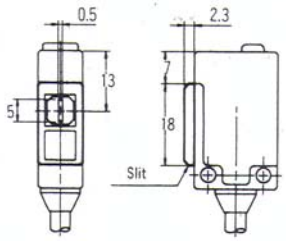
Cord lenght: 2m




(With mounting bracket)




● When slit is mounted

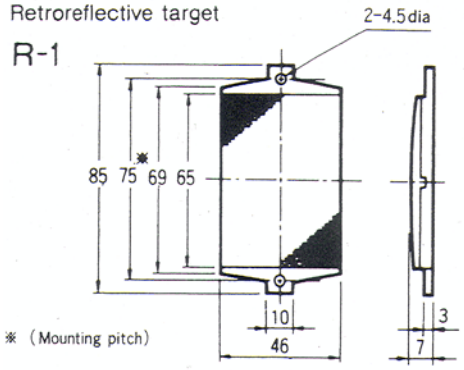



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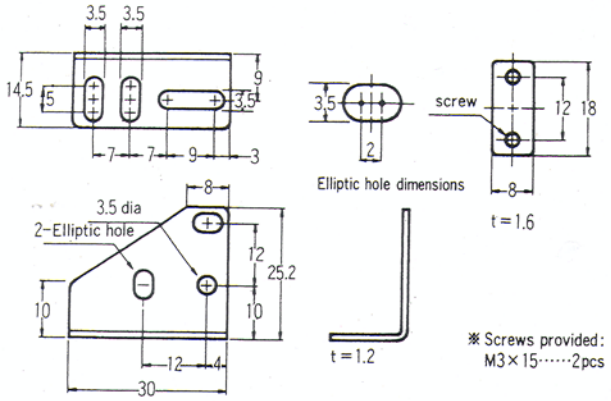
# Dimensions (Retroreflective target, mounting bracket)

Retroreflective target

R-1




Mounting bracket




*A reverse type mounting bracket is also provided for through-beam type.

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