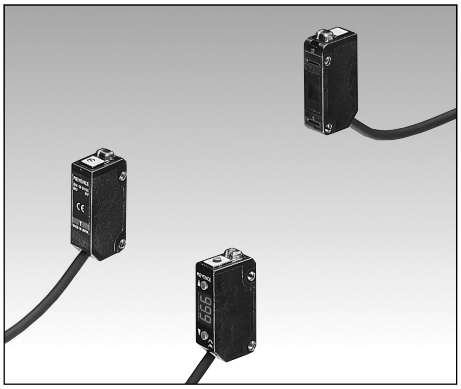
KEYENCE

96M0434

Self-contained Photoelectric Sensor
PZ-V/PZ-M

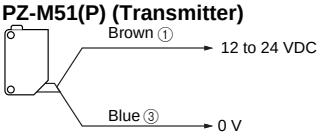
Instruction Manual



Connections

Circled numbers 1 to 4 represent the connector pin numbers.

PZ-M51(P) (Transmitter)



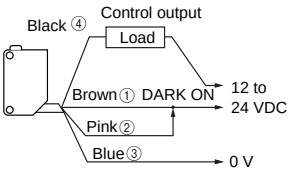
Pin arrangement for M12 connector

Pin arrangement for M8 connector

Pins ② and ④ are not used.

PZ-M51 (Receiver)/M61/M11/M31/M71/V11/V31/V71

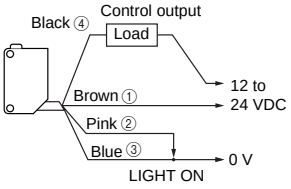
1. DARK-ON mode



Pin arrangement for M12 connector

Pin arrangement for M8 connector

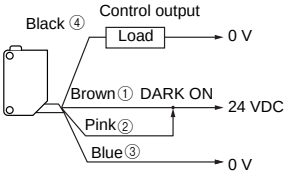
2. LIGHT-ON mode



* Be sure to connect the pink cable (output control) to the 12 to 24 VDC or 0 V terminal.

PZ-M51P (Receiver)/M61P/M11P/M31P/M71P/V11P/V31P/V71P

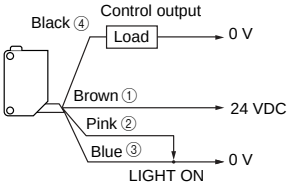
1. DARK-ON mode



Pin arrangement for M12 connector

Pin arrangement for M8 connector

2. LIGHT-ON mode

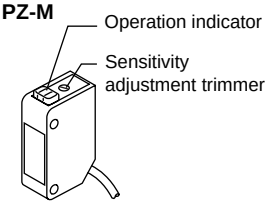


* Be sure to connect the pink cable (output control) to the 12 to 24 VDC or 0 V terminal.

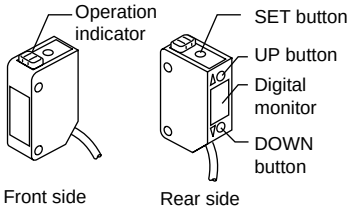
Note: The connector sensors will be released in the near future. Refer to “Model List” for the model of the connector sensor.

Part Names

PZ-M



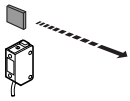
PZ-V



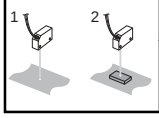
Sensitivity Adjustment

■ **PZ-V (Digital type)**

● **To detect a moving target (Fully-automatic calibration)**

Operation	Procedure	Adjustment
	1	Pass a target through the optical axis while pressing the SET button.
	2	Confirm that "SEt" flashes on the monitor.
	3	Release the SET button. The preset value flashes several times before the normal display appears.

● **To detect a stationary target (Two-point calibration)**

Operation	Procedure	Adjustment
	1	With no target, press the SET button and release it. "SEt" and the current distance flash alternately.
	2	With the target in place, press and release the SET button. The preset value flashes several times before the normal display appears.

● **To obtain maximum sensitivity (Maximum sensitivity setting)**

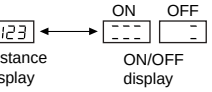
Operation	Procedure	Adjustment
	1	With no target, press the SET button for three seconds or more.
	2	Confirm that "SEt" flashes on the monitor.
	3	Release the SET button. The preset value flashes several times before the normal display appears.

Note: If the green LED turns off or " - - - " flashes after the calibration, the sensitivity has no allowance. In such a case, adjust the sensor head position, and calibrate again.

● **Fine sensitivity adjustment**

- When the ◁ or ▷ button is pressed and released, the numerical value flashes (approx. 2 seconds). This is the preset value. If the ◁ or ▷ button is pressed again while the preset value flashes, the preset value can be increased or decreased.
- When the ◁ or ▷ button is held down for 3 seconds or more, the preset value increases/decreases continuously.

● **Other functions**

Function	Operation	Description	Display
Display selection	Press the ◁ and ▷ buttons simultaneously and release them.	Change the display as shown on the right.	
Key-lock	Press the ◁ and ▷ buttons simultaneously for three seconds or more.	Lock the operation buttons to avoid the preset value from being accidentally changed .	LOC flashes and then the normal display appears.
Key-lock cancel	Press the ◁ and ▷ buttons simultaneously for three seconds or more.	Unlock the operation buttons to allow the preset value to be changed.	UNL flashes and then the normal display appears.

● **Distance display**

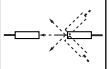
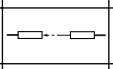
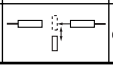
- The greater the distance between the target and the sensor head, the larger the displayed value becomes.
- If the target or background is out of the detectable range, 999 is displayed.

Note 1: The distance value indicates a reference value only. It is not an absolute distance.
Note 2: If the target approaches the sensor head closer than the specified range, the displayed value may increase.

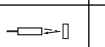
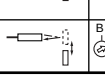
Sensitivity Adjustment

■ **PZ-M (Trimmer type)**

- **DARK-ON mode (When LIGHT-ON mode is selected, refer to the description in parentheses.)**

	Procedure	Operation	Trimmer	Indicators	Adjustment
Thrubeam type	1		 Max.	Green ☼ (☼) Orange ● (☼)	With the target in place, turn the trimmer to "Max." With the receiver in place, move the transmitter up/down and right/left. Set the transmitter at the midpoint of the range where the green LED is lit. Secure the transmitter and adjust the receiver position in the same way.
	2		 A Max.	Green ● (●) Orange ● (☼)	Turn the trimmer counterclockwise from Max. until the green LED turns off. Assume the position as Point A.
	3		 A Optimal position Max.	Green ☼ (☼) Orange ● (☼)	Set the trimmer midway between point A and Max. Confirm sensor operation.

- **LIGHT-ON mode (When DARK-ON mode is selected, refer to the description in parentheses.)**

	Procedure	Operation	Trimmer	Indicators	Adjustment
Multi-reflective type	1		 A	Green ● (●) Orange ☼ (●)	With no target, turn the trimmer clockwise until the orange indicator illuminates (turns off) and assume the position as Point A. If the LED does not illuminate (turn off) even with the trimmer at Max., use Max. as Point A.
	2		 A	Green ● (●) Orange ☼ (●)	With the target in place, turn the trimmer counterclockwise from Point A until the green LED turns off. Assume the position as Point B.
	3		 B Optimal position A	Green ☼ (☼) Orange ☼ (●)	Set the trimmer midway between points A and B. Confirm sensor operation.

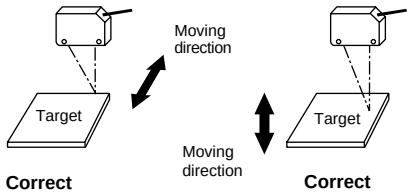
* The adjustment for the retroreflective type is the same as for the thrubeam type.

Mutual Interference

- The alternate-frequency type allows mutual interference suppression up to two sensors.
- The alternate-frequency type is not available for the thrubeam type.
- To suppress the mutual interference with the thrubeam type or with three or more sensors, contact KEYENCE.

Sensor Head Orientation

To detect a moving target, consider orientation of the sensor head according to the direction of the movement.



If you want to mount the sensor head in an orientation other than the above, contact KEYENCE.

Specifications

Type	Thrubeam	Retroreflective	Multi-reflective					
Model	**PZ-M51**	**PZ-M61** [1.]	**PZ-M11** [1.]	**PZ-M31** [1.]	**PZ-M71** [1.]	**PZ-V11** [1.]	**PZ-V31** [1.]	**PZ-V71** [1.]
Detecting distance [2.]	10 m	0.1 to 1.5 m (When R-5 reflector is used)	5 to 100 mm (10 x 10 cm white paper)	5 to 300 mm (10 x 10 cm white paper)	20 to 900 mm (30 x 30 cm white paper)	5 to 100 mm (10 x 10 cm white paper)	5 to 300 mm (10 x 10 cm white paper)	20 to 900 mm (30 x 30 cm white paper)
Setting distance	—	—	30 to 100 mm (10 x 10 cm white paper)	40 to 300 mm (10 x 10 cm white paper)	150 to 900 mm (10 x 10 cm white paper)	30 to 100 mm (10 x 10 cm white paper)	40 to 300 mm (10 x 10 cm white paper)	150 to 900 mm (10 x 10 cm white paper)
Light source	Red LED				Infrared LED	Red LED		Infrared LED
Sensitivity adjustment	1-turn trimmer (230°)					Automatic calibration		
Response time	1.5 ms max.	1 ms max. (1.2 ms max. with alternate-frequency type, 2 ms max. with M65 only [1.])						
Operation mode	LIGHT-ON/DARK-ON (selectable by wiring)							
Indicators [3.]	Output: Orange LED, Stable operation: Green LED							
Digital monitor	—					7-segment 3-digit red LED		
Control output	NPN open-collector 100 mA max. (30 V max.), Residual voltage 1 V max. PNP open-collector [4.] 100mA max. (26.4V max.), Residual voltage 1 V max.							
Protective circuit	Reversed polarity protection, Overcurrent protection, Surge absorbe							
Power supply	12 to 24 VDC ±10%, Ripple (P-P) 10% max							
Current consumption	T: 24 mA max. R: 27 mA max.	34 mA max.	30 mA max.		38 mA max.	37 mA max.		45 mA max.
Enclosure rating	IP-67							
Ambient light	Incandescent lamp: 5000 [5.] lux max., Sunlight: 20000 lux max							
Ambient temperature	-20 to +55°C (-4 to 158°F), No freezing							
Relative humidity	35 to 85%, No condensation							
Vibration	10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions, 2 hours respectively							
Shock	1000 m/s^2 in X, Y and Z directions, six times each							
Housing material	Glass-fiber reinforced resin							
Weight (including 2-m cable)	T: Approx.50 g R: Approx.55 g	Approx. 55 g			Approx. 70 g	Approx. 55 g		Approx. 70 g

1. The alternate-frequency type is indicated by replacing "1" at the end of model name with "5". The models are PZ-M65, M15, M35, M75, V15 V35 and V75.
2. The detecting distance is obtained with the maximum sensitivity.
3. The transmitter of the PZ-M51 features a power indicator only.
4. The PNP-output type sensor is suffixed with P after the model name.
5. 3000 lux max for the PZ-M71P/V71P.

■ Options

The optional slit plate and polarizing filter are available for the PZ-M51 thrubeam type. Model: A-4 (A set of three types of slit plates and a polarizing filter.)

	Slit plate		
Slit width (mm)	0.5	1	2
Detecting distance (mm)	500	1000	2000
Target size (mm)	0.5 x 5	1 x 5	2 x 5

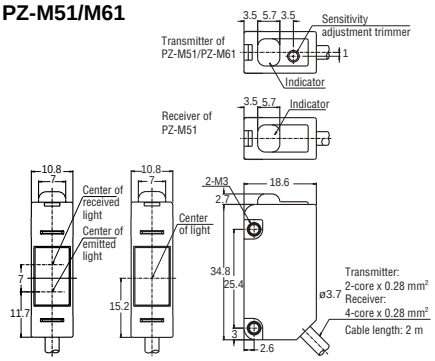
	Slit plate + Polarizing filter			
Slit width (mm)	No slit	0.5	1	2
Detecting distance (mm)	4000	200	600	1300
Target size (mm)	6 x 6	0.50 x 5	1 x 5	2 x 5

Model List

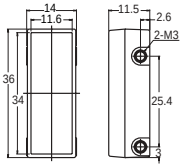
			Cable type	M8 connector type	M12 connector type
Thrubeam			PZ-M51	PZ-M52	PZ-M53
Retrorefrective			PZ-M61	PZ-M62	PZ-M63
Multi-reflective	**100 mm**	**Digital**	PZ-V11	PZ-V12	PZ-V13
		Trimmer	PZ-M11	PZ-M12	PZ-M13
	300 mm	**Digital**	PZ-V31	PZ-V32	PZ-V33
		Trimmer	PZ-M31	PZ-M32	PZ-M33
	900 mm	**Digital**	PZ-V71	PZ-V72	PZ-V73
		Trimmer	PZ-M71	PZ-M72	PZ-M73

Dimensions

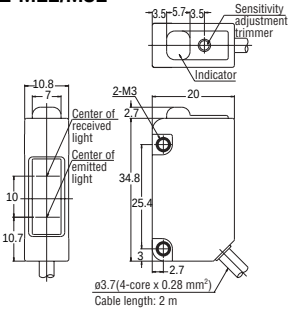
PZ-M51/M61



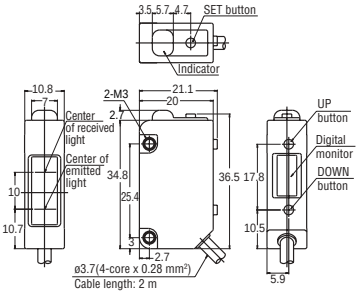
Reflector R-5 (Accessory for PZ-M61only)



PZ-M11/M31

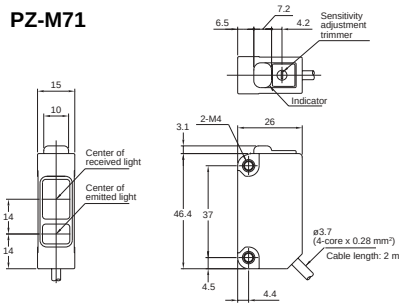


PZ-V11/V31

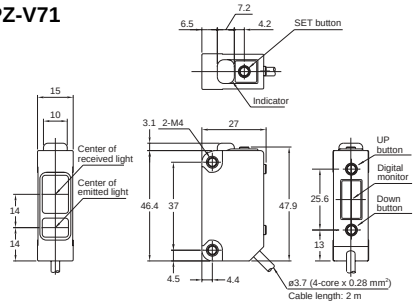


Special mounting bracket is optionally available. Contact KEYENCE for details.

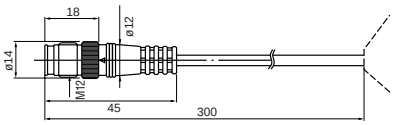
PZ-M71



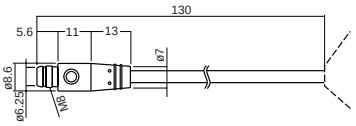
PZ-V71



M12 Connector type



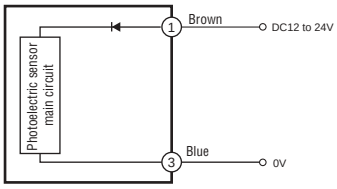
M8 Connector type



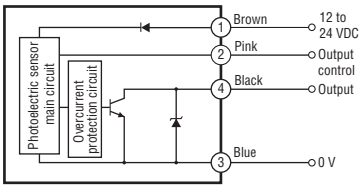
I/O Circuit

Circled numbers 1 to 4 represent the connector pin numbers.

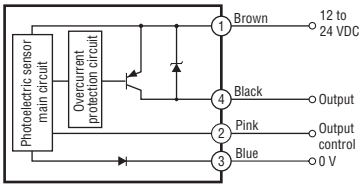
PZ-M51(P) (Transmitter)



PZ-M51 (Receiver)/M61/M11/M31/V11/V31



PZ-M51P (Receiver)/M61P/M11P/M31P/V11P/V31P



Hints On Correct Use

⚠ WARNING

- ***The PZ-V/PZ-M series is designed only to detect a target. Do not use it in a safety circuit to protect human body.***
- ***The PZ-V/PZ-M series does not have explosion-proof structure. Do not use it in the atmosphere where flammable gas, liquid or powder exists.***

- To extend the cable length, use a cable with at least a 0.3 mm² nominal cross-section area. Limit the length of cable extension to no more than 100 m.
- If the amplifier cable is placed together with power lines or high voltage lines in the same conduit, a detection error may occur due to noise interference, or the sensor may be damaged. Isolate the amplifier cable from these lines.
- When using a commercially available switching regulator, ground the frame ground terminal and ground terminal.
- Do not use the PZ-V/PZ-M series outdoors or in a place where extraneous light can enter the light-receiving surface directly.
- When the multi-reflective type is used for the detection of a target with high reflectivity (e.g. mirror-surfaced object), proper detection or distance adjustment may be disabled. In such a case, tilt the sensor head at some angle.
- During maximum sensitivity setting, the detecting distance may vary due to a difference in characteristics of each unit.
- Be sure to check that the wiring is properly established. Improper wiring may cause a decrease in sensitivity or overheating and sensor damage. (See “I/O Circuit”.)
- To mount the sensor, use an M3 screw (coarse thread). Limit the tightening torque to 0.6 N•m or less.
- To mount PZ-M71/V71, use an M4 screw (coarse thread). Limit the tightening torque to 0.7 N•m or less.
- To attach the R-5 reflector, use an M3 screw (coarse thread). Limit the tightening torque to 0.3 N•m or less.
- The displayed value may vary depending on the surrounding environment, such as temperature change or dust.
- Use a stable power supply. The sensor cannot operate properly if the power supply is unstable at power-on or if the ripple exceeds the specified range.

WARRANTIES (MUST ACCOMPANY THE PRODUCTS)

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0061-1 96M0434 Printed in Japan