

Self-contained Photoelectric Sensor

PR-G□B Series

User's Manual



Read this manual before using the product in order to achieve maximum performance.
Keep this manual in a safe place after reading it so that it can be used at any time.

The following symbols alert you to important messages.
Be sure to read these messages carefully.

WARNING	It indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	It indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Safety Information for PR-G□B Series

WARNING	- This product is only intended to detect object(s). Do not use this product to protect a human body or part of a human body. - This product is not intended for use as an explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere. - This product uses DC power. The product may explode or burn if an AC voltage is applied.
NOTICE	- Do not wire the sensor together with power lines or high voltage lines. If the sensor is wired together with power lines or high voltage lines, there is a risk of malfunction from noise or damage to the sensor. - When using a commercially available switching regulator, always ground the frame and ground terminal. - Do not use the sensor outdoors or in locations where ambient light hits the receiving surface.

Precautions on Regulations and Standards

■ UL Certificate

- This product is a UL/C-UL Listed product.
- UL File No.: E301717, Category: NRKH/NRKH7, Enclosure Type 1 (UL50)
- Be sure to consider the following specifications when using this product as an UL/C-UL Listed product.
- Use a power supply with Class 2 output defined in NFPA70 (NEC: National Electrical Code).
 - Power supply and control output circuits shall be connected to a single Class 2 source only.
 - Use with an over current protection device which is rated 30 V or more and not more than 2A.

■ CE Marking

Keyence Corporation has confirmed that this product complies with the essential requirements of the applicable EC Directive(s), based on the following specifications. Be sure to consider the following specifications when using this product in the Member States of European Union.

● EMC Directive (2004/108/EC)

- Applicable Standard EMI : EN60947-5-2, Class A / EMS : EN60947-5-2

These specifications do not give any guarantee that the end-product with this product incorporated complies with the essential requirements of EMC Directive. The manufacturer of the end-product is solely responsible for the compliance on the end-product itself according to EMC Directive.

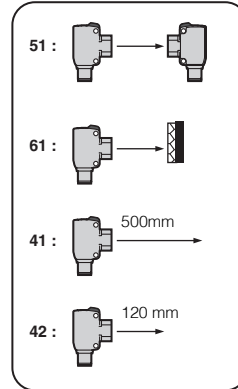
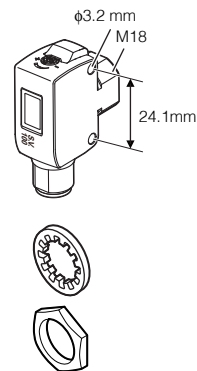
Packed Items

- PR-G sensor
- M18 nut, lock washer
- Instruction Manual

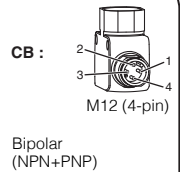
Interpreting the Part Number

PR-G 51 CB D
(1) (2) (3)

(1) Detection type



(2) Cable connection Output type

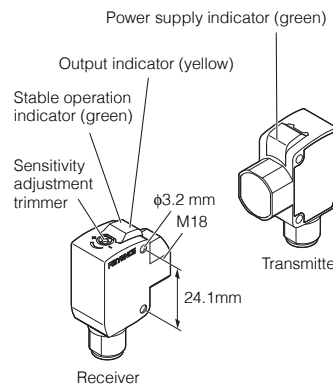


(3) Output operation

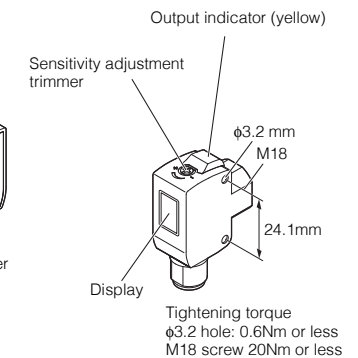
D : D.ON
L : L.ON

Sensor Head Components

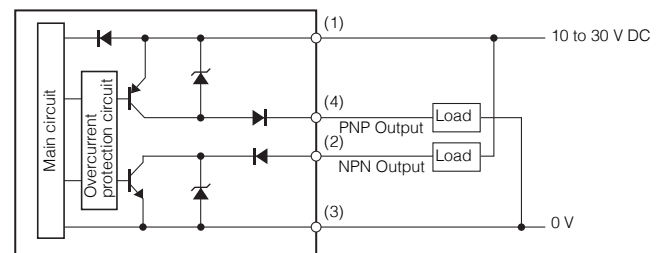
■ Thru-beam type



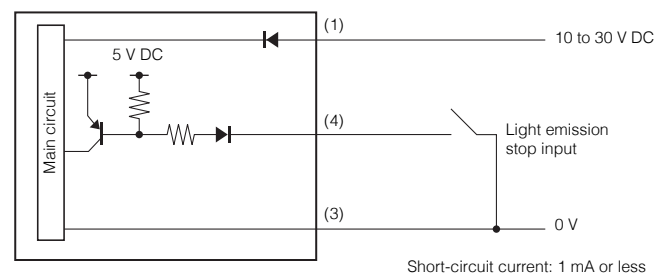
■ Reflective type, Retro-Reflective type



Wiring



■ Thru-beam type transmitter



Short-circuit current: 1 mA or less

■ Connector type pin layout

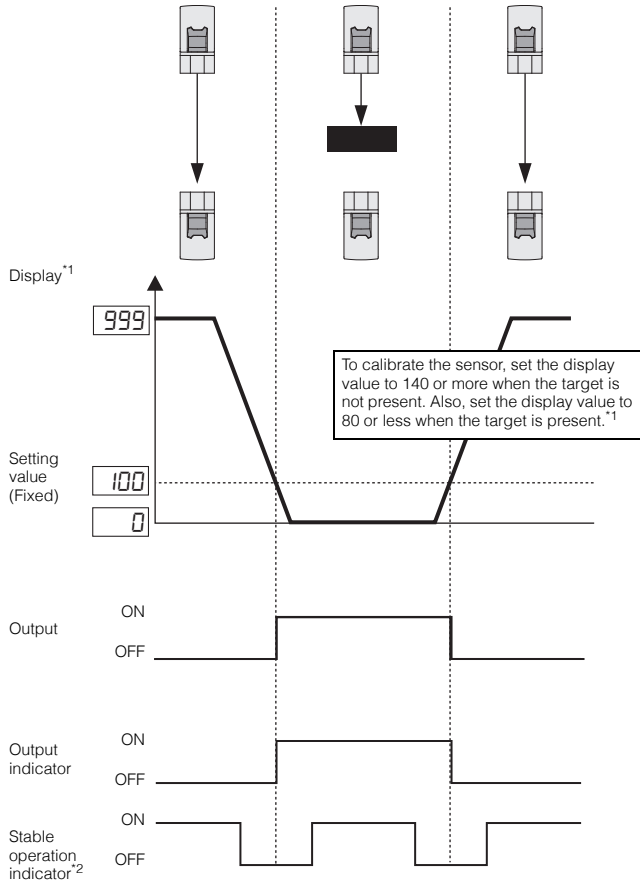
M12 connector (4-pin) type



The recommended tightening torque for the M12 connector is 0.8 Nm. Waterproof performance will decrease when the connection is loose, so tighten it with a tool.

Output and Indicator Operation

■ Thrubeam type, Retro-Reflective type

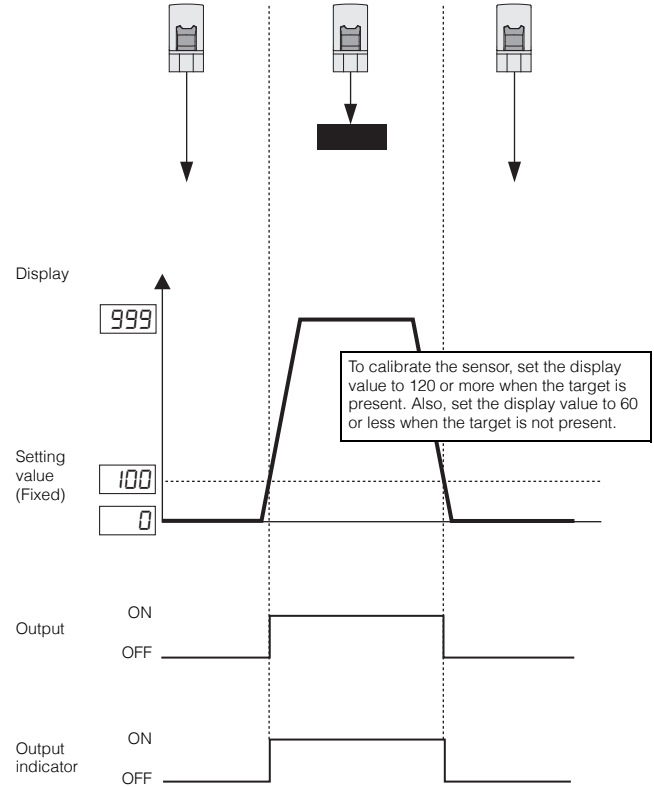


*1 There is no display for the thrubeam type.

*2

- There is no stable operation indicator for the Retro-Reflective type.
- The stable operation indicator on the thrubeam type turns on when stable incoming light is received and when light is stably blocked. Adjust the installation condition so that the stable operation indicator is always on. Rotate the trimmer as necessary to adjust the light reception sensitivity.

■ Reflective type



Troubleshooting

Problem	Cause	Check & Action
All indicators are off.	The power supply is not connected.	Connect the power supply.
The output indicators turn on and off, but output does not turn on or off.	Mistaken wiring.	Check the wiring of the output wires.
	The input device has been damaged. The sensor output has been damaged. Or an output wire is broken.	Try connecting the sensor output to another input device.
"E-L" appears on the display.	Current of 100 mA or more has passed through a control output	Check that the rated current for the input device has not exceeded 100 mA. Check that the output wires are not shorted with any other wires.
The output indicator is flashing.	Current of 100 mA or more has passed through a control output	Check that the rated current for the input device has not exceeded 100 mA. Check that the output wires are not shorted with any other wires.
	The sensor is affected by ambient light.	When there are light sources nearby (sensors, lighting, etc.), adjust the sensor installation.

Specifications

Body type		M18 Threaded type		
Type	Thrubeam	Retro-reflective	Diffuse reflective (Long distance)	Diffuse reflective (Short distance)
Model	PR-G51CBD	PR-G61CBD	PR-G41CBL	PR-G42CBL
Detection distance	30 m	0.1 to 4.2 m (when using R-2L)	500 mm	120 mm
Cable connection	M12 connector (4-pin)			
Number of control outputs	2 (NPN+PNP)			
Output operation	Dark-ON		Light-ON	
Response time	1 ms	0.5 ms		
Sensitivity adjustment	1-rotation trimmer (230°)	5-rotation trimmer		
Spot diameter	—	—	φ20 mm or less (at 300 mm)	Approx. φ3 mm (at 100 mm)
Light source	4 element, red LED (631 nm)	4 element, red LED (630 nm)	4 element, point light source, red LED (650 nm)	
Mutual interference prevention function	—	2 sensors		
Indicator	Transmitter: power supply indicator (green) Receiver: output indicator (yellow) stable operation indicator (green)	7 segment display (0 to 999), output indicator (yellow)		
Power supply voltage	10 to 30 V DC including 10% ripple (P-P)			
Power consumption	Transmitter: 450 mW or less (15 mA or less at 24 V, 15 mA or less at 12 V) Receiver: 360 mW or less (12 mA or less at 24 V, 15 mA or less at 12 V)	450 mW or less (15 mA or less at 24 V, 21 mA or less at 12 V)		
Control output	NPN + PNP open collector 30 V DC or less, 100 mA or less Residual voltage: 1.2 V or less at 10 mA or less, 2 V or less at 10 to 100 mA			
Light emission stop input	No voltage input Input time ON: 1 ms or more OFF : 20 ms or more	—		
Protection circuit	Power supply reverse connection protection, power supply surge protection, output overcurrent protection, output surge protection, output reverse connection protection			
Environment resistance	Enclosure rating**1	IP68 (IEC60529), IP69K (DIN40050-9), 4, 6, 13 (NEMA250)		
	Ambient light	Incandescent lamp 5,000 lx or less, sunlight: 20,000 lx or less		
	Ambient temperature	-20 to +70°C (No freezing)**2		
	Storage ambient temperature	-20 to 70°C		
	Ambient humidity	35 to 85% RH (No condensation)		
	Shock resistance	1,000 m/s ² , X, Y, Z each direction 6 times		
	Vibration resistance	10 to 55 Hz, double amplitude 1.5 mm, X, Y, Z each direction 2 hours		
	Insulation resistance	20 MΩ or more (500 V DC)		
	Withstand voltage	1,000 V AC 50/60Hz 1 min		
Material	Case: zinc die-cast (nickel-chrome-plated), indicator cover: PES, 7 segment display/lens cover: PMMA (Scratch-resistant coating) M18 nut: brass (nickel-plated), lock washer: steel (chrome-plated)			
Weight	Approx. 85g	Approx. 45g		
Accessory	Instruction Manual, M18 nut, lock washer			

*1 The enclosure rating for the connector type varies based on the cable that is used.

*2 When the ambient temperature is 60°C or higher, the device should be powered with no more than 24 VDC and 50 mA..

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