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Find the *Keyence LV-51M* at our website: ***Click HERE***

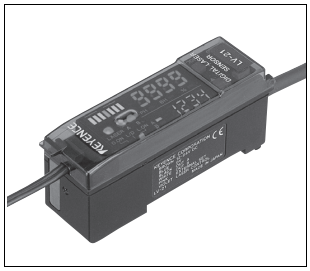
KEYENCE

96M11626

96M11626-4

General Purpose Digital Laser Sensor
LV Series

Instruction Manual



Safety Information for LV Series

WARNING	• This product is just intended to detect the object(s). Do not use this product for the purpose to protect a human body or a part of human body. • This product is not intended for use as explosion-proof product. Do not use this product in a hazardous location and/or potentially explosive atmosphere. • LV-H35F/H62F uses glass parts. Since there is the possibility of breakage in the case of dropping etc, take adequate care when handling. When pressure is placed on the glass portion (the main unit detection part, the reflective surface of the reflector), the waterproofing of the product may be damaged so please take great care.

Safety precautions on laser product

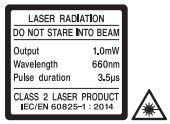
WARNING	• Use of controls or adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure. • The LV series product uses a laser diode as a light source.

Specifications of the laser diode change depending on the model.
Refer to the tables below.

Sensor head		LV-H32, H35, H37, H42, H47, H52, H62, H64, H65, H67, H35F, H62F, H100, H110, H300	LV-H41, H51
Wavelength		660 nm	785 nm
FDA	Laser class	Class II Laser Product	Class I Laser Product
	Output	3.0 mW	2.5 mW
IEC	Laser class	Class 2 Laser Product	Class 1 Laser Product
	Output	1.0 m	0.3 mW

■ Warning labels

• **IEC CLASS 2**



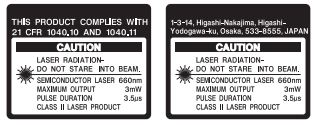
• **IEC (French) CLASS 2**



• **DIN Klasse 2**

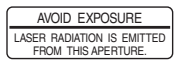


• **Laser CLASS II warning labels(FDA CLASS II)**



The FDA warning label has already been stuck.

• **Aperture label**



• **Protective housing label**

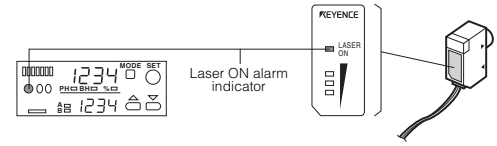


LV-H32 only

Safety features

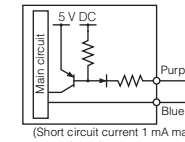
■ Laser ON alarm indicator

The laser ON alarm indicator will start flashing after power is turned on. The lamp will remain ON for as long as the laser light is emitting. This alarm indicator can be seen even when wearing protective goggles



■ Laser emission stop input (LV-21A/21AP/51M/51MP/11A)

Laser emission can be stopped by short-circuiting between the purple and blue (GND) wires when LV-21A, LV-51M or LV-11A used. When LV-21AP or 51MP is used, short-circuit between the purple and brown (12 to 24 V DC) wires to stop laser emission.

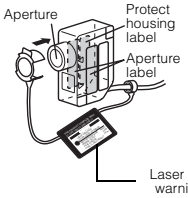


(Short circuit current 1 mA max.)
LV-21A/11A/51M

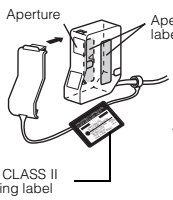
■ Label location

Warning labels are attached to the sensor head, as shown below.

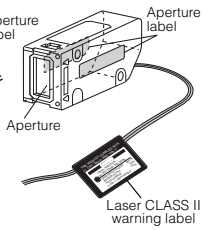
• **LV-H32**



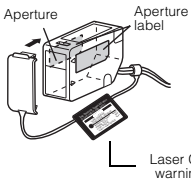
• **LV-H37/H47**



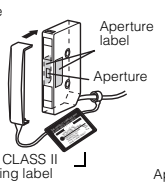
• **LV-H100 (Transmitter side)/ H110 (Transmitter side)**



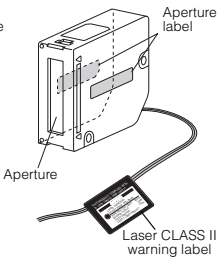
• **LV-H42**



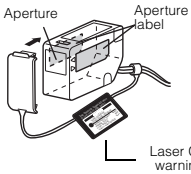
• **LV-H52**



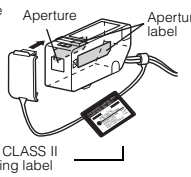
• **LV-H300 (Transmitter side)**



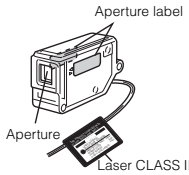
• **LV-H35/H62/H67**



• **LV-H64/H65**



• **LV-H35/H62/H67**



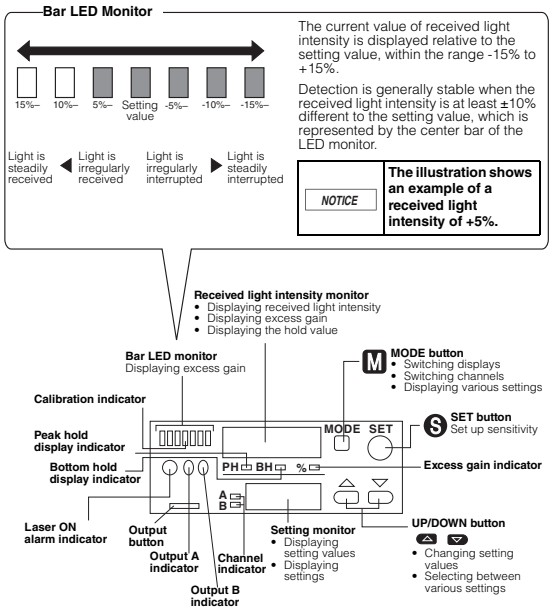
■ Safety consideration

WARNING	• Follow the instructions mentioned in this manual. Otherwise, injury to the human body (eyes and skin) may result. • Do not disassemble this product. Laser emission from this product is not automatically stopped when it is disassembled. Precautions on Class I/1 Laser Products • Do not stare into the direct or specularly reflected beam. Precautions on Class II/2 Laser Products • Do not stare into the direct or specularly reflected beam. • Be careful of the path of the laser beam. If there is a possibility that the operator may be exposed to the specular or diffuse reflections, block the beam by installing a protective enclosure. • Install this produ so that the path of the laser beam is not as the same height as that of human eye.

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Part Names

Amplifier



Sensor head

■ Bar LED monitor (sensor head)

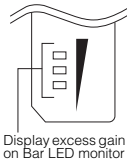
When A, which is closer to the amplifier, is ON, the monitor displays the excess gain of output A. When B is ON, the monitor displays the excess gain of output B.

Bar Graph LED monitor (Interlocked with amplifier)

Light is steadily received +10% –
Setting value
Light is steadily interrupted -10% –

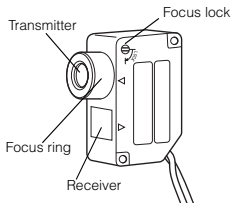
The indicator turns on according to the difference between the received light intensity and the setting value. The current level of detection stability can be determined from this difference.

If detection becomes unstable (light cannot be "steadily received" or "steadily interrupted") due to a change in the surroundings or the target, or for any other reason, readjust the sensitivity.

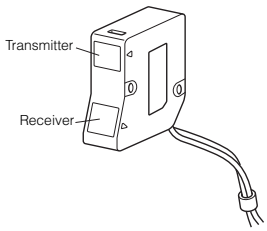


■ LV-H32

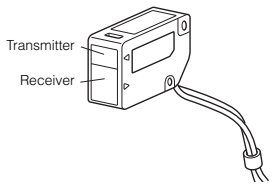
Adjust the beam spot size by turning the focus ring. After completing the adjustment, fix by turning the focus lock screw.



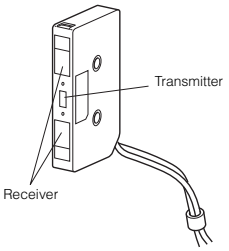
■ LV-H37/H47



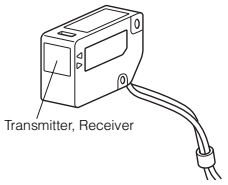
■ LV-H41/H42



■ LV-H51/H52



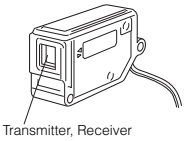
■ LV-H35/H62/H67



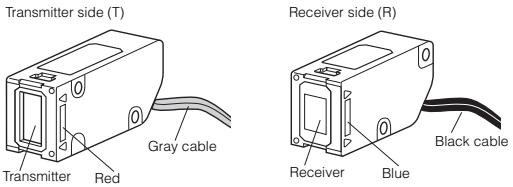
■ LV-H64/H65



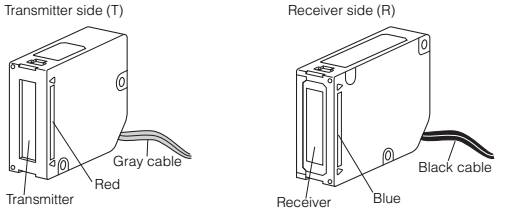
■ LV-H35F/H62F



■ LV-H100/H110



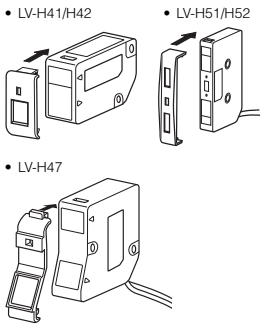
■ V-H300



Slit for sensor head (Option for LV-H41/H42/H47/H51/H52)

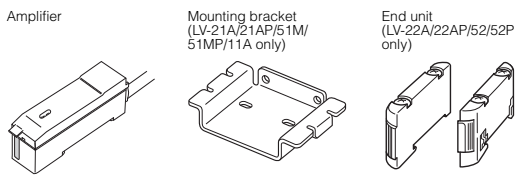
Use in accordance with the distance and target.

- Attaching the slit
  Attach the slit to the transmitter
- Removing the slit
  Remove the slit by lifting up the pin on the slit with a screwdriver.



Accessories

Amplifier



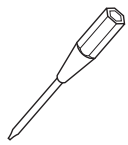
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Sensor head

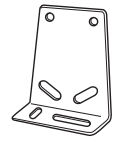
■ LV-H32



Plastic driver

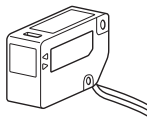


Mounting bracket



Mounting bracket
main body
Board nut
M3 x 18 screw:2

■ LV-H35

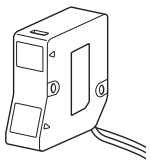


Mounting bracket



Mounting bracket
main body
Board nut
M3 x 18 screw:2

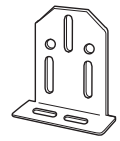
■ LV-H37



Magnifying glass

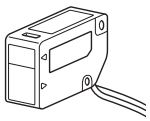


Mounting bracket

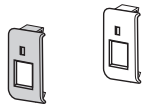


Mounting bracket
main body
Board nut
M3 x 18 screw:2

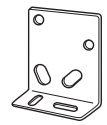
■ LV-H41/H42



Slit (black, gray)

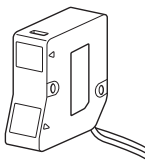


Mounting bracket

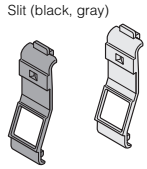


Mounting bracket
main body
Board nut
M3 x 18 screw:2

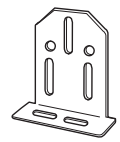
■ LV-H47



Slit (black, gray)

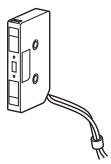


Mounting bracket



Mounting bracket
main body
Board nut
M3 x 18 screw:2

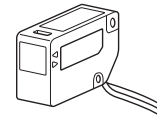
■ LV-H51/H52



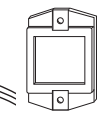
Slit



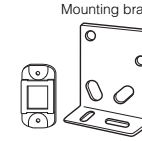
■ LV-H62



Reflector

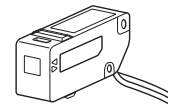


Mounting bracket



Mounting bracket
main body
Board nut
M3 x 18 screw:2

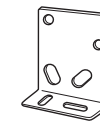
■ LV-H64/H65



Reflector

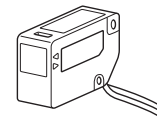


Mounting bracket



Mounting bracket
main body
Board nut
M3 x 18 screw:2

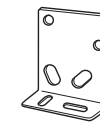
■ LV-H67



Reflector

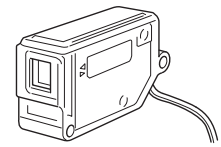


Mounting bracket



Mounting bracket
main body
Board nut
M3 x 18 screw:2

■ LV-H35F/H62F



Reflector



Supplied only with
LV-H62F

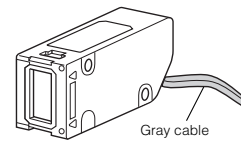
Mounting bracket



Mounting bracket
main body
Board nut
M3 x 22 screw:2

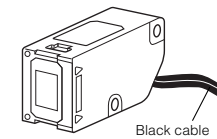
■ LV-H100/H110

Transmitter side (T)



Gray cable

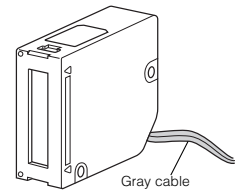
Receiver side (R)



Black cable

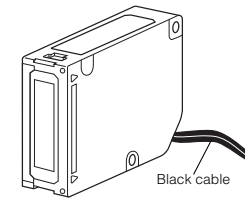
■ LV-H300

Transmitter side (T)



Gray cable

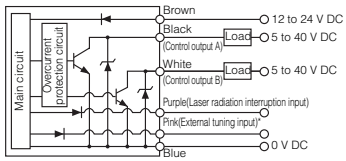
Receiver side (R)



Black cable

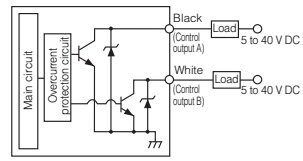
Input/Output Circuit Diagram

● LV-11A/21A/51M



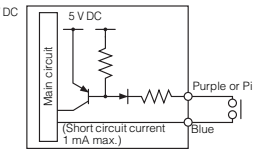
* LV-51M (monitor output) only is orange.

● LV-22A/52

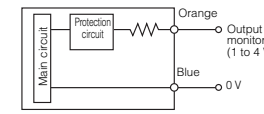


● Laser radiation interruption (Main unit only) External tuning input circuit diagram

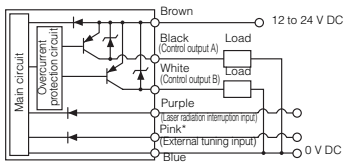
LV-21A/11A/51M



● Analog output circuit diagram for monitor (LV-51M/51MP)

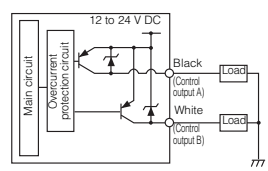


● LV-11A/21A/51M

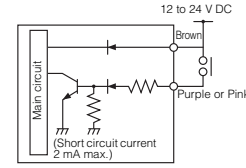


* LV-51MP (monitor output) only is orange.

● LV-22A/52



LV-21A/11A/51M

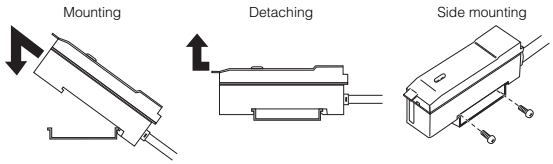


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Mounting Amplifiers

■ Mounting and detaching amplifiers to and from the DIN rail mounting bracket

Hook the claw on the rear of the amplifier onto the mounting bracket of the DIN rail, then hook the front claw on the bracket while pressing the amplifier forward. To detach the amplifier, unhook the front claw by simultaneously lifting and pushing the amplifier forward.



■ Mounting additional amplifiers

The number of expansion units that can be mounted to the side of main unit (LV-11A/21A/51M) is as shown below.

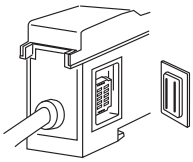
Up to 7	LV-22A, LV-52, AP-V42
Up to 14	FS-T2/M2/V12/V22/PS-T2/ES-M2

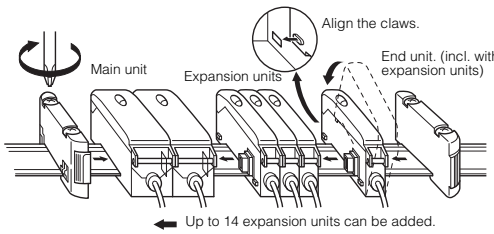
1 **Remove the protective cover on the side of the amplifier.**

2 **Mount expansion units one by one to the DIN rail.**

3 **Slide one expansion unit toward the main unit or other unit. Align the front claws of the units and push them together until you hear a click.**

4 **Secure the units together by pushing the end units (included with the expansion unit) from both sides.**


Remove the protective cover



* The sticker on the right is included with the expansion unit. Attach this sticker near the amplifier.



■ Detaching amplifiers

1 **Take off the end unit.**

2 **Slide the expansion units. Remove them one by one from the DIN rail.**

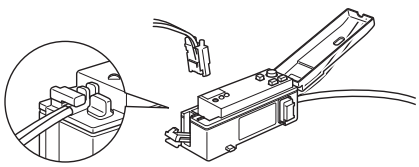
▶ Important

- **When connecting several amplifiers, always use a DIN rail and end unit.**
- **Take care to turn the power off before connecting/ disconnecting amplifiers.**
- **Do not remove the protective cover from the expansion connector of the outermost unit.**
- **Do not detach multiple units from the DIN rail while they are still connected to each other.**
- **If several units are connected, check that the ambient temperature is appropriate. “Specifications” (page 8).**

Mounting the Sensor Head

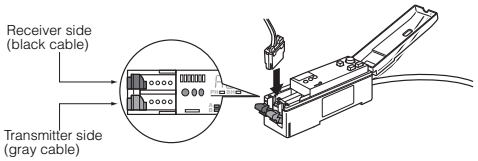
■ Mounting the reflection type

1 **Insert the connector into the amplifier and lock it with the lever. Pass the cable underneath the lever and close the dust cover.**



■ Mounting the transmission type

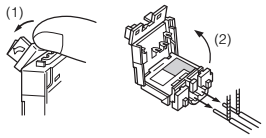
1 **Insert the two connectors into the amplifier unit and lock them with the lever. Insert the transmitter side connector (with gray cable) into the light gray lever side, and insert the receiver side connector (with black cable) into the dark gray lever side. Route the cable underneath the lever and close the dust cover.**



To shorten the sensor head cable

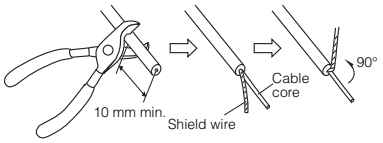
Point **When the cable length of the sensor head is changed, be sure to connect the amplifier to check that it operates correctly.**

1 **Push the upper tab of the connector in the direction of arrow (1) and open it in the direction of arrow (2) to remove the cables.**

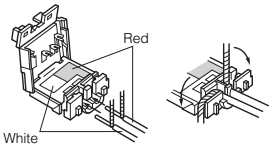


2 **Cut the cables to the appropriate length, and manipulate the end of the cables as shown in the figure below.**

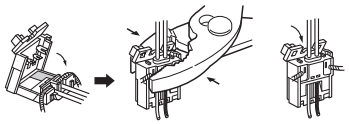
- Twist the silver shielded wire about five times so it does not ravel, and bend it 90° to the side.



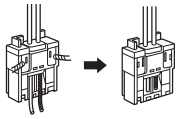
3 **Insert the cable with the shield wire bent at 90°C, then bend the shield wire in the direction of the arrow along the groove. Match the color of the connector to the color of the shield wire.**



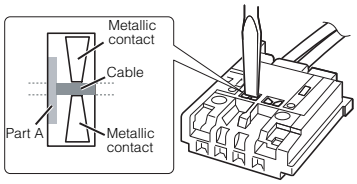
4 **Close the connector, and lock it by pushing down the top.**



5 **Using nippers or a similar tool, trim the wires sticking out from the connectors.**



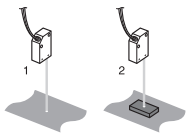
Point **Do not install the connectors more than two times. If the installation exceeds twice, purchase OP-27934 separately. If "brk" appears on the amplifier even when using pliers to crimp the connector, press the cable (part A) between the metallic contacts with a thin tool such as a flathead screwdriver to crimp the cable more firmly.**



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Sensitivity Adjustment

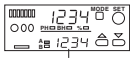
■ Two-point tuning



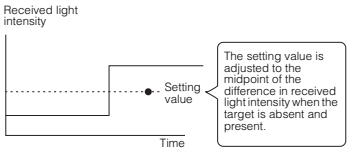
1 **With no target in place, press the Ⓢ button lightly.**



2 **Put a target in place and press the Ⓢ button again lightly.**



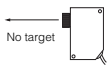
The setting value is displayed.



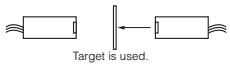
■ Maximum sensitivity setting

For the reflection type sensor, adjust the sensitivity without using target. For the transmission type sensor, adjust the sensitivity by using target.

Reflection type



Transmission type



1 **According to the directions on the left, press the Ⓢ button for 3 seconds or more.**

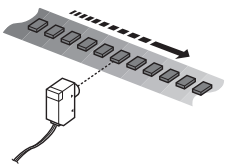


2 **Confirm that the calibration indicator (orange LED) and setting monitor (green LED) are flashing.**



3 **Release the Ⓢ button.**

■ Automatic tuning

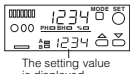


1 **Pass a target through the optical axis while pressing the Ⓢ button.**

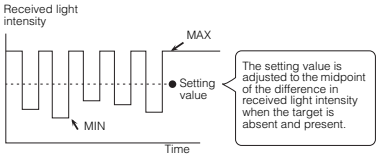
2 **Confirm that the calibration indicator (orange LED) and setting monitor (green LED) are flashing.**



3 **Release the Ⓢ button.**

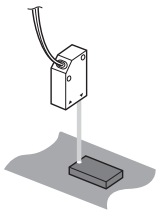


The setting value is displayed.



If the setting does not work well, perform the two-point tuning.

■ Positioning tuning



1 **With no target in place, press the Ⓢ button lightly (orange LED lights up).**

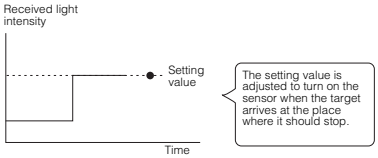


2 **Place a target in the position where it should stop.**



3 **Press the Ⓢ button for 3 seconds or more until the calibration indicator (orange LED) and setting monitor (green LED) are flashing.**





Differentiation Mode (page 6)

■ Setting sensitivity

Quickly press Ⓢ once, to set sensitivity to its maximum value.
Perform fine-tuning adjustments using ▲ or ▼, or refer to the details on hold display below.

■ Received light intensity monitor

The received light intensity monitor displays the amount of differentiation. Use hold mode switching with hold display ON.

■ Output state

	⌐‾d UP edge	⌐_d DOWN edge
D.ON	N.C. output	N.C. output
L.ON	N.O. output	N.O. output

Reference

Differentiation Mode Detection (UP/DOWN edge)
Detects only sudden changes in received light intensity within a certain time interval.

- UP edge detection : Output is turned ON when light intensity increases by more than the setting value within a fixed time interval.
- DOWN edge detection : Output is turned ON when light intensity decreases by more than the setting value within a fixed time interval.

To achieve stable detection in differentiation mode, changes in received light intensity resulting from the presence or absence of the target must be greater than the changes in received light intensity resulting from dust or vibration.

Fine Adjustment of Setting Values

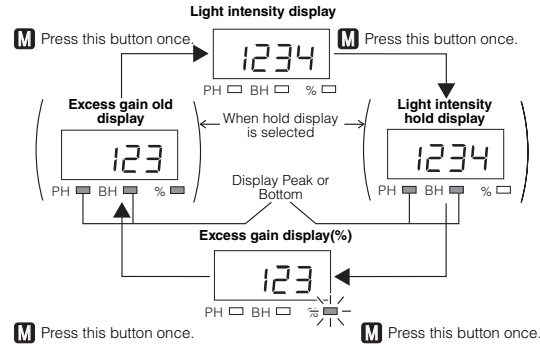
The values displayed on the calibration LED monitor can be changed by pressing ▲ (to increase sensitivity) or ▼ (to decrease sensitivity). This allows you to fine-tune your setting values.

Point

If you press the Ⓢ button accidentally while performing a fine adjustment of your setting values, a sensitivity calibration will start automatically and prevent you from continuing your fine adjustment until the calibration is completed. If this happens, press the Ⓢ button again to cancel the setting and start your fine adjustment again.
The value may not change by 1 digit during fine-tuning adjustments. This is not a malfunction.

Selecting Display Modes

The display changes each time the Ⓜ MODE button is pressed.
The received light intensity/excess gain hold display appears only after peak/bottom hold is selected in the hold mode.



For more information about hold display, refer to "Mode Setting" (p. 6).
You cannot select the excess gain display when the standard light intensity is set.

- **Setting value display**
  Displays setting value.
- **Received light intensity display**
  Displays received light intensity.
- **Excess gain display**
  Shows the received light intensity as a percentage of the setting value (setting value = 100%).
  This display cannot be shown when the standard light intensity display is selected.

Point

The displayed value for excess gain is 0 when the excess gain is less than 1%.

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Mode Setting

If you press the M button for three seconds or more when either Light intensity hold display 1234 or Received light intensity 1234 is displayed, you can display the values of various settings.
Each setting can be adjusted separately for channel A and channel B.

Reference When the M button is pressed for 3 seconds or more during mode setting, the display returns to the received light intensity display.

1. Initial display

Press M for three seconds or more.

2. Selecting power mode

Press M once lightly.

2. Switching power mode:(A/B for both outputs A and B)

Select a power mode to use for ▲ or ▼.

- FINE — Set to this mode for detecting high-speed targets.
- TURBO — Set to this mode for regular detection work.
- SUPER — Set to this mode when there is insufficient light.

Be sure to adjust the sensitivity again after switching POWER mode.

3. Selecting detection method

Press M once lightly.

3. Switching detection mode:(Skipped during the standard light intensity setting is in progress.)

Select a detection mode to use for ▲ or ▼.

- STANDARD 1 — Set this mode for regular detection work.
- STANDARD 2 — Use this mode to increase hysteresis.
- DIFFERENTIATION (UP edge detection) — Detects the UP edge of received light change.
- DIFFERENTIATION (DOWN edge detection) — Detect the DOWN edge received light change.

Differentiation Mode Detection (page 5)

4. Selecting display shift

Press M once lightly.

4. Switching display shift

By pressing S once, the received light intensity display will shift to a value of 0. Also, fine adjustments of display shift can be done using ▲ or ▼.

Received light intensity after shift

Amount of shift

NOTE Setting values will also shift.

*To set the shift value to 0, press ▲ and ▼ together.

5. Selecting hold mode

Press M once lightly.

5. Hold mode switching

Select a hold mode to use for ▲ or ▼.

- NO HOLD — Display is not held
- PEAK HOLD — Peak value is held on the display
- BOTTOM HOLD — Minimum value is held on the display

6. Selecting timer mode

Press M once lightly.

6. Switching timer mode

Select a timer mode to use for ▲ or ▼.

- NO TIMER — Set to this mode for regular detection work.
- OFF DELAY — Use for output OFF delay
- ON DELAY — Use for output ON delay
- ONE SHOT — Use for one-shot output

Selecting no timer

7. Timer setting

Press M once lightly.

7. Timer setting

Set the timer for ▲ or ▼.

Min. 1 ms to max. 9999 ms

*LV-51M/52/51MP/52P only

1-1. Setting the standard light intensity

Press M once lightly.

1-1. Setting the standard light intensity:(A/B for both outputs A and B)

Select a standard light intensity by using ▲ or ▼. When you select OFF and press M once lightly, the menu moves to 2.

1) 2)

1) A: Displays the data in accordance with the received light intensity
b: Displays the data in accordance with the interrupted light intensity

2) 5: Standard light intensity is set to 500.
10: Standard light intensity is set to 1000.
20: Standard light intensity is set to 2000.
30: Standard light intensity is set to 3000.

Ex. When the standard light intensity is 500.

State	A-5 Displays the received light intensity	b-5 Displays the interrupted light intensity
Receive all light	500	0
Interrupt half light	250	250
Interrupt all light	0	500

1-2. Registering the standard light intensity

Press M once lightly.

1-2. Registering the standard light intensity :(A/B for both outputs A and B)

Press the S button in the state that no target is set. When the SET indication flashes quickly, the setting is completed.

1-3. Changing the number of display digits

Press M once lightly.

To "2. Selecting power mode"

1-3. Changing the number of display digits :(A/B for both outputs A and B)

The last digit of digital display can be set to non-display.

Select a value to be displayed in the digital display (green) by using ▲ or ▼.

Ex. When A-5 is selected in 1-1

Point **When the standard light intensity is set, the detection mode is fixed to "Standard Detection 1"**

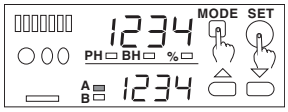
* It is possible to perform detection work while changing mode settings. To do this, switch the monitor to display received light intensity.

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Initializing Settings (Initial Reset)

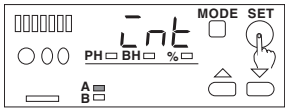
All settings can be reset to their original values (factory defaults).
This can be done only when the operation button is not locked.

1 In the state of the received light intensity display, press (S) five times, while pressing (M).

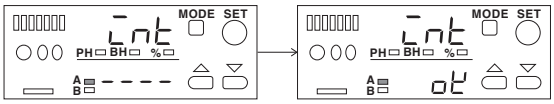


2 When [Cnt] is displayed on the digital LED monitor, press (S) once.

(When (▲) is pressed here instead of (S), the monitor returns to the received light intensity display without being reset)



3 [----] is displayed on the setting monitor for three seconds and then [oU] is displayed. Initialization is now complete. The received light intensity display will appear on the monitor again.



Initial settings

	Output A / Output B	
Standard light intensity setting*1	OFF	oFF
Power mode*2	TURBO	--t
Detection methods	Standard output 1	Std
Display shift	Shift value: 0	0
Hold mode	No hold display	Std
Timer mode	No timer	oFF
Timer	10 ms	10
Output setting	D. ON: 46, L. ON: 50 (52 for LV-H62)	

*1: LV-51M/52/51MP/52P only
*2: For LV-51M/52/51MP/52P, FINE only

Point **The value for the timer is only effective when timer mode is set to a setting other than "NO TIMER (OFF)."**

Error Messages

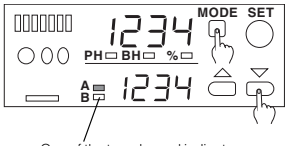
If any of the following errors appear on the LED display, check the amplifier or sensor unit according to the countermeasures listed below.

Error message	Problem description	Countermeasures
brt	The sensor head is not connected, sensor is inserted in a wrong connector, or the sensor head cable has an open circuit.	Check for an open circuit in the head cable, and that the sensor is connected to the correct connector.
ouLd	Excessive current in output cable.	Check the load and adjust to within rated values.
Err	Data error	Perform the initial reset.

If an error message other than the above is displayed, contact KEYENCE.

Selecting Channels

The LV Series can perform two different types of sensitivity settings.



One of the two channel indicators will start flashing.

1 Press (▲) or (▼) quickly while holding down (M).

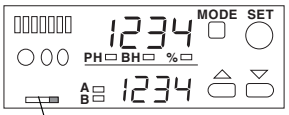
2 Channel indicator for set up mode starts flashing.

3 Release (M).

Point **While tuning sensitivity or setting modes such as power mode, it is not possible to select channels.**

Selecting Output Mode

Three types of output modes can be selected.



Output switches

Switch	Output A	Output B
▬	L.ON (Output ON when light is received)	
▬	L.ON (Output ON when light is received)	D.ON (Output ON when light is interrupted)
▬	D.ON (Output ON when light is interrupted)	

Key Lock

The operation button can be locked to prevent anyone accidentally touching the operation button and changing settings.

■ Turning on Key Lock

Press (▼) or (▲) for three seconds or more while pressing (M).
[Loc] will start flashing on the display.

■ Releasing Key Lock

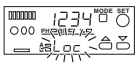
Press (▼) or (▲) for three seconds or more while pressing (M).
[unL] will start flashing on the display.

When Key Lock is on, all settings except selecting display, selecting output and display settings remain disabled until Key Lock is released.

Adjusting Sensitivity via External Signals (External Tuning)

This is the function of the LV-11A/21A/21AP. You cannot use this function with LV-51M/51MP.

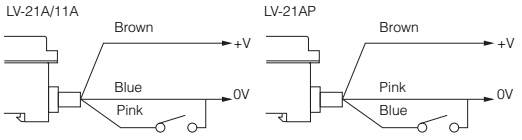
1 Lock the operation button



Important **The operation button must be locked to perform external tuning.**

2 Connect the pink cable to a switch or PLC.

3 Making a short circuit between the pink cable and blue cable has the same effect as pressing (S).



Point **Minimum input time is 20 ms.**

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Caution on usage of QL (LV-20A only)

▶ Important

- **When you want to monitor the received light intensity in a PLC using the KEYENCE QL-R01, note that the indication will be limited in the range of 0 to 4095, and that the threshold value that can be written in LV using the QL-R01 is up to 4095 (common to all of FINE, TURBO and SUPER TURBO).**
- **Monitoring of the received light intensity and writing of the threshold value using QL-R01 are possible in the LV-20A only.**
- **Up to eight expansion units can be mounted on the QL-R01 provided all the expansion units are the LV-20A. Refer to "Mounting additional amplifier" (page 4) and the instruction manual for the QL-R01.**
- **LV requires two QL channels because a single LV unit has two output channels.**
- **Restrictions due to compliance with EMC Directive: When linking four LVs or more to the QL-R01, install a ferrite core to the root of the QL-R01 cable.**

Mutual Interference Suppression

The LV Series is equipped with a mutual interference suppression function. Please note, however, that this mutual interference suppression function will not work when two main units are used together.

Point

When additional sensor head units are installed, mutual interference suppression allows the units to be positioned close together. The number of units with which mutual interference suppression will work depends on the selected power mode.

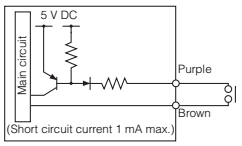
Power mode	FINE	TURBO	SUPER
No. of units free	Not possible	2*	4*

* Total (main unit plus expansion units

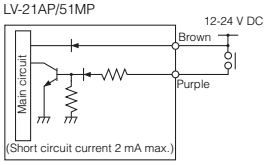
Interruption of Laser Radiation

A short circuit between the purple and blue conductors will cause laser radiation to be interrupted (min. input time: 20 ms).

LV-11A/21A/51M



LV-21AP/51MP



Point

This function is available only with the main unit.
Even when expansion units (LV-22A/22AP/52/52P) are connected, laser radiation stops only from the main unit.

Specifications

Amplifier unit

Model	NPN output	LV-21A	LV-22A	LV-20A	LV-11A	LV-51M	LV-52
	PNP output	LV-21AP	LV-22AP	-	-	LV-51MP	LV-52P
Supported sensor head		LV-H32/H35/H37/H42/H47/H52/H62/H64/H65/H67/H35F/H62F			LV-H41/H51	LV-H100/H110/H300	
Laser Class	FDA (CDRH) 21CFR Part1040.10	Class II Laser Product			Class I Laser Product	Class II Laser Product	
	IEC60825-1	Class 2 Laser Product			Class 1 Laser Product	Class 2 Laser Product	
Main unit/expansion unit		Main unit	Expansion unit (1 line)	Expansion unit (0 line)	Main unit	Main unit	Expansion unit (1 line)
Response time		FINE: 80 µs TURBO: 500 µs SUPER: 4 ms		280 µs to 4.7 ms(1)	FINE: 500 µs TURBO: 2 ms SUPER: 8 ms	FINE : 80 µs TURBO: 500 µs SUPER: 4 ms	
Operation mode		LIGHT-ON/DARK-ON (switch selectable)					
Indicators		Output display x 2, Digital LED monitor (light intensity monitor, setting monitor), Bar LED monitor, Laser ON alarm indicator					
Detection modes		STANDARD 1, STANDARD 2, UP edge, DOWN edge, separate settings for ch A/B (Except the mode in which the standard light intensity setting is in progress)					
Timer function		OFF DELAY/ON DELAY/ONE SHOT, separate settings for ch A/B, timer 1 to 9999 ms variable					
Laser emission stop input		Stop during laser radiation, input time: at least 20 ms.(Main unit only)					
External tuning input		Input time: at least 20 ms (LV-51M/51MP do not support this item)					
Control output(2)	NPN output	NPN open-collector x 2 ch, max. 100 mA (40 V max.), residual voltage 1 max.					
	PNP output	PNP open-collector x 2 ch, max. 100 mA (30 V max.), residual voltage 1 max.					
Analog output for monitor		1 to 4 V voltage output, 1 to 4 V across load resistance of at least 20 kΩ for FINE indication 0 to 3000 (LV-51M/51MP only)					
Protection circuit		Reverse-polarity protection, overcurrent protection, surge absorber					
Rating	Power voltage	DC 12 to 24V ±10% max., Ripple (P-P) 10% max.(3)					
	Power consumption (current consumption)	1.5 W (12 V:125 mA, 24 V:62.5 mA)					
Environmental resistance	Ambient temperature	-10 to +55 °C (14 to 131 °F), No freezing(4)					
	Relative humidity	35 to 85%, No condensation					
	Vibration resistance	10 to 55 Hz, 1.5 mm double-amplitude in X, Y, and Z direction: 2 hours per axis					
Materials		Main body & cover: Polycarbonate					
Weight (incl. 2-m cable)		Approx. 120 g	Approx. 75 g	Approx. 35 g	Approx. 120 g	Approx. 120 g	Approx. 75 g

(1) For use with FS-R0 as main unit. If you wish to use the QL-R01 as the main unit, contact KEYENCE.
(2) No control output cable for LV-20A
(3) The power for LV-20A/22A/22AP/52/52P is supplied from the main unit.
(4) With additional units connected, the allowable ambient temperature range varies as follows.
2 to 5 units connected: -10 to +50°C (14 to 122°F)
6 to 7 units connected: -10 to +45°C (14 to 113°F)
To connect additional units they must be mounted on a DIN rail (metal DIN rail). Make sure that output current is 20 mA. max.
Note also that the expansion unit cannot be used as it is.

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Specifications

Sensor head specifications 1

Model		LV-H32	LV-H35	LV-H37	LV-H42	LV-H47	LV-H52	LV-H62	LV-H67
Light source		Visible red semiconductor laser, Wavelength: 660 nm, Output: 3.0mW(FDA), 1.0mW(IEC), Pulse duration: 3.5 µs							
Laser Class	FDA (CDRH) Part1040.10	Class II Laser Product							
	IEC60825-1	Class 2 Laser Product							
Supported amplifier unit		LV-21A / 22A / 20A / 21AP / 22AP							
Detection distance	FINE	30 to 250 mm	150 mm	70±15 mm	250 mm (Slit black: 150 mm) (Slit gray: 100 mm)	55 to 85 m	15 to 120 mm (Slit: 20 to 60 mm)	2 m	20 m
	TURBO	30 to 500 mm	300 mm		500 mm (Slit black: 300 mm) (Slit gray: 200 mm)		15 to 180 mm (Slit: 20 to 80 mm)	5 m	30 m
	SUPER	30 to 1000 mm	600 mm		1000 mm (Slit black: 600 mm) (Slit gray: 400 mm)		15 to 240 mm (Slit: 20 to 100 mm)	7 m	30m (When OP-42198 is used: 50 m)
Beam spot shape		Detection distance max.300 mm Spot diameter: 0.8 mm max.	approx. Ø2 mm	approx. Ø50 µm (distance 70 mm)	Detection distance 150 mm Area width: approx. 37mm (Slit black: approx. 19 mm) (Slit gray: approx. 7 mm) Thickness: 1 mm max.	approx. 21 mm (distance 70 mm)	Detection distance 35 mm Area width: approx. 25 mm (Slit: approx.9 mm)	approx. Ø1.5 mm (Distance 1 m max)	<Typical>*1 20 m approx.10x3 cm 30 m approx.15x4 cm
Indicator		Laser ON alarm indicator: green LED, Level indicator: green x 2, red x 1 (level indicator displays excess gain from 90 to 110%)							
Environmental resistance	Ambient illumination	Incandescent light: 10,000 lx max. Sunlight: 20,000 lx max.							
	Ambient temperature	-10 to +55°C (14 to 131°F), No freezing							
	Relative humidity	35 to 85%, No condensation							
	Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions: 2 hours per direction							
Materials	Case	Glass-reinforced resin							
	Lens (cover)	Transmitter: Acrylic Receiver: Polyarylate	Norbornene resin	Transmitter: Glass Receiver: Polyarylate	Polyarylate	Transmitter: Glass Receiver: Polyarylate	Polyarylate	Norbornene resin	
	Others	-			Slit: Polyacetal			Reflector: Acrylic, Polycarbonate	
Cable length		2 m							
Weight (including cable)		approx. 45 g					approx. 55 g	approx. 45 g	

Sensor head specifications 2

Model		LV-H64	LV-H65	LV-H41	LV-H51	LV-H35F	LV-H62F	LV-H100	LV-H110	LV-H300
Light source		Visible red semiconductor laser Wavelength: 660 nm Output: 3.0mW(FDA), 1.0mW(IEC) Pulse duration: 3.5 µs		Invisible infrared semiconductor laser Wavelength: 785 nm Output: 2.5mW(FDA), 0.3mW(IEC) Pulse duration: 3.5 µs		Invisible infrared semiconductor laser Wavelength: 660 nm Output: 3.0mW(FDA), 1.5mW(IEC) Pulse duration: 3.5 µs		Visible red semiconductor laser Wavelength: 660 nm Output: 3.0mW(FDA), 1.0mW(IEC) Pulse duration: 3.5 µs		
Laser Class	FDA (CDRH) Part1040.10	Class II Laser Product		Class I Laser Product		Class II Laser Product				
	IEC60825-1	Class 2 Laser Product		Class 1 Laser Product		Class 2 Laser Product				
Supported amplifier unit		LV-21A / 22A / 20A / 21AP / 22AP		LV-11A		LV-21A / 22A / 20A / 21AP / 22AP		LV-51M / 52 / 51MP / 52P		
Detection distance	FINE	100 to 500 mm (When OP-51428 is used: 100 to 700 mm)	100 mm (When OP-51428 is used: 150 mm)	250 mm (Slit black: 150 mm) (Slit gray: 100 mm)	15 to 120 mm (Slit: 20 to 60 mm)	100 mm	1.5 m	2000 mm (Detection width 10 mm)		2000 mm (Detection width 30 mm)
	TURBO	200 to 850 mm (When OP-51428 is used: 300 to 1000 mm)	10 to 150 mm (When OP-51428 is used: 10 to 250 mm)	500 mm (Slit black: 300 mm) (Slit gray: 200 mm)	15 to 180 mm (Slit: 20 to 80 mm)	200 mm	3.5 m			
	SUPER	400 to 1200 mm (When OP-51428 is used: 600 to 1500 mm)	100 to 200 mm (When OP-51428 is used: 150 to 350 mm)	1000 mm (Slit black: 600 mm) (Slit gray: 400 mm)	15 to 240 mm (Slit: 20 to 100 mm)	450 mm	5 m			
Beam spot shape		Area width: 40 mm (Distance 300 mm)	Area width: 50 mm (Distance 100 mm)	Detection distance150 mm Area width: approx. 38 mm (Slit black: approx.19 mm) (Slit gray: approx. 7 mm) Thickness: 1.3 mm max	Detection distance 35 mm Area width: approx. 25 mm(Slit: approx. 9 mm)	approx. Ø2 mm	approx. Ø1.5 mm (Distance 1 m max)	Area width approx. 12 mm		Area width approx. 32 mm
Indicator		Laser ON alarm indicator, Power indicator*2: green LED, Level indicator: green x 2, red x 1 (level indicator displays excess gain from 90 to 110%)								
Environmental resistance	Ambient illumination	Incandescent light; 10,000 lx max. Sunlight: 20,000 lx max.								
	Ambient temperature	-10 to +55°C (14 to 131°F), No freezing								
	Vibration resistance	10 to 55 Hz, 1.5 mm double amplitude in X, Y and Z directions: 2 hours per direction								
Materials	Case	Glass-reinforced resin				Fluoroplastic (PFA)		Glass-reinforced resin		
	Lens (cover)	Norbornene resin		Polyarylate		Glass		Transmitter: Glass, Receiver: Polyarylate		
	Others	Reflector: Acrylic, Polycarbonate		Slit: Polyacetal		O-ring: Fluororubber	O-ring: Fluororubber Reflector: Glass, Fluoroplastic (PFA), Fluororubber	-		
Cable length*4		2 m								
Weight (including cable)		approx. 45 g		approx. 55 g		approx. 80 g	approx. 100 g	approx. 80 g		approx. 100 g

*1 Beam spots may appear outside the beam spot due to stray light.
*2 The power indicator is installed only in the receiver of the LV-H100/H110/H300.
*3 The LV-H35F/H62F enclosure rating is IP67. *4 The LV-H35F/H62F cable minimum bend radius is 25 mm.

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Hints on Correct Use

- To extend the amplifier cable length, use a cable that has a crosssectional area of at last 0.3 mm^2. Limit the length of cable extensions to 100 m. (For further information on connecting several units contact KEYENCE)
- Placing the amplifier cable together in the same conduit with power lines or high voltage lines may cause detection errors due to interference or sensor damage. For this reason, always isolate the amplifier cable from these lines.
- If using a commercial switching regulator, make sure to ground both the frame ground terminal and ground terminal.
- Do not use the LV Series outdoors, or in any location where extraneous light can directly enter the light receiving surface.
- At the maximum sensitivity setting, detection distance may vary somewhat due to slight differences in the characteristics of individual units.
- Improper wiring may cause the amplifier to become hot or alter sensitivity. (Input/Output Circuit Diagram: page 7)
- Do not use connectors for sensor head-to-amplifier connections more than 100 times.
- Displayed values may vary due to surrounding conditions (e.g. temperature changes, dust)

Cautions on using the LV-H62/H62F/H67

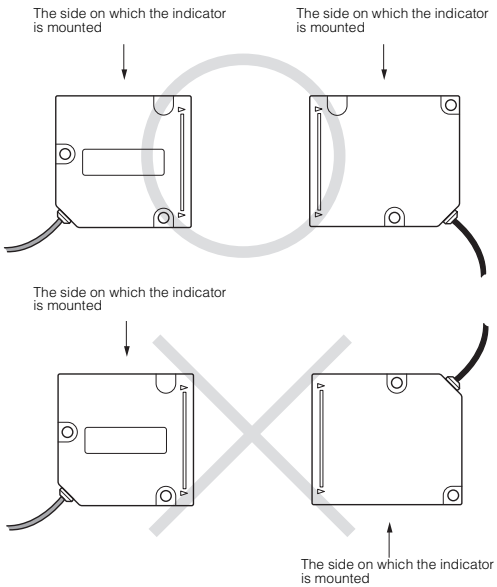
- Use FINE mode when there are any white or mirror-surfaced objects near the sensor head.
- When the output is unstable in standard 1 mode (Std), change the detection mode to standard 2 (Std2).

Reflector

- The values on the received light intensity display may vary depending on the surface condition of the reflector.

Cautions on Usage the LV-H100/H110/H300

- Use the exclusive bracket (optional LV-B101, LV-B102, LV-B301, LV-B302) to mount the sensor. Adjust the light axis of the transmitter and receiver in both the vertical and horizontal directions without any target in the detection area. Then, mount the sensor while maximizing the value displayed on the amplifier. (Adjust the light axis so that the transmitter beam is at the center of the receiver block)
- When mounting the sensor, mount the transmitter and receiver so that their sides on which the indicator is mounted face the same direction.



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