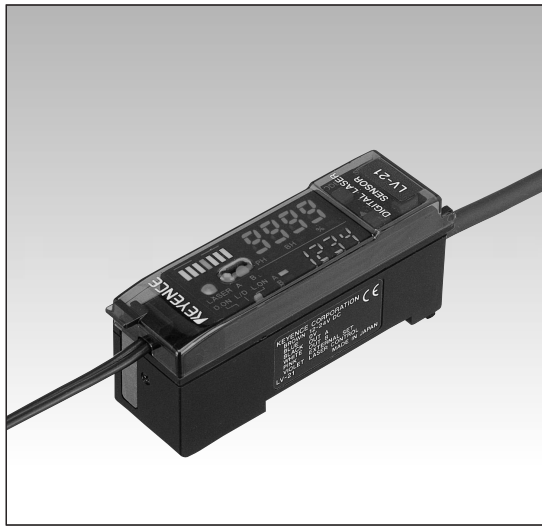


## General Purpose Digital Laser Sensor

# LV Series

### Instruction Manual



### Safety Precautions

#### Warning

- This is the product for detecting the target object. Do not use it in the safety circuit such as the human body protection circuit.
- This product does not have the explosion-proof construction Do not use it in the inflammable atmosphere such as atmosphere gas, liquid or dust.

### Laser safety precautions

#### 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, H37, H42, H52, H62, H67 H47, H35, H64, H65, H100, H300	LV-H41, H51
Wavelength	650 nm	785 nm
Maximum output	3 mW	2.5 mW
FDA class	II	I
IEC class	2	1

### Warning labels

#### • IEC CLASS 2

LV-H32 only



#### • IEC (French) CLASS 2

LV-H32 only

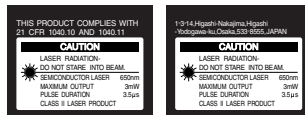


#### • DIN Klasse 2

LV-H32 only

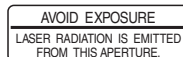


#### • Laser CLASS II warning labels(FDA CLASS II)



The FDA warning label has already been stuck.

#### • Aperture label



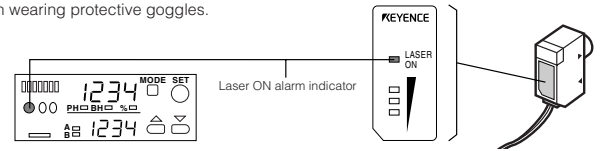
#### • Protective housing label



### Safety features

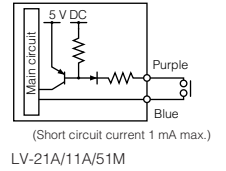
#### ■ Laser ON alarm indicator

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)

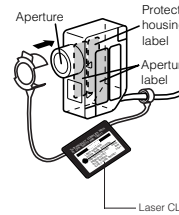
Laser emission can be stopped by short-circuiting between the purple and blue (GND) wires when LV-21A, LV-51M or LV-11A used. When LV-21AP or 51MP is used, short-circuit between the purple and brown (12 to 24 V DC) wires to stop laser emission.



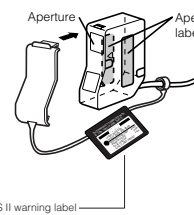
#### ■ Label location

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

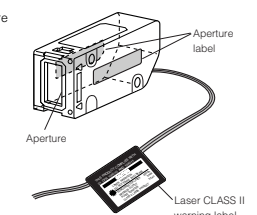
#### • LV-H32



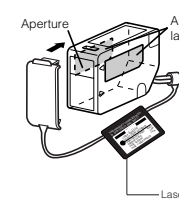
#### • LV-H37/H47



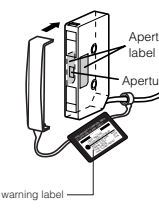
#### • LV-H100 (Transmitter side)



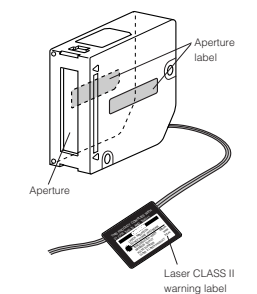
#### • LV-H42



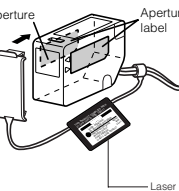
#### • LV-H52



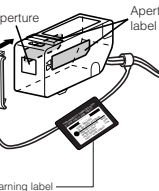
#### • LV-H300 (Transmitter side)



#### • LV-H35/H62/H67



#### • LV-H64/H65



### ■ Safety consideration

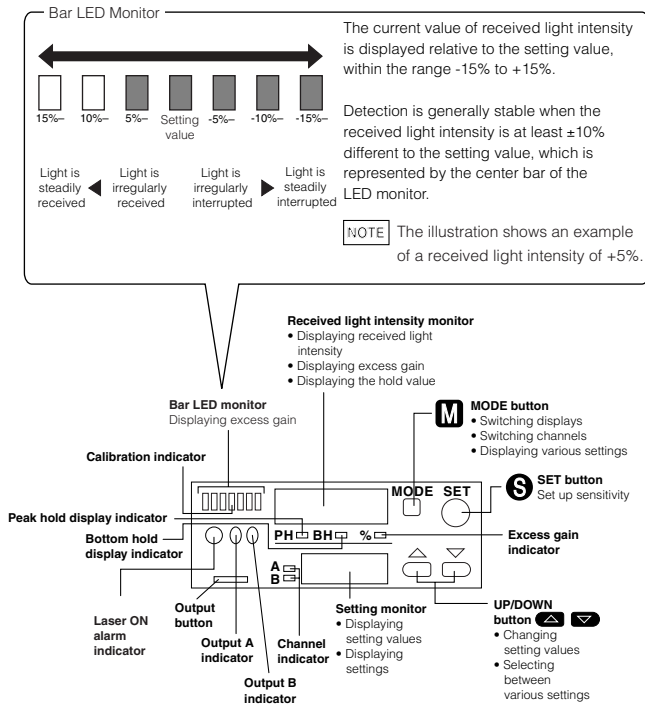
#### Warning

Follow the safety precautions below to ensure operator safety:

- Operate the LV Series only according to the procedures described in this instruction manual. Otherwise, injury may occur due to exposure to the laser beam.
- Do not disassemble the sensor head. Laser emission from the LV Series is not automatically stopped if the sensor head is disassembled. If you disassemble the sensor head for inspection or repair, you may be exposed to the laser beam. If the LV Series malfunctions, contact KEYENCE immediately.
- Do not look directly at the laser beam. Looking directly at the laser beam may result in serious eye injury.
- Protective enclosure It is recommended that you install a protective enclosure around the sensor head to prevent any person from getting near the sensor head during operation.
- Protective goggles It is recommended that you wear protective goggles when using the LV Series.
- Stop laser emissions before cleaning the laser emission port. Failure to stop the laser emission may expose eyes or skin to the laser beam.
- Check the laser beam path. To prevent exposure to the laser beam due to specular or diffuse reflection, install a screen which offers the appropriate reflectance and temperature characteristics to interrupt the reflected laser beam. Do not install the LV Series in such a way that the laser beam passes at eye height.

## 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.

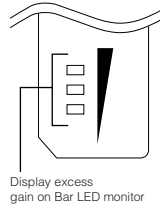
#### Bar Graph LED monitor (Interlocked with amplifier)

Light is steadily received +10% — 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.

Setting value

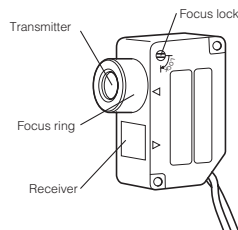
Light is steadily interrupted -10% —

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.

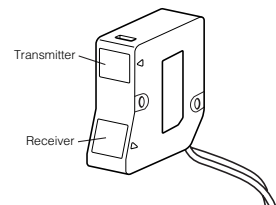


#### ■ LV-H32

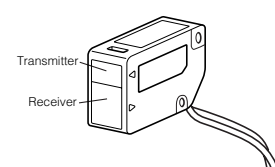
Adjust the beam spot size by turning the focus ring. After completing the adjustment, fix by turning the focus lock screw.



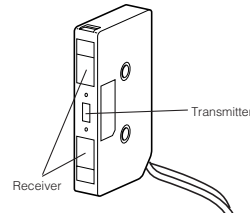
#### ■ LV-H37/H47



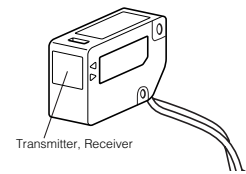
#### ■ LV-H41/H42



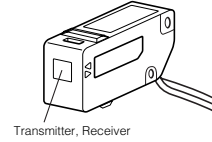
#### ■ LV-H51/H52



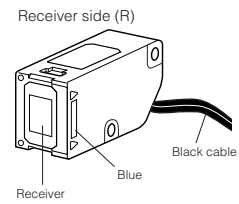
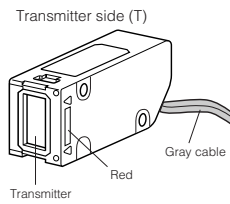
#### ■ LV-H35/H62/H67



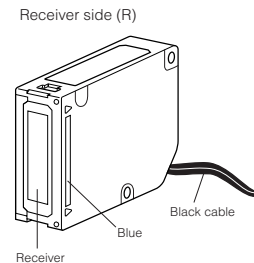
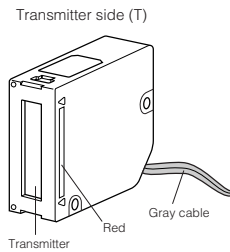
#### ■ LV-H64/H65



#### ■ LV-H100



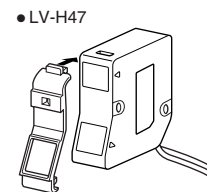
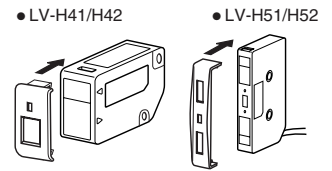
#### ■ LV-H300



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

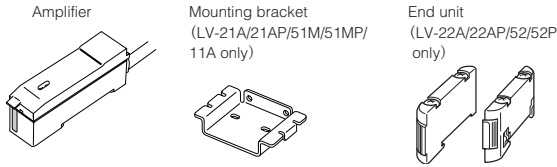
Use in accordance with the distance and target.

- **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.



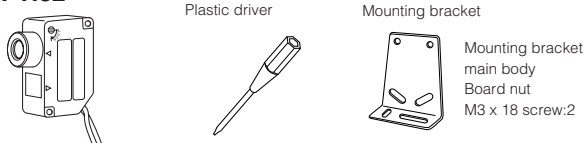
# Accessories

## Amplifier



## Sensor head

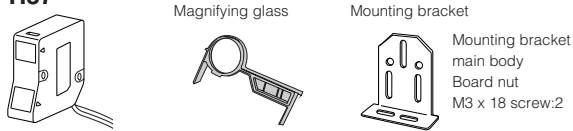
### LV-H32



### LV-H35



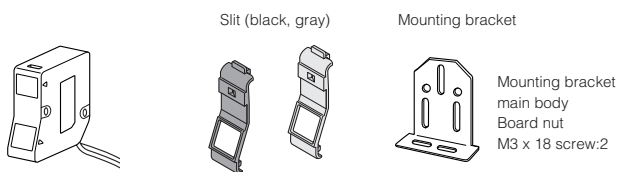
### LV-H37



### LV-H41/H42



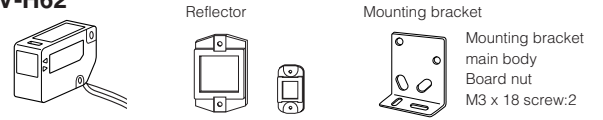
### LV-H47



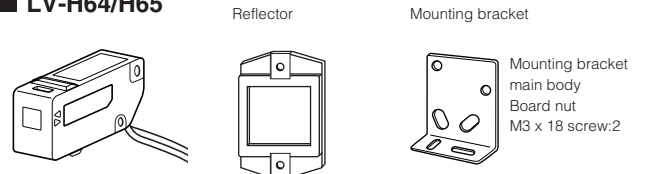
### LV-H51/H52



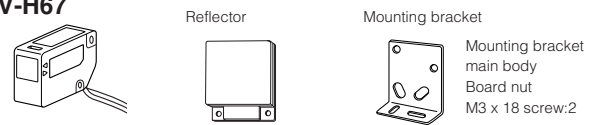
### LV-H62



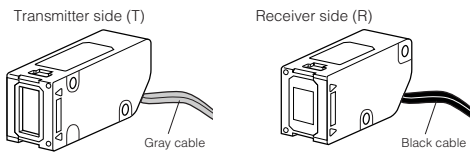
### LV-H64/H65



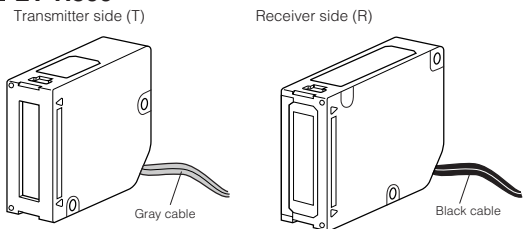
### LV-H67



### LV-H100

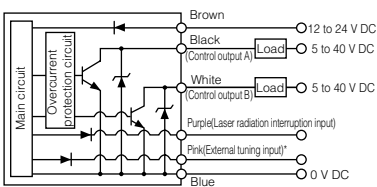


### LV-H300



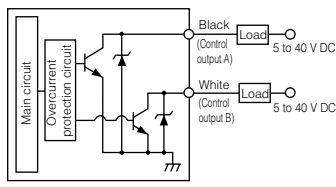
## Input/Output Circuit Diagram

### LV-11A/21A/51M

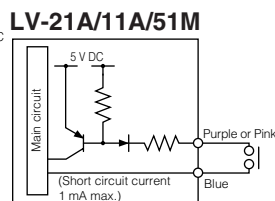


\* LV-51M (monitor output) only is orange.

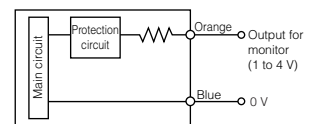
### LV-22A/52



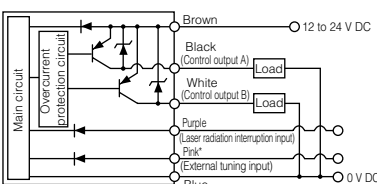
### Laser radiation interruption External tuning input circuit diagram



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

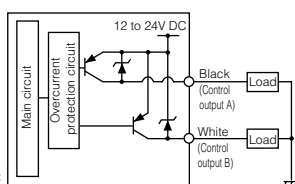


### LV-21AP/51MP

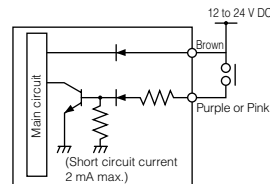


\* LV-51MP (monitor output) only is orange.

### LV-22AP/52P



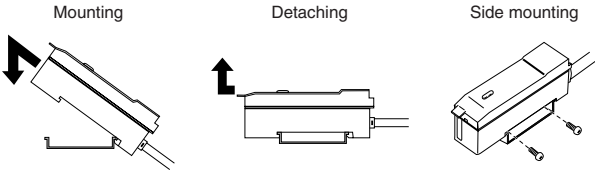
### LV-21AP/51MP



## 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.

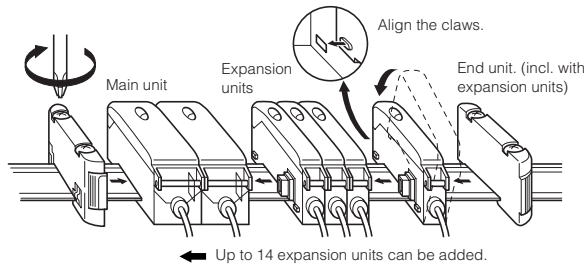
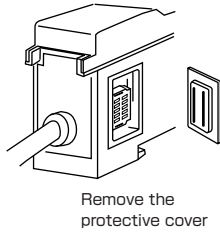


### Mounting additional amplifiers

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.



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



### Detaching amplifiers

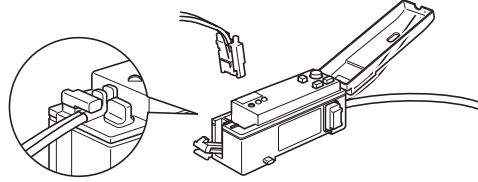
- 1 Take off the end unit.
- 2 Slide the expansion units. Remove them one by one from the DIN rail.

- 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

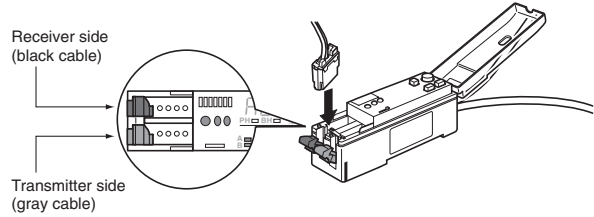
### Mounting the reflection type

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



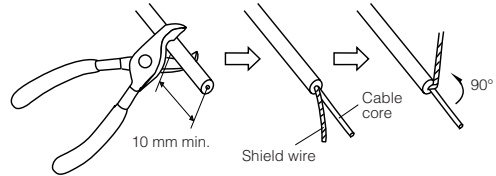
### Mounting the transmission type

- 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.

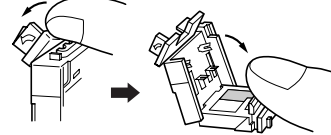


## To shorten the sensor head cable

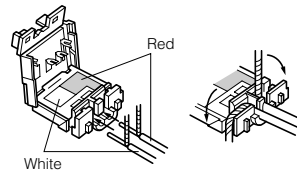
- 1 Process the end of the cable as shown below.



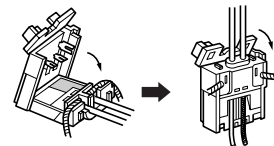
- 2 Tilt the top in the direction of the arrow on the left side of the top, then open the connector.



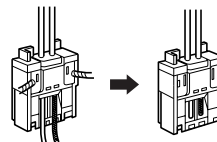
- 3 Insert the cable with the shield wire bent at 90°, then bend the shield wire in the direction of the arrow along the groove. Match the color of the connector to the color of the shield wire.



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

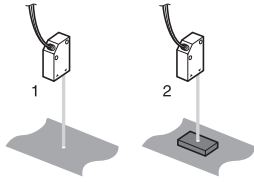


- 5 Using nippers or a similar tool, trim the wires sticking out from the connectors.



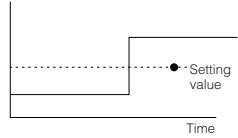
## Sensitivity Adjustment

### Two-point tuning



- 1 With no target in place, press the **S** button lightly.
- 2 Put a target in place and press the **S** button again lightly.

Received light intensity



The setting value is adjusted to the midpoint of the difference in received light intensity when the target is absent and present.

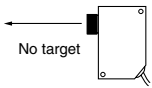


The setting value is displayed.

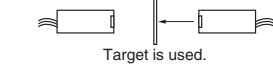
### Maximum sensitivity setting

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

Reflection type



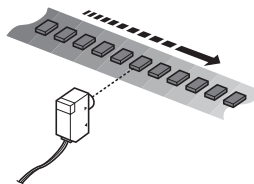
Transmission type



- 1 According to the directions on the left, press the **S** button for 3 seconds or more.
- 2 Confirm that the calibration indicator (orange LED) and setting monitor (green LED) are flashing.
- 3 Release the **S** button.

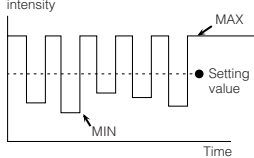


### Automatic tuning



- 1 Pass a target through the optical axis while pressing the **S** button.
- 2 Confirm that the calibration indicator (orange LED) and setting monitor (green LED) are flashing.
- 3 Release the **S** button.

Received light intensity



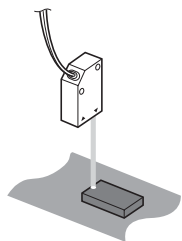
The setting value is adjusted to the midpoint of the difference in received light intensity when the target is absent and present.



The setting value is displayed.

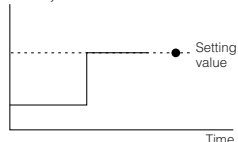
If the setting does not work well, perform the two-point tuning.

### Positioning tuning



- 1 With no target in place, press the **S** button lightly (orange LED lights up).
- 2 Place a target in the position where it should stop.
- 3 Press the **S** button for 3 seconds or more until the calibration indicator (orange LED) and setting monitor (green LED) are flashing.

Received light intensity



The setting value is adjusted to turn on the sensor when the target arrives at the place where it should stop.



## Differentiation Mode (page 6)

### Setting sensitivity

Quickly press **S** 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

	<b>J-d</b> UP edge	<b>7-d</b> 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

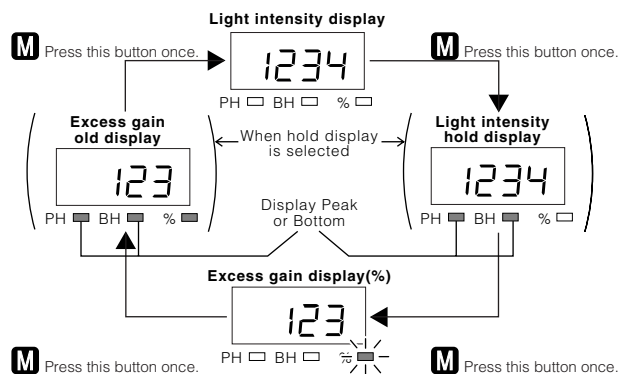
The values displayed on the calibration LED monitor can be changed by pressing **▲** (to increase sensitivity) or **▼** (to decrease sensitivity). This allows you to fine-tune your setting values.

### Note

If you press the **S** 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 **S** 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 **M** 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.

### Note

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

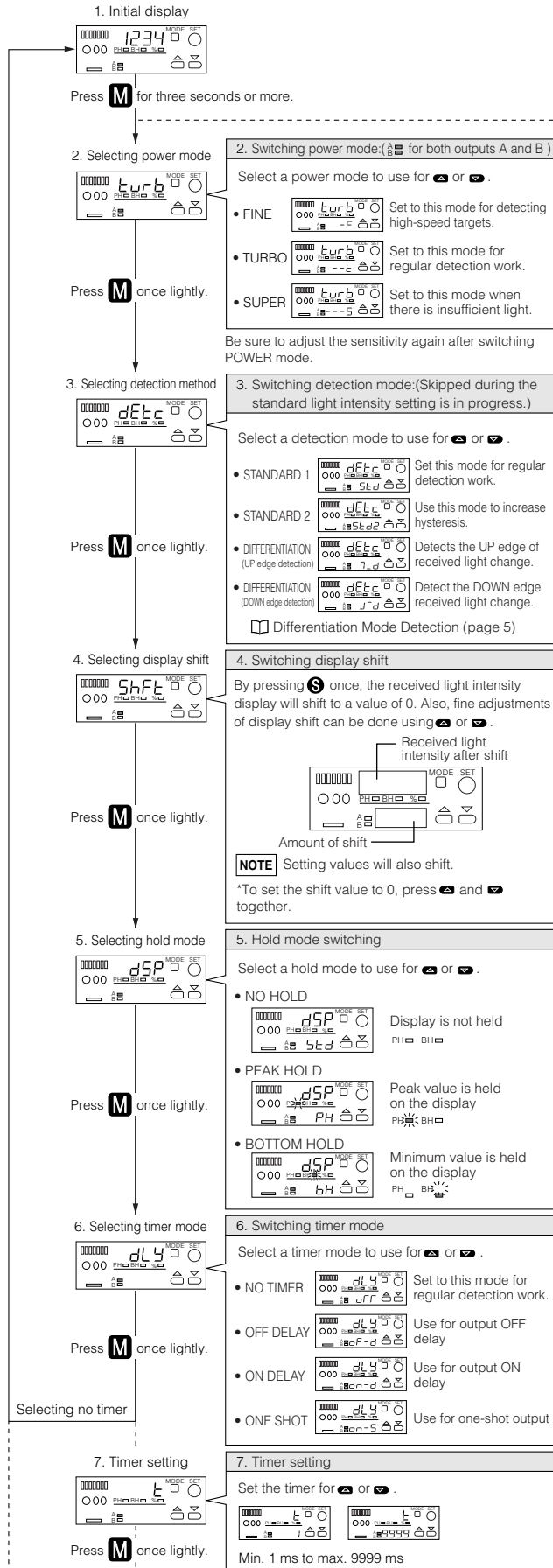


# Mode Setting

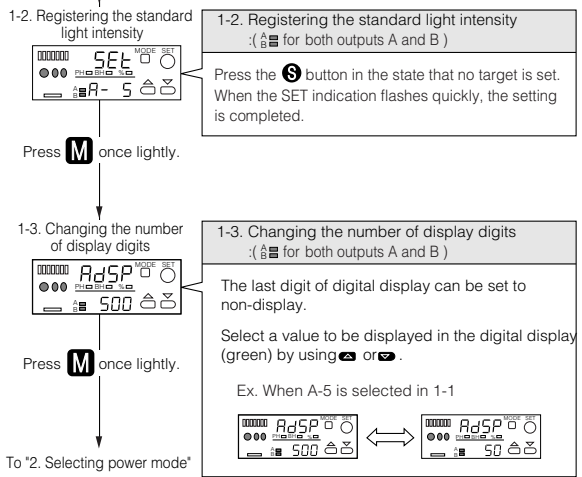
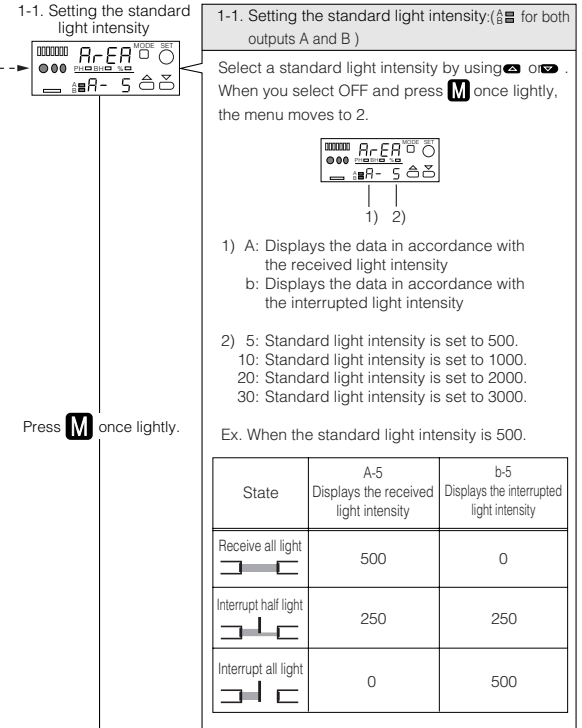
If you press the **M** button for three seconds or more when either **1234** or **1234** is displayed, you can display the values of various settings. Each setting can be adjusted separately for channel A and channel B.

## Reference:

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



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



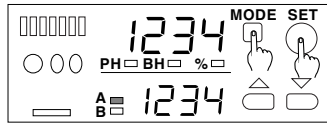
**Note** When the standard light intensity is set, the detection mode is fixed to "Standard Detection 1"

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

## Initializing Settings (Initial Reset)

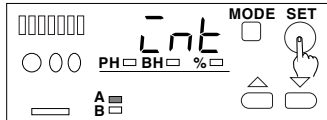
All settings can be reset to their original values (factory defaults). This can be done only when the operation button is not locked.

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

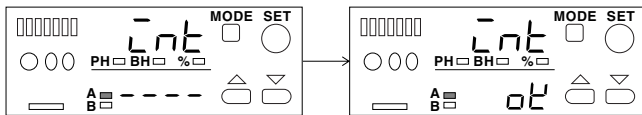


- 2 When **LnE** is displayed on the digital LED monitor, press **S** once.

(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 **oE** 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	<b>oFF</b>
Power mode*2	TURBO	<b>--t</b>
Detection methods	Standard output 1	<b>Std</b>
Display shift	Shift value: 0	<b>0</b>
Hold mode	No hold display	<b>Std</b>
Timer mode	No timer	<b>oFF</b>
Timer	10 ms	<b>10</b>
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

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

## Error Messages

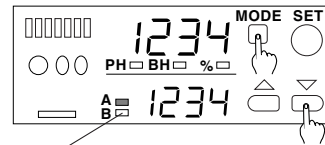
If any of the following errors appear on the LED display, check the amplifier or sensor unit according to the countermeasures listed below.

Error message	Problem description	Countermeasures
<b>brE</b>	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.
<b>oULd</b>	Excessive current in output cable.	Check the load and adjust to within rated values.
<b>Err</b>	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.



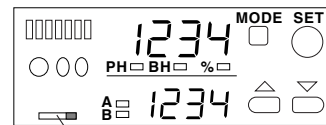
One of the two channel indicators will start flashing.

- 1 Press **▲** or **▼** quickly while holding down **M**.
- 2 Channel indicator for set up mode starts flashing.
- 3 Release **M**.

**Note** 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
<b>o</b>	L.ON (Output ON when light is received)	
<b>o</b>	L.ON (Output ON when light is received)	D.ON (Output ON when light is interrupted)
<b>o</b>	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

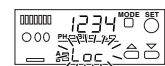
Press **▼** or **▲** for three seconds or more while pressing **M**. **unL** will start flashing on the display.

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.

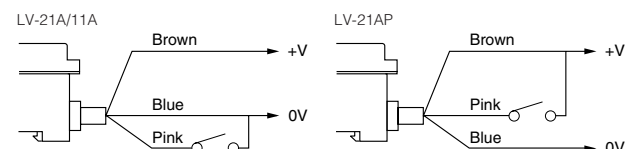
- 1 Lock the operation button



**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**.



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

## 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.

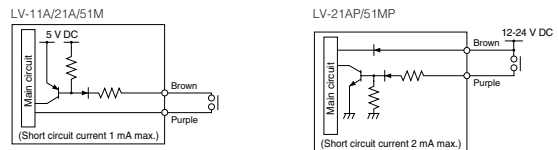
- Note** When additional sensor head units are installed, mutual interference suppression allows the units to be positioned close together. The number of units with which mutual interference suppression will work depends on the selected power mode.

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).



- Note** 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

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 senser head	LV-H32/H35/H37/H42/H47/H52/H62/H64/H65/H67				LV-H41/H51	LV-H100/H300	
FDA class	class II				class I	class II	
IEC class(JIS)	class 2				class 1	class 2	
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	Non-voltage input, stop during laser radiation, input time: at least 20 ms.(Main unit only)						
External tuning input	Non-voltage 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/52/52AP 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.



## Specifications

### Sensor head specifications1

Model		LV-H32	LV-H35	LV-H37	LV-H42	LV-H47	LV-H52
Light source		Visible red semiconductor laser, Wavelength: 650 nm, 3 mW max.					
Supported amplifier unit		LV-21A / 22A / 20A / 21AP / 22AP					
FDA class		class II					
IEC class(JIS)		class 2					
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 mm	15 to 120 mm (Slit: 20 to 60 mm)
	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)
	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)
Beam spot shape		Detection distance max. 300mm 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)
Indicator		Laser ON alarm indicator: green LED, Label indicator: green x 2, red x 1 (label indicator displays excess gain from 90 to 110%)					
Environmental resistance	Ambient illumination	Incandescent light: 10,000 lux max. Sunlight: 20,000 lux 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: Polyallylate	Acrylic	Transmitter: Glass Receiver: Polyallylate	Polyallylate	Transmitter: Glass Receiver: Polyallylate	Polyallylate
	Accessories	-			Accessories		
Weight (incl. 2-m cable)		approx. 45 g					approx. 55 g

### Sensor head specifications 2

Model		LV-H62	LV-H67	LV-H64	LV-H65	LV-H41	LV-H51	LV-H100	LV-H300
Light source		Visible red semiconductor laser, Wavelength: 650 nm, 3 mW max.				Invisible infrared semiconductor laser Wavelength: 785 nm, 2.5 mW max.		Visible red semiconductor laser, Wavelength: 650 nm, 3 mW max.	
Supported amplifier unit		LV-21A / 22A / 20A / 21AP / 22AP				LV-11A		LV-51M / 52 / 51MP / 52P	
FDA class		classII				classI		classII	
IEC z )		class2				class1		class2	
Detection distance	FINE	30 to 250 mm	20 m	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)	2000 mm (Detection width 10 mm)	2000 mm (Detection width 30 mm)
	TURBO	30 to 500 mm	30 m	200 to 850 mm (When OP-51428 is used: 300 to 1100 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)		
	SUPER	30 to 1000 mm	30m (When OP-51428 is used: 50 m)	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)		
Beam spot shape		approx. ø1.5 mm (Distance 1 m max)	<Typical> 20 m approx. 10x3 cm 30 m approx. 15x4 cm	Area width: 40 mm (Distance 300 mm)	Area width: 50 mm (Distance 100 mm)	Detection distance 150 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)	Area width approx. 12 mm	Area width approx. 32 mm
Indicator		Laser ON alarm indicator, Power indicator*: green LED, Label indicator: green x 2, red x 1 (label indicator displays excess gain from 90 to 110%)							
Environmental resistance	Ambient illumination	Incandescent light; 10,000 lux max. Sunlight: 20,000 lux 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							
	Lens (cover)	Acrylic		Norbornene resin		Polyallylate		Transmitter: Glass, Receiver: Polyallylate	
	Accessories	Reflector: Acrylic, Polycarbonate				Slit: Polyacetal		-	
Weight (incl. 2-m cable)		Approx. 45 g				Approx. 55 g		Approx. 80 g	Approx. 100 g

\* The power indicator is installed only in the receiver of the LV-H100/H300.

## Hints on Correct Use

- To extend the amplifier cable length, use a cable that has a cross-sectional area of at least 0.3 mm<sup>2</sup>. 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/H67

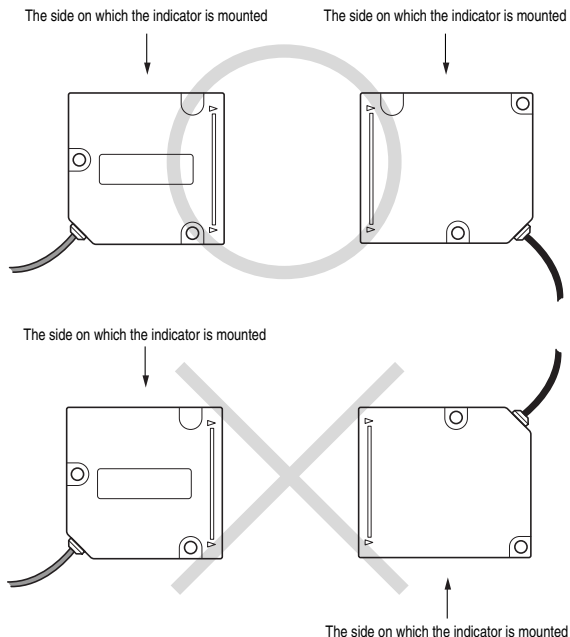
- Use FINE mode when there are any white or mirror-surfaced objects near the sensor head.
- When the output is unstable in standard 1 mode (Std), change the detection mode to standard 2 (Std2).

### 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/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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