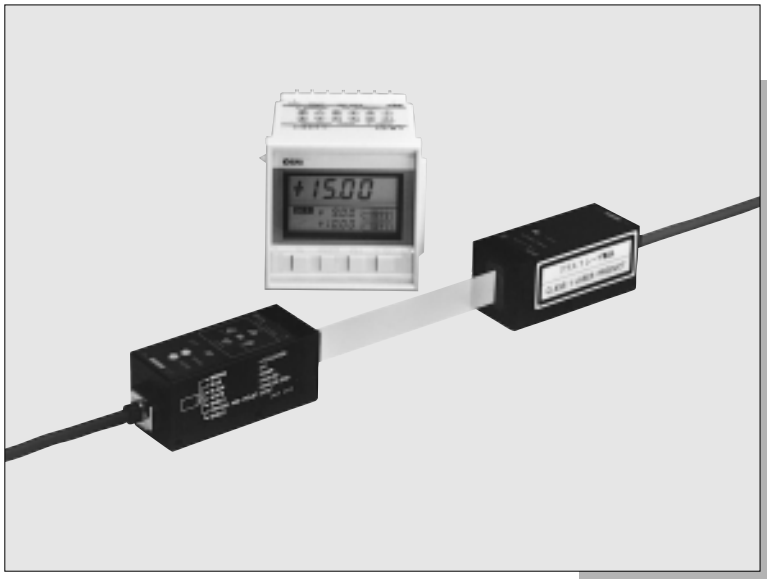
LA SERIES
Laser Collimated Beam Sensor



‘Class 1’ Laser Beam Sensor Safe for Your Eyes

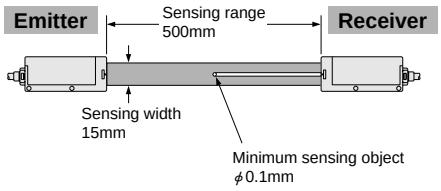
CE Marked
Conforming to EMC Directive (Excluding LA-C1)

Safe Laser Beam

This laser collimated beam sensor conforms to the Class 1 laser stipulated in IEC Publication 825 and JIS C 6802. Hence, safety measures such as protective gear are not necessary.

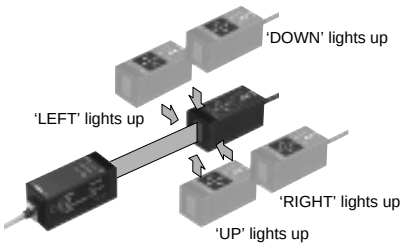
Precise Sensing in Wide Area

Sensing area: 15 × 500mm
Minimum sensing object: ϕ0.1mm
Repeatability: 10 μm or less



Easy Laser Beam Alignment

Four monitoring LEDs help you to easily align the emitter and the receiver.

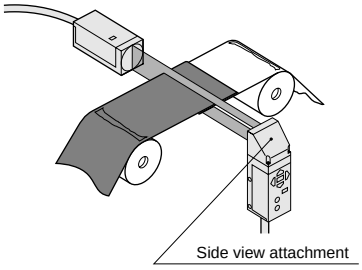


Receiver front face

The monitoring system checks whether the incident beam falls evenly on all the four receiving elements in the receiver window.

Versatile Mounting

The side view attachment (optional) enables versatile mounting styles.



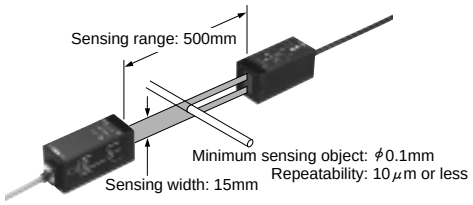
FDA Class 1 Type LA-511

LA-511 conforms to FDA Class 1.
It is approved for use in U.S.A. by FDA.
(Refer to P.862 for FDA standards.)

LA

ORDER GUIDE

Laser collimated beam sensors

Type	Appearance	Model No.	Conforming standard
Class 1 type	 Emitting element: Infrared semiconductor laser diode (Class 1)	**LA-510**	IEC and JIS standards
		LA-511	FDA standard

Laser sensor controller

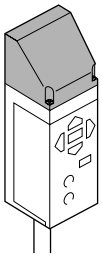
Appearance	Model No.
 DIN 72×72mm	**LA-C1**

OPTIONS

Designation	Model No.	Description	
Side view attachment	**LA-SV1**	Versatile mounting is possible as the laser beam can be bent at a right angle. • Sensing range: 500mm • Minimum sensing object: ϕ0.1mm • Repeatability: 20μm or less (Note 1)	
Digital panel controller (Note 2)	**CA2-T2**	NPN open-collector transistor	This is a very small controller which allows two independent threshold level settings. • Supply voltage: 24V DC ± 10% • No. of inputs: 1 No. (sensor input) • Input range: 1 to 5V DC • Main functions: Threshold level setting function, zero-adjust function, scale setting function, hysteresis setting function, start/hold function, auto-reference function, power supply ON-delay function, etc.
	CA-R2	Relay contact	This is a multi-functional controller having mathematical functions, hold function, etc. • Supply voltage: 100 to 240V AC ± 10% • No. of inputs: 2 Nos. (sensor input) • Input range: 1 to 5V DC • Power supply for sensor: 12V DC, 150mA • Main functions: Mathematical functions, process number selection function, hold function, scaling function, auto-reference function, power supply ON-delay function, measurement start delay function, hysteresis setting function, etc.
	CA-T2	NPN open-collector transistor	
	CA-B2	NPN open-collector transistor With BCD output	

Notes :1) Mount **LA-SV1** on either the emitter or the receiver. If it is mounted on both sides, the monitor LEDs may not light off perfectly.
2) For further details, refer to P.776～ for the ultra-compact digital panel controller **CA2** series, and to P.766～ for the digital panel controller **CA** series.

Side view attachment



Two M3 (length 10mm) screws with washers are attached.

Digital panel controller

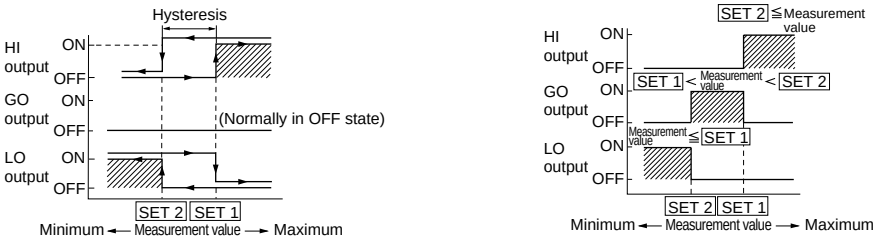
• **CA2** series

• **CA** series

LA

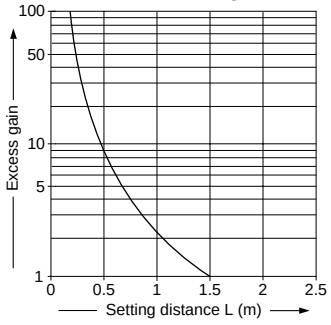
SPECIFICATIONS

Laser sensor controller

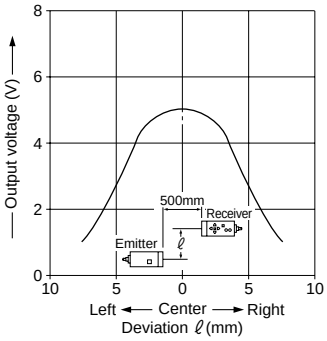
Item \ Model No.			LA-C1
Supply voltage			12 to 24V DC ± 10% Ripple P-P 10% or less
Current consumption			260mA or less
Power supply for sensor			12V DC, 70mA max.
Input	Sensor input		Input voltage range: 1 to 5V (Maximum allowable voltage: 10V DC) Input impedance: 1MΩ A/D conversion method: double integration method Sampling cycle: 50ms (20 times/sec.)
	Auto-reference input		Specifying timing of auto-reference function • Operation: Effective when NPN non-contact transistor input is Low • Signal condition: Low level 1.5V or less Low level output current 0.6mA or less Low level input time duration 0.5ms or more
Output	Comparative output		NPN open-collector transistor (3 outputs of HI, GO or LO) • Maximum sink current: 100mA • Applied voltage: 30V DC or less (between comparative output and 0V) • Residual voltage: 1V or less (at 100mA sink current) 0.4V or less (at 16mA sink current)
		Output operation	**Hysteresis mode** / **Window comparator mode** 
		Response time	100ms or less (150ms or less while the auto-reference input is applied)
		Short-circuit protection	Incorporated
Display	Measurement value display		$3^{1}/_{2}$ digit LCD display [Display cycle: 250ms (4 times/sec.)]
		Display range	− 19.99 to + 19.99
		Accuracy	± (0.15% × Measurement value + 1 digit) at 23 ± 1°C
	Setting value display		$3^{1}/_{2}$ digit LCD display
		Display range	− 19.99 to + 19.99
	Comparative output operation display		LCD display of 'HI', 'GO' and 'LO' (HI, GO or LO lights up when the respective output is ON)
Environmental resistance	Ambient temperature		0 to + 50°C (No dew condensation), Storage: − 10 to + 60°C
	Ambient humidity		35 to 85% RH, Storage: 35 to 85% RH
	Noise immunity		Power line: 240Vp, 10ms cycle, and 0.5 μs pulse width Radiation: 300Vp, 10ms cycle, and 0.5 μs pulse width (with noise simulator)
	Vibration resistance		10 to 55Hz frequency, 1mm amplitude in X, Y and Z directions for two hours each
	Shock resistance		300m/s² acceleration (30G approx.) in X, Y and Z directions for three times each
Connection method			Screw-on terminal block
Material			Enclosure: Polycarbonate, Front bezel: ABS, Terminal block: PBT, Front panel: Acrylic, Protector: Acrylic
Weight			230g approx.

SENSING CHARACTERISTICS (TYPICAL)

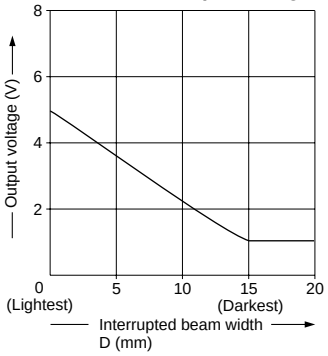
Correlation between setting distance and excess gain



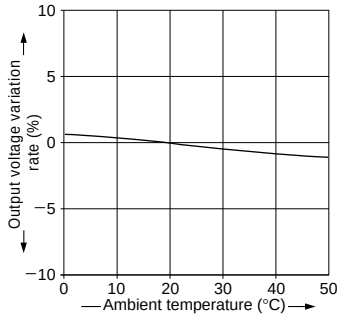
Correlation between transverse deviation and output voltage



Correlation between interrupted beam width and output voltage



Correlation between ambient temperature and output voltage variation rate



PRECAUTIONS FOR PROPER USE

Laser collimated beam sensor

This product is not a safety sensor. Its use is not intended or designed to protect life and prevent body injury or property damage from dangerous parts of machinery. It is a normal object detection sensor.

Safety measures for laser beam products

- The safety standard IEC Publication 825 specifies the application of laser beam products. Please read it carefully before using the laser beam sensor.
- Do not expose your eyes to the laser beam through optical instruments, like a lens.

Safety standards for laser beam products

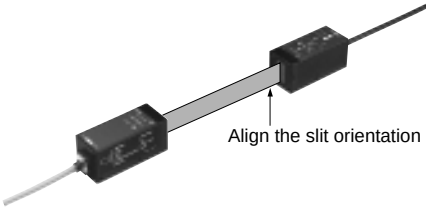
- A laser beam can harm human being's eyes, skin, etc., because of its high energy density. IEC and JIS have classified laser products according to the degree of hazard and the stipulated safety requirements.

LA-510 and **LA-511** are identified as a 'Class 1' laser products.

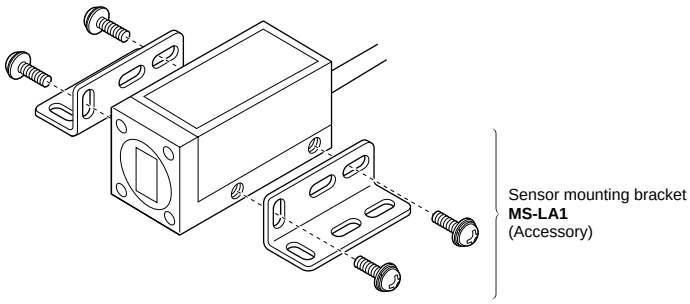
Class	Applicable model No.	Degree of danger
Class 1	**LA-510 LA-511**	Intrinsically safe design.
Class 2	——	Visible and low power (wavelength 400 to 700nm). Eyes react instinctively to laser beam and protect themselves.
Class 3A	——	Dangerous if eyes are exposed to laser beam through optical means. Visible beam should be 5mW or less. Invisible beam should not exceed 5 times the Class 1 power.
Class 3B	——	Dangerous if eyes are exposed to laser beam directly. Unfocused, pulsed laser radiation 0.5W or less can be observed by means of diffuse reflection.
Class 4	——	Too intense. Even diffuse reflection is possibly dangerous. It can burn the skin or cause a fire.

Mounting

- The emitter and the receiver must face each other with proper slit orientation so that the beam can be received.



- The tightening torque should be 1.17N·m or less. When mounting the sensor with the attached sensor mounting bracket, the sensor must be fixed on both sides.

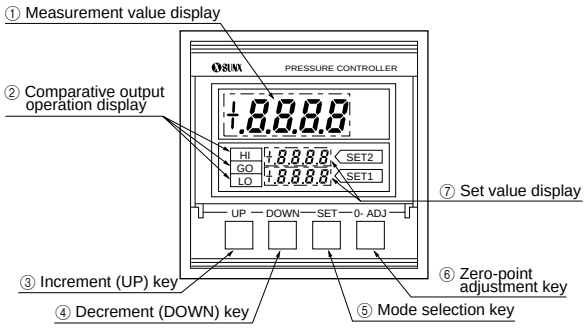


PRECAUTIONS FOR PROPER USE

Laser sensor controller

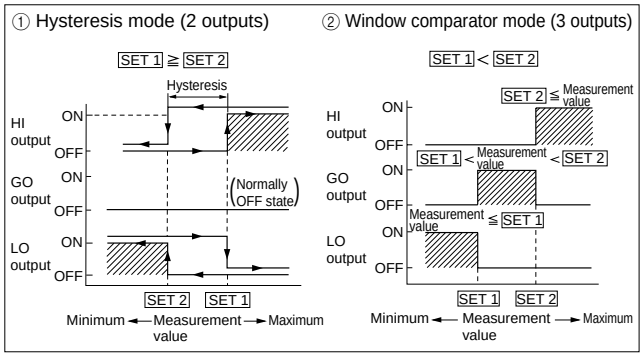
Threshold level setting

• Operation panel description



• Output mode

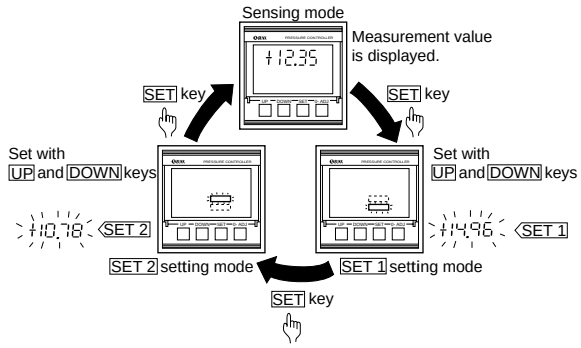
Two output modes are possible depending on the relative magnitudes of SET 1 and SET 2 .



Note: In the window comparator mode, SET 1 and SET 2 should be separated by 2 digits or more.

• Setting method

SET 1 , SET 2 setting modes and Sensing mode can be cyclically selected by pressing the SET key.



• Setting procedure

<Light width indication (indicated with ' + ')>

Step	Setting item	Display mode	Setting procedure
1	Zero-point adjustment	Sensing mode	Press the 0-ADJ key under the Darkest condition (entire beam interrupted).
2	Full-scale adjustment	Sensing mode	Enter the sensor into the Lightest condition (entire beam is received). Turn the span adjuster until the displayed value becomes " + 15.00 ".
3	SET 1 level setting	SET 1 setting mode	Use UP and DOWN keys to set the level of SET 1 . To increase the value, press the UP key. To decrease the value, press the DOWN key. + 19.99 + 19.98 (UP) + 0.00 − 19.98 (DOWN) − 19.99
4	SET 2 level setting	SET 2 setting mode	Set the level of SET 2 with UP and DOWN keys.
5	——	Sensing mode	Press the SET key to complete the setting procedure.

<Interrupted beam width indication (indicated with ' − ')>

After completing Step 2 'Full-scale adjustment' given above, press the 0-ADJ key again.
The subsequent procedure is similar to that for 'Light width indication'.

Note: The output and operation display remain unchanged while SET 1 or SET 2 is adjusted.

★If an error occurs, take the following corrective action.

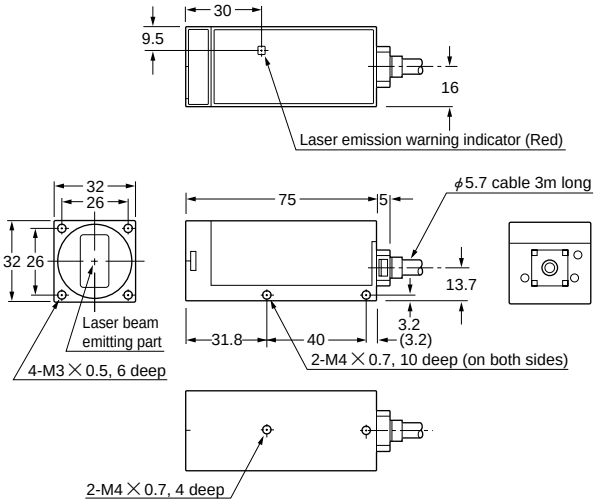
Error code (Note 1)	Cause	Corrective action
Err 1	Short-circuit causing excess current flow.	Turn the power off and check the load.
Err 5	Set value exceeds the possible setting range (± 19.99) during the auto-reference input.	Check the set value.
- - - - (Note 2)	• Input voltage exceeds 5.25V. • The measurement value exceeds the display range (− 19.99 to + 19.99).	• The input voltage should not exceed 5.25V. • Keep the measurement value within the display range.

Notes: 1) The error code blinks in the measurement value display.
2) ' - - - - ' does not blink.
3) Please contact our office if ' Err2 ' is displayed.

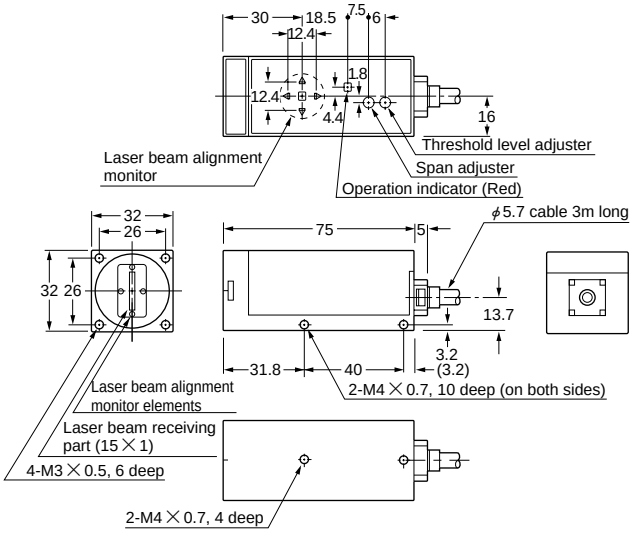
DIMENSIONS (Unit: mm)

LA-510 LA-511 Laser collimated beam sensor

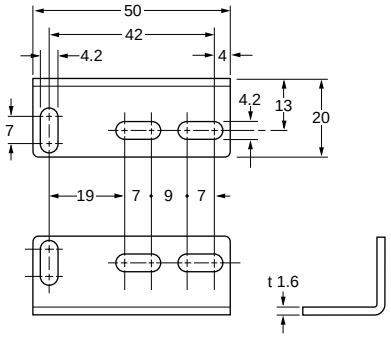
Emitter



Receiver



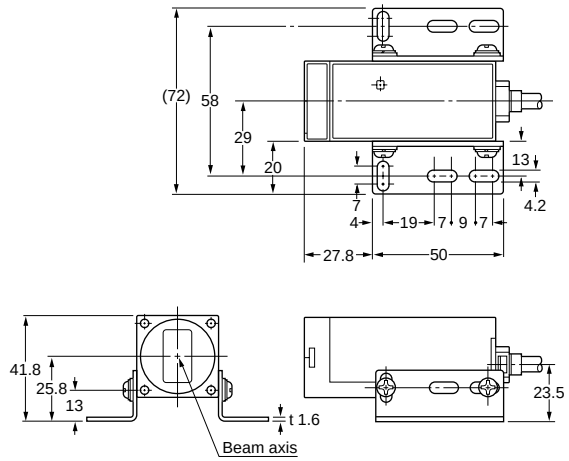
MS-LA1 Sensor mounting bracket (Accessory for **LA-510** and **LA-511**)



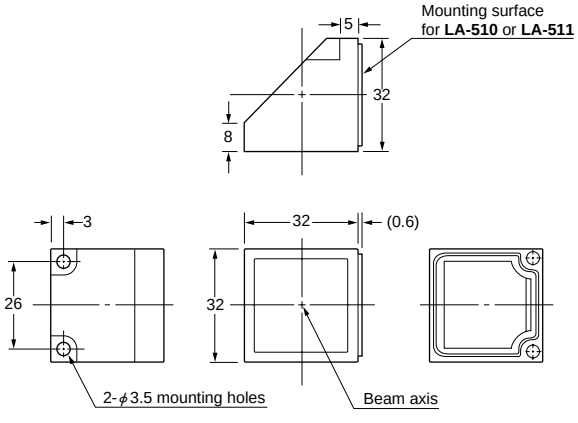
Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

Set of two L-shaped brackets and four M4 (length 8mm) screws with washers

Assembly dimensions



LA-SV1 Side view attachment (Optional)



Material: Glass (Front protection cover, Aluminum evaporated mirror)
Polyetherimide (Enclosure)

Two M3 (length 10mm) screws with washers are attached.

Assembly dimensions