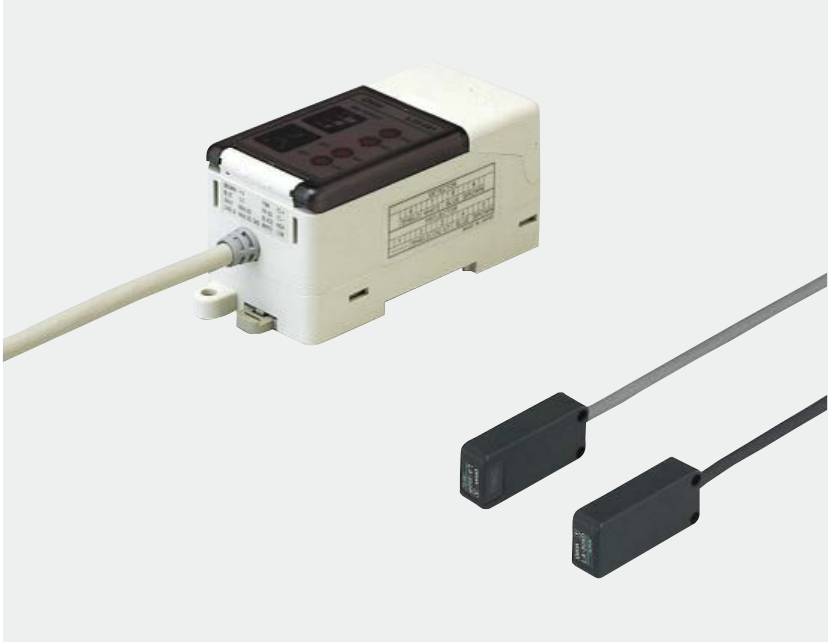
Panasonic
INDUSTRY

LED Collimated Beam Sensor

LA-300 SERIES

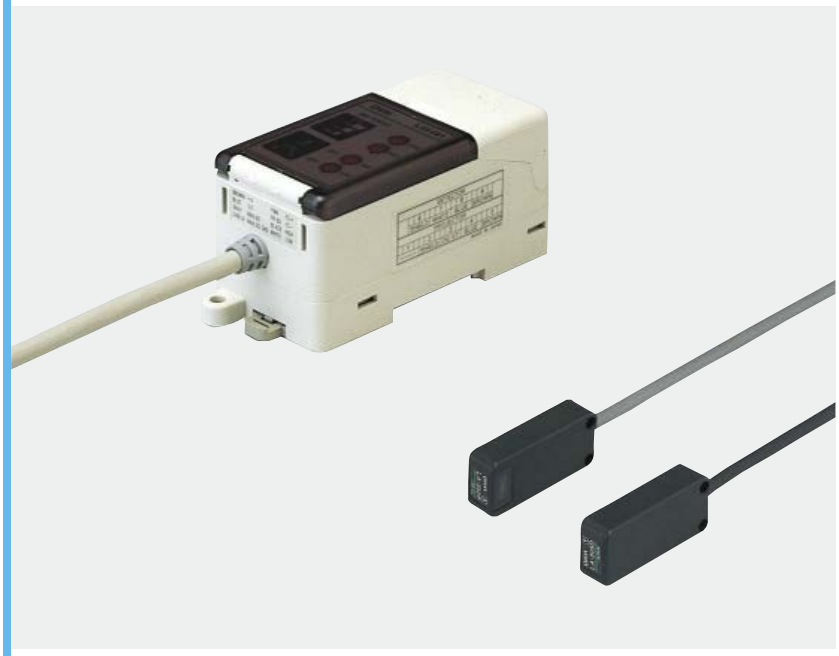


2022.8

* The contents of this catalog are as of October 2017.
For the latest information, please visit our company website.

LED Collimated Beam Sensor

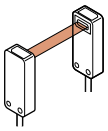
LA-300 SERIES



LED collimated beam type which is as accurate as a laser sensor, but much safer

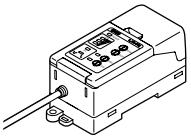
ORDER GUIDE

Sensor heads

Type	Appearance	Sensing range	Sensing width	Minimum sensing object	Model No. (Note)
Slim		300 mm 11.811 in	5 mm 0.197 in	ø0.05 mm ø0.002 in opaque object	**LA-305**

Note: The model No. with suffix "**P**" shown on the label affixed to the product is the emitter, "**D**" shown on the label is the receiver.
(e.g.) Emitter of **LA-305**: **LA-305P**, Receiver of **LA-305**: **LA-305D**

Amplifiers

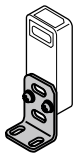
Type	Appearance	Model No.	Output
NPN output		**LA-A1**	NPN open-collector transistor (Judgment output) Analog voltage • Output voltage: 1 to 5 V

Always use the sensor head and the amplifer together as a set.

ORDER GUIDE

Accessories

• **MS-LA3-2**
(Sensor head mounting bracket for **LA-305**)
(Note)



Two M3 (length 15 mm 0.591 in) screws with washers are attached.

Note: 2 sets are required to mount the emitter and the receiver.

OPTIONS

Designation	Model No.	Description
Digital panel controller (Note)	**CA2-T2**	This is a very small controller which allows two independent threshold level settings. • Supply voltage: 24 V DC ±10 % • Output: NPN open-collector transistor • No. of inputs: 1 No. (sensor input) • Input range: 1 to 5 V DC • Main functions: Threshold value setting function, zero-adjust function, scale setting function, hysteresis setting function, start/hold function, auto-reference function, power supply ON-delay function, etc.

Digital panel controller

• **CA2-T2**

Note: If analog voltage output of **LA-A1** is shifted, the input range may be exceeded. In that case, use **CA2-T5** (input range ±10 V).

SPECIFICATIONS

Sensor head

Item \ Type		Slim
Model No.		**LA-305**
CE marking directive compliance		EMC Directive, RoHS Directive
Applicable amplifier		**LA-A1**
Beam width		5 mm 0.197 in
Sensing range		300 mm 11.811 in
Min. sensing object		ø0.05 mm ø0.002 in opaque object
Repeatability		Perpendicular to sensing axis: 0.01 mm 0.0004 in or less
Temperature characteristics		0.2 % F.S./°C or less
Emission indicator		———
Environmental resistance	Pollution degree	3 (Industrial environment)
	Ambient temperature	0 to +40 °C +32 to +104 °F (No dew condensation), Storage: –20 to +70 °C –4 to +158 °F
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
	Ambient illuminance	Incandescent light: 10,000 ℓx or less at the light-receiving face
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude in X, Y and Z directions for two hours each
	Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions three times each
Emitting element		Red LED (Peak emission wavelength 650 nm 0.026 mil, modulated)
Material		Enclosure: Heat-resistant ABS, Cover: Heat-resistant ABS, Front cover: Glass
Cable		0.18 mm² 3-core composite cabtyre cable, 2 m 6.562 ft long
Cable extension		Extension up to total 10 m 32.808 ft is possible, for both emitter and receiver, with 0.18 mm², or more, cable. (Shield wire must be extended with shield wire.)
Net weight		Emitter: 70 g approx., Receiver: 70 g approx.
Accessories		**MS-LA3-2** (Sensor head mounting bracket): 1 set for emitter and receiver, Target label: 2 pcs.

Note: Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.

SPECIFICATIONS

Amplifier

Item \ Type		NPN output type
Model No.		**LA-A1**
Applicable CE marking directives		EMC Directive, RoHS Directive
Applicable sensor head		**LA-305**
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less
Current consumption		120 mA or less (including sensor heads)
Comparative outputs (HIGH, LOW)		NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between comparative output and 0 V) • Residual voltage: 1.5 V or less (at 100 mA sink current) 0.5 V or less (at 16 mA sink current)
	Response time	0.5 ms or less
	Output operation	HIGH output: ON when the received beam level is equal to or lower than HIGH (Over-dark) level LOW output: ON when the received beam level is equal to or higher than LOW (Under-dark) level
	Short-circuit protection	Incorporated
Analog output		Analog voltage • Output voltage: 1 V (Darkest) to 5 V (Lightest) • Output impedance: 75 Ω
	Slew rate	8 V/ms or more
	Temperature characteristics	0.05 % F.S./°C or less
External synchronization		Incorporated (Either gate trigger or edge trigger is selectable)
Indicators	Power	Green LED (lights up when the power is ON)
	Stable incident beam	Three green LEDs (light up in three stages in proportion to the amount of beam received)
	Operation	Two orange LEDs (light up when High and Low comparative outputs are ON, respectively)
	External synchronization	Green LED (lights up when the comparative outputs are effective)
Adjusters	Span	15-turn adjuster sets the span for the analog output voltage
	Shift	15-turn adjuster sets the offset for the analog output voltage
	HIGH (Over-dark) level	15-turn adjuster sets the HIGH output threshold level (Over-dark level)
	LOW (Under-dark) level	15-turn adjuster sets the LOW output threshold level (Under-dark level)
Environmental resistance	Ambient temperature	0 to +50 °C +32 to +122 °F (No dew condensation allowed), Storage: –20 to +70°C –4 to +158 °F
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH
	Voltage withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude in X, Y and Z directions for two hours each
	Shock resistance	500 m/s² acceleration (50 G approx.) in X, Y and Z directions three times each
Material		Enclosure: Heat-resistant ABS, Terminal cover: Heat-resistant ABS, Front cover: Polycarbonate
Cable		0.22 mm² (shield wire: 0.15 mm²) 7-core composite cabtyre cable, 2 m 6.562 ft long
Cable extension (Note 2)		Extension up to total 50 m 164.042 ft is possible with 0.22 mm², or more, cable. (Shield wire must be extended with 0.15 mm², or more, shield wire.)
Weight		Net weight: 200 g approx.
Accessory		Adjusting screwdriver: 1 pc.

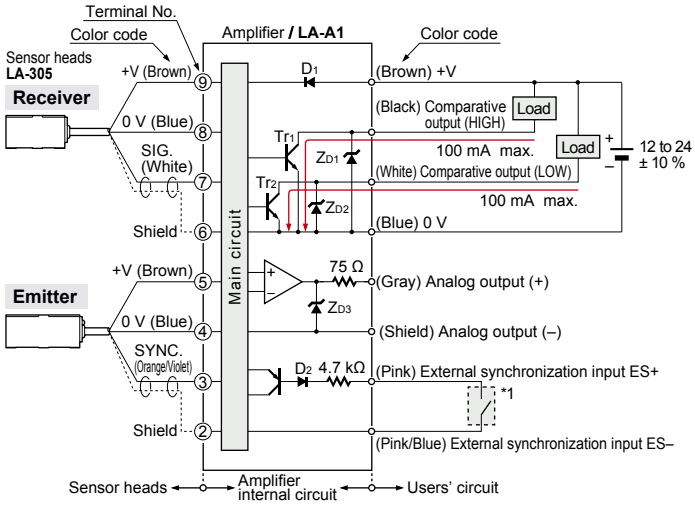
Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +20 °C +68 °F.
2) This product is CE compliant and complies with EMC directives. EN 61000-6-2 is the applicable standard that covers immunities relating to use of this product, but in order to comply with this standard, the following conditions must be satisfied.

Conditions

- The amplifier should be connected less than 10 m 32.808 ft from the power supply.
- The signal line to connect with the amplifier should be less than 30 m 98.425 ft.

I/O CIRCUIT DIAGRAMS

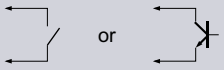
LA-A1 — NPN output type



Symbols ... D_1: Reverse supply polarity protection diode
D_2: Input protection diode
Z_{D1}, Z_{D2}, Z_{D3}: Surge absorption zener diode
Tr_1, Tr_2: NPN output transistor

* 1

Non-voltage contact or NPN open-collector transistor



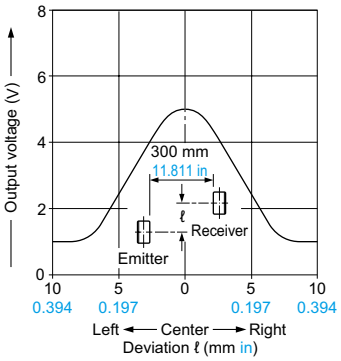
- External synchronization input (Voltage between ES+ and ES–)
  Low: 0 to 1 V
  High: +V or open

Notes: 1) When ES+ (pink) and ES– (pink/blue) of external synchronization input are connected, both HIGH and LOW comparative outputs are triggered in the mode selected by the external synchronization selection switch.
If the external synchronization function is not used, always short-circuit ES+ and ES– and set the external synchronization selection switch to gate trigger.
2) To use the analog output (gray), choose a device with an input impedance of 1 MΩ, or more, and connect the shield wire of the analog output to 0 V (common input) of the device.
3) Insulate all unused wires individually to avoid miscontact.

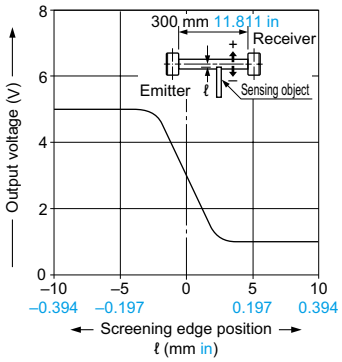
SENSING CHARACTERISTICS (TYPICAL)

LA-305 — Slim type

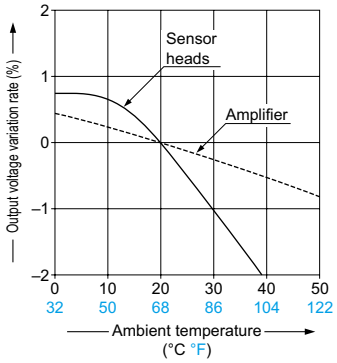
Correlation between transverse deviation and output voltage



Correlation between interrupted beam width and output voltage



Correlation between ambient temperature and output voltage variation rate



PRECAUTIONS FOR PROPER USE

- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

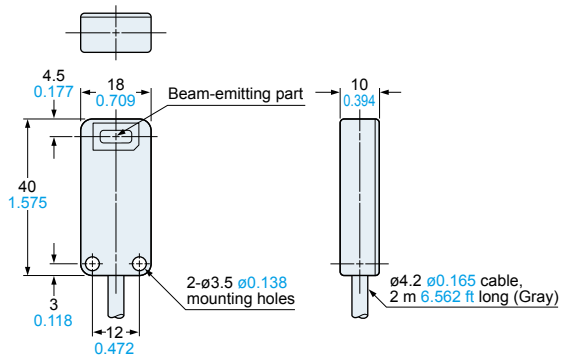
Others

- The sensor's output is proportional to the amount of the LED light received. Since there is some variation in the light intensity at the center and the periphery of the sensing area, take care that "output = dimension" may not hold.
- For stable operation, use the sensor 10 min., or more, after switching on the power supply.
- Keep the front faces of the sensor heads free of dust, dirt, metal powder, etc. Should the faces be covered with it, deteriorating its performance, wipe them clean with a soft cloth or blown air.

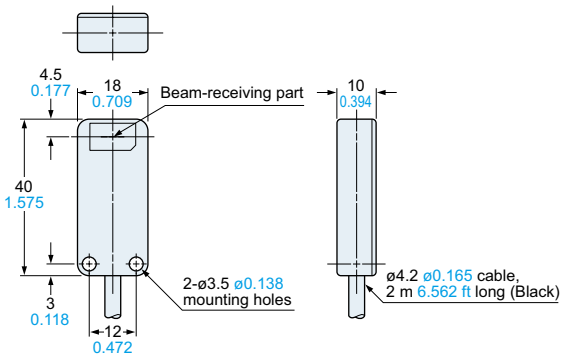
DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

LA-305 Sensor head

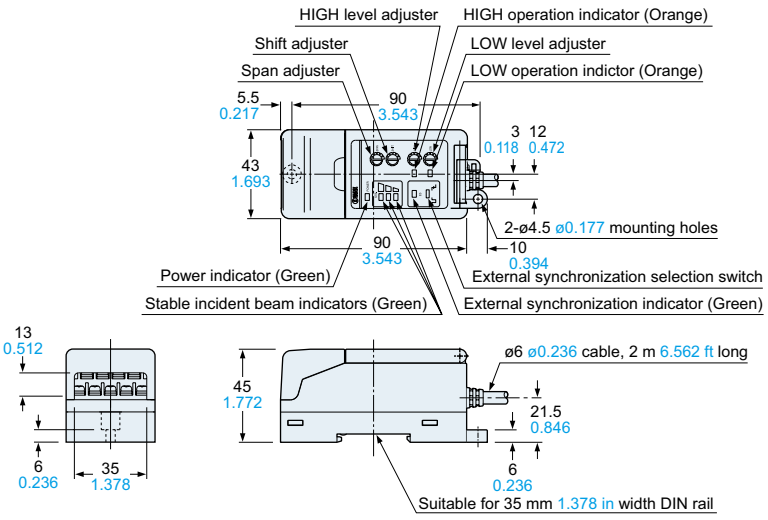


Emitter



Receiver

LA-A1 Amplifier

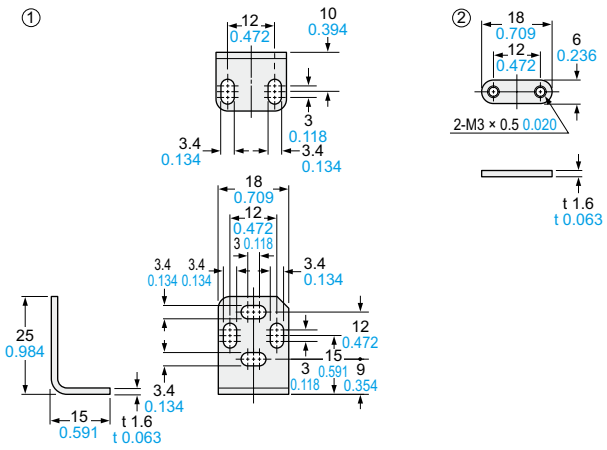


DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

MS-LA3-2

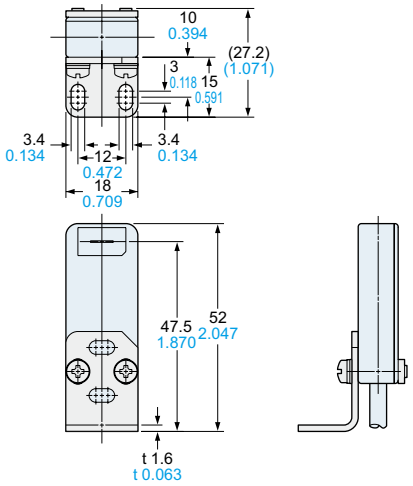
Sensor head mounting bracket for **LA-305** (Accessory for **LA-305**)



Material: Cold rolled carbon steel (SPCC-P3)
(Uni-chrome plated)

Two M3 (length 15 mm 0.591 in) screws with washers are attached.

Assembly dimensions



Disclaimer

The applications described in the catalog are all intended for examples only. The purchase of our products described in the catalog shall not be regarded as granting of a license to use our products in the described applications. We do NOT warrant that we have obtained some intellectual properties, such as patent rights, with respect to such applications, or that the described applications may not infringe any intellectual property rights, such as patent rights, of a third party.

Panasonic
INDUSTRY

Panasonic Industry Co., Ltd.
Industrial Device Business Division
7-1-1, Morofuku, Daito-shi, Osaka 574-0044, Japan
industrial.panasonic.com/ac/e/

Specifications are subject to change without notice.
Printed in Japan
2022.8