Laser Type Edge Detection Sensor

LD SERIES

Related Information
■ General terms and conditions..... F-3
■ About laser beam..... P.1593~
■ Selection guide ..... P.1021~
■ General precautions..... P.1595

panasonic.net/id/pidsx/global

CE

FDA
Conforming to FDA regulations (**LD-601** only)

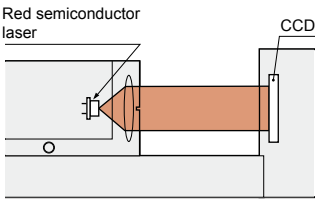
This product is classified as a Class 1 Laser Product in IEC / JIS standards and a Class II Laser Product in FDA regulations.
Do not look at the laser beam though optical system such as a lens.

Easy measurement of outer diameter

BASIC PERFORMANCE

High accuracy measurement

A red semiconductor laser is used as the emitting device and CCD is used as the receiving device. An ideally parallel optical beam is emitted enabling high accuracy measurement.



Safety countermeasures not required

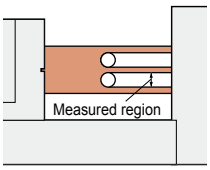
Safety counter measures, such as protective gear, etc., are not required since **LD-600** uses a Class 1 laser as per IEC standards, and **LD-601** uses a Class II laser as per FDA regulations.

FUNCTIONS

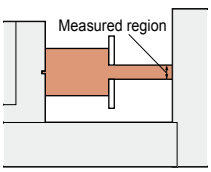
Various applications

The sensor can be used for various applications with its binary data output with four different sensing modes.

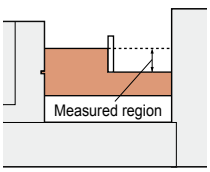
①**Width measurement / Dark mode**
The first dark region from the lower side of the measurement region is measured.



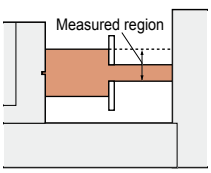
②**Width measurement / Light mode**
The first light region from the lower side of the measurement region is measured.



③**Edge measurement / Dark mode**
The first dark edge from the lower side of the measurement region is sensed and the width from the dark edge to the upper side of the measurement region is measured.



④**Edge measurement / Light mode**
The first light edge from the lower side of the measurement region is sensed and the width from the light edge to the upper side of the measurement region is measured.



Stable sensing

Shading correction function which compensates for receiver sensitivity variation and generates a uniform sensitivity distribution has been incorporated. Stable sensing over extended time periods is possible.

VARIETIES

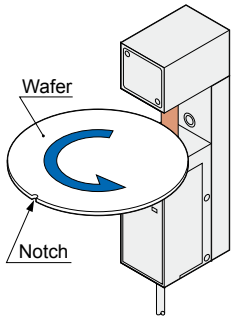
FDA regulation conforming

FDA regulation (Class II) conforming model **LD-601** is available.

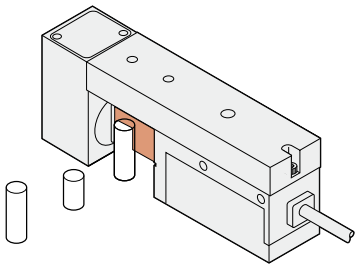
FIBER SENSORS
LASER SENSORS
PHOTOELECTRIC SENSORS
MICRO PHOTOELECTRIC SENSORS
AREA SENSORS
SAFETY LIGHT CURTAINS / SAFETY COMPONENTS
PRESSURE / FLOW SENSORS
INDUCTIVE PROXIMITY SENSORS
PARTICULAR USE SENSORS
SENSOR OPTIONS
SIMPLE WIRE-SAVING UNITS
WIRE-SAVING SYSTEMS
MEASUREMENT SENSORS
STATIC CONTROL DEVICES
LASER MARKERS
PLC
HUMAN MACHINE INTERFACES
ENERGY MANAGEMENT SOLUTIONS
FA COMPONENTS
MACHINE VISION SYSTEMS
UV CURING SYSTEMS
Selection Guide
Laser Displacement
Magnetic Displacement
Contact Displacement
Collimated Beam Sensors
Metal-sheet Double-feed Detection
Digital Panel Controller
Other Products
HL-T1
LD
LA

APPLICATIONS

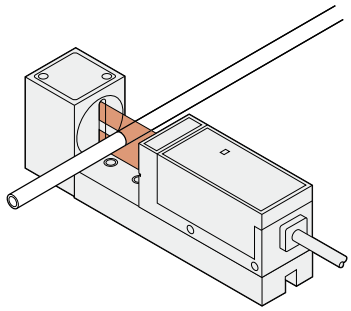
Sensing inclination or notch of wafer



Judging height of small objects



Measuring pipe's outer diameter



ORDER GUIDE

Sensor heads

Appearance	Distance between emitter and receiver	Sensing width	Min. sensing object	Model No.	Applicable standards
	40 mm 1.575 in (fixed)	15 mm 0.591 in	ϕ0.5 mm ϕ0.020 in	**LD-600**	IEC / JIS
				LD-601	FDA / IEC / JIS

Controller

Appearance	Model No.	Output
	**LD-C60**	NPN open-collector transistor

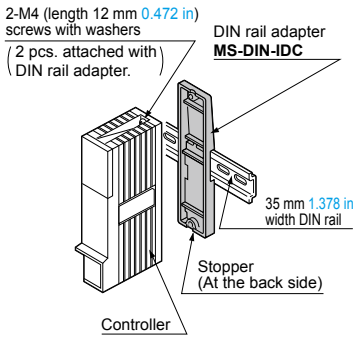
Make sure to use the sensor head and the controller as a set.

OPTIONS

Designation	Model No.	Description
DIN rail adapter	**MS-DIN-IDC**	Adapter for mounting the controller on a 35 mm 1.378 in width DIN rail

DIN rail adapter

・**MS-DIN-IDC**



SPECIFICATIONS

Sensor heads

Item \ Model No.	LD-600	LD-601
CE marking directive compliance	EMC Directive, RoHS Directive	
Applicable controller	**LD-C60**	
Distance between emitter and receiver	40 mm 1.575 in (fixed)	
Sensing width	15 mm 0.591 in (beam width: 20 mm 0.787 in)	
Min. sensing object	ø0.5 mm ø0.020 in	
Resolution	11 µm 0.433 mil	
Scan time	0.6 ms approx.	
Emitting element	Red semiconductor laser Class 1 (IEC / JIS standards) (Max. output: 0.2 mW, Peak emission wavelength: 670 nm 0.026 mil)	Red semiconductor laser Class II (FDA regulations) (Max. output: 0.2 mW, Peak emission wavelength: 670 nm 0.026 mil) (IEC / JIS standards: Class 1)
Power indicator	Red LED (lights up when the power is ON)	——
Laser emission indicator	——	Green LED (Lights up during laser emission)
Ambient temperature	0 to +40 °C +32 to +104 °F (No dew condensation allowed) Storage: –10 to +60 °C +14 to +140 °F	
Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH	
Enclosure earthing	Capacitor earth	
Material	Emitter enclosure: Die-cast zinc Receiver enclosure: Aluminum, Base: Aluminum Top cover: PPO, Front protection cover: Glass	
Cable	6-core (0.22 mm² × 4, 0.18 mm² × 2) cabtyre cable, 1 m 3.281 ft long (with connector on one end)	
Weight	Net weight: 420 g approx.	
Accessories	M4 (length 12 mm 0.472 in) hexagon-socket-head bolt: 2 pcs.	M4 (length 12 mm 0.472 in) hexagon-socket-head bolt: 2 pcs. Laser attenuator: 1 pc.

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

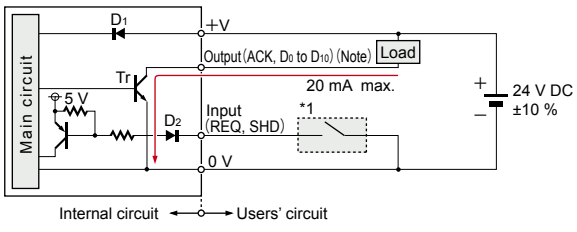
Controller

Item \ Model No.		LD-C60
CE marking directive compliance		EMC Directive, RoHS Directive
Applicable sensor heads		**LD-600**, **LD-601**
Sensing modes		Width measurement, edge measurement
Measuring accuracy		Width measurement: ±44 µm ±1.732 mil Edge measurement: ±22 µm ±0.866 mil
Supply voltage		24 V DC ±10 % Ripple P-P 10 % or less
Current consumption		250 mA or less (including sensor head)
Inputs (REQ, SHD)		Signal conditions: Low...0 to 1 V High...5 to 30 V, or open Applied voltage: 30 V DC or less
Outputs (ACK, D0 to D10)		NPN open-collector transistor • Maximum sink current: 20 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1 V or less (at 20 mA sink current)
	Output operation	ACK: ON during data output, D0 to D10: pixel binary output
Response time		1.2 ms or less
Indicators	Power	Red LED (lights up when the power is ON)
	REQ	Red LED (lights up when the REQ input is Low)
	ACK	Red LED (lights up when the ACK output is ON)
Measurement display		4 digit LED (letter height 8 mm 0.315 in)
	Display resolution	10 µm 0.394 mil
Ambient temperature		0 to +40 °C +32 to +104 °F (No dew condensation allowed) Storage: –10 to +60 °C +14 to +140 °F
Ambient humidity		35 to 85 % RH, Storage: 35 to 85 % RH
Material		Enclosure: ABS, Front panel: ABS Display panel: Polycarbonate, Terminal cover: Polycarbonate
Weight		Net weight: 230 g approx.
Accessory		Connector: 1 pc.

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

I/O CIRCUIT AND WIRING DIAGRAMS (CONTROLLER)

I/O circuit diagram



Symbols…D1: Reverse supply polarity protection diode
D2: Reverse current protection diode
Tr : NPN output transistor

Note: Insulate all unused wires individually to avoid miscontact.

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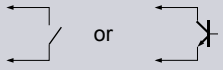
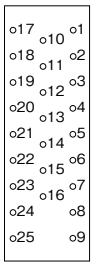
Non-voltage contact or NPN open-collector transistor



- Input (REQ, SHD)
  Low : 0 to 1 V
  High: 5 to 30 V, or open

I/O Terminal Arrangement



Attached connector
Solder side

Pin No.	Symbol	I/O	Description	Pin No.	Symbol	I/O	Description
1	REQ	Input	Data output request	14	D4	Output	Data (2^4)
2	ACK	Output	Data being output	15	D5	Output	Data (2^5)
3	SHD	Input	Shading correction	16	D6	Output	Data (2^6)
4	——	——	Not connected	17	D7	Output	Data (2^7)
5	——	——	Not connected	18	D8	Output	Data (2^8)
6	——	——	Not connected	19	D9	Output	Data (2^9)
7	——	——	Not connected	20	D10	Output	Data (2^{10})
8	G	——	0 V	21	——	——	Not connected
9	G	——	0 V	22	——	——	Not connected
10	D0	Output	Data (2^0)	23	——	——	Not connected
11	D1	Output	Data (2^1)	24	G	——	0 V
12	D2	Output	Data (2^2)	25	G	——	0 V
13	D3	Output	Data (2^3)				

PRECAUTIONS FOR PROPER USE

Refer to p.1595 for general precautions and p.1593~ for information about laser beam.

- This catalog is a guide to select a suitable product. Be sure to read instruction manual attached to the product prior to its 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.

- This product is classified as a Class 1 Laser Product in IEC / JIS standards and a Class II Laser Product in FDA regulations. Do not look at the laser beam though optical system such as a lens.
- The following label is attached to the product. Handle the product according to the instruction given on the warning label.

The English warning label based on FDA regulations is pasted on the FDA regulations conforming type.

- This product has been designed to meet the specifications when a sensor is used along with the optional exclusive controller. If a controller other than the exclusive controller is used, not only the specifications may not be met, but it may also be a cause for malfunction or break down. Hence, please ensure to use this product along with the optional exclusive controller.
- Before using this product, please allow a warming up time of 3 min. approx. after the power supply is switched on.
- Never disassemble the sensor head.

Safety standards for laser beam products

- A laser beam can harm human being's eyes, skin, etc., because of its high energy density. IEC has classified laser products according to the degree of hazard and the stipulated safety requirements.
  The **LD** series is classified as Class 1 laser.

Classification by IEC 60825-1

Classification	Description
Class 1	Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing.

Note: **LD-601** conforms to FDA Class II.

Note: Refer to p.1594 for information about Laser Beam for the classification in FDA regulations.

Safe use of laser products

- For the purpose of preventing users from suffering injuries by laser products, IEC 60825-1 (Safety of laser products).
  Please check the standards before use.
  (Refer to p.1593~ for information about laser beam.)

Conditions in use for CE conformity

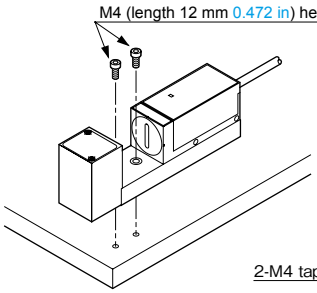
- The **LD** series is CE compliant and complies with EMC directives. EN 61000-6-2 is the applicable standard that covers immunities relating to use of this product, but in order to comply with this standard, the following conditions must be satisfied.

Conditions

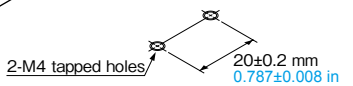
- This controller should be connected less than 10 m 32.808 ft from the power supply.
- The signal line to connect with this controller should be less than 30 m 98.425 ft.

Mounting

- Mount the sensor head using the attached 2 pcs. M4 (length 12 mm 0.472 in) hexagon-socket-head bolts, with a tightening torque of 1.2 N·m or less.

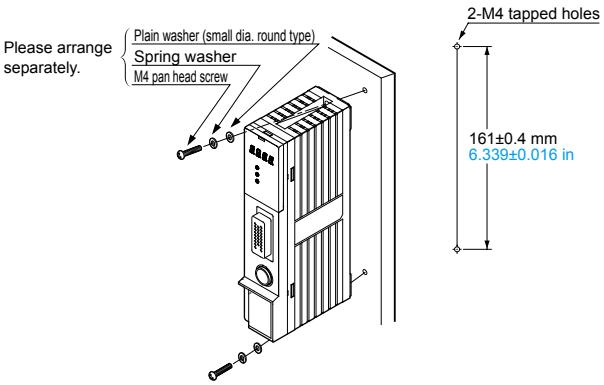


Mounting hole dimensions



- Mount the controller using 2 pcs. M4 pan head screws, with a tightening torque of 1.2 N·m or less.

Mounting hole dimensions



PRECAUTIONS FOR PROPER USE

Refer to p.1595 for general precautions and p.1593~ for information about laser beam.

Wiring

- Make sure that the power supply is off while wiring.
- Verify that the supply voltage variation is within the rating.
- Make sure to use an isolation transformer for the power supply. It an auto-transformer (single winding transformer) is used, this product or the power supply may get damaged.
- In this sensor head, capacitor earth is used to enhance the noise characteristics. In case there is a high frequency noise generating equipment, such as, an ultrasonic welding machine, etc., near the sensor head and if the mounting base is electrically conducting (metallic, etc.), then insulate the sensor head from the mounting base.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of the sensor head or the controller, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- In case a surge is generated in the used power supply, connect a surge absorber to the supply and absorb the surge.
- Do not run the wires together with high-voltage lines or power lines or put them in the same raceway. This can cause malfunction due to induction.
- In order to reduce noise, make the wiring as short as possible.

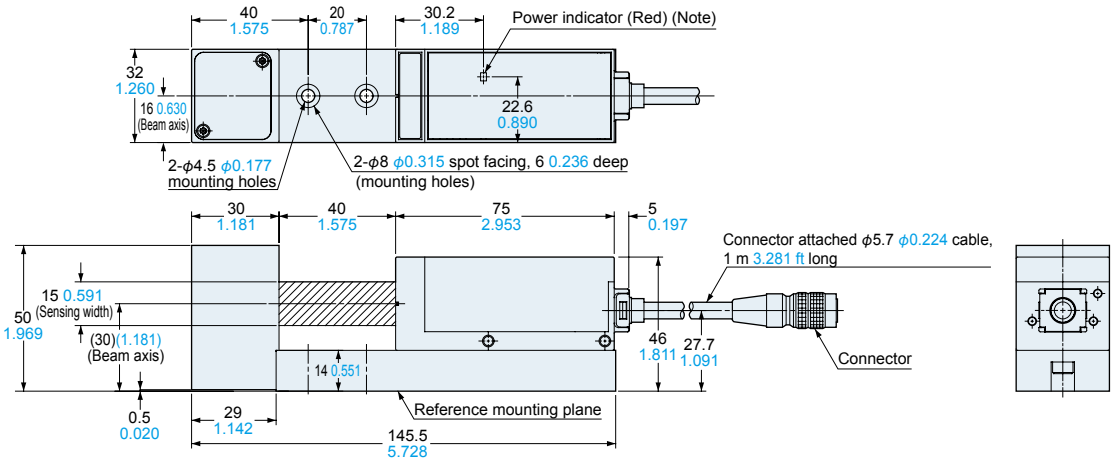
Others

- This product is not a measuring instrument. Hence, the company does not offer any calibration services.
- Do not allow any water, oil, fingerprints, etc., which may refract light, or dust, dirt, etc., which may block light, to stick to the emitting / receiving surfaces of the sensor head. In case they are present, wipe them with a clean, soft cloth or lens paper.
- Avoid dust, dirt, and steam.
- Take care that the sensor head and the controller does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- Take care that the sensor head and the controller are not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency lighting device, as it may affect the sensing performance.

DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

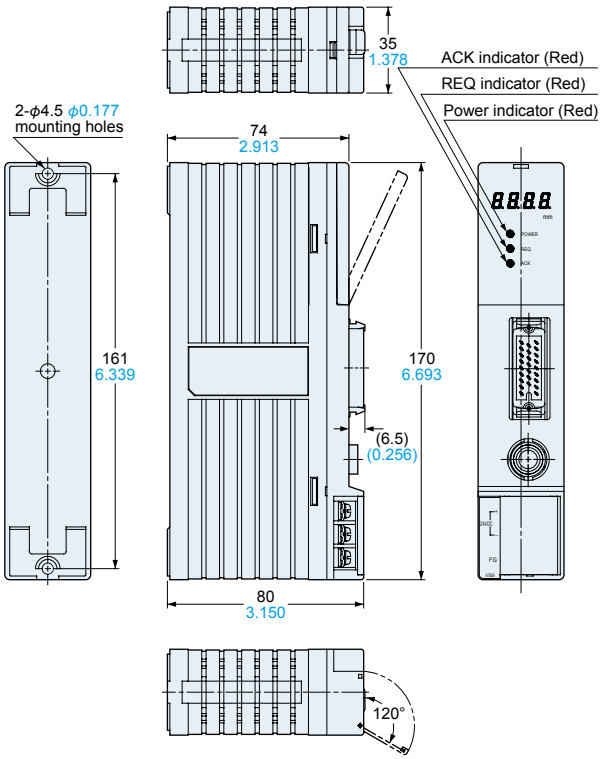
LD-600 LD-601 — Sensor head



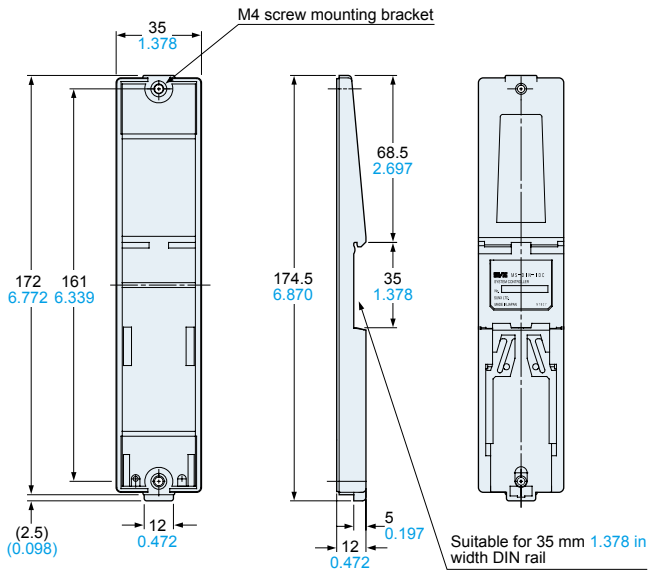
Two M4 (length 12 mm 0.472 in) hexagon-socket-head bolts are attached.

Note: In **LD-601**, this is the laser emission indicator (green).

LD-C60 — Controller



MS-DIN-IDC — DIN rail adapter (Optional)



Two M4 (length 12 mm 0.472 in) screws with washers are attached.

单击下面可查看定价，库存，交付和生命周期等信息

>>Panasonic(松下)