

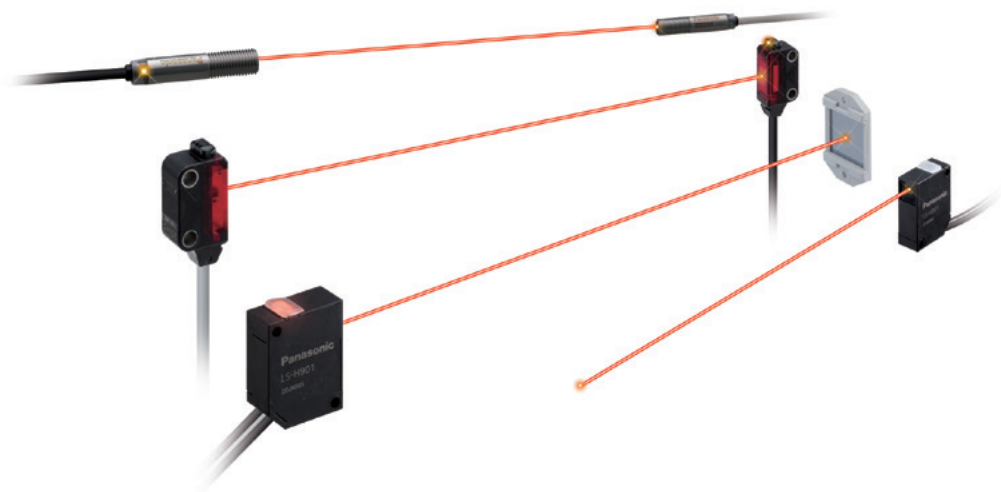
Amplifier-separated Type
Digital Laser Sensor
LS-500 SERIES



Industry's smallest*

Laser sensor head

LASER CLASS 1



- Connectable to CC-Link
Communication unit **SC-GU3-01**
- Connectable to DeviceNet
Communication unit **SC-GU3-02**
- Connectable to EtherCAT
Communication unit **SC-GU3-03**
- Connectable to CC-Link IE Field
Communication unit **SC-GU3-04**



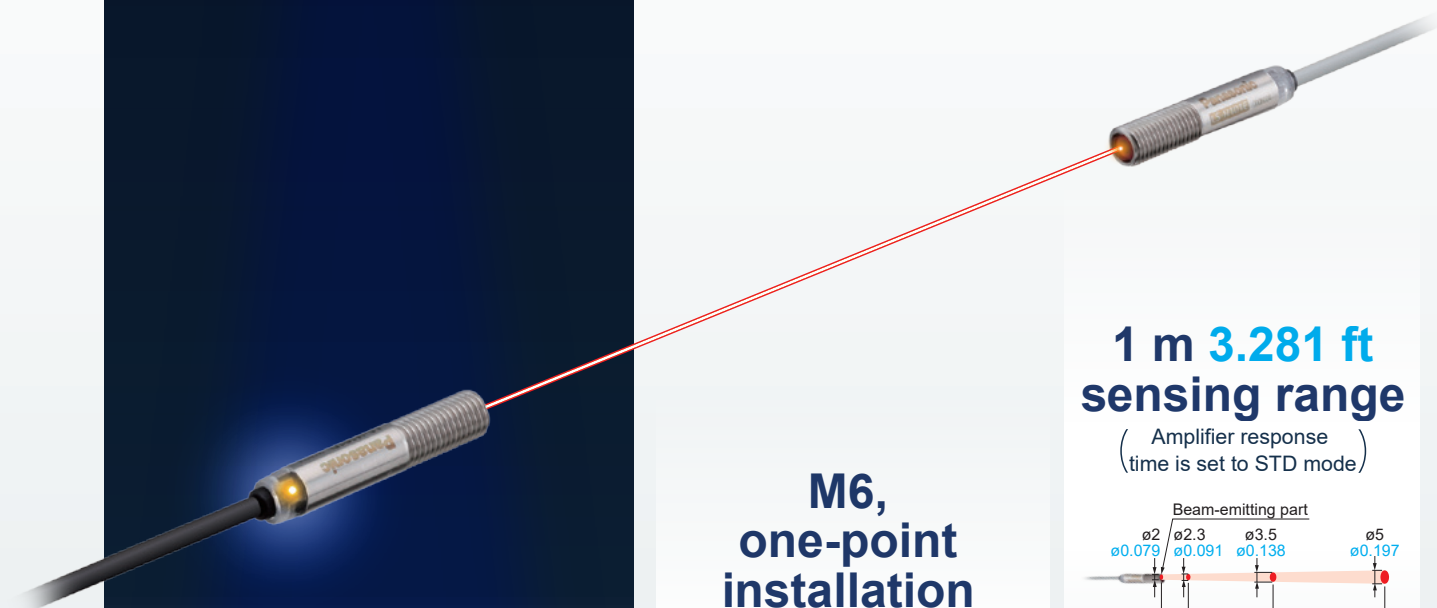
* Smallest amplifier-separated type laser sensor head as of March 2024
based on research conducted by our company

Industry's smallest* head



Stainless
steel (SUS)
enclosure

Featuring stainless steel
(SUS) enclosure that won't
break when bumped during
installation or maintenance.

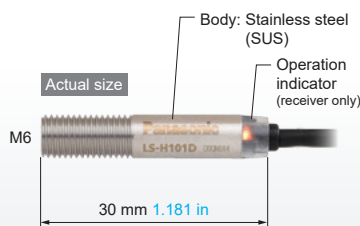


Thru-beam
M6 Cylindrical type

LS-H101

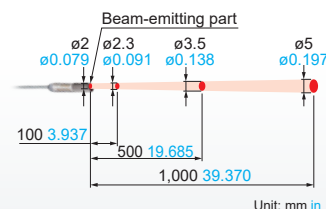
M6, one-point installation

Features an easy-to-install
design.

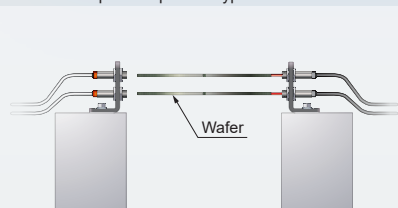


1 m 3.281 ft
sensing range

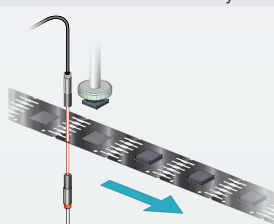
(Amplifier response
time is set to STD mode)



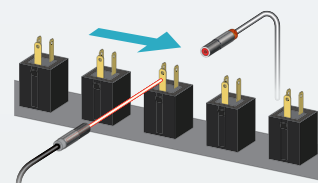
* Smallest amplifier-separated type laser sensor head as of March 2024 based on research conducted by our company



Wafer presence detection



Lead frame positioning



Workpiece orientation detection

Industry's smallest* head



IP67



Thru-beam
Square type

LS-H102

Featuring waterproof IP67
to allow use in the
presence of large amounts
of water or dust.

Simple positioning

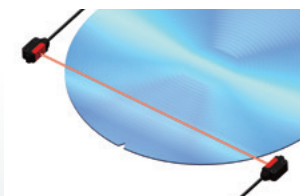
Check the optimal light receiving
position at a glance while watching
the red spot on the beam axis
adjustment screen.



1 m 3.281 ft sensing range

(Amplifier response
time is set to STD mode)

Delivers sufficient sensing range
for use with 450 mm
17.717 in wafers.



Two-point installation

The thru-beam type **LS-H102**
features the same form as the
EX-L200 amplifier built-in
ultra-compact laser sensor.
And it can be used as an
EX-L200 with a digital indicator.

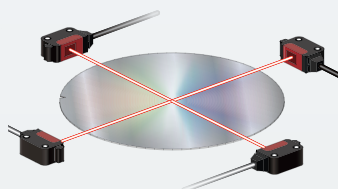


LS-H102

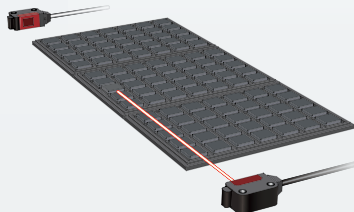
EX-L211 / EX-L212

Same installation
pitch as the **EX-L200**
series

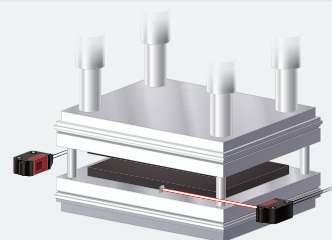
* Smallest amplifier-separated type laser sensor head as of March 2024 based on research conducted by our company



Wafer inclination detection



IC float detection



Detection of residual matter inside molds

Industry's smallest* head



Thinnest
profile



Coaxial reflective type

LS-H201

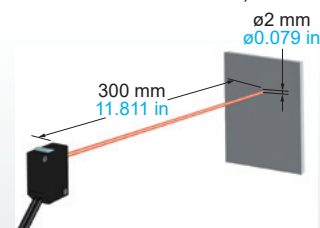
Featuring a 60% smaller design (by volume) than previous coaxial reflective models, our smallest unit is smaller in every dimension at just W8 × H23 × D18 mm

W0.315 × H0.906 × D0.709 in (excluding indicators)*



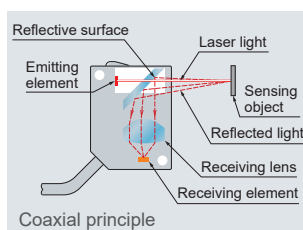
Small, long-range spot

The **LS-H201** produces a spot of $\varnothing 2$ mm $\varnothing 0.079$ in at a sensing range of up to 300 mm **11.811 in** (amplifier response time is set to STD mode).

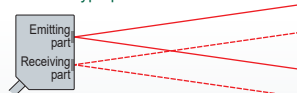


Coaxial design

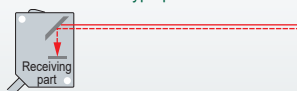
By using a laser which goes straight in a coaxial design, the **LS-H201** is able to detect stably in confined spaces and simple installation can be achieved.



Reflective type photoelectric sensor



Coaxial reflective type photoelectric sensor

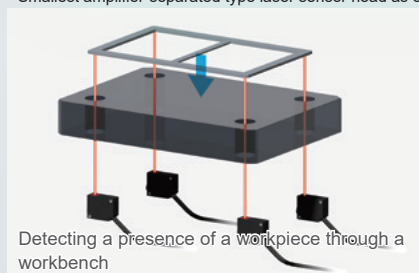


Easy-to-see operation indicator

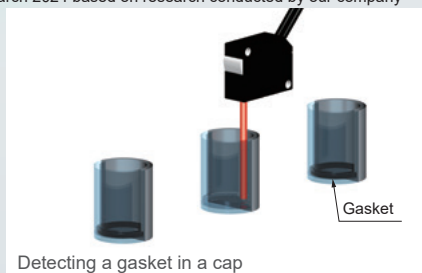
Visible from all directions.



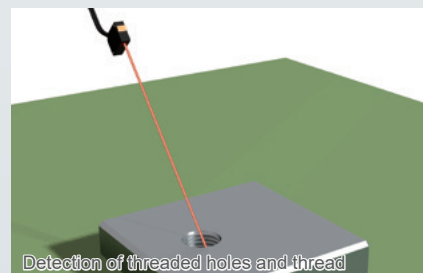
* Smallest amplifier-separated type laser sensor head as of March 2024 based on research conducted by our company



Detecting a presence of a workpiece through a workbench



Detecting a gasket in a cap

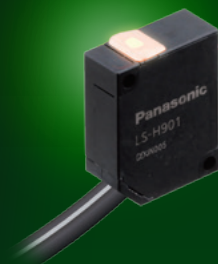


Detection of threaded holes and thread

Industry's smallest* head



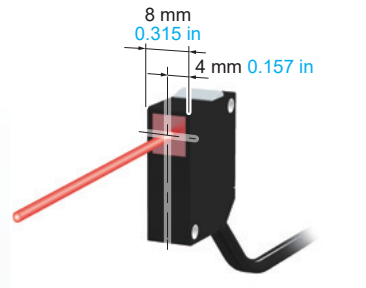
Horizontal
symmetry



Coaxial retroreflective type

LS-H901

The light source is positioned in the center of the sensor head, which helps to design easier.



**Sensing range
of 10 mm to 1 m
0.394 in to 3.281 ft**

(Amplifier response
time is set to STD mode)

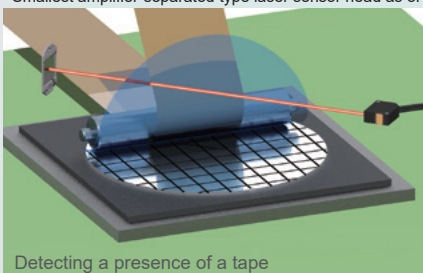
Good to perform detection at
close range.



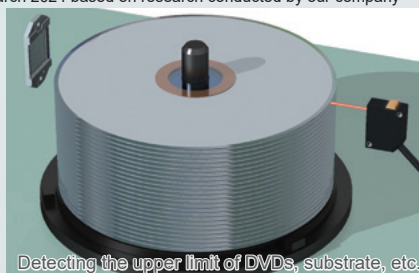
**Industry's
smallest* and
thinnest design**

Size just as thin as W8 × H23
(excluding indicators) × D18 mm
W0.315 × H0.906 × D0.709 in.

* Smallest amplifier-separated type laser sensor head as of March 2024 based on research conducted by our company



Detecting a presence of a tape

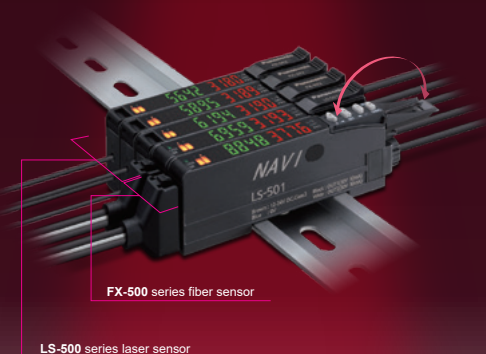


Detecting the upper limit of DVDs, substrate, etc.



Detecting a presence of a bottle

Among
industry's
fastest
response times*
60 μ s



Amplifier

LS-500 series

Enhanced compatibility with fiber sensors in shape and operability. It is easier to select and add laser sensors which have a lot of convenient features in common with fiber sensors.

Increased compatibility with fiber sensors

The LS-500 series features the same operation, menu displays, and shape.

Detection of beam axis misalignment Dual outputs (self-diagnosis output)

Light intensity deterioration due to dust accumulation can be notified as an alarm output. Output 2 can be set to self diagnosis output. When the teaching of output 1's threshold value is carried out, output 2 is set concurrently with the setting randomly shifted by the amount of surplus of threshold value.

Stable sensing over the long term

Equipped with the threshold value tracking function. This contributes to maintain stable detection over the long term as well as to reduce maintenance man-hours. In order to track the light amount change due to environmental factors (such as dust accumulation), the incident light intensity can be checked in a certain cycle and threshold value is reset automatically.

Logic operations

Three logic operations (AND, OR, XOR) can be performed with laser sensor only. A dedicated controller is not required and the wire saving and cost reduction are both achieved. Compatible with the FX-500 series.

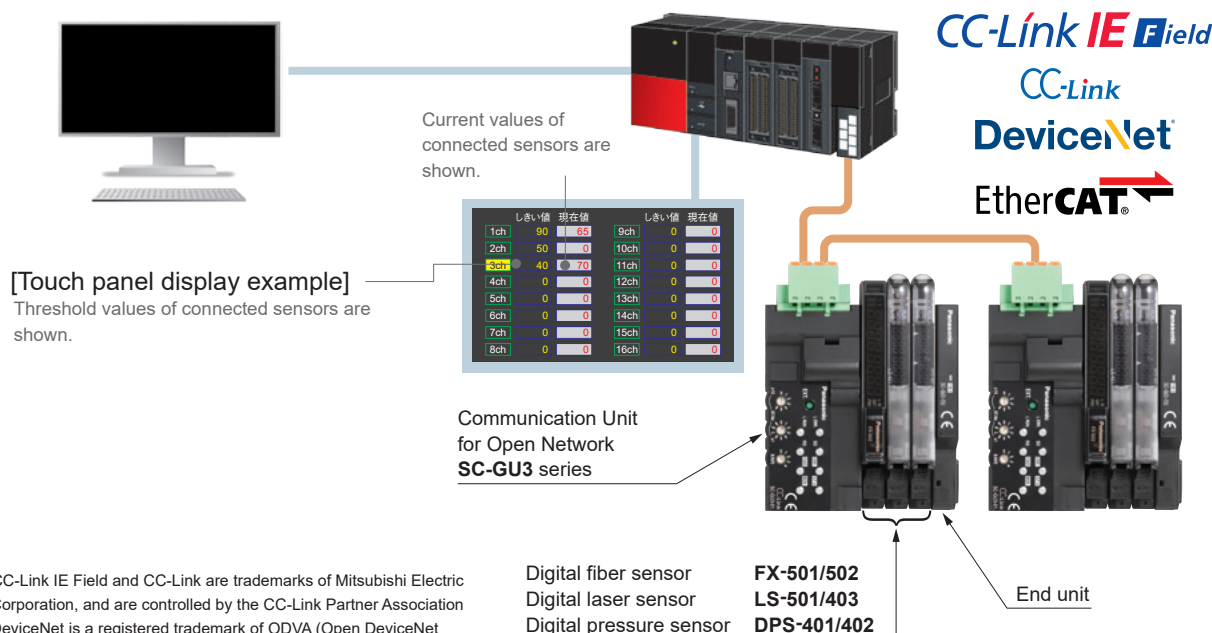
Data bank

Eight sets of amplifier settings can be stored in the unit's built-in memory. The ability to save and load settings reduces workload when changing the setup in a multi-model production environment.

* Smallest amplifier-separated type laser sensor head as of March 2024 based on research conducted by our company

Network communication possible

Can connect to Open Network CC-Link IE Field / CC-Link / DeviceNet / EtherCAT via Communication Unit for Open Network SC-GU3 series. Monitoring and various settings can be done from PLC, PC, etc.



*CC-Link IE Field and CC-Link are trademarks of Mitsubishi Electric Corporation, and are controlled by the CC-Link Partner Association. DeviceNet is a registered trademark of ODVA (Open DeviceNet Vender Association, Inc.). EtherCAT is a registered trademark of Beckhoff Automation GmbH.

* Refer to our website for details of each sensor.

ORDER GUIDE

Sensor heads

Type	Appearance	Model No.	Sensing range ■ : HYPR ■ : U-LG ■ : LONG ■ : STD ■ : FAST ■ : H-SP
Thru-beam type	Cylindrical	LS-H101	1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft
	Square	LS-H102	1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft 1 m 3.281 ft
Coaxial reflective type		LS-H201	750 mm 29.528 in 600 mm 23.622 in 450 mm 17.717 in 300 mm 11.811 in 200 mm 7.874 in 150 mm 5.906 in
Coaxial retroreflective type		LS-H901	0.01 to 2.5 m 0.033 to 8.202 ft 0.01 to 2 m 0.033 to 6.562 ft 0.01 to 1.5 m 0.033 to 4.921 ft 0.01 to 1 m 0.033 to 3.281 ft 0.01 to 1 m 0.033 to 3.281 ft 0.01 to 1 m 0.033 to 3.281 ft

5 m 16.404 ft cable length type

5 m 16.404 ft cable length types (standard: 2 m 6.562 ft) are available. When ordering this type, add “-C5” at the end of the model number.

LS-H101-C5

LS-H102-C5

LS-H201-C5

LS-H901-C5



Package without reflector

The LS-H901 is also available without a reflector (RF-330).

When ordering this type, add “-Y” at the end of the model number.

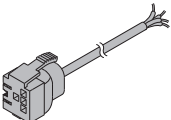
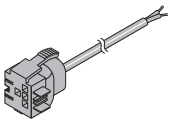
LS-H901-Y

Amplifiers


Type	Appearance	Model No.	Output	Connection method
Connector type		LS-501	NPN open-collector transistor two outputs	Use quick-connection cable (optional)
		LS-501P	PNP open-collector transistor two outputs	
Cable type (With external input)		LS-501-C2	NPN open-collector transistor two outputs	2 m 6.562 ft cabtyre cable (6-core) included Cable outer diameter: ø4 mm ø0.157 in
		LS-501P-C2	PNP open-collector transistor two outputs	

Quick-connection cables

Quick-connection cable is not supplied with the connector type amplifier. Please order it separately.

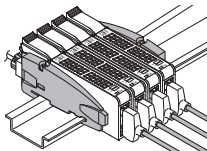
Type	Appearance	Model No.	Description
Main cable (4-core)		CN-74-C1	Length: 1 m 3.281 ft
		CN-74-C2	Length: 2 m 6.562 ft
		CN-74-C5	Length: 5 m 16.404 ft
Sub cable (2-core)		CN-72-C1	Length: 1 m 3.281 ft
		CN-72-C2	Length: 2 m 6.562 ft
		CN-72-C5	Length: 5 m 16.404 ft

Connector

Type	Appearance	Model No.	Description
Connector for amplifier		CN-EP4	Connector included with sensor head Use for maintenance, for example when another connector is damaged. Five pcs. per set

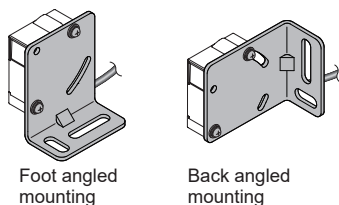
ORDER GUIDE

End plates End plates are not supplied with the amplifier. Please order them separately when the amplifiers are mounted in cascade.

Appearance	Model No.	Description
	MS-DIN-E	When amplifiers are mounted in cascade, or when an amplifier moves depending on the way it is installed on a DIN rail, these end plates clamp amplifiers into place on both sides. Make sure to use end plates when cascading multiple amplifiers together. Two pcs. per set

Accessories

MS-LS-1 (Sensor head mounting bracket)
For **LS-H201□** / **LS-H901□**



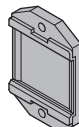
Foot angled mounting

Back angled mounting

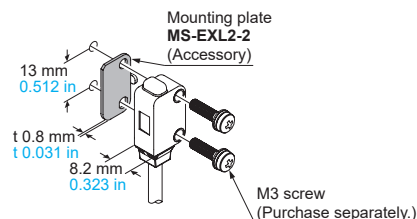
Material: Stainless steel (SUS304)

Two M2 (length 12 mm 0.472 in) screws with washers [stainless steel (SUS)] are attached.

RF-330 (Reflector)



MS-EXL2-2 (Mounting plate for thru-beam type)



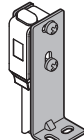
Material: Stainless steel (SUS304)

OPTIONS

Designation	Model No.	Description
Sensor head mounting bracket	MS-EXL2-1	For LS-H102□ (square type) Foot angled mounting bracket
	MS-EXL2-4	For LS-H102□ (square type) Universal sensor mounting bracket
	MS-EXL2-5	For LS-H102□ (square type) Back angled mounting bracket
Amplifier mounting bracket	MS-DIN-2	Mounting bracket for amplifier
Amplifier protective seal	FX-MB1	10 sets of 2 communication window seals and 1 connector seal Communication window seal: It prevents malfunction due to transmission signal from another amplifier, as well as, prevents effect on another amplifier. Connector seal: It prevents contact of any metal, etc., with the pins of the quick-connection cable.
Reflector	RF-310	For coaxial retroreflective type Compact reflector
Reflective tape	RF-31	For coaxial retroreflective type Size: 9.2 × 9.2 × t 0.4 mm 0.362 × 0.362 × t 0.016 in
	RF-33	For coaxial retroreflective type Size: 25.2 × 27.8 × t 0.4 mm 0.992 × 1.094 × t 0.016 in

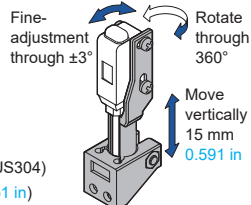
Sensor head mounting bracket

• **MS-EXL2-1**



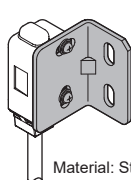
Material: Stainless steel (SUS304)
Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS)] are attached.

• **MS-EXL2-4**



Material: Die-cast zinc alloy
Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS)], one M3 (length 10 mm 0.394 in) hexagon-socket-head bolt [stainless steel (SUS)], and one M3 hexagon nut [stainless steel (SUS)] are attached.

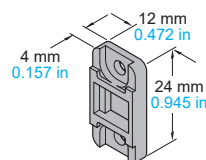
• **MS-EXL2-5**



Material: Stainless steel (SUS304)
Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS)] are attached.

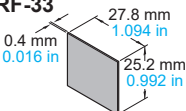
Reflector

• **RF-310**

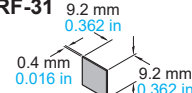


Reflective tape

• **RF-33**

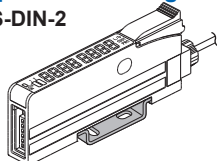


• **RF-31**



Amplifier mounting bracket

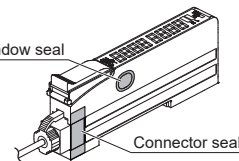
• **MS-DIN-2**



Amplifier protective seal

• **FX-MB1**

Communication window seal



SPECIFICATIONS

Sensor heads

Item	Type	Thru-beam type		Coaxial reflective type	Coaxial retroreflective type
		Cylindrical	Square		
Model No.		LS-H101	LS-H102	LS-H201	LS-H901
Applicable amplifiers		LS-501(P), LS-501(P)-C2 (Note 2)			
Sensing range (Note 3.4)	H-SP	1 m 3.281 ft	1 m 3.281 ft	150 mm 5.906 in	0.01 to 1 m 0.033 to 3.281 ft
	FAST	1 m 3.281 ft	1 m 3.281 ft	200 mm 7.874 in	0.01 to 1 m 0.033 to 3.281 ft
	STD	1 m 3.281 ft	1 m 3.281 ft	300 mm 11.811 in	0.01 to 1 m 0.033 to 3.281 ft
	LONG	1 m 3.281 ft	1 m 3.281 ft	450 mm 17.717 in	0.01 to 1.5 m 0.033 to 4.921 ft
	U-LG	1 m 3.281 ft	1 m 3.281 ft	600 mm 23.622 in	0.01 to 2 m 0.033 to 6.562 ft
	HYPR	1 m 3.281 ft	1 m 3.281 ft	750 mm 29.528 in	0.01 to 2.5 m 0.033 to 8.202 ft
Spot size		Approx. ø5 mm ø0.197 in or less (at a distance from the emitter of 1 m 3.281 ft)	Approx. ø5 mm ø0.197 in or less (at a distance from the emitter of 1 m 3.281 ft)	Approx. ø2 mm ø0.079 in or less (at a distance from the sensor head of 300 mm 11.811 in)	Approx. ø6 mm ø0.236 in or less (at a distance from the sensor head of 1 m 3.281 ft)
Sensing object		Opaque, translucent, or transparent object (Note 5)			
Operation indicator		Orange LED (lights up when the amplifier output is ON)			
Environmental resistance	Protection	IP40 (IEC)	IP67 (IEC)	IP40 (IEC)	IP40 (IEC)
	Ambient temperature	-10 to +55 °C +14 to +131 °F (No dew condensation or icing allowed), Storage: -20 to +70 °C -4 to +158 °F			
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH			
	Ambient illuminance	Incandescent light: 3,000 lx at the light-receiving face			
	Voltage resistance	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 500 Hz frequency, 1.5 mm 0.059 in double amplitude or maximum acceleration 98 m/s ² in X, Y and Z directions for two hours each			
	Shock resistance	98 m/s ² acceleration (10 G approx.) in X, Y and Z directions three times each			
Emitting element	Type	Red semiconductor laser diode			
	Peak emission wavelength	660 nm 0.026 mil			
	Laser class	Class 1 [IEC / EN / JIS / GB / KS / FDA (Note 6)]			
	Max. output	2 mW	2 mW	2 mW	1 mW
Material		Enclosure: Stainless steel (SUS303) Cover: Polycarbonate	Enclosure: PBT Cover: Acrylic	Enclosure: PBT, Indicator cover: Polycarbonate Beam-emitting / receiving surfaces: Glass	
Cable		0.09 mm ² 2-core shielded cable, 2 m 6.562 ft long (Note 7)		0.09 mm ² , 2-core two parallel shielded cables, 2 m 6.562 ft long (Note 7)	
Weight		Net weight: 50 g approx. Gross weight: 75 g approx.	Net weight: 50 g approx. Gross weight: 70 g approx.	Net weight: 50 g approx. Gross weight: 80 g approx.	Net weight: 50 g approx. Gross weight: 85 g approx.
Accessories		M6 screw: 4 pcs. Toothed lock washer: 2 pcs.	MS-EXL2-2 (Mounting plate): 2 pcs.	MS-LS-1 (Mounting bracket): 1pc.	MS-LS-1 (Mounting bracket): 1pc. RF-330 (Reflector): 1pc.

- Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C **+73.4 °F**.
2) When using the thru-beam type **LS-H101** or **LS-H102**, do not set the receiving light sensitivity (gctl) of the applicable **LS-500** series amplifier to level 2 or less. This is because there is a possibility of sensing becoming unstable.
3) The sensing range of the coaxial reflective type sensor is specified for white non-glossy paper (100 × 100 mm **3.937 × 3.937 in**) as the object.
4) The sensing ranges for coaxial retroreflective type sensors are values for the **RF-330** reflector. In addition, the sensing range is the possible setting range for the reflector. The sensor can detect an object less than 0.01 m **0.033 ft** away. Note that if there are white papers or specular objects near the sensor head, reflected light from these objects may be received. In such cases, use the amplifier unit's receiving sensitivity function to lower the sensitivity, change the response time, or move the sensor head away from the target object. The incident light intensity may vary with the condition of the reflector surface. When using one of the applicable **LS-500** series amplifiers, leave an adequate safety margin when setting the threshold.
5) Make sure to confirm detection with an actual sensor before use.
6) This product complies with the FDA regulations (FDA 21 CFR 1040.10 and 1040.11) in accordance with FDA Laser Notice No. 56, except for complying with IEC 60825-1 Ed. 3.
7) Cable cannot be extended.

SPECIFICATIONS

Amplifiers

Item	Model No.	Type	Connector type	Cable type
		NPN output	LS-501	LS-501-C2
		PNP output	LS-501P	LS-501P-C2
Supply voltage		12 to 24 V DC ⁺¹⁰ ₋₁₅ % Ripple P-P 10 % or less		
Power consumption		Normal operation: 1,200 mW or less (Current consumption 50 mA or less at 24 V supply voltage,Cable type: excluding monitor current output) ECO mode: 980 mW or less (Current consumption 40 mA or less at 24 V supply voltage,Cable type: excluding monitor current output)		
Sensing outputs (Sensing output 1, 2) (Note 4)		<NPN output type> NPN open-collector transistor • Maximum sink current: 50 mA (Note 2) • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 2 V or less (at max. sink current)		<PNP output type> PNP open-collector transistor • Maximum source current: 50 mA (Note 2) • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 2 V or less (at max. source current)
		Output operation		Selectable either Light-ON or Dark-ON
		Short-circuit protection		Incorporated
Sensing output setting	Sensing output 1	Normal mode, differential mode, hysteresis mode, window comparator mode, selectable		
	Sensing output 2 (Note 4)	Normal mode, differential mode, hysteresis mode, self-diagnostic output mode, selectable	Normal mode, differential mode, hysteresis mode, self-diagnostic output mode, answer-back output mode, selectable	
Response time		H-SP: 60 μs or less, FAST: 150 μs or less, STD: 250 μs or less, LONG: 500 μs or less, U-LG: 5 ms or less, HYPR: 24 ms or less , selectable		
Monitor current output		Output current: Approx. 4 to 20 mA (H-SP, FAST, STD: at 0 to 4,000 indication) Response time: 2 ms or less Zero point: 4 mA ± 1 % F.S. Span: 16 mA ± 5 % F.S. Linearity: ± 3 % F.S. Load resistance: 0 to 250 Ω		
External input (Note 4)		<NPN output type> NPN non-contact input • Signal condition High: +8 V to +V DC or open, Low: 0 to +2 V DC (source current 0.5 mA or less) • Input impedance: 10 kΩ approx. <PNP output type> PNP non-contact input • Signal condition High: +4 V to +V DC (sink current 3.0 mA or less), Low: 0 to +0.6 V DC or open • Input impedance: 10 kΩ approx.		
External input function		Laser emission halt / teaching (full-auto teaching, limit teaching, 2 point teaching) / logic operation setting / copy lock / display adjustment / data bank load / data bank save, selectable		
Sensing output operation indicator		Orange LED (lights up when sensing output 1 or sensing output 2 is ON)		
Laser emission indicator		Green LED (lights up during laser emission)		
Output select indicator		Yellow LED (lights up when output is selected)		
Digital display		8-digit 7-segment digital display (4-digit green LED + 4-digit red LED), MODE indicator (Yellow LED): L/D, CUST, PRO		
Incident light indication range		H-SP / FAST / STD: 0 to 4,000, LONG / U-LG / HYPR: 0 to 9,999		
Sensitivity setting		2-point teaching / limit teaching / full auto teaching / manual adjustment		
Logical operation		Between sensing output 1 and calculation target: Disabled / AND / OR / XOR, selectable Calculation target: Sensing output 2 / adjacent upstream amplifier (sensing output 1) / external input, selectable		
Timer functions		<Sensing output 1> OFF-delay timer, ON-delay timer, One-shot timer, ON / OFF-delay timer, ON-delay / One-shot timer, switchable either effective of ineffective, with variable timer period		
		<Sensing output 2> OFF-delay timer, ON-delay timer, One-shot timer, switchable either effective of ineffective, with variable timer period		
	Timer period	Timer range “ms”: 0.5 ms approx., 1 to 9,999 ms approx., in approx. 1 ms intervals Timer range “sec”: 0.5 sec. approx., 1 to 32 sec. approx., in approx. 1 sec. intervals Timer range “1/10 ms”: 0.05 ms approx., 0.1 to 999.9 ms approx., in approx. 0.1 ms intervals, Set separately for each output.		
Interference prevention function		Incorporated (Note 3)		
Environmental resistance	Protection	IP40 (IEC)		
	Ambient temperature	-10 to +55°C +14 to +131 °F (If 4 to 7 units are mounted close together, -10 to +50°C +14 to +122 °F; if 8 to 16 units (cable type: 8 to 12 units) are mounted close together, -10 to +45 °C +14 to +113°F) (No dew condensation or icing 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, 1.5 mm 0.059 in double amplitude or maximum acceleration 98 m/s ² in X, Y and Z directions for two hours each		
	Shock resistance	98 m/s ² acceleration (10 G approx.) in X, Y and Z directions five times each		
Material		Enclosure: Polycarbonate, Cover: Polycarbonate, Switch: Polyacetal		
Cable		0.2 mm ² 6-core cabtyre cable, 2 m 6.562 ft long		
Cable extension		Extension up to total 100 m 328.084 ft is possible with 0.3 mm ² , or more, cable.		
Weight		Net weight: 15 g approx., Gross weight: 55 g approx.	Net weight: 75 g approx., Gross weight: 110 g approx.	
Accessory		FX-MB1 (Amplifier protective seal): 1 set		

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.

2) 25 mA if 5 or more amplifier are connected in cascade (excluding cable extension).

3) Number of units that can be mounted close together: 0 for H-SP; 2 for FAST; 4 for STD, LONG, U-LG, or HYPR

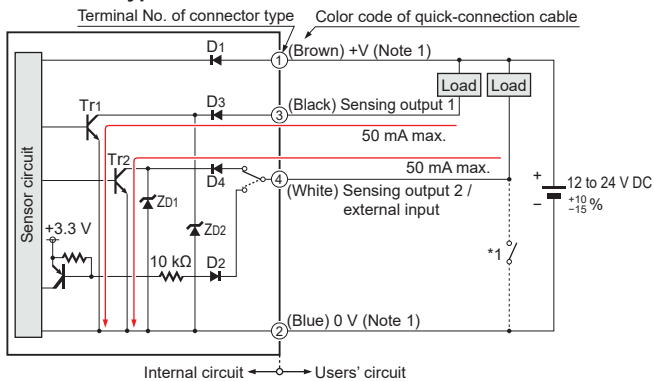
4) Select either sensing output 2 or external input as the connector type.

I/O CIRCUIT AND WIRING DIAGRAMS

I/O circuit diagram

NPN output type

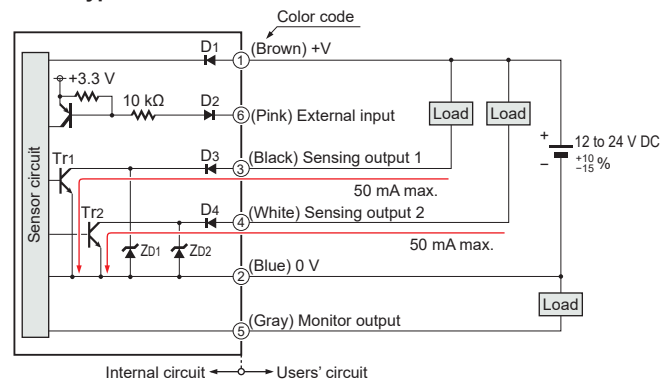
Connector type



Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
2) Wiring when sensing output 2 is selected is shown with solid lines. Wiring when external input is selected is shown with broken lines.

Symbols ... D₁, D₂, D₃, D₄: Reverse supply polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr₁, Tr₂: NPN output transistor

Cable type



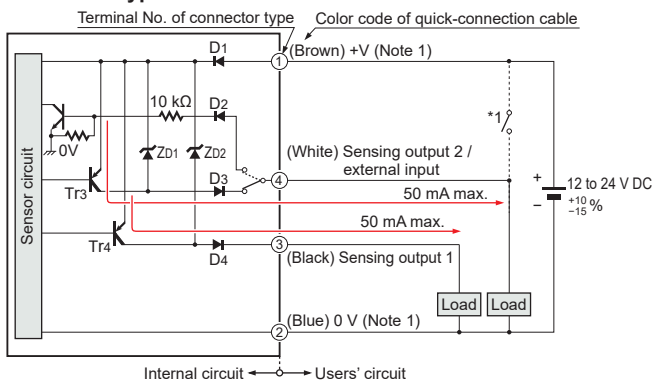
*1

Non-voltage contact or NPN open-collector transistor

- External input
High: +8 V to +V, or open
Low: 0 to +2 V (source current: 0.5 mA or less)
- Light emission halts and teaching occurs when at Low.

PNP output type

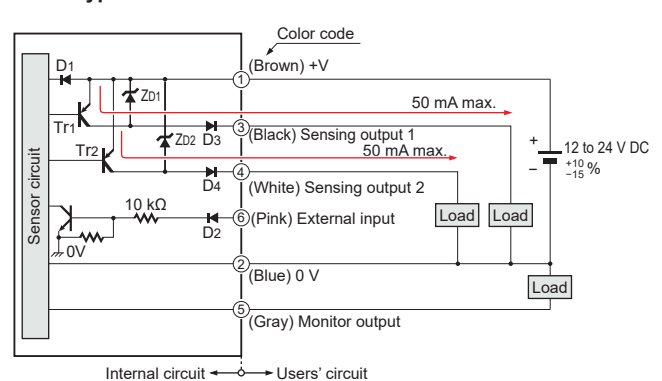
Connector type



Notes: 1) The quick-connection sub cable does not have +V (brown) and 0 V (blue). The power is supplied from the connector of the main cable.
2) Wiring when sensing output 2 is selected is shown with solid lines. Wiring when external input is selected is shown with broken lines.

Symbols ... D₁, D₂, D₃, D₄: Reverse supply polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr₁, Tr₂: PNP output transistor

Cable type



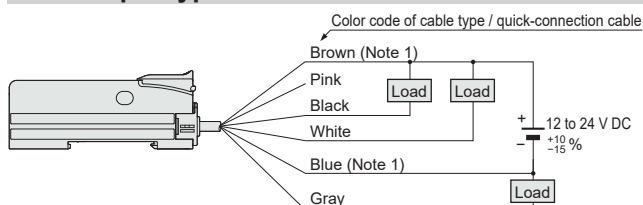
*1

Non-voltage contact or PNP open-collector transistor

- External input
High: +4 V to +V (sink current: 3 mA or less)
Low: 0 to +0.6 V, or open
- Light emission halts and teaching occurs when at High.

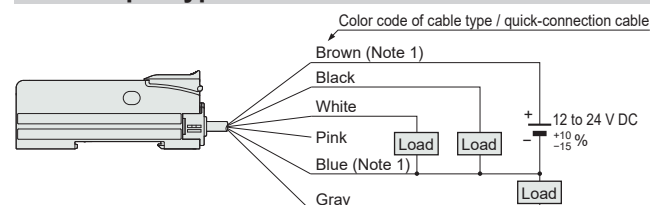
Wiring diagram

NPN output type



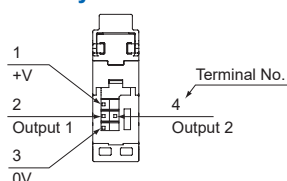
Notes: 1) The quick-connection sub cable does not have brown lead wire and blue lead wire. The power is supplied from the connector of the main cable.
2) The quick-connection cable does not have gray or pink lead wires.

PNP output type



Notes: 1) The quick-connection sub cable does not have brown lead wire and blue lead wire. The power is supplied from the connector of the main cable.
2) The quick-connection cable does not have gray or pink lead wires.

Terminal layout of connector type



* Connector for amplifier (CN-EP4) pin position

Terminal No.	Connection cable
①	Purple
②	White
③	Shield
④	Shield
⑤	Black
⑥	Pink

PRECAUTIONS FOR PROPER USE

- This catalog is a guide to select a suitable product. Be sure to read the 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 regulations and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Cautions for laser beams



- These products are Class 1 laser in compliance with IEC / EN / JIS / GB / KS and FDA regulations*. To reduce the risk of danger, do not look directly at the laser beam or view it through an optical system.
- A label with instructions as found at the below is affixed to the product. Handle this sensor as per the instruction on the labels.

Panasonic Industry Co., Ltd.
1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8505, Japan
Complies with 21 CFR 1040.10 and 1040.11
except for conformance with IEC 60825-1 Ed. 3, as
described in Laser Notice No. 56, dated May 8, 2019.

MANUFACTURED:



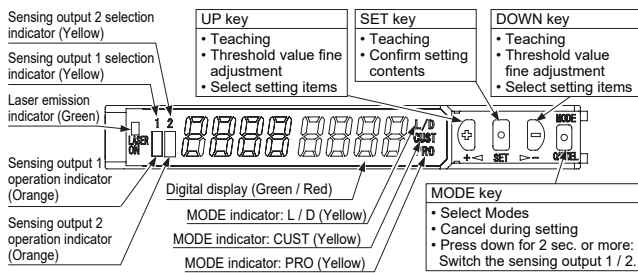
FDA certification / identification label

Explanation label

* This product complies with the FDA regulations (FDA 21 CFR 1040.10 and 1040.11) in accordance with FDA Laser Notice No. 56, except for complying with IEC 60825-1 Ed. 3.

- For the purpose of preventing users from suffering injuries by laser products, each standard stipulates (Safety of laser products). Kindly check the standards before use.

Part description (Amplifier)

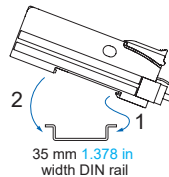


Mounting

Amplifier

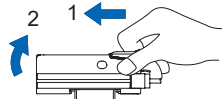
<How to mount the amplifier>

- (1) Fit the rear part of the mounting section of the amplifier on a 35 mm 1.378 in width DIN rail.
- (2) Press down the rear part of the mounting section of the unit on the 35 mm 1.378 in width DIN rail and fit the front part of the mounting section to the DIN rail.



<How to remove the amplifier>

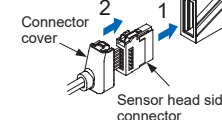
- (1) Push the amplifier forward.
- (2) Lift up the front part of the amplifier to remove it.



Note: Be careful. If the front part is lifted without pushing the amplifier forward, the hook on the rear portion of the mounting section is likely to break.

<How to mount the sensor head>

- (1) Insert the sensor head connector into the inlet until it clicks.
- (2) Fit the cover to the connector.



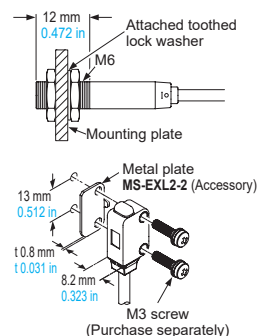
Sensor head

LS-H101□

- The tightening torque should be 0.98 N·m or less.

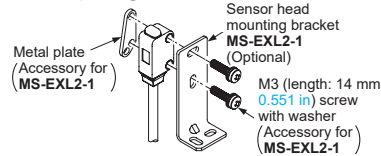
LS-H102□

- In case mounting this product, use a metal plate **MS-EXL2-2** (accessory).
- The tightening torque should be 0.5 N·m or less with M3 screws.

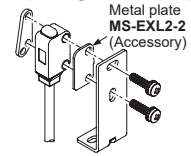


- In case using the dedicated sensor head mounting bracket **MS-EXL2-1** (optional) when mounting this product, the metal plate **MS-EXL2-2** (accessory) is required depending on the mounting direction. Mount as the diagram below indicates.

<Not requiring the metal plate>



<Requiring the metal plate>



LS-H201□, LS-H901□

- The tightening torque should be 0.5 N·m or less.
- When placing the sensor head horizontally or vertically, the reflector must also be positioned horizontally or vertically as shown in Fig. 1 below. If the sensor head is placed horizontally or vertically but the reflector is tilted as shown in Fig. 2 below, the reflection amount will decrease, which may cause unstable detection.

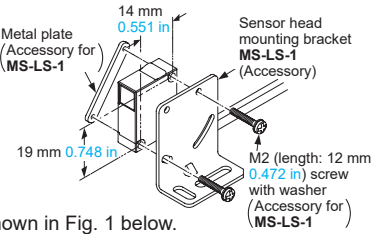


Fig. 1 Proper positioning

When placing the sensor head horizontally or vertically, the reflector shall also be positioned horizontally or vertically.

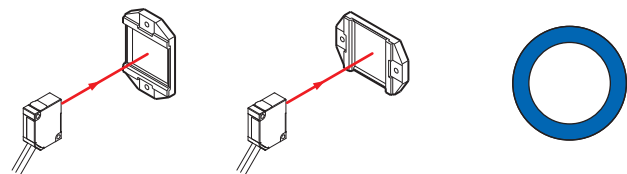
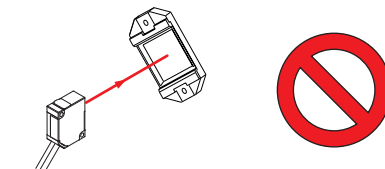


Fig. 2 Improper positioning

When placing the reflector tilted even when the sensor head is positioned horizontally or vertically.



Wiring

- Make sure that the power supply is off while wiring.
- Verify that the supply voltage variation is within the rating.
- Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the sensor may get burnt or damaged.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Take care that short-circuit or wrong wiring of the load may burn or damage the sensor.
- 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.
- Ensure that an isolation transformer is utilized for the DC power supply. If an auto transformer is utilized, the main amplifier or power supply may be damaged.
- Make sure to use the optional quick-connection cable for the connection of the amplifier [connector type **LS-501(P)**]. Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable. However, in order to reduce noise, make the wiring as short as possible. Set the supply voltage after considering the voltage drop caused by the cable's resistance. When adding units, wiring length must not exceed 50 m 164.042 ft for 5 to 8 amplifiers or 20 m 65.617 ft (for 9 to 16 amplifiers).

PRECAUTIONS FOR PROPER USE

Others

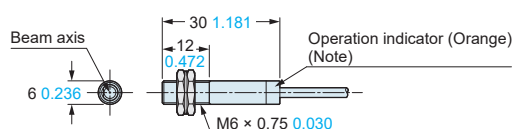
- Do not use during the initial transient time (0.5 sec. approx.) after the power supply is switched on.
- Because the sensitivity is higher in U-LG and HYPER modes than in other modes, it can be more easily affected by extraneous noise. Check the operating environment before use.
- This sensor is suitable for indoor use only.
- This product has been developed / produced for industrial use only.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in direct contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- This sensor cannot be used in an environment containing inflammable or explosive gasses.
- Never disassemble or modify the sensor.

DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

LS-H101

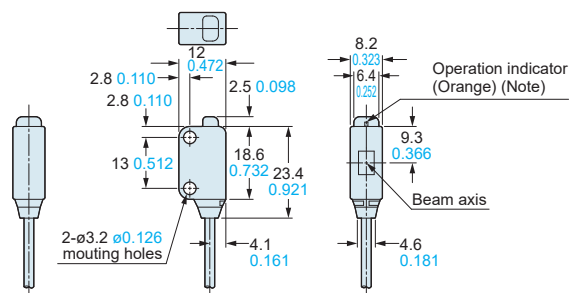
Sensor head



Note: Not incorporated on the emitter.

LS-H102

Sensor head

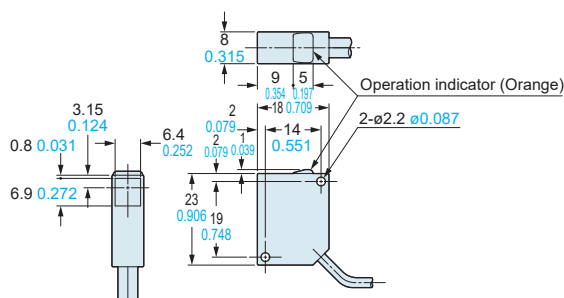


Note: Not incorporated on the emitter.

LS-H201

LS-H901

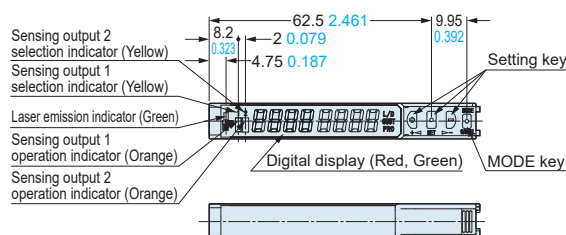
Sensor head



LS-501

LS-501P

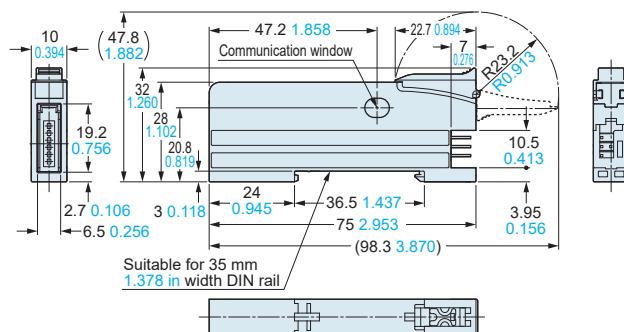
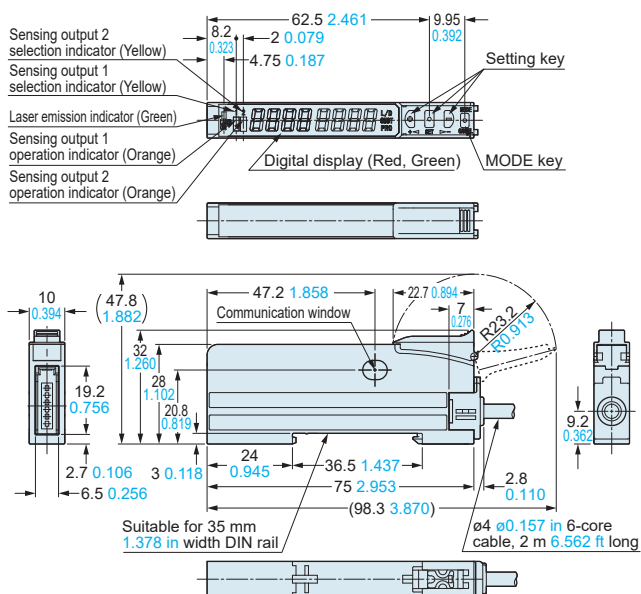
Amplifier



LS-501-C2

LS-501P-C2

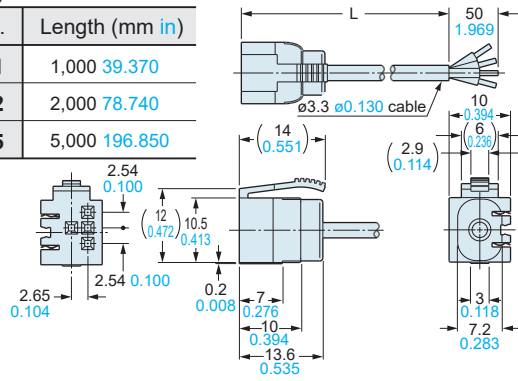
Amplifier



CN-74-C1 CN-74-C2 CN-74-C5 Main cable (Optional)

• Length (L)

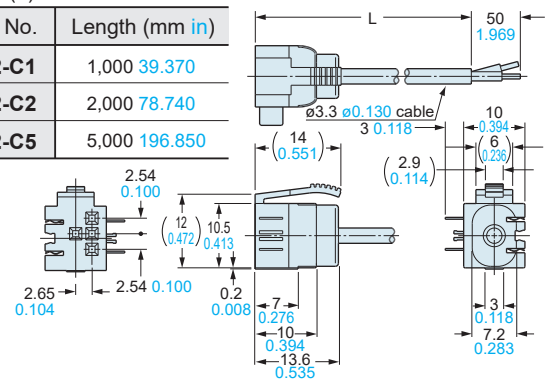
Model No.	Length (mm in)
CN-74-C1	1,000 39.370
CN-74-C2	2,000 78.740
CN-74-C5	5,000 196.850



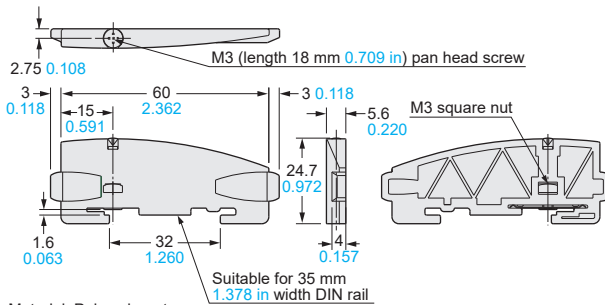
CN-72-C1 CN-72-C2 CN-72-C5 Sub cable (Optional)

• Length (L)

Model No.	Length (mm in)
CN-72-C1	1,000 39.370
CN-72-C2	2,000 78.740
CN-72-C5	5,000 196.850

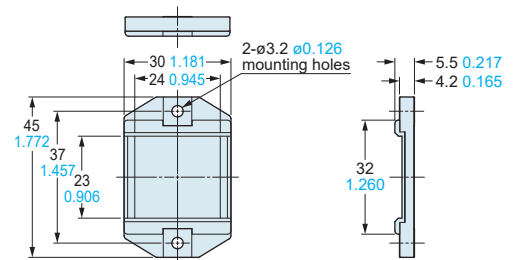


MS-DIN-E End plate (Optional)



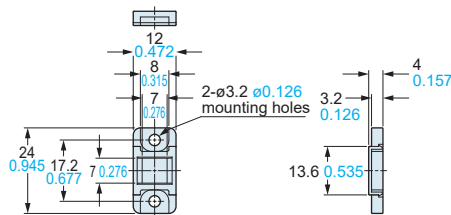
Material: Polycarbonate

RF-330 Reflector (Accessory for LS-H901□)



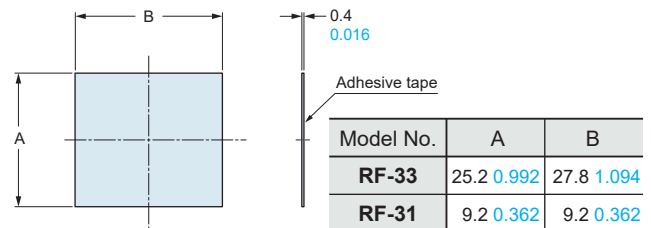
Material: Acrylic (Reflector)
ABS (Base)

RF-310 Reflector (Optional)



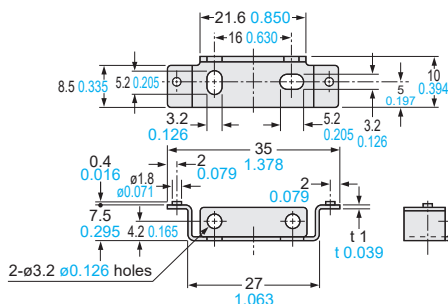
Material: Acrylic (Reflector)
ABS (Base)

RF-33 RF-31 Reflective tape (Optional)



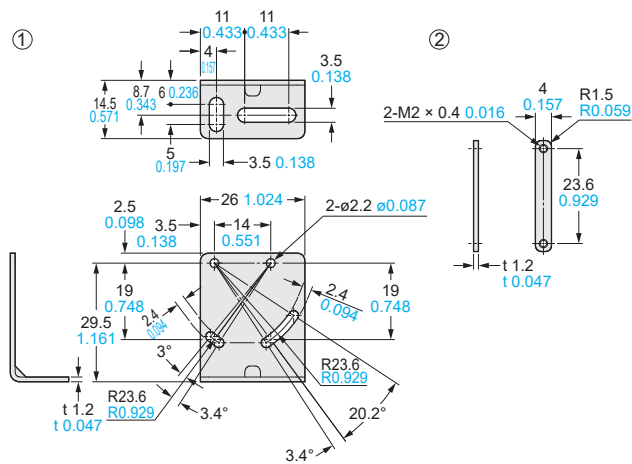
Material: Acrylic

MS-DIN-2 Amplifier mounting bracket (Optional)

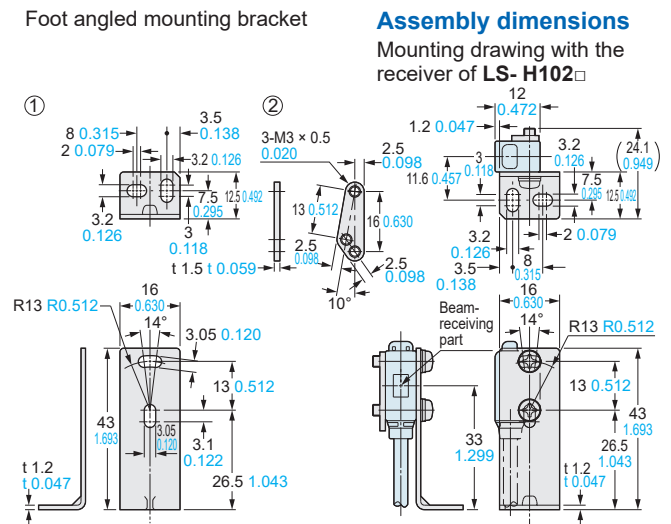


Material: Cold rolled carbon steel (SPCC)
(Uni-chrome plated)

MS-EXL2-1 Sensor head mounting bracket for LS-H102□ (Optional)



Material: Stainless steel (SUS304)
Two M2 (length 12 mm [0.472 in](#)) screws with washers [stainless steel (SUS)] are attached.

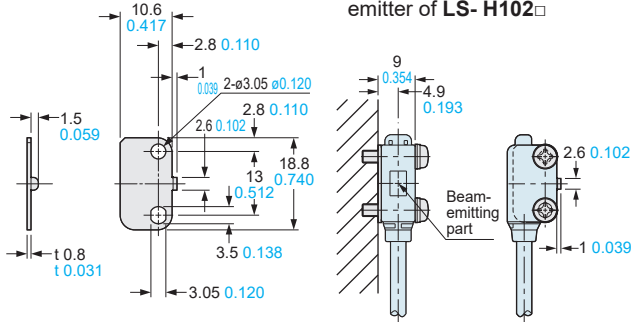


Material: Stainless steel (SUS304)
Two M3 (length 14 mm [0.551 in](#)) screws with washers [stainless steel (SUS)] are attached.

MS-EXL2-2	Mounting plate (Accessory for LS-H102□)
------------------	---

Assembly dimensions

Mounting drawing with the emitter of **LS- H102**□

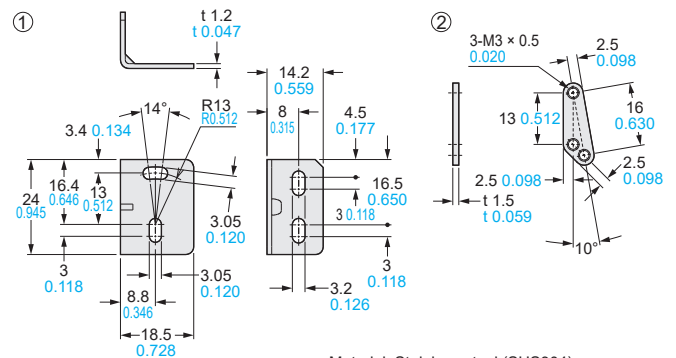


Material: Stainless steel (SUS304)
Note: Screws are not attached.
Purchase separately.

Note: Without using the mounting plate, beam misalignment may occur.

MS-EXL2-5 Sensor head mounting bracket for **LS-H102□** (Optional)

Rear mounting bracket



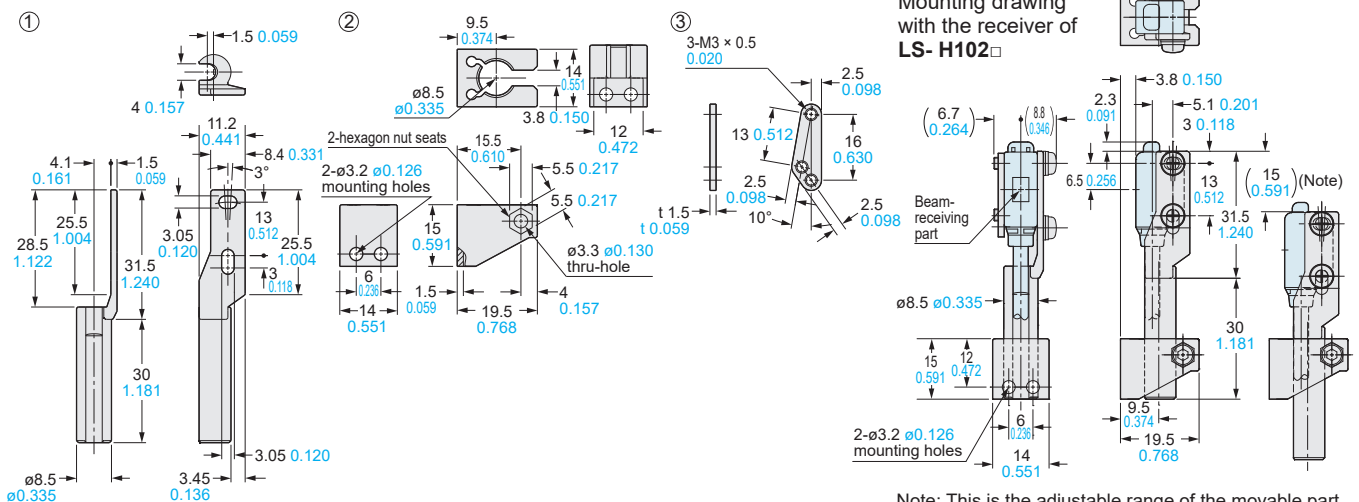
Material: Stainless steel (SUS304)
Two M3 (length 14 mm 0.551 in) screws with washers [stainless steel (SUS)] are attached.

MS-EXL2-4 Sensor head mounting bracket for **LS-H102** (Optional)

Universal sensor mounting bracket

Assembly dimensions

Mounting drawing
with the receiver of
LS- H102□



Note: This is the adjustable range of the movable part.

Two M3 (length 14 mm [0.551 in](#)) screws with washers [stainless steel (SUS)], one M3 (length 10 mm [0.394 in](#)) hexagon-socket-head bolt [stainless steel (SUS)], and one M3 hexagon nut [stainless steel (SUS)] are attached.

Related Products

Communication Unit for Open Network

SC-GU3 SERIES



■ To minimize life cycle cost

Panasonic Industry offers a line of devices, the **SC-GU3** series communication units for open network, that maximize the capabilities of open networks, streamline regular maintenance and preventive maintenance, and reduce wiring and installation work. We offer solutions that minimize costs during the life cycle of equipment.

■ Traceability

It is useful to keep track of the sensor configurations at equipment start-up so that failures can be quickly identified and the user alerted.

■ Models that can be connected to the SC-GU3 series

Sensors capable of communicating internal digital values (Models that support optical communications)

*Please use in combination with the cascading connector unit **SC-71** and the end unit **SC-GU3-EU**.

Link digital sensors directly to open networks

Communication unit for CC-Link

Compatible with Mitsubishi Electric's iQ Sensor Solution (iQSS)

SC-GU3-01

Communication unit for DeviceNet

SC-GU3-02

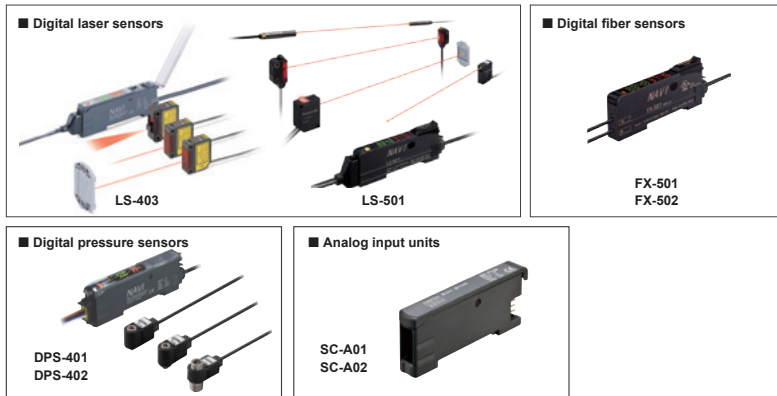
Order end date: September 30, 2024

Communication unit for EtherCAT

SC-GU3-03

Communication unit for CC-Link IE Field

SC-GU3-04



Digital Fiber Sensor

FX-500 SERIES Ver.2

At the industry's leading edge

Featuring superior stability and sharpness



Standard type

FX-501 (P)

Two-output type

FX-502 (P)

Cable type

FX-505 (P)-C2



■ Reduced individual differences

Thanks to increased stability of the incident light intensity, units will indicate similar readings, even if the amplifier is replaced.

■ Sharp detection

In addition to these sensors' low hysteresis, their hyper beam feature boosts the sensing range.

■ Flat display with a wide field of view

The high-brightness, 7-segment display can be seen clearly, even from an angle.

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

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Industrial Device Business Division

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