

Digital Laser Sensor **Amplifier-separated**

LS-400 series

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## FEATURES

The LS series uses a highly focused and concentrated laser beam and a coaxial optical lens system to enable it to detect extremely small objects a long distance away. Choose from ultracompact sensor heads as a reflective light barrier with a polarisation filter or as a reflective sensor with a light spot or light band.

A jog switch and mode key allow you to conveniently program all controller functions; programming is easy with a dual, two-color, 4-digit LCD display and several LED displays. The LS series' M.G.S. function, which allows the receiving sensitivity's dynamic range to be adjusted to prevent oversaturation of the reflected light intensity (transparent objects in the case of reflective light barriers or shiny objects in the case of reflective sensors, for example).

- **Red light laser class 1 or 2** : Can visible light intensity and high Accurately sense the minutest variations.
- **Ultra-compact dimensions** : W11.2xH31xD25 easy to mounting in narrow area
- **Long sensing range** : Retroreflective type sensing range max. 30 m
- **Response time max. 80µs** : Fastest response time when used with amplifier LS-400
- **IP40 degree of protection** : Can protected against solid objects, but is not watertight,
- **Light-ON/dark-ON modes** : Can switching by jog switch on the amplifier to operation L/D mode.

# Laser sensor

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## SPECIFICATIONS

### Sensor heads

Type		Appearances	Model no.	Sensing range	Conforming standards	
Coaxial retroreflective	Class 2		LS-H92	U-LG : 0.2 to 30 m STD : 0.2 to 20 m	IEC / JIS / GB	
			LS-H92F	FAST : 0.2 to 10 m H-SP : 0.2 to 10 m	FDA / IEC / JIS	
			LS-H91	U-LG : 0.1 to 7 m STD : 0.1 to 5 m	IEC / JIS / GB	
			LS-H91F	FAST : 0.1 to 3 m H-SP : 0.1 to 3 m	FDA / IEC / JIS	
	Class 1		LS-H91A	U-LG : 0.1 to 5 m STD : 0.1 to 3 m	IEC / JIS / GB	
			LS-H91F-A	FAST : 0.1 to 1 m H-SP : 0.1 to 1 m	FDA / IEC / JIS	
Diffuse reflective	Long sensing range spot reflective		LS-H21	U-LG : 30 to 1,000 mm STD : 30 to 500 mm	IEC / JIS / GB	
			LS-H21F	FAST : 30 to 300 mm H-SP : 30 to 300 mm	FDA / IEC / JIS	
			LS-H21A	U-LG : 30 to 500 mm STD : 30 to 250 mm	IEC / JIS / GB	
			LS-H21F-A	FAST : 30 to 150 mm H-SP : 30 to 150 mm	FDA / IEC / JIS	
	Long sensing range line reflective		Class 2	LS-H22	U-LG : 30 to 1,000 mm STD : 30 to 500 mm	IEC / JIS / GB
				LS-H22F	FAST : 30 to 300 mm H-SP : 30 to 300 mm	FDA / IEC / JIS

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## Amplifiers

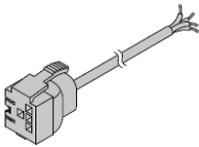
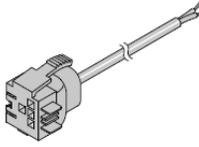
Type		Appearances	Model no.	Output	Connection method
Connector type			LS-401	NPN open-collector transistor two outputs	Use quick-connection cable (4-core) (optional)
			LS-401P	PNP open-collector transistor two outputs	
			LS-403	NPN open-collector transistor two outputs	
	With upper communication function				
Cable type (With external input)			LS-401-C2	NPN open-collector transistor two outputs	2 m 6.562 ft cabtyre cable (5-core) included Cable outer diameter: ø3.7 mm
			LS-401P-C2	PNP open-collector transistor two outputs	

# Laser sensor

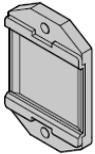
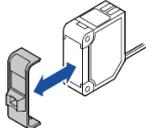
# LS-400 series

## OPTIONS

- Quick-connection cables

Type	Appearances	Model no.	Cable length	Description
Main cable (4-core)		CN-74-C1	1 m	0.2 mm <sup>2</sup> 4-core cabtyre cable, with connector on one end Cable outer diameter: ø3.3 mm
		CN-74-C2	2 m	
		CN-74-C5	5 m	
Sub cable (2-core)		CN-72-C1	1 m	0.2 mm <sup>2</sup> 2-core cabtyre cable, with connector on one end Cable outer diameter: ø3.3 mm
		CN-72-C2	2 m	
		CN-72-C5	5 m	

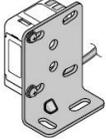
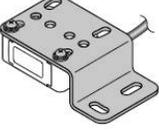
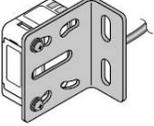
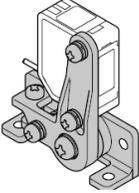
- Accessory

Type	Appearances	Model no.	Description
Reflector		RF-230	For retroreflective type sensor LS-H92, LS-92F only
Reflector		RF-330	For retroreflective type sensor only
Lens attachment		LS-MR1	For line reflective type LS-H22, LS-H22F only

# Laser sensor

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- Sensor mounting bracket

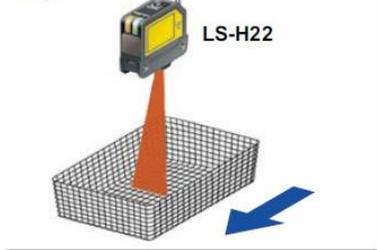
Type	Appearance	Model no.	Description
Sensor head mounting bracket		MS-CX-1	Foot angled mounting bracket
		MS-CX-2	Foot biangled mounting bracket. Flat mounting possible to avoid obstructions caused by the height of the sensor.
		MS-CX-3	Back angled mounting bracket
		MS-CX-4	Protective mounting bracket Protects sensors preventing beam axis displacement due to shocks.
Sensor mounting bracket for beam axis alignment		MS-CX-11	Mounting bracket that makes fine beam axis alignment possible after setting the sensor head. Adjustment angle: up and down, right and left: 4 degrees Mounting directions: two directions, vertical and horizontal

# Laser sensor

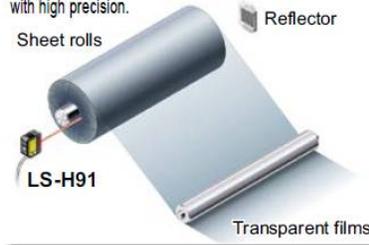
# LS-400 series

## APPLICATIONS

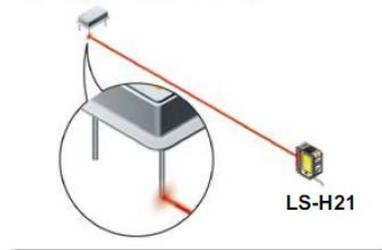
**Detecting objects with a complex shape**  
Its linear sensing area enables more stable detection of objects with complex shapes.



**Detecting the remaining amount of sheet rolls**  
The coaxial retroreflective sensor with a spot diameter of approx.  $\phi 1\text{ mm}$   $\phi 0.039\text{ in}$  (at a 1 m 3.281 ft sensing distance), can measure amounts remaining on sheet rolls with high precision.

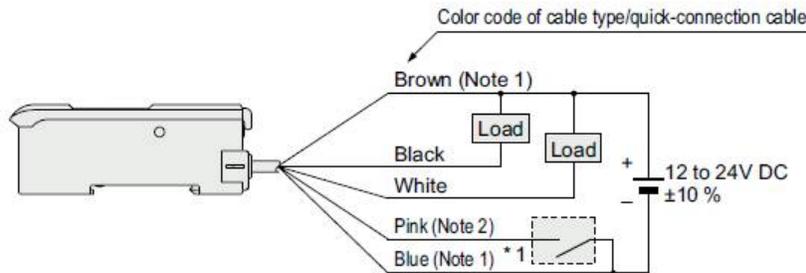


**Detecting electronic component pins**  
Because its spot shape can be adjusted in accordance with the object, it can be easily set to detect even the minutest object from a remote location.



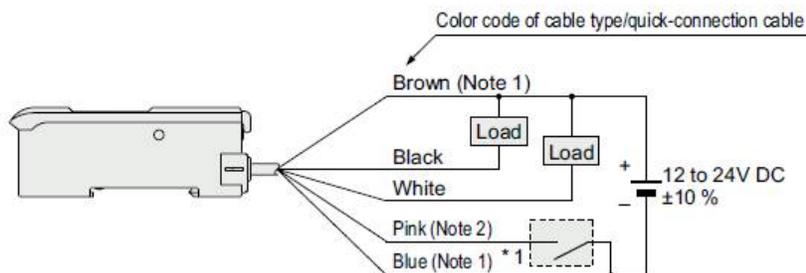
## WIRING DIAGRAMS

- 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 a pink lead wire.

- 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 a pink lead wire.