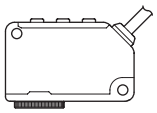
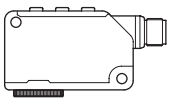
ORDER GUIDE

Sensors

Mating cable is not supplied with the plug-in connector type. Please order it separately.

Type	Appearance	Model No.	Output	Sensing range
Cable type		**LX-101**	NPN open-collector transistor	10 ±3 mm 0.394 ±0.118 in
		LX-101-P	PNP open-collector transistor	
Plug-in connector type		**LX-101-Z**	NPN open-collector transistor	
		LX-101-P-Z	PNP open-collector transistor	

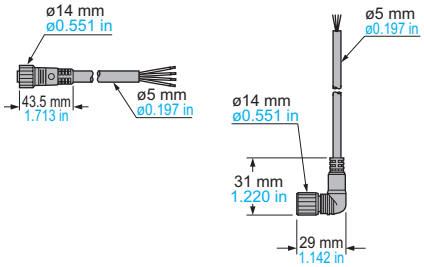
Mating cables for plug-in connector type sensor

Mating cable is not supplied with the plug-in connector type sensor. Please order it separately.

Type	Model No.	Description
Straight	**CN-24B-C2**	Length: 2 m 6.562 ft 0.34 mm² 4-core cabtyre cable, with connector on one end Cable outer diameter: ø5 mm ø0.197 in
	CN-24B-C5	Length: 5 m 16.404 ft
Elbow	**CN-24BL-C2**	Length: 2 m 6.562 ft
	CN-24BL-C5	Length: 5 m 16.404 ft

Mating cables for plug-in connector type sensor

- **CN-24B-C2**
- **CN-24B-C5**
- **CN-24BL-C2**
- **CN-24BL-C5**

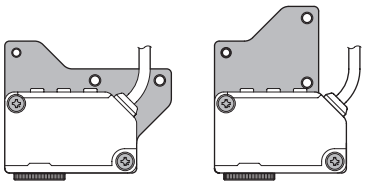


OPTIONS

Type	Model No.	Description
Sensor mounting bracket	**MS-LX-1**	Mounting bracket made for **LX-100** series applicable for various kinds of installations
	MS-LX-2	

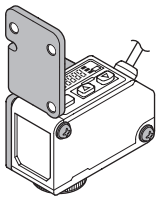
Sensor mounting bracket

- **MS-LX-1**



Two M4 (length 28 mm 1.102 in) screws with washers are attached.

- **MS-LX-2**



Two M4 (length 30 mm 1.181 in) screws with washers are attached.

SPECIFICATIONS

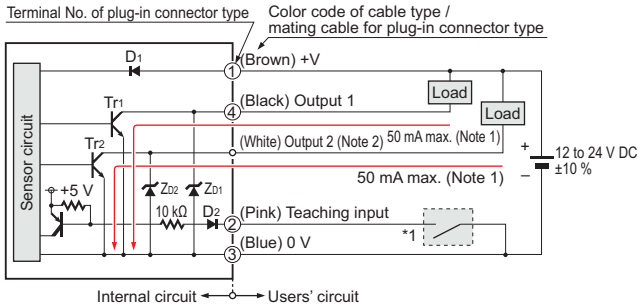
Item \ Type		Cable type	Plug-in connector type
Model No.	NPN output	**LX-101**	**LX-101-Z**
	PNP output	**LX-101-P**	**LX-101-P-Z**
Sensing range		10 ±3 mm 0.394 ±0.118 in	
Spot size		1 × 5 mm 0.039 × 0.197 in (at 10 mm 0.394 in setting distance)	
Supply voltage		12 to 24 V DC ±10 % Ripple P-P 10 % or less	
Current consumption		Normal mode: 750 mW or less (Current consumption 30 mA or less at 24 V supply voltage) ECO mode: 600 mW or less (Current consumption 25 mA or less at 24 V supply voltage)	
Output 1 (OUT)		<NPN output type> NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less (at 50 mA sink current) <PNP output type> PNP open-collector transistor • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1.5 V or less (at 50 mA source current)	<NPN output type> NPN open-collector transistor • Maximum sink current: 100 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less (at 100 mA sink current) <PNP output type> PNP open-collector transistor • Maximum source current: 100 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1.5 V or less (at 100 mA source current)
	Short-circuit protection	Incorporated	
	Output operation	Mark mode: Light-ON / Dark-ON (Auto-setting on teaching), Color mode: Consistent-ON / Inconsistent-ON (Setting on teaching)	
Output 2 (OUT)		<NPN output type> NPN open-collector transistor • Maximum sink current: 50 mA • Applied voltage: 30 V DC or less (between output and 0 V) • Residual voltage: 1.5 V or less (at 50 mA sink current) <PNP output type> PNP open-collector transistor • Maximum source current: 50 mA • Applied voltage: 30 V DC or less (between output and +V) • Residual voltage: 1.5 V or less (at 50 mA source current)	———
	Short-circuit protection	Incorporated	———
	Output operation	Inverted operation of the output 1	———
Response time		Mark mode: 45 µs or less, Color mode: 150 µs or less	
Teaching input		<NPN output type> NPN non-contact input • Signal condition: High… +5 V to +V, or open Low… 0 to +2 V (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 (sink current: 3 mA or less) Low… 0 to +0.6 V, or open • Input impedance: 10 kΩ approx.
Digital display		4-digit red LED display	
Sensitivity setting		Mark mode: 2-level teaching / Full-auto teaching, Color mode: 1-level teaching	
Fine sensitivity adjustment function		Incorporated	
Timer function		Incorporated with variable ON-delay / OFF-delay timer, switchable either effective or ineffective (Timer period: 1 to 500 ms, 9 levels variable)	
Environmental resistance	Protection	IP67 (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 withstandability	1,000 V AC for one min. between all supply terminals connected together and enclosure	
	Vibration resistance	10 to 500 Hz frequency, 3.0 mm 0.118 in amplitude (max. 20 G) 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 for three times each	
Emitting element		Combined Red / Green / Blue LEDs (Peak emission wavelength: 640 nm 0.025 mil / 525 nm 0.021 mil / 470 nm 0.019 mil)	
Material		Enclosure: PBT, Display cover: Polycarbonate, Operation buttons: Silicone rubber, Lens: Glass, Lens holder: Aluminum	
Cable		0.34 mm² 5-core cabtyre cable, 2 m 6.562 ft long	(Note 2)
Cable extension		Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable.	
Weight		Net weight: 120 g approx., Gross weight: 180 g approx.	Net weight: 55 g approx., Gross weight: 120 g approx.
Accessory		M4 (length 30 mm 1.181 in) screw with washers: 2 pcs.	

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) Mating cable is not supplied with the plug-in connector type. Please order it separately.

I/O CIRCUIT AND WIRING DIAGRAMS

LX-101(-Z) NPN output type

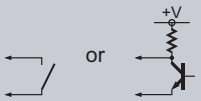
I/O circuit diagram



Notes: 1) The current of the plug-in connector type **LX-101-Z** is 100 mA max.
2) The output 2 is not incorporated to the plug-in connector type **LX-101-Z**.

* 1

Non-voltage contact or NPN transistor

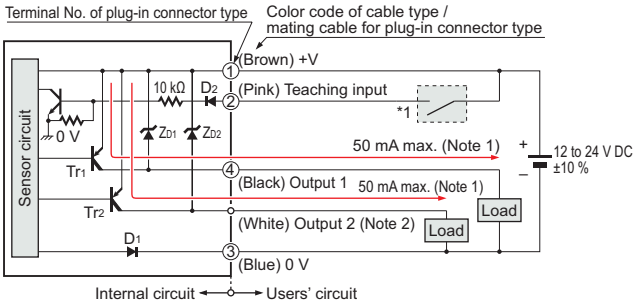


- Teaching input
  High: 5 V to +V, or open
  Low: 0 to +2 V(source current: 0.5 mA or less)
  Teaching is carried out at the Low.

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

LX-101-P(-Z) PNP output type

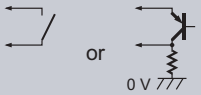
I/O circuit diagram



Notes: 1) The current of the plug-in connector type **LX-101-P-Z** is 100 mA max.
2) The output 2 is not incorporated to the plug-in connector type **LX-101-P-Z**.

* 1

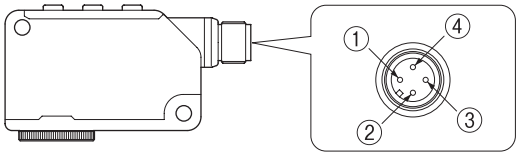
Non-voltage contact or PNP transistor



- Teaching input
  High: +4 V to +V (sink current: 3 mA or less)
  Low: 0 to +0.6 V, or open
  Teaching is carried out at the High.

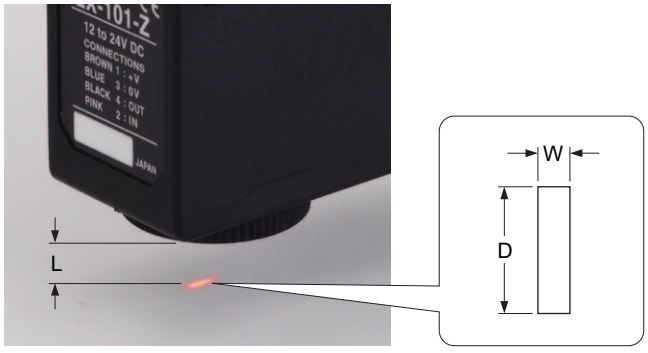
Symbols … D_1, D_2 : Reverse supply polarity protection diode
Z_{D1}, Z_{D2}: Surge absorption zener diode
Tr_1, Tr_2 : PNP output transistor

Connector pin layout of plug-in connector type



Connector pin No.	Description
①	+V
②	Teaching input
③	0 V
④	Output

SPOT SIZE CHARACTERISTICS (TYPICAL)



(Unit: mm in)

Setting distance L (Note 1)	Spot size (Note 2)	
	Width (W)	Length (D)
7 0.276	2.0 0.079	5.5 0.217
8 0.315	1.7 0.067	5.5 0.217
9 0.354	1.2 0.047	5.3 0.209
10 0.394	1.0 0.039	5.0 0.197
11 0.433	1.3 0.051	5.0 0.197
12 0.472	1.5 0.059	5.0 0.197
13 0.512	2.0 0.079	5.0 0.197

Notes: 1) Setting distance "L" represents the distance from the lens surface to the sensing object.
2) Examples only meant for use as a guideline.

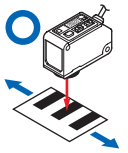
PRECAUTIONS FOR PROPER USE

Refer to General precautions.

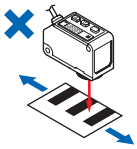
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

Mounting

- Care must be taken regarding the sensor mounting direction with respect to the object's direction of movement.



Mark and base



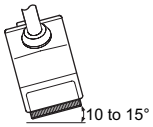
Mark and base

Do not make the sensor detect an object in this direction because it may cause unstable operation.

- The tightening torque should be 0.8 N·m or less.

Sensing glossy object

- Objects with a glossy surface have a large amount of specular reflection particles that may destabilize sensing. In such a case, by slightly tilting the sensor's beam axis, this specular reflection can be reduced rendering sensing more stable.
- If the surface of the sensing object has a shine, mount the sensor inclining approx. 10 to 15 degrees against the sensing object.



Wiring

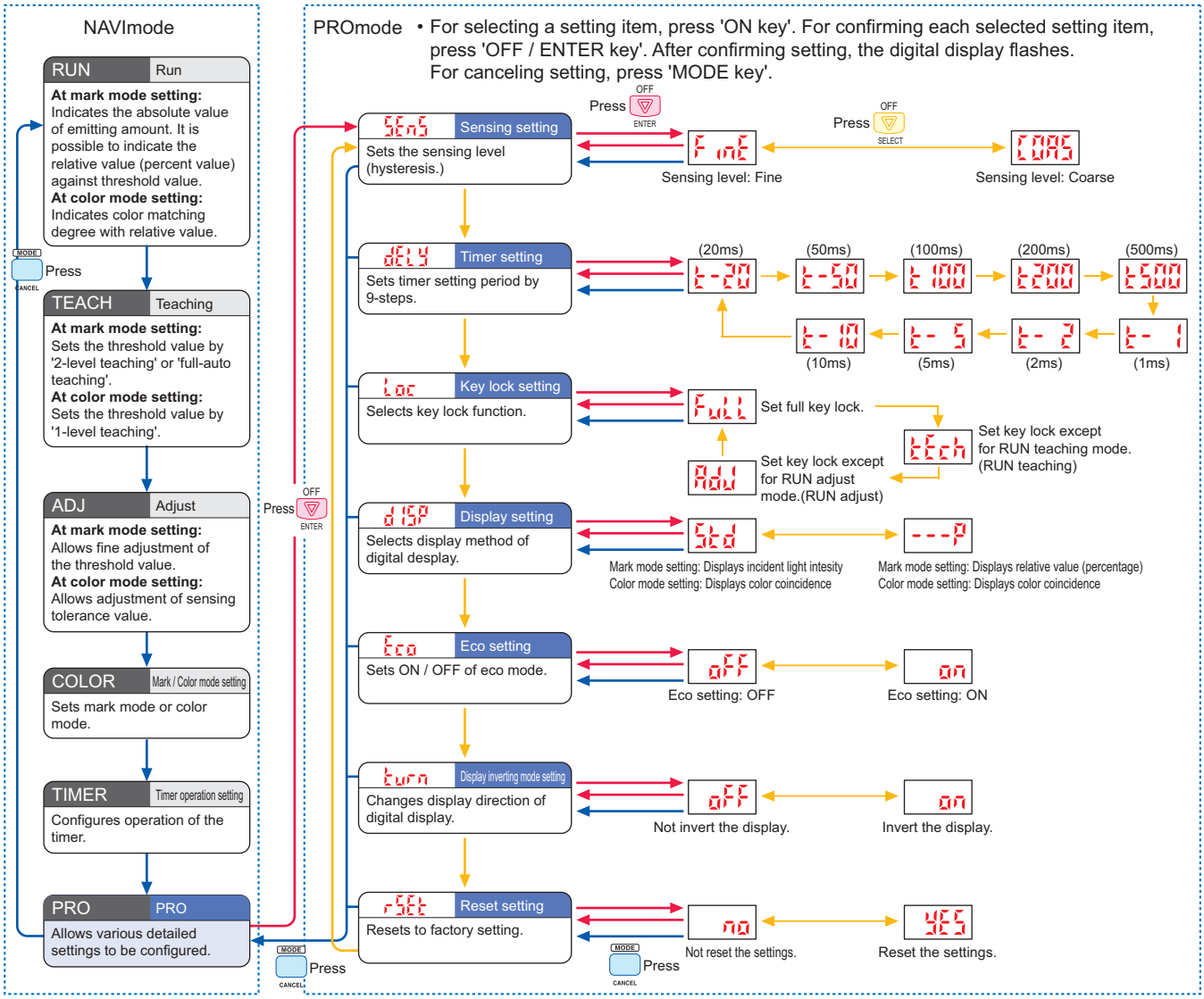
- Make sure to carry out wiring in the power supply off condition.
- Take care that wrong wiring will damage the sensor.
- Verify that the supply voltage variation is within the rating.
- Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the sensor may get burnt or damaged.
- 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.
- 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.
- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.
- Take care that short-circuit of the load or wrong wiring 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.
- Extension up to total 100 m is possible with 0.3 mm^2, or more, cable. However, in order to reduce noise, make the wiring as short as possible.

Others

- Do not use during the initial transient time (0.5 sec.) after the power supply is switched on.
- Take care that the sensor is not directly exposed to fluorescent light from a rapid-starter lamp or a high frequency light device or sunlight etc., as it may affect the sensing performance.
- Do not touch the lens of the sensor by hand directly. If the lens becomes dirty, wipe it off with a soft cloth gently.
- When the inside lens is steamed up, unscrew the lens to get rid of the condensation.
- These sensors are only for indoor use.
- Do not use this sensor in places having excessive vapor, dust, etc., or where it may come in direct contact with water, or corrosive gas.
- Take care that the product does not come in contact with water, oil, grease, or organic solvents, such as, thinner, etc.
- Make sure that stress by forcible bend or pulling with 76 N, or more, force is not applied to the sensor cable joint.
- This sensor cannot be used in an environment containing inflammable or explosive gases.
- Never disassemble or modify the sensor.

LIST OF PROMODE SETTING ITEMS

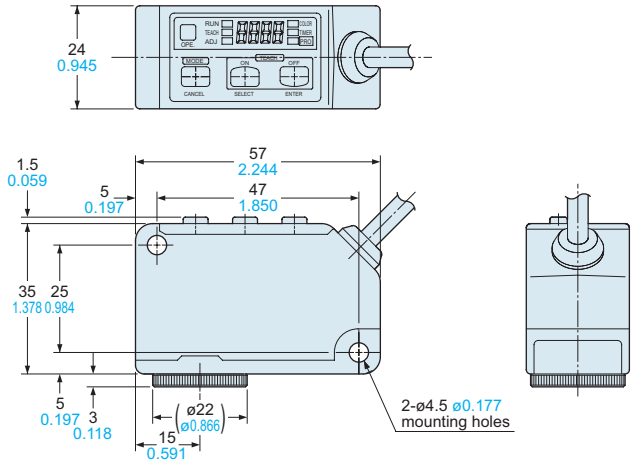
• Before performing teaching or each detail setting, perform the setting of either mark mode or color mode with mark / color mode setting of NAVI mode.



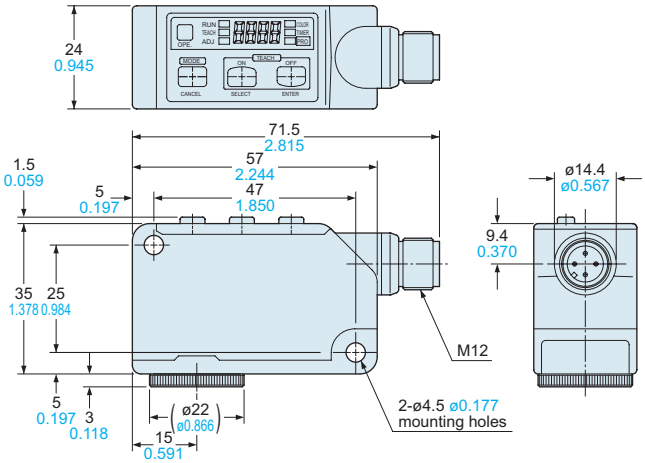
DIMENSIONS (Unit: mm in)

The CAD data in the dimensions can be downloaded from our website.

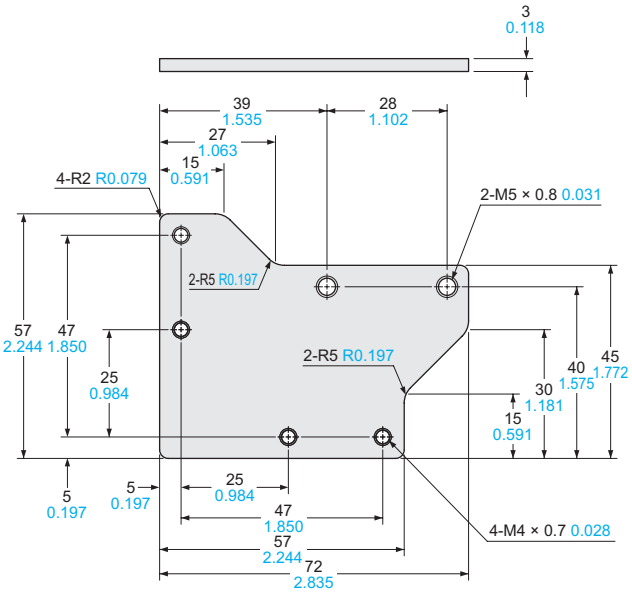
LX-101 LX-101-P — Sensor



LX-101-Z LX-101-P-Z — Sensor



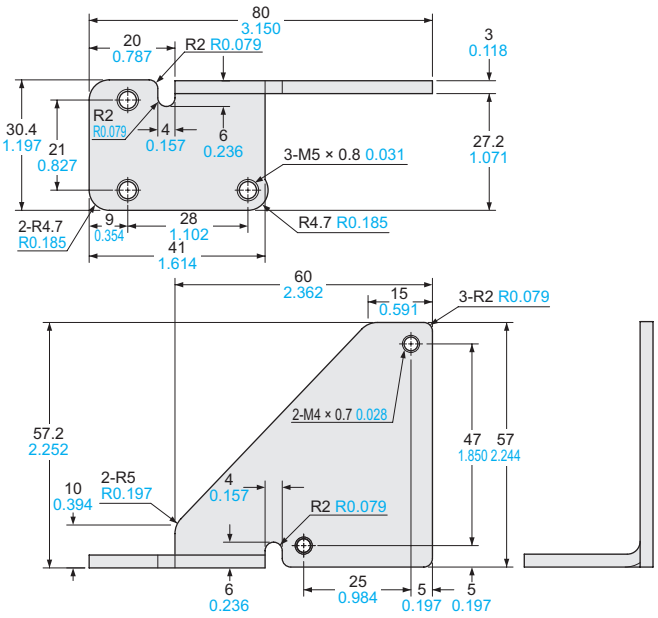
MS-LX-1 — Sensor mounting bracket (Optional)



Material: Stainless steel (SUS)

Two M4 (length 28 mm 1.102 in) screws with washers are attached.

MS-LX-2 — Sensor mounting bracket (Optional)



Material: Stainless steel (SUS)

Two M4 (length 30 mm 1.181 in) screws with washers are attached.