

Industrial Automation Sensor Comprehensive Catalogue

 Service Hotline

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Crafting Exceptional
Chinese Sensors With Dedication

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Shenzhen Kinnki Technology Co., Ltd

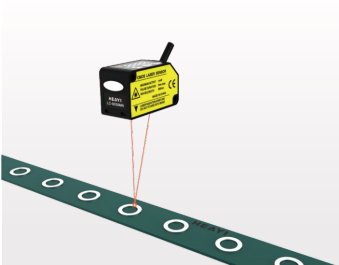
LC-S Series

CMOS laser displacement sensor

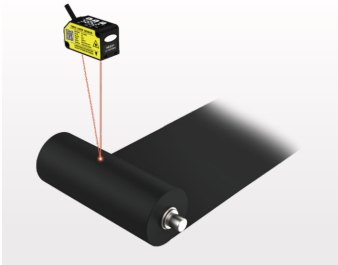


- Short, medium and long detection distances are optional
 - Multiple functions, multiple detection modes
 - Small volume, small light spot and high precision
 - Large output indicator light at the top
- It has dual output of switching and analog
 - White digital tube shows the distance value, clear and bright.
 - Film button, easy operation
 - Aluminum alloy shell, strong and durable

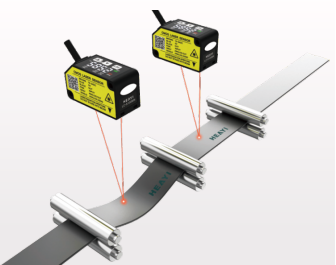
Application



Check whether there is micro flat pad



Detect the residual volume of coil material



Test the bending amount of sheet material

Product category

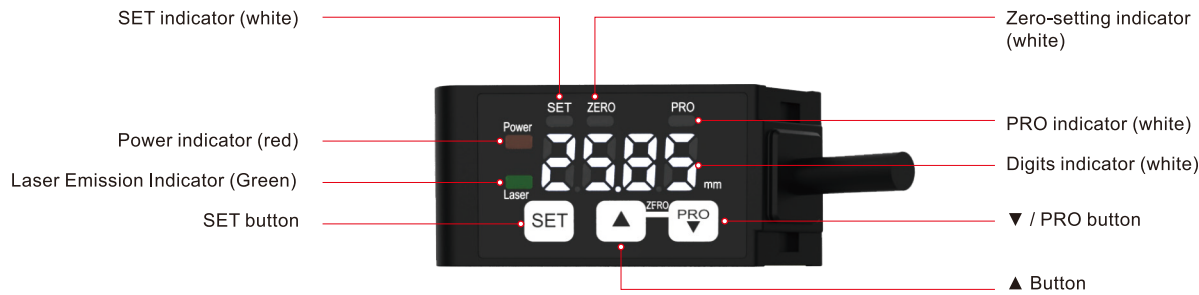
Type	Model	Detection distance	Output mode	Repeatability
Short distance	LC-S030MN	30±5mm	Switch + analog	10μm
	LC-S030MP	30±5mm	Switch + analog	10μm
	LC-S030RL	30±5mm	Switch + analog (Upgraded Analog Version)	10μm
	LC-S030RE	30±5mm	RS485	10μm
	LC-S050MN	50±15mm	Switch + analog	50μm
	LC-S050MP	50±15mm	Switch + analog	50μm
	LC-S050RL	50±15mm	Switch + analog (Upgraded Analog Version)	50μm
	LC-S050RE	50±15mm	RS485	50μm
Medium distance	LC-S100N	100±35mm	Switch output type	100μm
	LC-S100MN	100±35mm	Switch + analog	100μm
	LC-S100P	100±35mm	Switch output type	100μm
	LC-S100MP	100±35mm	Switch + analog	100μm
	LC-S100RL	100±35mm	Switch + analog (Upgraded Analog Version)	100μm
	LC-S100RE	100±35mm	RS485	100μm
	LC-S200N	200±80mm	Switch output type	200μm
	LC-S200MN	200±80mm	Switch + analog	200μm
	LC-S200P	200±80mm	Switch output type	200μm
	LC-S200MP	200±80mm	Switch + analog	200μm
	LC-S200RL	200±80mm	Switch + analog (Upgraded Analog Version)	200μm
	LC-S200RE	200±80mm	RS485	200μm
Long distance	LC-S400N	400±200mm	Switch output type	400μm/800μm
	LC-S400MN	400±200mm	Switch + analog	400μm/800μm
	LC-S400P	400±200mm	Switch output type	400μm/800μm
	LC-S400MP	400±200mm	Switch + analog	400μm/800μm
	LC-S400RL	LC-S400RL	Switch + analog (Upgraded Analog Version)	400μm/800μm
	LC-S400RE	LC-S400RE	RS485	400μm/800μm
	LC-S700RL	700±500mm	Switch + analog (Upgraded Analog Version)	300μm(measured range200mm-400mm) 800μm(measured range400mm-600mm) 1000μm(measured range600mm-1200mm)
	LC-S700RE	700±500mm	RS485	

Note 1: The measurement conditions when not specified are as follows: power supply voltage: 24VDC, ambient temperature: +20 ℃, reaction time: 10ms, and the analog output value of the measurement center distance.Object: White ceramic.

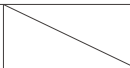
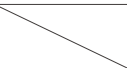
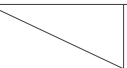
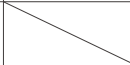
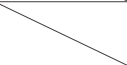
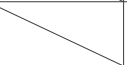
Note 2: The beam value is the value at the measurement center distance. These values are defined as 1/e² of the central light intensity (about 13.5%).

If the region is defined as an external leak, and the detection point range has strong reflection higher than the detection point itself, the detection result may be affected.

Name of each part



Product specifications

Type		Switch + analog	Switch + analog	Switch output type	Switch + analog	Switch output type	Switch + analog	Switch output type	Switch + analog
Model	NPN output	LC-S030MN	LC-S050MN	LC-S100N	LC-S100MN	LC-S200N	LC-S200MN	LC-S400N	LC-S400MN
	PNP output	LC-S030MP	LC-S050MP	LC-S100P	LC-S100MP	LC-S200P	LC-S200MP	LC-S400P	LC-S400MP
Measure center distance		30mm	50mm	100mm		200mm		400mm	
Detection range		±5mm	±15mm	±35mm		±80mm		±200mm	
Repeatability accuracy		10μm	50μm	100μm		200μm		400μm (Measuring distance 200mm - 400mm) 800μm (Measuring distance 400mm - 600mm)	
Linearity		±0.2%F.S.		±0.2%F.S.		±0.3%F.S.		±0.3%F.S. (Measuring distance 200mm - 400mm) ±0.3%F.S. (Measuring distance 400mm - 600mm)	
Temperature characteristic		0.03%F.S./℃							
Light source		Red laser, class 2, Max. output : 1mW,Wavelength of light-emitting beam: 655nm							
Beam diameter		about φ50μm	about φ100μm	about φ150μm		about φ300μm		about φ500μm	
Supply voltage		12V ~ 24V DC±10% Ripple P - P10%							
Consumption current		Lower than 40mA (Power supply voltage 24V DC), Lower than 60mA (Power supply voltage 12V DC)							
Control output		<NPN output type>				<PNP output type>			
		NPN Open-collector transistor				PNP Open-collector transistor			
		· Maximum sink current: 50mA				Maximum source current: 50 mA			
		· Applied voltage: 30V DC or less (Between control output to 0V)				Applied voltage: 30 V DC or less (Between control output to +V)			
		· Residual voltage: 2.5 V or less(at 50 mA sink current)				Residual voltage: 2.5 V or less (at 50 mA source current)			
		· Leakage current: 0.1 mA or less				Leakage current: 0.1 mA or less			
Output		Switchable between either Light-ON or Dark-ON							
Short circuit protection		Incorporated (auto reset type)							
Analog Output	Voltage analog output (alarm: +5.2V)	Output range: 0V-5V Output impedance:100Ω		Output range: 0V-5V Output impedance: 100Ω		Output range: 0V-5V Output impedance: 100Ω		Output range: 0V-5V Output impedance: 100Ω	
	Current analog output (alarm: 0mA)	Output range: 4~20mA Output impedance:300Ω or less		Output range: 4~20mA Output impedance: 300Ω or less		Output range: 4~20mA Output impedance: 300Ω or less		Output range: 4~20mA Output impedance: 300Ω or less	
Reaction time		Switchable between 1.5ms/5ms/10ms							
External input		NPN/PNP non-contact input, effective: 0V ~ + 1.2V DC input impedance: 10KΩ							
IP		IP65							
Degree of soiling		2							
Ambient temperature		-10℃~+40℃ (No dew condensation or icing allowed) 、 Storage: -20℃ ~+60℃							
Ambient humidity		35%~85%RH、 Storage: 35%~85%RH							
Environment illumination		Incandescent light: 3,000 lx or less at the light-receiving face							
Vibration resistance		10 to 55 Hz (period: 1 min.) frequency, 1.5 mm 0.059 in double amplitude in X, Y and Z directions for two hours each							
Shock resistance		500 m/s2 acceleration (50 G approx.) in X, Y and Z directions three times each							
Elevation		below 2,000m							
Cable		with 0.15mm,5-core composite cable, 2 m							
Material		Body shell: aluminum casting, front cover plate: acrylic							
Weight		About 35g (excluding cable) about 85g (including cable)							
Applicable specifications		Compliance with EMC instructions							

Product specifications

Type		Switch + analog (Upgraded Analog Version)				
Model	LC-S030RL	LC-S050RL	LC-S100RL	LC-S200RL	LC-S400RL	LC-S700RL
Measure center distance	30mm	50mm	100mm	200mm	400mm	700mm
Detection range	±5mm	±15mm	±35mm	±80mm	±200mm	±500mm
Repeatability accuracy	10μm	50μm	100μm	200μm	400μm (Measuring distance 200mm - 400mm) 800μm (Measuring distance 400mm - 600mm)	400μm (Measuring distance 200mm-400mm) 800μm (Measuring distance 400mm-600mm) 1000μm (Measuring distance 600mm-1200mm)
Linearity	±0.2%F.S.			±0.3%F.S.	±0.3%F.S. (Measuring distance 200mm - 400mm) ±0.3%F.S. (Measuring distance 400mm - 600mm)	200-600mm degree of linearity±0.3%F.S. 600-1000mm degree of linearity±0.5%F.S. 1000-1200mm degree of linearity±0.8%F.S.
Temperature characteristic	0.03%F.S./℃					
Light source	Red laser, class 2, Max. output : 1mW,Wavelength of light-emitting beam: 655nm					
Beam diameter	about φ50μm	about φ100μm	about φ150μm	about φ300μm	about φ500μm	about φ1000μm
Supply voltage	12V ~ 24V DC±10% Ripple P - P10%					
Consumption current	Lower than 40mA (Power supply voltage 24V DC), Lower than 60mA (Power supply voltage 12V DC)					
Control output	<NPN output type> NPN Open-collector transistor · Maximum sink current: 50mA · Applied voltage: 30V DC or less (Between control output to 0V) · Residual voltage: 1.5 V or less(at 50 mA sink current) · Leakage current: 0.1 mA or less			<PNP output type> PNP Open-collector transistor Maximum source current: 50 mA Applied voltage: 30 V DC or less (Between control output to +V) Residual voltage: 1.5 V or less (at 50 mA source current) Leakage current: 0.1 mA or less		
	NPN/PNP can be switched freely					
	Switchable between either Light-ON or Dark-ON					
Short circuit protection		Incorporated (auto reset type)				
Analog Output	Voltage analog output (alarm: +5.2V)	Output range: 0V-5V Output impedance:100Ω				
	Current analog output (alarm: 0mA)	Output range: 0V-10V Output impedance:100Ω				
	Voltage analog output (alarm: +5.2V)	Output range: 4~20mA Output impedance: 300Ω or less				
Reaction time		0.25ms/0.5ms/1ms/2ms/5ms/Auto				
External input		NPN/PNP non-contact input, effective: 0V ~ + 1.2V DC input impedance: 10KΩ				
IP		IP65				
Degree of soiling		2				
Ambient temperature		-10℃~-40℃ (No dew condensation or icing allowed) 、 Storage: -20℃ ~+60℃				
Ambient humidity		35%~85%RH、Storage: 35%~85%RH				
Environment illumination		Incandescent light: 3,000 lx or less at the light-receiving face				
Vibration resistance		10 to 55 Hz (period: 1 min.) frequency, 1.5 mm 0.059 in double amplitude in X, Y and Z directions for two hours each				
Shock resistance		500 m/s2 acceleration (50 G approx.) in X, Y and Z directions three times each				
Elevation		below 2,000m				
Cable		with 0.15mm,5-core composite cable, 2 m				
Material		Body shell: aluminum casting, front cover plate: acrylic				
Weight		About 35g (excluding cable) about 85g (including cable)				
Applicable specifications		Compliance with EMC instructions				

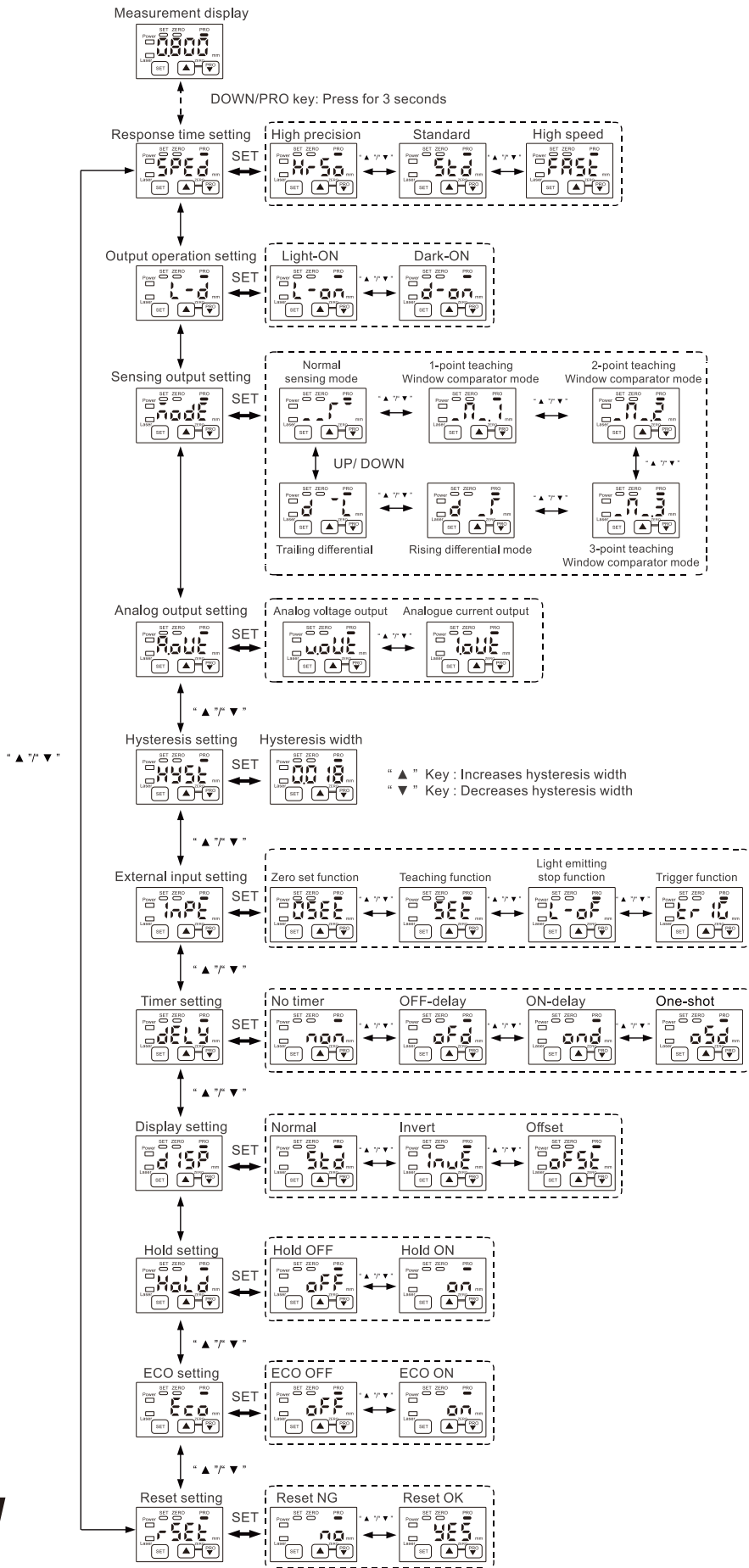
Product specifications

Type	❖❖❖ Communications					
Model	LC-S030RR	LC-S050RR	LC-S100RR	LC-S200RR	LC-S400RR	LC-S700RR
Measure center distance	30mm	50mm	100mm	200mm	400mm	700mm
Detection range	±5mm	±15mm	±35mm	±80mm	±200mm	±500mm
Repeatability accuracy (Note 3)	10μm	50μm	100μm	200μm	400μm (Measuring distance 200mm - 400mm) 800μm (Measuring distance 400mm - 600mm)	400μm(Measuring distance 200mm-400mm) 800μm(Measuring distance 400mm-600mm) 1000μm(Measuring distance 600mm-1200mm)
Linearity	±0.2%F.S.			±0.3%F.S.	±0.3%F.S. (Measuring distance 200mm - 400mm) ±0.3%F.S. (Measuring distance 400mm - 600mm)	200-600mm degree of linearity±0.3%F.S. 600-1000mm degree of linearity±0.5%F.S. 1000-1200mm degree of linearity±0.8%F.S.
Temperature characteristic	0.03%F.S./℃					
Light source	Red laser, class 2, Max. output : 1mW,Wavelength of light-emitting beam: 655nm					
Beam diameter	about φ50μm	about φ100μm	about φ150μm	about φ300μm	about φ500μm	about φ1000μm
Supply voltage	12V ~ 24V DC±10% Ripple P - P10%					
Consumption current	Lower than 40mA (Power supply voltage 24V DC), Lower than 60mA (Power supply voltage 12V DC)					
Control output	<NPN output type>			<PNP output type>		
	NPN Open-collector transistor			PNP Open-collector transistor		
	· Maximum sink current: 50mA			Maximum source current: 50 mA		
	· Applied voltage: 30V DC or less (Between control output to 0V)			Applied voltage: 30 V DC or less (Between control output to +V)		
	· Residual voltage: 1.5 V or less(at 50 mA sink current)			Residual voltage: 1.5 V or less (at 50 mA source current)		
	· Leakage current: 0.1 mA or less			Leakage current: 0.1 mA or less		
	NPN/PNP can be switched freely					
Output	Switchable between either Light-ON or Dark-ON					
Short circuit protection	Incorporated (auto reset type)					
Protocol	RS485					
	Bottleneck rate:4.8k/9.6k/19.2k/38.4k/115.2kbps					
	Data bit length is 8bit, end bit length is 1bit, parity check is not available					
MODBUS	CRC-16/MODBUS check					
Free Protocol	Frame header ❖×AA,CRC-❖❖					
Sampling period	0.25ms/0.5ms/1ms/2ms/5ms/Auto					
External input	NPN/PNP non-contact input, effective: 0V ~ + 1.2V DC input impedance: 10KΩ					
IP	IP65					
Degree of soiling	2					
Ambient temperature	-10℃~-+40℃ (No dew condensation or icing allowed) 、 Storage: -20℃~-+60℃					
Ambient humidity	35%~85%RH、 Storage: 35%~85%RH					
Environment illumination	Incandescent light: 3,000 lx or less at the light-receiving face					
Elevation	below 2,000m					
Cable	with 0.15mm,5-core composite cable, 2 m					
Material	Body shell: aluminum casting, front cover plate: acrylic					
Weight	About 35g (excluding cable) about 85g (including cable)					
Applicable specifications	Compliance with EMC instructions					

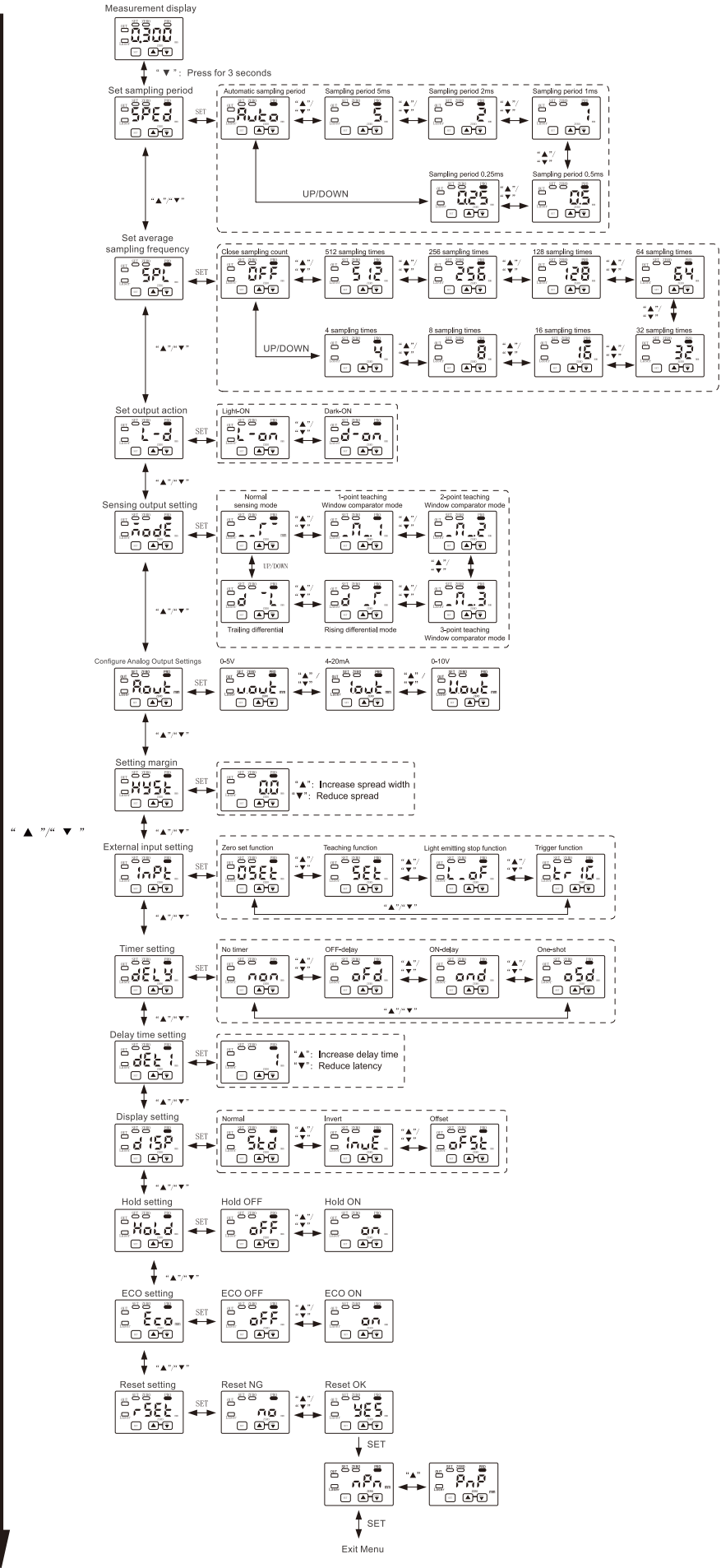
Note 3: Peak-to-peak value of measurements taken under static conditions (at 512 averaging samples)

Procedure

(Analog Series)

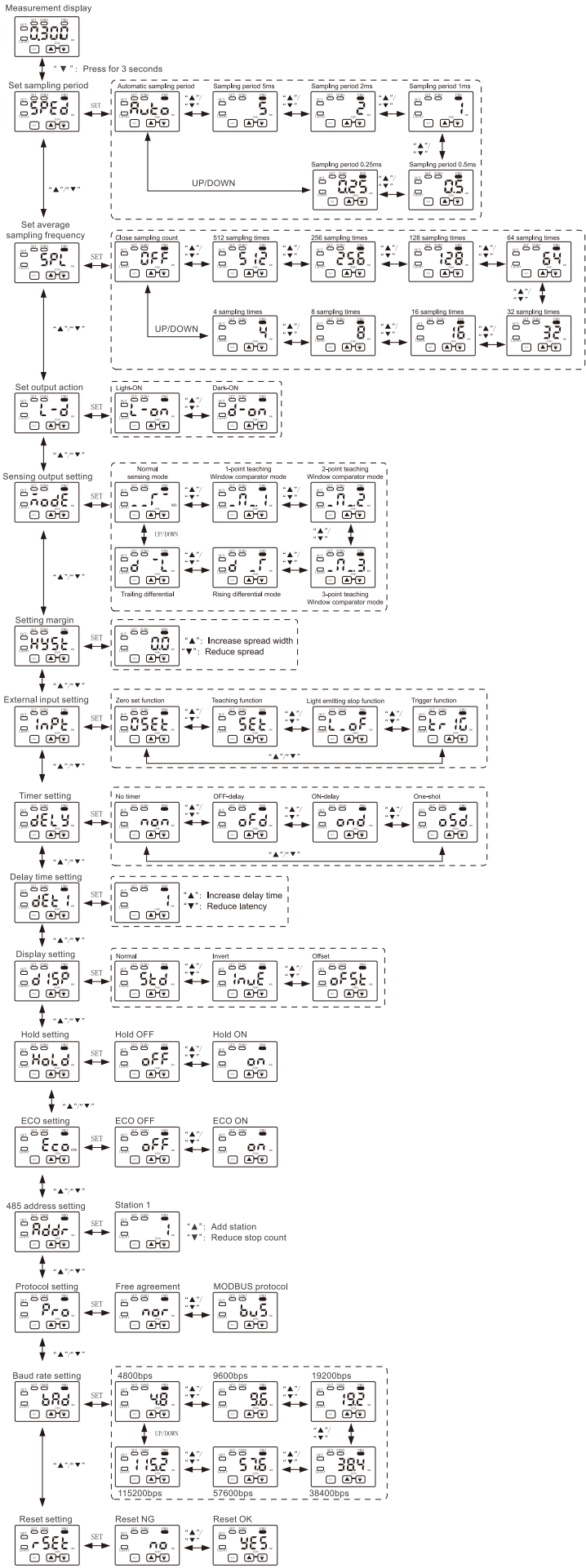


(Switch + analog Series)



(485 Series)

"▲"/"▼"



Function operation and initial state

Type	Initial state	Content
Response speed setting	Hr50	Set the response time. " Hr50 " : High precision 10ms, " Std " : Standard 5ms " FASt " : High speed 1.5ms
Sampling period	1	Sampling period 0.25ms/0.5ms/1ms/2ms/5ms/Auto
Average sampling frequency	8	Average sampling frequency OFF/4/8/16/32/64/128/256/512
Output operation setting	L-on	Select the control output operation mode. " L-on " : Light ON, " d-on " : Dark ON
Sensing output setting	---	Set the sensing output. " --- " : Normal sensing mode " n.1 " : 1-point teaching (Window comparator mode) " n.2 " : 2-point teaching (Window comparator mode) " n.3 " : 3-point teaching (Window comparator mode) " d.f " : Trailing differential mode " d.l " : Trailing differential mode
Analog Output Settings (Analog Series)	vout	Analog output setting " vout " : Voltage analog output, " iout " : Current analog output
Baud rate setting (RS485 Series)	48	Baud Rate Setting 48 9600bps 19200bps 38400bps 384 57600bps 115200bps
Station ID (RS485 Series)	1	Station ID Stop ... Station number
Agreement setting (RS485 Series)	nor	communication protocol setting " nor " : free agreement " bus " : MODBUS protocol
Hysteresis setting	< LC-S > 0010 < LC-S > 003 < LC-S > 007 < LC-S > 02 < LC-S > 08	Set the hysteresis width LC-S030N: 0.001mm ~ 5.00mm LC-S050N: 0.001mm ~ 15.00mm LC-S100N: 0.02mm ~ 35.00mm LC-S200N: 0.1mm ~ 80.0mm LC-S400N: 0.2mm ~ 200.0mm
External input setting	0Set	Set the external input " 0Set " : Zero set function, " Set " : Teaching function " L-off " : Light emitting stop function, " Tr 19 " : Trigger function
Timer setting	non	Set the timer operation. The timer time is fixed at 5ms. " non " : No timer, " ofd " : OFF-delay timer " ono " : ON-delay timer, " o5d " : One-shot timer
Display setting	Std	The display of the measured value can be changed. " Std " : Normal, " invE " : invert, " ofSt " : Offset
Hold setting	off	Set the control output and the analogue output operation when a measurement error occurs (insufficient light intensity, saturation of light intensity, out of measurement range). " off " : Hold OFF, " on " : Hold ON
ECO Setting	off	The digital display can be set to go OFF when key operation is not performed for 30 seconds. Current consumption can be reduced. " off " : Hold OFF, " on " : Hold ON
Reset setting	no	Return to the default setting (factory setting). " off " : Reset NG, " on " : Reset OK

- The PRO indicator (RED) will turn ON when the PRO mode is set.
- When the DOWN key is pressed for 3 seconds or more in the middle the PRO MODE setting, the display returns to the measurement display.

Error indication

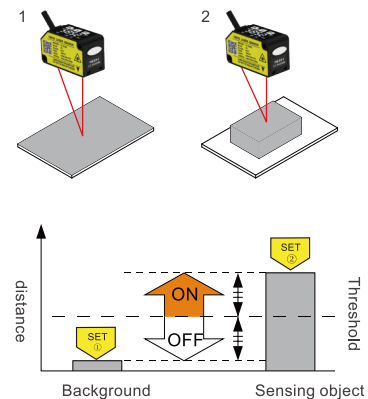
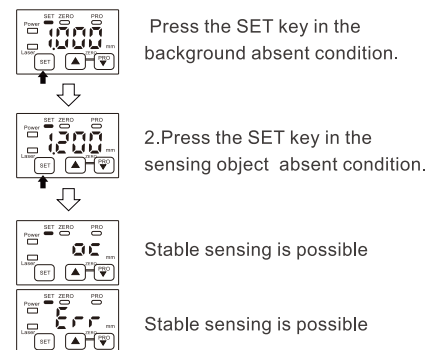
In case of errors, attempt the following measures

Error indication	Description	Remedy
< Hold OFF > ----- < Hold ON > Measured value blinks	Insufficient amount of reflected light. The sensing object is out of the sensing range.	Confirm that the sensing distance is within the specification range. Adjust the installation angle of the sensor.
E001	Flash memory is damaged or passed its life expectancy.	Please contact our office.
E011	Load of the sensing output is short-circuited causing an over-current to flow.	Turn OFF the power and check the load.
E021	The semiconductor laser is damaged or passed its life expectancy.	Please contact our office.
E031	During zero adjustment, normal measurement failed. Since the display setting is set to "Offset", the zero set function can not be used.	Confirm that the sensing distance is within the specification range. Set the display to any setting except "Offset."
E041	During teaching, the measurement is not performed normally.	Confirm that the sensing distance is within the specification range.

Teach

2 Point teaching

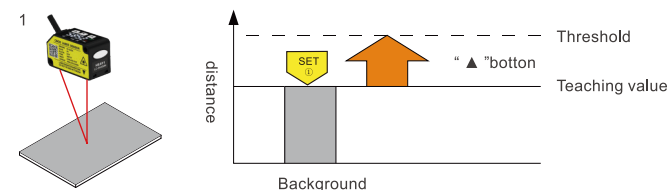
Basic teaching methods



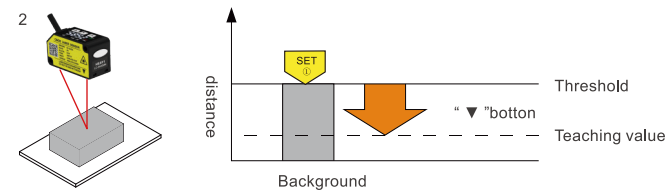
Limited teaching

This is teaching method in case small object or object in background are existing.

< When an object in background is used as reference >



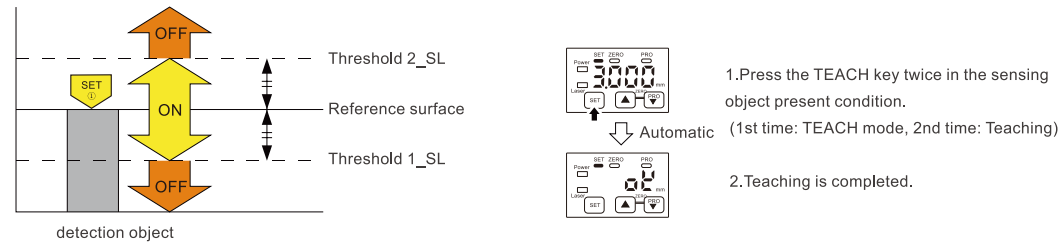
< When a sensing object is used as reference >



1. Press the SET key in the background absent condition or the sensing object absent condition.
2. When the background object is the reference, the "▲" key is pressed to set the reference value in the sensor.
3. When the background object is the reference, the "▼" key is pressed to set the reference value in the sensor.

1-point teaching (Window comparison mode)

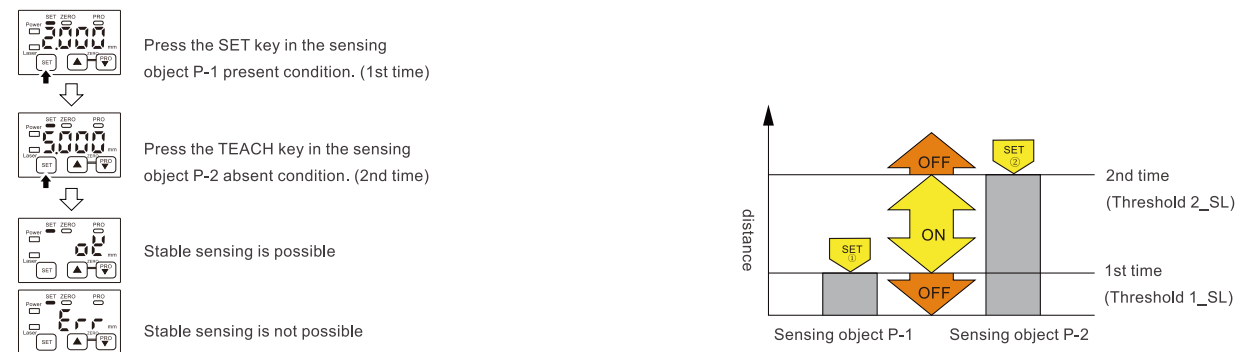
- The method of setting the upper limit and the lower limit is adopted instead of 1 point teaching for the distance between the detection object datum. This function is used when discriminating between upper and lower limits.
- In the case of 1 point teaching (window comparison mode), please set 1 point teaching (window comparison mode) in the detection output setting of PRO mode in advance.
- In the state of detecting objects, the reference value can be set simply by pressing the set key. In addition, it is judged to be OK in the range of 2 datum values, and NG outside the range.



Teaching operation

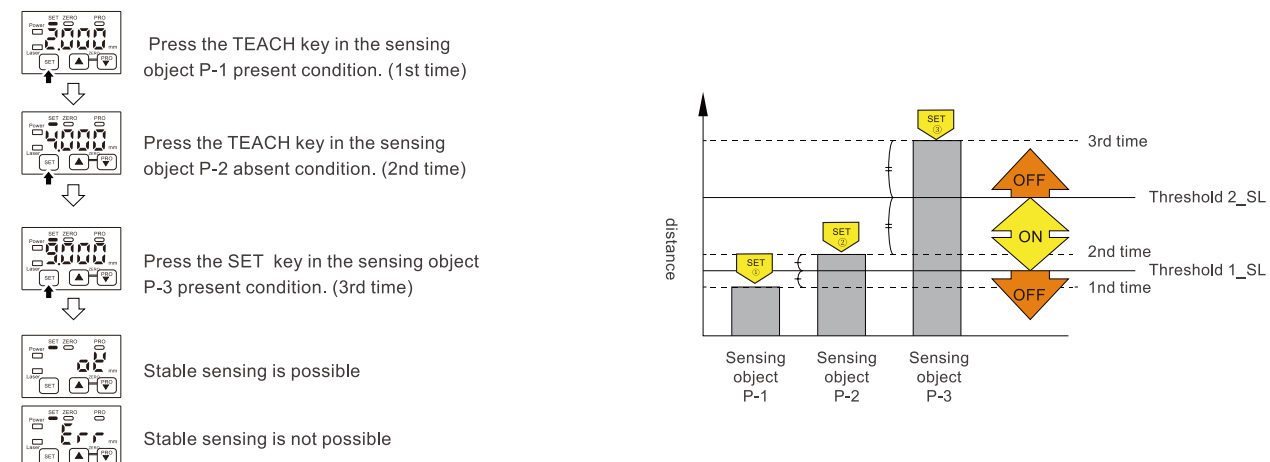
2-point teaching (Window comparison mode)

- This is method to set the threshold range by conducting the 2-point teaching.
- When performing 2-point teaching (window comparator mode), preset "Window comparator mode 2" in the sensing output setting of the PRO mode.
- For the setting, refer to "PRO MODE SETTING."
- When conducting teaching, use sensing objects (P-1 and P-2) whose distance are different from each other.



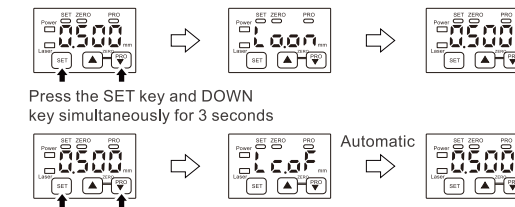
3-point teaching (Window comparator mode)

- This is the method to perform 3-point teaching (P-1, P-2, P-3) and to set the threshold range by setting threshold 1_SL in the mid-point between the 1st time and 2nd time, and threshold 2_SL in the mid-point between the 2nd time and 3rd time as shown in the following figure.
- When performing 3-point teaching (window comparator mode), preset "Window comparator mode 3" in the sensing output setting of the PRO mode.
- For the setting, refer to "PRO MODE SETTING."
- When performing teaching, use sensing objects (P-1, P-2, P-3) with different distance.
- After teaching, P-1, P-2 and P-3 will be automatically rearranged from the smaller value.



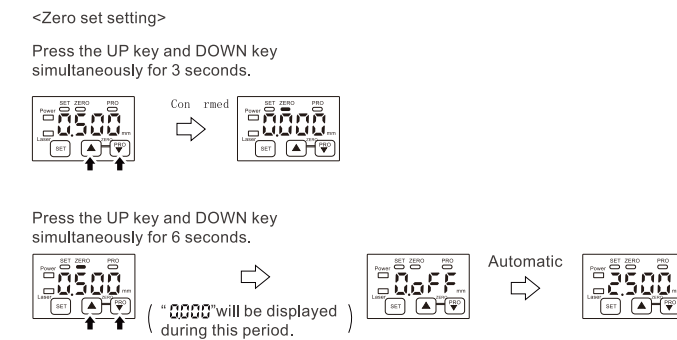
Key lock function

- The key lock function is to prevent acceptance of key operations, so that the conditions set in each setting mode are not changed accidentally.
- When key operation is performed after the key lock is set, "Lo" will be displayed on the digital display.

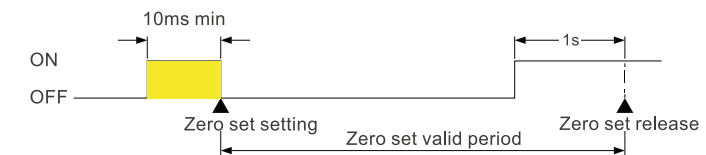


Zero set function

- The zero set function is the function to compulsorily set the measured value to "zero".
- The zero set indicator (yellow) will turn ON when the zero set is valid.
- When the zero set function is executed while the peak / bottom hold function is valid, the held measured value will be reset.
- When the display setting is set to Offset, the zero set function cannot be set.



- The setting or releasing of the zero set from an external input operates as in the following figure.



When the power is turned ON again, zero set from external input can be released.

At this time, the zero set will not be saved.

Even when the zero set is set in the sensor, the zero set can be set or released from an external input. However, when the power is turned ON again, the zero set setting in the sensor will be displayed.

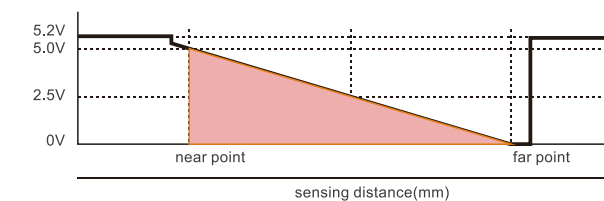
When saved to the sensor through external input settings.

Please use the external input settings set in PRO mode to make the save valid.

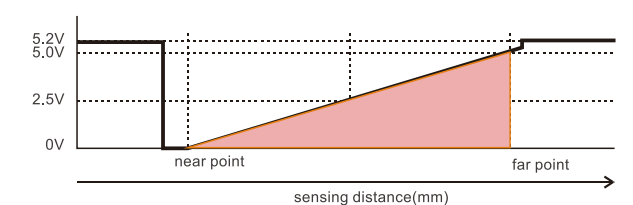
Analog output

Voltage analog output

1. display setting: normal and display

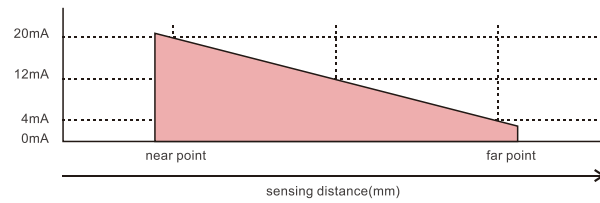


2. display setting: over turn

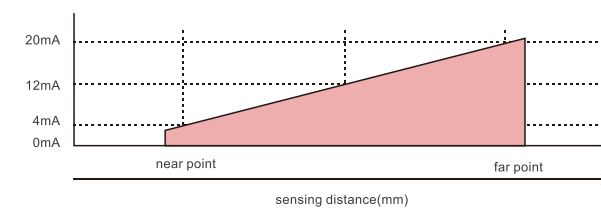


Current analog output

1. display setting: normal and display



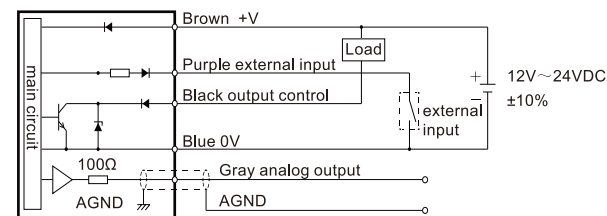
2. display setting: over turn



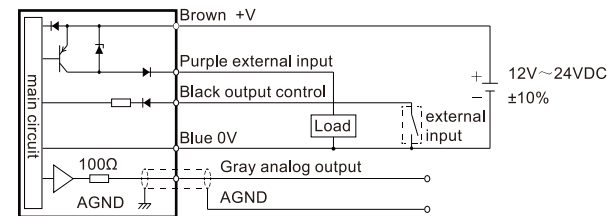
Input / output circuit

Dual Output/Switching Output

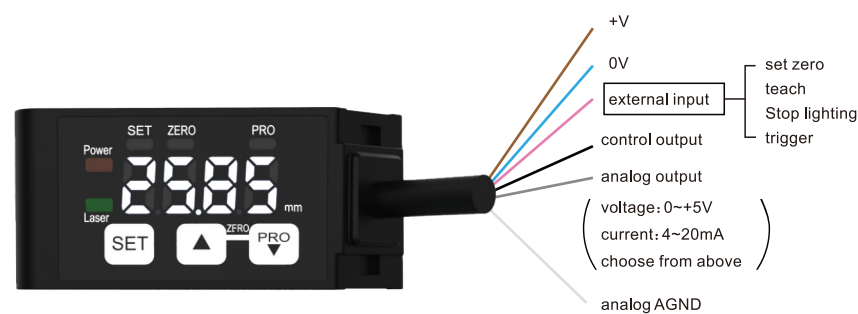
NPN output



PNP output

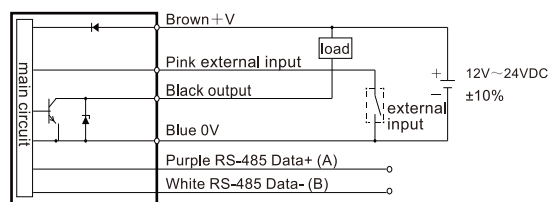


Wiring diagram

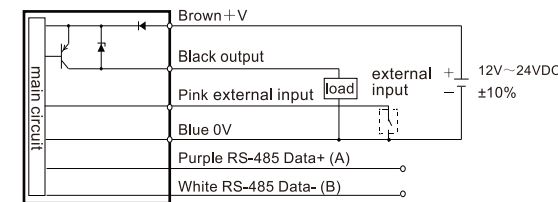


485 communication

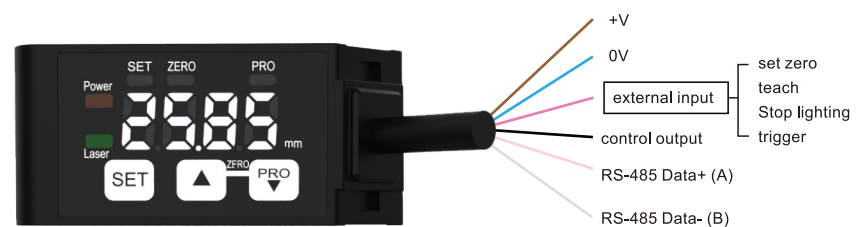
NPN output



PNP output



Wiring diagram

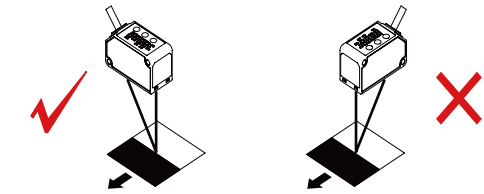


Installation direction

Direction relative to the moving object

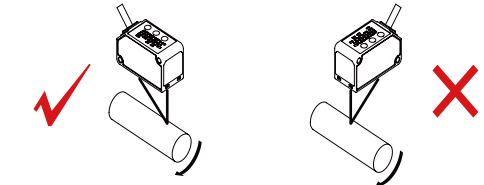
<In the case of material and colour difference. >

When measuring, when the material and color of the moving object are extremely different, the measurement error can be controlled to a minimum by installing it in the direction shown in the following figure.



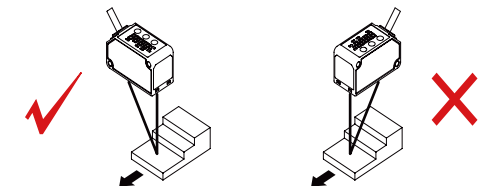
<Measuring rotating objects >

When measuring a rotating object, please install it in the direction shown in the figure below, so as to restrain the influence of up-down vibration and position offset of the object.



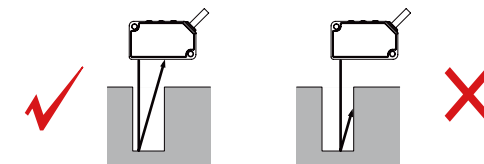
<In the case of step difference >

In the case of moving measurement object with step difference, install it according to the method shown in the figure below, so as to restrain the influence of step difference edge.



<Measurements in narrow locations and depressions >

When measuring in narrow places and small holes, when installing, please pay attention to avoid blocking the light path of the emitting part and the receiving part.

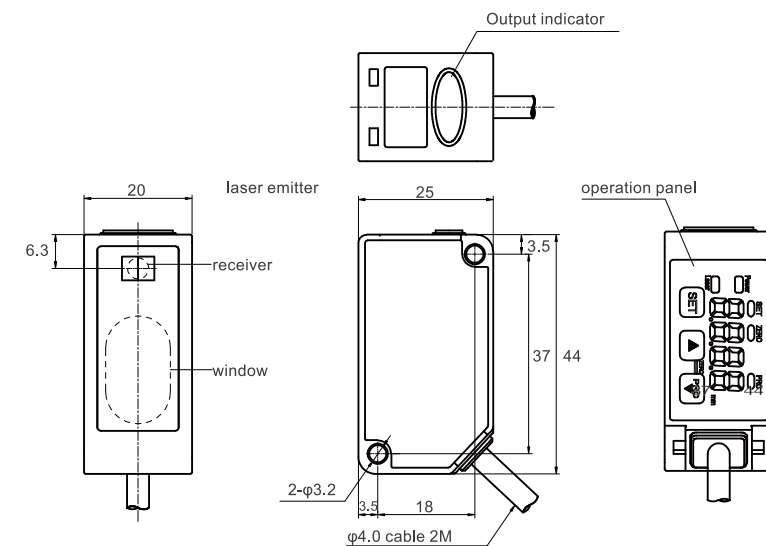


<When the sensor is mounted on the wall >

Installation should be according to the method shown in the following figure so as not to cause multiple light emitted from the wall to enter the light receiving part. In addition, in the case of high reflectivity of the wall, good results can be obtained if it is changed to dull black.



Dimensions



LC-D Series

CMOS laser displacement sensor



Product categories					
Type	Model Number	Appearance	Measurement Center Distance & Measurement Range	Resolution	Beam Diameter
High Function	LC-D030RD		30±4mm	0.5μm	0.1×0.1mm
	LC-D030RR				0.1×1mm
	LC-D050RD		50±10mm	1.5μm	0.5×1mm
	LC-D050RR				
	LC-D085RD		85±20mm	2.5μm	0.75×1.25mm
	LC-D085RR				
	LC-D120RD		120±60mm	8μm	1.0×1.5mm
	LC-D120RR				
	LC-D250RD		250±150mm	20μm	1.75×3.5mm
	LC-D250RR				

Product Specifications						
Model	Analog Output	LC-D030RD	LC-D050RD	LC-D085RD	LC-D120RD	LC-D250RD
	RS485	LC-D030RR	LC-D050RR	LC-D085RR	LC-D120RR	LC-D250RR
Measurement Method		Diffuse Reflection				
Repeatability		2μm	5μm	10μm	30μm	100μm
Measurement Center Distance		30mm	50mm	85mm	120mm	250mm
Measurement Range		±4mm	±10mm	±20mm	±60mm	±150mm
Light Source		Red Semiconductor Laser, Class 1 (Compliant with JIS/IEC/GB/KS/FDA Laser Notice No.50/GB)Maximum Output: 0.39mWPeak Emission Wavelength: 655nm				
Beam Diameter ^(Note2)		0.1×0.1mm	0.5×1mm	0.75×1.25mm	1.0×1.5mm	1.75×3.5mm
		0.1×1mm				
Light-Receiving Unit		CMOS Image Sensor				
Resolution		2.5μm				
Linearity		±0.1%F.S.				
Temperature Charaderistics		±0.08%F.S./°C				
Supply Voltage		24V DC ±10% (including a ripple of 0.5V P-P)				
Current Consumption		<100mA				
Sampling Period		500μs、1ms、2ms				
Analog Output	Voltage Output	Output Range: 0~10.5V (Normal Operation); 11V (Warning Condition)Output Impedance: 100Ω				
	Current Output	Output Range: 3.2-20.8mA (Normal Operation); 21.6mA (Warning Condition) Load Impedance: ≤ 300Ω				
OUT1 output OUT2 output OUT3 output		Judgment Output or Warning Output (Configurable Switching Type)				
		Open Collector NPN Transistor / Open Collector PNP Transistor (Switchable)				
		When NPN Operation is Configured			When PNP Operation is Configured	
		Maximum Inrush Current: 50mA			Maximum Sink Current: 50mA	
		Applied Voltage: 3~24V DC (Between Output and 0V)			Residual Voltage: ≤ 2.8V (At a sink current of 50mA)	
		Residual Voltage: ≤ 2V (At an inrush current of 50mA)			Leakage Current: ≤ 0.1mA	
		Leakage Current: ≤ 0.1mA				
Output Action		Open circuit when ON (Output Active)				
Short-Circuit Protection		Equipped with (Auto-Recovery Type)				
Switch Input		When connected to 0V: Open Collector NPN Output Active When connected to 24V DC Power Supply: Open Collector PNP Output Active				
Timer Input		When NPN Operation is Configured: Active when connected to 0V or Active during connection (varies by configuration) When PNP Operation is Configured: Active when connected to external power supply (+) or Active during connection (varies by configuration)				
Multi-Channel Input		Zero adjustment, reset, memory switching, teaching, saving, and laser control are performed based on input time.				
		When NPN Operation is Configured: Functions are triggered based on the time of connection to 0V.				
		When PNP Operation is Configured: Functions are triggered based on the time of connection to the external power supply (+).				
Communication Interface		Interface: RS-422 or RS-485 Baud Rate: 9,600 / 19,200 / 38,400 / 115,200 bps Data Format: 8-bit data Length, 1-bit stop bit, no parity, BCC enabled, data delimiter: CR				
Indicator Light	Laser Transmittance	Green LED: Illuminates when laser is emitted				
	Alarm	Orange LED: Indicates insufficient light intensity (measurement unavailable)				
	Output	Yellow LED (Quantity: 3): Illuminates when output is active				
Digital Display Unit		Red LED: Displays symbols and 5-digit numerical values				
Protection Structure		IP67(Except for the connector part)				
Pollution Degree		2				
Insulation Resistance		Insulation Resistance: ≥ 20MΩ (Between all terminals and housing) when measured with a DC 250V Megger				
Withstand Voltage		Withstand Voltage: AC 1,000V for 1 minute (Between all terminals and housing)				
Vibration Resistance		Vibration Resistance: 10~55Hz frequency (1-minute cycle), 1.5mm double amplitude, 2 hours each in X, Y, Z directions				
Shock Resistance		Shock Resistance: 500m/s, 3 times each in X, Y, Z directions				
Ambient Illumination (Note 3)		≤ 3,000 Lux (Illuminance on the light-receiving surface under incandescent light)				
Ambient Temperature		-10 ~ +45°C (Condensation and freezing prohibited) Storage Temperature: -20 ~ +60°C				
Ambient Humidity		35 ~ 85% RH				
Operating Altitude		≤ 2,000 meters				
Material		Main Body Housing: PBT (Polybutylene Terephthalate) Front Cover: Polypropylene Cable: PVC (Polyvinyl Chloride)				
Cable		0.5 meters				
Cable Extension		Up to 20 meters (using optional separately sold cables)				
Tightening Torque		≤ 0.8 N·m (Newton - meter)				
Weight		Approximately 70g (excluding cable) Approximately 110g (including cable) Approximately 160g (packaged)				
Applicable Standards		Complies with the EMC Directive				

Note 1: Unless otherwise specified, the measurement conditions are as follows: Power supply voltage: 24V DC; Ambient temperature: 20°C; Sampling period: 500μs; Averaging times: 1,024; Measurement center distance; Target object: Aluminum-deposited surface mirror; Analog output.

Note 2: These values are at the measurement center distance. They are defined by 1/e² (approximately 13.5%) of the central light intensity. If there is light leakage outside the defined area and strong reflections higher than the detection point itself around the detection point, the measurement result may be affected.

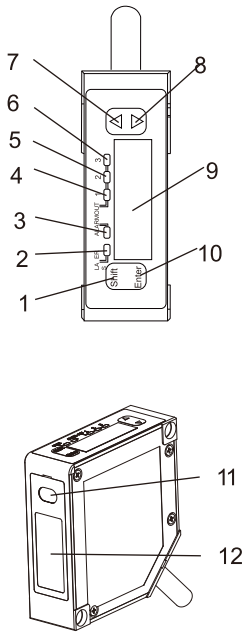
Note 3: The fluctuation range due to ambient illumination is within ±0.1% F.S. (Full Scale).

Component Names

1	[SHIFT]	7	[UP]
2	Laser Emission Indicator Light(LASER)	8	[DOWN]
3	Warning Indicator Light(ALARM)	9	Digital Display Section
4	OUT1 Indicator Light(OUT1)	10	[ENTER]
5	OUT2 Indicator Light(OUT2)	11	Light Emitting Section
6	OUT3 Indicator Light(OUT3)	12	Light Receiving Section

Switch/ Analog/ RS485 Output

Name	Function	Color of wire
Analog Output Wires	A(V) Analog Voltage Output	1-core Shielded black
	AGND Analog Ground	
	A(I) Analog Current Output	1-core Shielded grey
Input/Output Cables	AGND Analog Ground	
	OUT1 Judgment Output 1	black
	OUT2 Judgment Output 2	white
	OUT3 Judgment Output 3 or Alarm Output	grey
	TM Timer Input	pink
	MI Inputs for Zero Adjustment, Reset, Memory Switching, Teaching, Saving, and Laser Control	purple
	NP NPN/PNP Type Switch Input	pink/blue
	+SD ransmit Data	Twisted Pair Cable green
	-SD Transmit Data	light blue
	+RD Receive Data	Twisted Pair Cable orange
	-RD Receive Data	yellow
	SG Signal Ground	Shielded
	+V DC 24V Input for Power Supply	brown
	0V Ground for Power Supply (GND)	blue

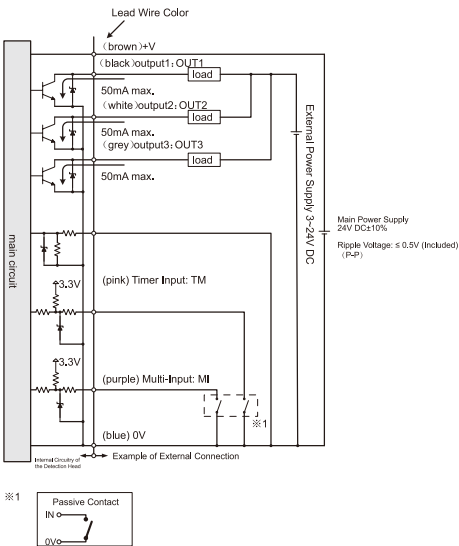


Switch/ RS485 Output

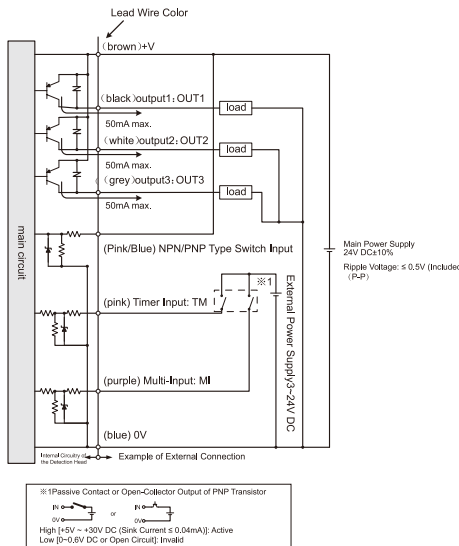
Name	Function	Color of wire
OUT2	Judgment Output 2	purple
MI	Inputs for Zero Adjustment, Reset, Memory Switching, Teaching, Saving, and Laser Control	grey
TXD+	Transmit Data	Twisted Pair Cable orange
TXD-	Transmit Data	pink
RXD+	Receive Data	Twisted Pair Cable black
RXD-	Receive Data	white
+V	DC 24V Input for Power Supply	brown
0V	Ground for Power Supply (GND)	blue

Input/output wiring diagram

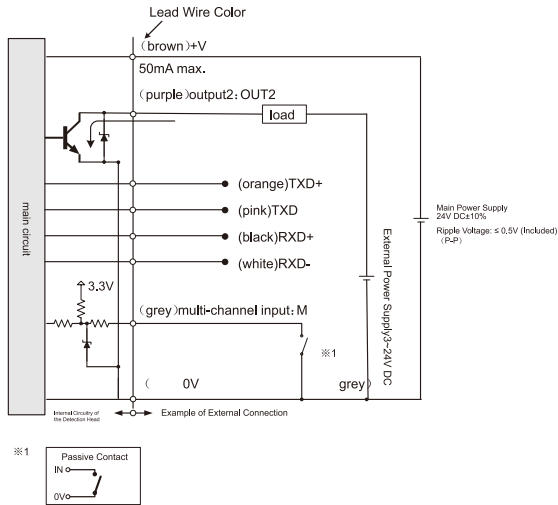
NPN(Switch/ Analog/ RS485 Output)



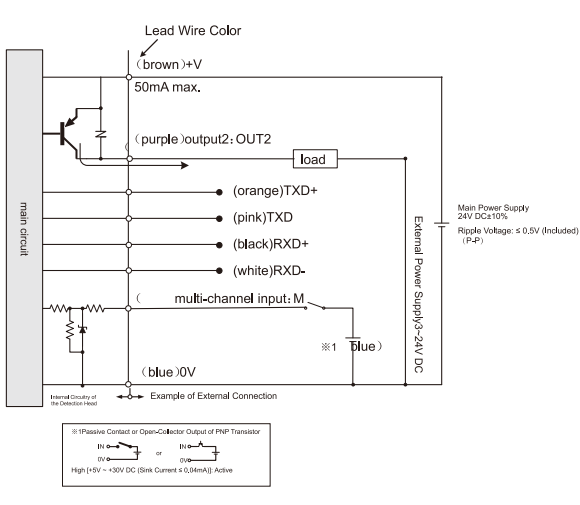
PNP(Switch/ Analog/ RS485 Output)



NPN(Switch/ RS485 Output)

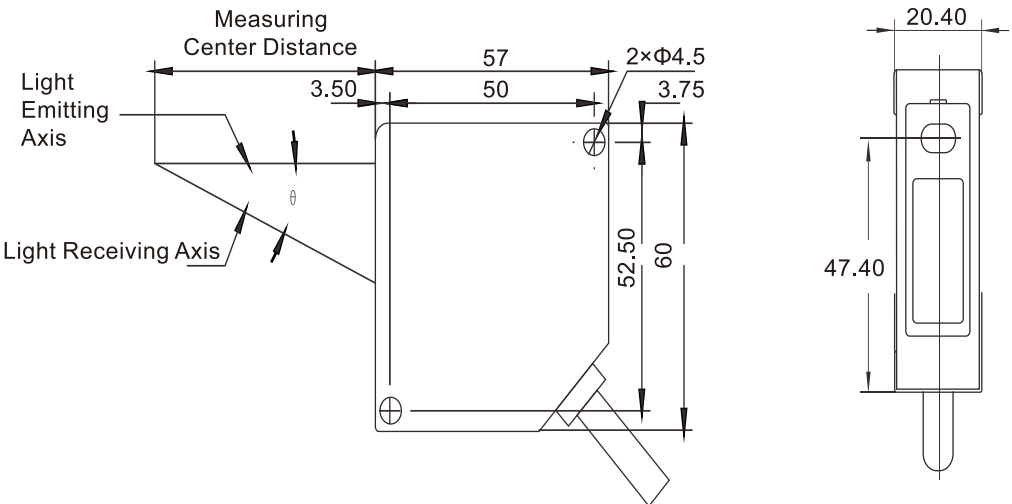


PNP(Switch/ RS485 Output)



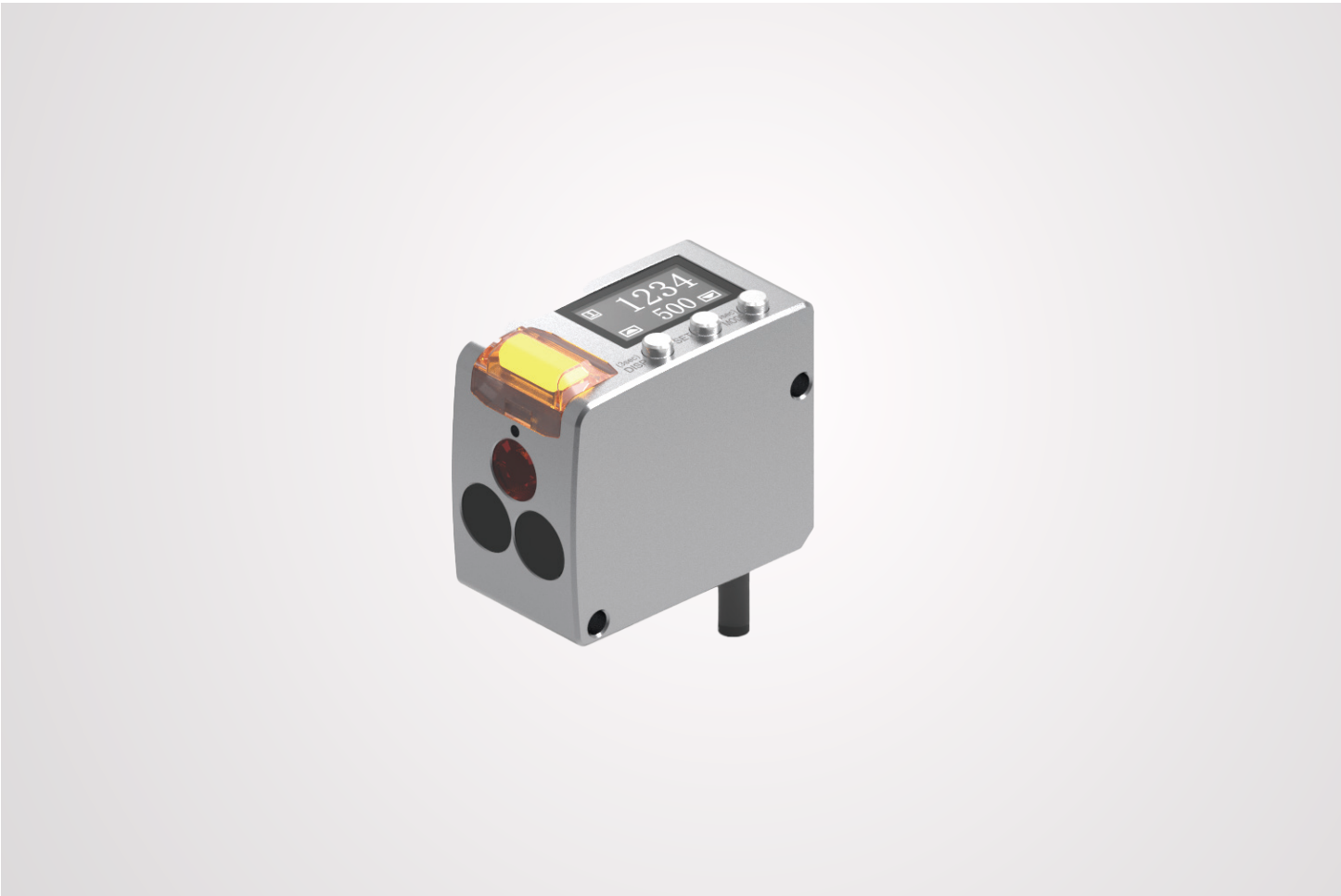
*Note: Color variations may occur between different batches. Please refer to the label attached to each sensor.

Dimensions



LSB Series

CMOS laser displacement sensor



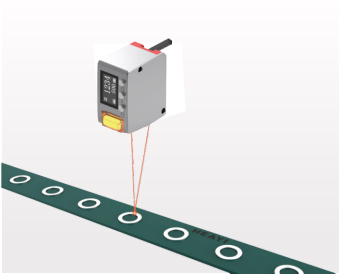
■ RS485 communication

■ The detection is not affected by surface reflections, color, or material of the object being tested

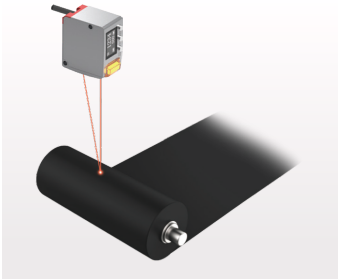
■ Detection range: 30-2000mm

■ Optional dual-channel output

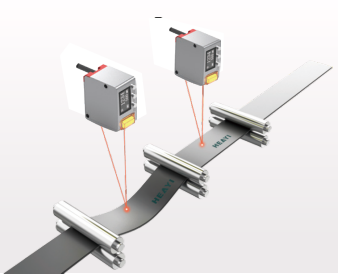
Application



Check whether there is micro flat pad



Detect the residual volume of coil material



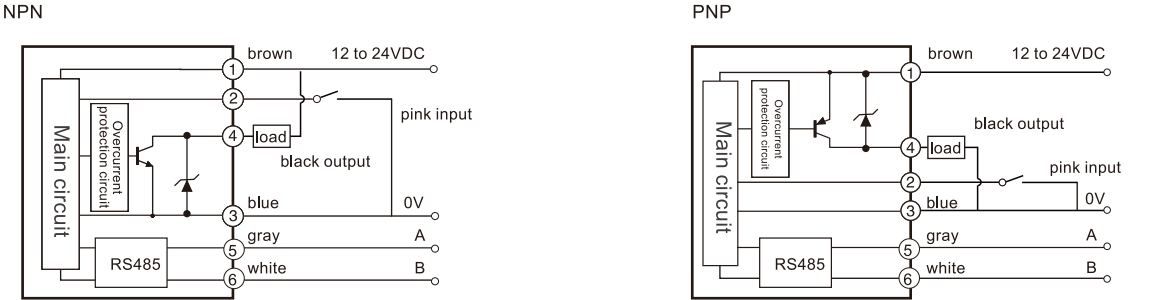
Test the bending amount of sheet material

Product category

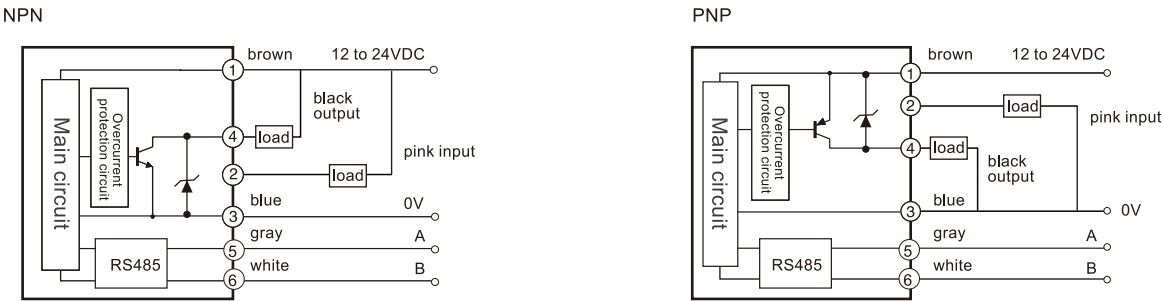
Model		LSB002R	LSB005R	LSB012R
Sensing distance		30 to 2000mm	30 to 5000mm	30 to 12000mm
Type		Cable Type		
Spot diameter		Approx. 4mm		
Light Source	Type	Red Laser (660nm)		
	Laser Classification	Class 1M (IEC60825-1)		
Linearity Accuracy		0.08m-1.2m: < 6mm; 1.2m-12m : <0.5%		
Repeatability Precision		7mm		
Power Supply Voltage		12 to 24VDC, < 45mA (no load)		
Response Time		3ms/10ms/25/ms/100ms/1000ms		
Delay		OFF Delay / ON Delay / Single Pulse Mode		
Output		1 route + 1 route available; NPN/PNP Selectable; Output current: 100mA, residual voltage < 2.5V; N.O./N.C. Selectable		
External Input		Stop/SET/Zero setting (Selectable)		
Communication		RS-485 MODBUS/Freedom Protocol (Switchable)		
Protection Circuit		Reverse Connection/Power Surge/Output Short Circuit		
Environmental Resistance	Housing Protection Rating	IP65		
	Ambient Light	Incandescent/Sunlight: ≤10,000 lux		
	Ambient Temperature	-20 to 55°C (no freezing)		
	Relative Humidity	35 to 85% RH (no condensation)		
	Vibration Resistance	10 to 55Hz, composite amplitude 1.5mm, 2 hours each in X, Y, Z directions		
Shock Resistance		1000m/s², 6 times each in X, Y, Z directions		
Material		Zinc Alloy (Nickel-Chromium Plated) ; Indicator Cover: PC; Button: Stainless Steel		
Weight		Lens Cover: Glass Display: PMMA; Cable: PVC		
		about125g		

Input/output circuit diagram

Use pink line as input



Use pink line as output



Dimensions

