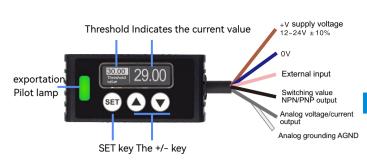
[Laser displacement sensor] **Product instruction manual**



1. Applicable specifications/regulations

This product complies with the following specifications/regulations.

- < European Specification > EMC Directive
- < US/Canada Specification > CAN/CSA-C22.2 NO.60947-5-2-14

2. Confirmation of packaging items:

☐ Host A set □ Specification of application 1 piece □ Product certificate 1 piece

☐ Mounting bracket (including screws)

3 Warningş<u>∕</u>\

- $_{ullet}$ Do not direct or reflect the laser light through the mirror body into the eye. If shot in the eye, it can cause blindness.
- This product is not explosion-proof structure, do not use in flammable or explosive gas, • liquid environment.
- This product does not have the function of automatically stopping laser projection
- afterdecomposition, do not decompose or transform.
- Do not use this product as a safety device for the purpose of protecting human body. If used improperly, it may cause injury, fire, and electric shock

4, operation panel description:

Power-on Displays the threshold and current detection value. The red indicator is the output indicator, and the green indicator is the power supply indicator.



9. Teach:

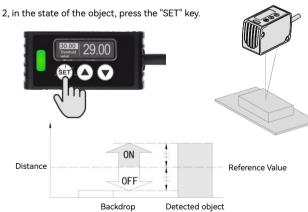
2 teachings:

Basic guidance methods.

1, in the state of no object, press the "SET" key



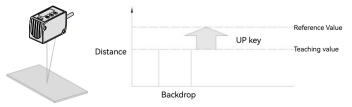




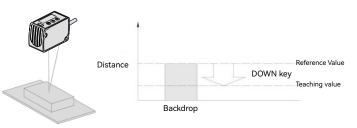
3. Complete the calibration. (When the difference between the two teachings is small, the return difference is too small.)

● In the case of small objects and backgrounds, how to use this teaching

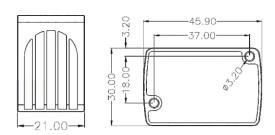
method is very convenient.< in case of background reference >



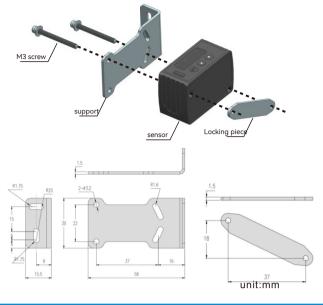
< In the case of detecting objects as benchmarks >



5. Product size diagram:



6, installation and support size diagram:

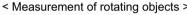


7, installation direction:

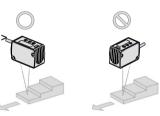
Relative to the direction of the moving body < Material, color difference case >

When measuring, if the material color of the

moving measurement object is extremely different, install it according to the direction shown in the right figure, so that the measurement error can be controlled to a



· When measuring the rotating object, install it in the direction shown in the figure on the right, which can inhibit the influence of the object's up and down vibration and position deviation



1, in the state of the background object or in the state of the detection object, press 1, in the detection of object P-1 state, press the "SET" key (the first time) the "SET" key.

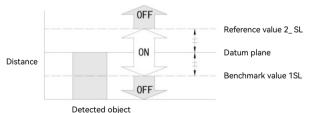
2, in the case of background objects as the benchmark, press the " \blacktriangle " key, set the reference value in the sensor. The value set in the checked object after pressing the "▼" key when the checked object is the base.

3. Complete the calibration.

1 point teaching (Window comparison mode)

- $\begin{tabular}{l} \bullet \end{tabular} For the distance between the datum surface of the detected object, the 1-point$ instruction is not implemented, but the method of setting the upper and lower than the contraction of thelimits is implemented. This function is used to distinguish between the upper and the contraction of the c
- lacktriangle In the case of 1 point teaching (window comparison mode), please set it to [1 point teaching (window comparison mode)] in the detection output setting of

Refer to the "Operating Instructions for the Mode PRO" for setting methods.



in the case of detecting objects, press the "SET" key twice



Return difference

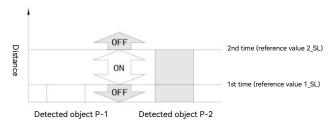
2. Teaching is complete.

2 point teaching (Window comparison mode)

•In the case of 2-point teaching (window compare mode), please set it to [2point teaching (window compare mode)] in the detection output setting of

Refer to the "Operation Instructions for the Mode PRO" for setting methods.

 \bullet When performing the instruction, please use a constant distance detection



< in case of segment difference >

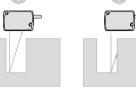
· If there is a segment difference in the moving measurement object, install it according to the method shown in the figure on the right, so as to suppress the influence of the segment difference





Measurements are made in narrow Spaces and depressed sections

In the case of measurement in narrow places and holes, take care to avoid blocking the light path from the light emitting part to the light receiving part when installing.



In the case of mounting the sensor part to the wall

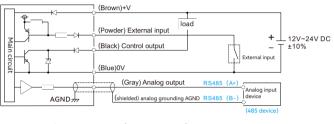
Please install according to the method shown in the right figure, so as to avoid the multiple reflected light generated by the wall will enter the light receiving part, in addition, in the case of high reflectivity of the wall, if changed to dull black, you can obtain good results.

< About the maximum tilt Angle of the sensor > · Sensor with mounting Angle range (90±15°)

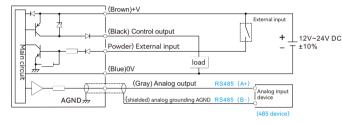
Please install and use in this Angle, beyond this range of measurement results will appear inaccurate measurement, misjudgment phenomenon

8. Input/output circuit diagram:

• NPN+ analog output type (RS485 output)



PNP+ analog output type (RS485 output)



- 2, in the detection of object P-2 state, press the "SET" key (the second time) 3, complete the calibration.

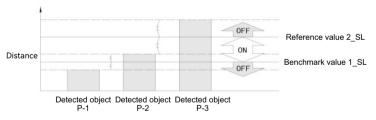
3-point teaching (Window comparison mode)

• Perform the 3-point (P-1, P-2, P-3) instruction, as shown in the figure below, set the reference value 1_SL between the 1st and 2nd time,

Method of setting the reference value 2_SL between the second and third times and setting the range of the reference value.

•In the case of 3-point teaching (window compare mode), please set to [3point teaching (window compare mode)] in the menu detection output setting

●After teaching, P-1, P-2, P-3 will be automatically arranged in order from smallest to largest.



1, in the detection of object P-1 state, press the "SET" key (the first time)

- 2, in the detection of object P-2 state, press the "SET" key (the second time)
- 3, in the detection of object P-3 state, press the "SET" key (the third time)
- 4. Complete the calibration

10. Threshold fine-tuning function:

Usual detection mode:

Press the "▲" key or "▼" key to change the threshold directly.

Window comparison mode:

Press the "▲" key or "▼" key to change the threshold directly.

Press the "▲" key and "▼" key at the same time to switch threshold 1 and threshold 2.

11, zero function:

Zero setting function is the function of forcing the measurement value to "zero". When setting zero, the screen has a vertical line, as shown below:



Press the "SET" key and the " \blacktriangle " key at the same time to reset the Settings

Press the "SET" key and the " \blacktriangle " key at the same time to zero and cancel



Note: Zero adjustment can be performed only when the display mode is set to reverse mode. Standard display mode does not have zero adjustment function.

12, key lock function:

Press the "SET" key and " \blacktriangledown " key at the same time to press the lockPress the "SET" key and "▼" key at the same time to unlock

13. Menu Settings:

Press and hold the "SET" key for 3 seconds under the distance display interface to enter the menu setting mode.

In the menu setting mode, hold down SET for 3 seconds to exit the menu setting

In the menu setting mode, stop for 20 seconds without pressing any button, you can automatically exit the menu setting mode.

After entering the menu setting mode, press the "▲" key or "▼" key to switch the menu up and down. Press the SET key to access the corresponding menu item.

Working mode: Standard, high speed, high precision



2. Normally open and normally close: press "SET" to enter, "▲" or "▼" to switch the selection,



e-point teaching, two-point teaching, three-point teaching.



4. Simulation selection: 0-5V, 4-20mA.





			Read da	nta		
Address code	Function code	Register Address	Number of registers N	CRC	Sending code	Function Description
0x01	0x04	0x0000	0x0002	0x71CB		Acquisition - Distance
0x01	0x04	0×0001	0x0001	0x600A		Acquisition - Working Mode
0x01	0x04	0x0002	0x0001	0x900A		Acquiring - NO and NC
0x01	0x04	0x0003	0x0001	0xC1CA		Get - Detect Output
0x01	0x04	0x0004	0x0002	0x300A		Acquire - Tolerance
0×01	0x04	0x0005	0x0001	0x21CB		Get - External Input
0x01	0x04	0x0006	0x0001	0xD1CB		Acquire Output Timing
0x01	0x04	0x0007	0x0001	0x800B		Get Output Timing Time
0x01	0x04	0×0008	0x0001	0×B008		Get - Display Mode
0×01	0x04	0x0009	0x0001	0xE1C8		Get Keep
0x01	0x04	0x000A	0x0001	0x11C8		Acquisition - Screen Selection
0x01	0x04	0x000B	0x0002	0x0009		Obtain zero adjustment value
0x01	0x04	0x000C	0x0002	0xB1C8		Acquisition - Threshold 1
0x01	0x04	0x000D	0x0002	0xE008		Acquisition - Threshold 2
0x01	0x04	0x000E	0x0002	0x1008		Acquire - Baud

10H instruct	0H instruction (writing multiple holding registers)									
1. Commun	. Communication frame format									
1byte	1byte	2byte	2byte	1byte	N*2 byte	2byte				
Address code	Function code	Register Address	Number of registers N	Bytes 2N	Register value	CRC code				
2. Response frame format										
1byte	1byte	2byte	2byte	2byte						
Address code	Function code	Register Address	Number of registers N	CRC code						
3. Error Frame Format										
1byte	1byte	1byte	2byte							
Address code	Error code	Exception code	CRC code							

				Operating				
Address code	Function code	Register Address	Number of registers	Bytes	Register value	CRC	Sending code	Function settings
0x01	0x10	0×0000	0x0001	0x02	0x0000	0xA650		Discontinuous outpu
					0x0001	0x6790		Continuous output
					0x0000	0xA781		High precision
0x01	0x10	0x0001	0x0001	0x02	0x0001	0x6641		Standard
					0x0002	0x2640		High speed
0x01	0x10	0×0002	0x0001	0x02	0x0000	0xA7B2		Normally open
0,01	0.7.10	OXOGOZ	0,0001	OXOZ	0x0001	0x6672		Normally dosed
					0x0000	0xA663		Usually detected
0x01	0x10	0x0003	0x0001	0x02	0x0001	0x67A3		A little instruction
0.001	0.00	0.00003	0.00001	UXUZ	0x0002	0x27A2		Two point teaching
					0x0003	0xE662		Three point teachin
0x01	0x10	0x0004	0x0002	0x04				Stress difference
					0x0000	0xA605		Zeroing
0x01	0x10	0x0005	0x0001	0x02	0x0001	0x67C5		Teach
					0x0002	0x27C4		Stop laser
0x01			0x0001		0x0000	0xA636		Untimed
	0x10	0x0006		0x02	0x0001	0x67F6		Output extension
	UX 10				0x0002	0x27F7		Delayed output
					0x0003	0xE637		Single output
0x01	0x10	0x0007	0x0001	0x02				Timing time
					0x0000	0xA718		Routine
0x01	0x10	0×0008	0x0001	0x02	0x0001	0x66D8		Reversal
					0x0002	0x26D9		Deviation
0.04	0.40		0.0004	0.00	0x0000	0xA6C9		Keep open
0x01	0x10	0x0009	0x0001	0x02	0x0001	0x6709		Keep off
					0x0000	0xA6FA		Timed breathing screen
0x01	0x10	0x000A	0x0001	0x02	0x0001	0x673A		Chang liang
0x01	0x10	0x000B	0x0001	0x02	0x0001	0x66EB		Zero adjustment - current measured value
0x01	0x10	0x000C	0x0002	0x04				Threshold - input threshold
0x01	0x10	0x000D	0x0002	0x04				Threshold - input threshold
					0x000012C0	0x7ED3		4800
					0x00002580	0x6913		9600
0x01	0x10	0x000E	0x0002	0x04	0x00009600	0x1D83		38400
		1			0x0001C200	0x7283		115200
					0x0003E800	0xCC23		256000
0x01	0x10	0x000F	0x0001	0x02	0×0000	0xA6AF		Reset

 $\ensuremath{\mathsf{6}}.$ External input: When selecting the corresponding function, the pink line and OV short connect once Zero setting: the current value is cleared to zero, and the ± value is displayed in the range;

Instruction: Can be used as a single "SET" key;

Stop laser: the sensor stops emitting laser and does not work;



7. Output timing: output delay, delayed output, single output, output extension, no timing. Default 5ms is not adjustable



8. Display mode: standard, reverse [the current detection value from +35 to -35 to -35 to \pm 35, and the corresponding 0-5V or 4-20mA reverse to 5-0V or 20-4mA], offset is to change the ±35 value to 0-70.



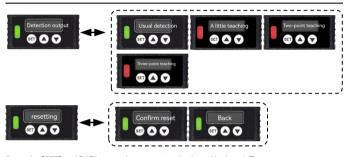
9. Hold: The default value is Hold off. You can press up or down to hold on. That is, when the current detection value reaches the maximum or minimum, the output voltage or current can be maintained. [Common application is to maintain 0 or 5v after exceeding the range].



10. Screen selection: steady on, timing screen.



1. Reset: press "SET" to return to the default display, you can switch to confirm the reset, press "SET OK", the display has restored factory Settings.



Press the "SET" and "▼" keys at the same time: keyboard lock on/off.

15, external input:

In the menu external input select: Zero, Teach, Stop laser.

PNP model: Pink wire gently shock the positive electrode of the source and release

	_		In response to			Response
Address code	Function code	Bytes 2N	Register value	CRC	Response code	description
0x01	0x04	0x04				Distance
			0x0000	0xB930		High precision
0x01	0x04	0x02	0x0001	0x78F0		Standard
			0x0002	0x38F1		High speed
0x01	0x04	0x02	0x0000	0xB930		Normally open
0.001	0.04	UXUZ	0x0001	0x78F0		Normally closed
			0x0000	0xB930		Usually detected
0x01	0x04	0x02	0x0001	0x78F0		A little instruction
OXOT	0.04	0.02	0x0002	0x38F1		Two point teaching
			0x0003	0xF931		Three point teaching
0x01	0x04	0x04				Stress difference
			0x0000	0xB930		Zeroing
0x01	0x04	0x02	0x0001	0x78F0		Teach
			0x0002	0x38F1		Stop laser
			0x0000	0xB930		Untimed
0x01	0x04	0x02	0x0001	0x78F0		Output extension
UXUT	0X04	UXUZ	0x0002	0x38F1		Delayed output
			0x0003	0xF931		Single output
0×01	0x04	0x02				Timing time
			0x0000	0xB930		Routine
0x01	0x04	0x02	0x0001	0x78F0		Reversal
			0x0002	0x38F1		Deviation
	0.07		0×0000	0xB930		Keep open
0x01	0x04	0x02	0x0001	0x78F0		Keep Off
	0.07		0×0000	0xB930		Timed beathing some
0x01	0x04	0x02	0x0001	0x78F0		Chang Liang
0x01	0x04	0x04				Zeroing value
0x01	0x04	0x04				Threshold 1
0x01	0x04	0x04				Threshold 2
			0x000012C0			4800
			0x00002580			9600
0x01	0x04	0x04	0x00009600			38400
	1		0x0001C200			115200

		esponse to		
Address code	Function code	Register Address	Number of registers	CRC
0x01	0x10	0x0000	0x0001	0x01C9
0x01	0x10	0x0001	0x0001	0x5009
0x01	0x10	0x0002	0x0001	0xA009
0x01	0x10	0x0003	0x0001	0xF1C9
0x01	0x10	0x0004	0x0002	0x4008
0x01	0x10	0x0005	0x0001	0x11C8
0x01	0x10	0x0006	0x0001	0xE1C8
0x01	0x10	0x0007	0x0001	0xB008
0x01	0x10	0x0008	0x0001	0x800B
0x01	0x10	0x0009	0x0001	0xD1CB
0x01	0x10	0x000A	0x0001	0x21CB
0x01	0x10	0x000B	0x0001	0x700B
0x01	0x10	0x000C	0x0002	0x81CB
0x01	0x10	0x000D	0x0002	0xD00B
0x01	0x10	0×000E	0x0002	0x200B
0x01	0x10	0x000F	0x0001	0x31CA

sp	pecies	Measuring center 30mm	Measuring center 50mm	Measuring center 100mm	Measuring center 200mm		suring pe 400mm	
			NPN output	NPN output	NPN output	NPN	output	
Output 1	type	Analog output	Analog output	Analog output	Analog output	Analo	g output	
		RS485 output	RS485 output	RS485 output	RS485 output	RS48	5 output	
Measuring c	enter distance	30mm	50mm	100mm	200mm	400)mm	
Measuri	ng range	±5mm	±15mm	±35mm	±80mm	±20	0mm	
repeatal	bility	10μm	30μm	70μm	200μm	400μm(Measuring dis 800μm(Measuring dis		
straighti	ness		±0.1%FS.		±0.2%FS.		distance200~400mm distance400~600mm	
Temperati	ure characteris	tic		0.03%	F.S./°C			
illuminaı	nt			Maximum output	luctor laser Cla :1mW, light beam th :655nm	ss 2		
Beam di	iameter	About φ50μm	About φ70μm	Aboutφ120μm	About φ300μm	About	ф500µm	
Supply v	voltage			12~24V DC±109	%, pulsation P-	P10%		
Current	consumption	Below 40mA (24V DC supply voltage), below 60mA (12VDC supply voltage)						
Control output		Maximum inflow current:50mA Applied voltage:30V DC below (control output -0 V) Residual voltage: less than 1.5V (inflow current 50mA) Leakage current: below 0.1mA						
Output a	action		(ON in light/ON in n	on-light can be sw	itched		
Short cir	rcuit protecti	on		Equipped (auto	matic recovery typ	e)		
Analogoutput	Voltage analog output (When alert :+5.2V)	Output rang Output impe			Output range:0~5V Output impedance: 1000		Output range:0~5V Output impedance: 100Ω	
Analogoutput	Current analog output (Alert :0mA)	Output range : Load impedance	4 to 20mA :300 Ω or less		Output range :4 to 20mA Lead Impedance :300© or less		Output range :4 to 25mA Lead impedance :300Ω or lea	
Reaction t	ime		1.	5ms/5ms/10ms	can be switche	ed		
External in	nput	NPN No contact input Valid :0V to +12V DC Input impedance: about 10 $k\Omega$						
Protective	construction	IP60						
Degree of	fouling	2						
Operating am	bient temperature	-10°C~+40°C(pay attention to do not condensation, icing), storage :-20°C~+60°C						
Ambient h	numidity	35%~85%RH, storage :35%~85%RH						
Use ambie	ent light	Incande	escent lamp: the ill	umination degree	of the illuminated :	surface is less than	3000lx	
Service lev	vel			Below	2000m			
cable			With (0.15mm 5-core	composite cal	ole 2m		
material		В	ody shell: alum	inum casting fr	ont cover plate	propylene bas	se .	
weight			Approx. 35	g(without cable	e), Approx. 85g(with cable)		
Applicable	specification		(Compliance wit	h EMC directive	,		

(Note): When the measurement conditions are not specified, the use conditions are as follows: power supply voltage :24V DC, ambient temperature :+20°C, reaction time :10ms, analog output value of the measurement distance. Object Object: White paper.

MODBUS PROTOCOL

1. Communication frame format							
1byte	1byte	2byte	2byte	2byte			
Address code	Function code	Register Address	Number of registers N	CRC code			
2. Response	frame format		•				
1byte	1byte	1byte	2N byte	2byte			
	Function code	Bytes 2N	Register value	CRC code			
Address code	runction code						
3. Error Fran		5,53 214					
		1byte	2byte				

communication mode	RS485
Synchronization method	asynchronous
Baud	9.6/19.2/38.4/57.6/115.2/256kbps
Data length	8-bit
Stop bit	1-bit
Parity check	nothing

MODBUS PROTOCOL

Communication example (obtaining distance)

Dispatch orders 01 04 00 00 00 02 71 CB

	N CRC
01 04 0000 0002	71CB

01 04 04 00 01 19 36 21 C2

Address code	Function code	Bytes	Register Value- Distance Value	Check digit
01	04	04	00 01 19 36	21 C2

Where 00 01 19 36 is distance information, unit: um,

Communication example (default Baud is 115200)

Dispatch orders

01 10 00 0E 00 02 04 00 00 25 80 69 13

Address code	Function code	Register Address	Number of registers	Bytes	Register value	CRC
0x01	0x10	0x000E	0x0002	0x04	0x00002580	0x6913

Feedback information

01 10 00 0E 00 02 20 0B Address code Function code Register Address 0x000E 0x0002 0x10

16. Precautions:

This product is developed/manufactured for use in an industrial environment.

Be sure to perform wiring operations when the power is off.

If miswiring occurs, it will cause a fault.

d parallel wiring with high voltage and power lines, or use the same wiring tube. Other $cause\ misoperation\ due\ to\ induction.\ Please\ confirm\ power\ supply\ changes\ to\ avoid\ power\ input$ exceeding the rated value.

CRC

In cases where a commercially available conversion regulator is used in the power supply, be sure to ground the housing ground (F.G.) terminal of the power supply.

When using machines that cause interference (conversion regulators, variable frequency motors, etc.) around sensor installation, be sure to ground the frame ground (F.G.) terminal of the machine.

Do not use in the transition state when the power is on.

For the extension of the cable, a cable of m0.03m or more can be used, with a total length 10m $_{\cdot}$ of up to

Do not bend the cable outlet with brute force, and avoid pressure such as Segara pulling. Although it varies by type, light from fast rt and bright hight fluorescent lamps, as well as solar energy, can

affect detection, so be careful to avoid direct incoming light.

Do not allow the product to shine, light surface attached to water. oil. fingerprints and other substances

that cause light refraction, or dust and garbage and other substances that \pmb{kings} e light bloc

If it is attached, please use a soft cloth that does not produce dust, or lens paper to wipe it. Do not use it in an environment where there is a lot of steam, dust, or corrosive gases.

Please be careful to avoid exposure to diluents and other organic solvents, strong acids, strong bases, oils

When cleaning the light casting window or light receiving window of the sensor head, be sure to perform

The orientation of this product is biased.

When using this product, please keep the optical axis of the mounting et. etc.brack adjustable. The memory has a write life of about 100,000 times.

0N": When the memory save is valid, note the write lifetime.