



Distance Measuring Sensor

User Manual

SW-LDS10A/B LDS30A/B LDS100A/B





Product execution standard:
GB/T 14267-2009

User Instructions

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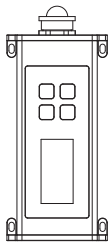
Safety Regulations

- ⚠ 1. Before using the instrument for the first time, please read the safety regulations and operating instructions carefully.
- ⚠ 2. Please read all operating instructions and safety regulations in this manual before using the instrument. Failure to operate the instrument according to the instructions in this manual may result in damage to the instrument, reduced measurement accuracy, or personal injury to the user or others.
- ⚠ 3. Do not attempt to open, disassemble, or repair the instrument by yourself. Unauthorized modification or alteration of the laser emitter performance is strictly prohibited. Keep the instrument properly stored and out of the reach of children to prevent unauthorized use.
- ⚠ 4. Never point the laser beam at your own eyes or the eyes of others, or at any other part of the body. Do not direct the laser beam toward highly reflective surfaces.
- ⚠ 5. Scrapped instruments must not be disposed of together with domestic garbage. Please handle them in accordance with relevant national or local laws and regulations.
- ⚠ 6. The electromagnetic radiation emitted by the instrument may interfere with other equipment and devices. Do not use the instrument on aircraft or near medical equipment. Do not operate the instrument in flammable or explosive environments.

1. Packing List

When purchasing the instrument, please carefully check whether all the accessories of the instrument are complete according to the following list?

Name	Unit	Quantity	Remarks
Main Unit (Host)	Piece	1	
Aviation Plug Cable	Piece	1	
Color Box	Piece	1	
User Manual	Copy	1	
Warranty & Certificate of Conformity	Sheet	1	



Host Machine



Aviation
Connector Wire



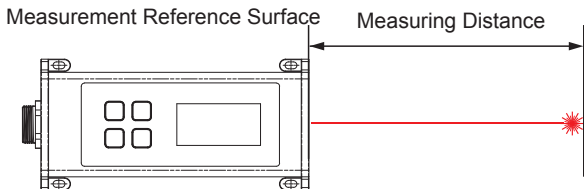
Manual



Warranty
Certificate

2. Product Features and Applications

The SISCO-SW-LDS series industrial-grade laser sensors provide precise and stable distance measurement, which can be seamlessly integrated into various industrial applications. The red laser beam is projected onto the reflective surface to perform non-contact measurement based on the return signal.



● Features

- ◇ Phase-based ranging provides high accuracy and fast measurement speeds.
- ◇ Precision optics ensure high accuracy even in outdoor and harsh environments.
- ◇ Die-cast metal housing with IP67 protection rating.
- ◇ Output interfaces: RS232, RS485, relay control, etc.; Model B includes voltage/current output.
- ◇ Equipped with buttons and a display for convenient configuration of instrument parameters.

● Application

- **Industrial measurement of position**, displacement, thickness, and distance; material/liquid level detection.
- **Industrial automation** and intelligent production management.
- **Dam deformation monitoring.**
- Material/liquid level detection
- Slope and dam deformation monitoring
- Structural safety monitoring

3. Technical Specification

Item	Model A			Model B (with Voltage/Current Output		
Model	SW-LDS10A	SW-LDS30A	SW-LDS100A	SW-LDS10B	SW-LDS30B	SW-LDS100B
Measurement Distance	0.2m-10m	0.2m-30m	0.1m-100m	0.2m-10m	0.2m-30m	0.1m-100m
Voltage/ Current Output	no			Configurable: 0~5V / 0~10V / 4~20mA / 0~20mA / 0~24mA output *Note 2		
Voltage Output Error	no			0.2%+0.5mV		
Current Output Error	no			0.2%+0.005mA		
Measurement Frequency	1Hz-10Hz		1Hz-20Hz	1Hz-10Hz		1Hz-20Hz
Laser Type	Class II,660±15nm, <1mW		639±15nm, <1mW	Class II,660±15nm, <1mW		639±15nm, <1mW
Measurement Resolution	1mm					
Measurement Error Indicator Light	±(2mm+d * one ten-thousandth) * Note 1					
Display screen	Red Laser					
Display Screen	128x64 Dot Matrix Screen					
Backlight Timeout	180s					
Operating Mode	Turn off measurement, continuous measurement.					
RS485 Interface	Yes					
RS232 Interface	Yes					
Transistor Switch Output	1 channel (Not exceeding DC36V 0.5A) *Note 3					
Power Supply	DC15~26V					

Power Consumption	<3.0W
Protection Grade	IP67
Shell Material	Die-cast aluminum alloy
Working Temperature	-10°C~50°C
Storage Temperature and Humidity	-20°C~60°C, 20%~85%RH
Overheat Protection	If the device temperature exceeds 70°C, measurement will stop; if it drops below 70°C, measurement will resume.
Body Size	123x60x30.7mm (Connector not included)

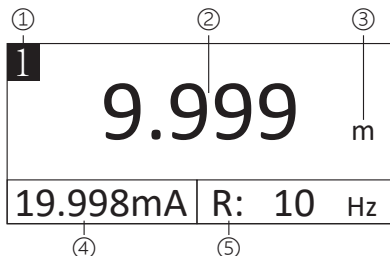
*Note 1: "d" represents the actual distance. In harsh environments—such as when sunlight is too intense or ambient temperature fluctuates excessively—the measurement results may have a larger error. In such cases, using the sensor in conjunction with a target reflective plate will yield better results.

*Note 2: Only one output type (either current output or voltage output) can be selected at a time; both cannot be output simultaneously.

*Note 3: The external DC power connected to the transistor switch output must not exceed the specified voltage or current limits; otherwise, it may cause permanent damage to the instrument.

4.Display Screen and Buttons

● Display Screen



- ① Station Number
- ② Measuring Distance
- ③ Measuring Distance Unit
- ④ Analog Output Status
- ⑤ R (Measurement Rate)
/ T (Temperature) Alternate Display

● Key Press

Key Press	Short Press	Long Press
	Confirm in settings mode	Enter parameter settings mode
	Return/Back in settings mode	
	Adjust Option Content	Adjust the position forward
	Adjust Option Content	Adjust the position and move backward

5. Settings Mode

5.1 Settings Menu

The settings menu includes: Communication Function, Analog Output, Miscellaneous Settings, Product Information.

- 1.Short press ▲ to adjust to the previous option;
- 2.Short press ▼ to adjust to the next option;
- 3.Short press SET to enter the selected menu option;
- 4.Short press ESC to return to the previous interface;

Note: The "Analog Output" function is only available for Model B; this option cannot be selected for Model A.

5.2 Communication Function

Select the "Communication Function" option in the menu, refer to section 5.1.

- Short press ▲ to adjust to the previous option;
- Short press ▼ to adjust to the next option;
- Short press SET to enter / select the chosen menu option;
- Short press ESC to return to the previous interface / deselect;

5.2.1 Station Number

Select the "Station No." option under communication function, refer to section 5.2.

- Short press ▲ to adjust the station number value upward;
- Short press ▼ to adjust the station number value downward;
- Short press SET to confirm the selected menu option;
- Short press ESC to cancel the selected menu option;

5.2.2 Communication Format Settings

Enter the "Communication Format Settings" option under communication function, refer to section 5.2; there are four options: B (Baud Rate), D (Data Bits), P (Parity), and S (Stop Bits).

- 1.Short press ▲ to adjust the option upward / adjust the value of the selected option upward;
- 2.Short press ▼ to adjust the option downward / adjust the value of the selected option downward;
- 3.Short press SET to select / deselect the chosen menu option;
- 4.Short press ESC to cancel the selected menu option;

B (Baud Rate) options: 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 D

(Data Bits) options: 8 / 9 P (Parity) options: Even / Odd S (Stop Bits) options:

1 / 1.5 / 2

5.3 Analog Output

Enter the "Analog Output" option in the settings menu, only available for Model B, refer to section 5.1.

- 1.Short press ▲ to adjust the option upward / adjust the value of the selected option upward;
- 2.Short press ▼ to adjust the option downward / adjust the value of the selected option downward;
- 3.Short press SET to select / deselect the chosen menu option;
- 4.Short press ESC to cancel the selected menu option;
- 5.Long press ▲ to switch to the previous digit place of the selected value;
- 6.Long press ▼ to switch to the next digit place of the selected value;

Output Mode options: No-Out / 0~5V / 0~10V / 4~20mA / 0~20mA / 0~24mA

5.4 Miscellaneous Settings

Enter the "Miscellaneous Settings" option in the settings menu, refer to section 5.1.

- Short press ▲ to adjust the option upward;
- Short press ▼ to adjust the option downward;
- Short press SET to enter the selected menu option;
- Short press ESC to return to the previous interface;

5.4.1 Work Mode

Enter the "Switch Output" option under miscellaneous settings, refer to section 5.4.

- Short press ▲ to adjust the option upward;
- Short press ▼ to adjust the option downward;
- Short press SET to confirm the selected menu option;
- Short press ESC to return to the previous interface;

5.4.2 Switch Output

In the Miscellaneous Settings, go to the “Switch Output” option; see Section 5.4.

- 1.Short press ▲ to adjust the option upward / adjust the value of the selected option upward;
- 2.Short press ▼ to adjust the option downward / adjust the value of the selected option downward;
- 3.Short press SET to select / deselect the chosen menu option;
- 4.Short press ESC to return to the previous interface / cancel the selected menu option;
- 5.Long press ▲ to switch to the previous digit place of the selected value;
- 6.Long press ▼ to switch to the next digit place of the selected value;

Trigger Level options: Close / Positive Polarity / Reverse Polarity

5.4.3 Factory Reset

Enter the "Factory Reset" option under miscellaneous settings, refer to section 5.4; restores to factory default settings.

- | | |
|------------------------|---|
| Trigger level options: | • Short press ▲ to adjust the option; |
| | • Short press ▼ to adjust the option; |
| Off/Positive polarity/ | • Short press SET to confirm the selected menu option; |
| Reverse polarity | • Short press ESC to cancel and return to the previous interface; |

5.5 Product Information

In the Settings menu, select the “Product Information” option (see 5.1); this displays the product name, software version, D (software compilation date), and the company's official website.

Product Information			
Model Name	LDS10A		
Versions	V.1.00		
D:	Jul	6	2021

1) Press ESC briefly to return to the previous interface.

6. Main Unit Wiring and Networking Instructions

No.	Cable Color	Interface Definition	Interface Description
1	Red	24V+	Positive terminal of external power supply DC 15–26V (Input)
2	Black	GND	Ground terminal for power supply and RS232
3	White	RELAY	Open-drain output, can be connected to the negative terminal of relays or other equipment. Note: Must not exceed DC36V 0.5A
4	Grey	AGND	Dedicated ground terminal for voltage/current output (Note 1)
5	Blue	Cur-OUT	Current output 4–20mA / 0–20mA / 0–24mA (Note 2)
6	Green	Vol-OUT	Voltage output 0–5V / 0–10V (Note 2)
7	Brown	RS232-TX	RS232 transmit signal
8	Purple / Sky Blue	RS232-RX	RS232 receive signal
9	Orange / Pink	RS485-A	RS485 positive terminal
10	Yellow	RS485-B	RS485 negative terminal

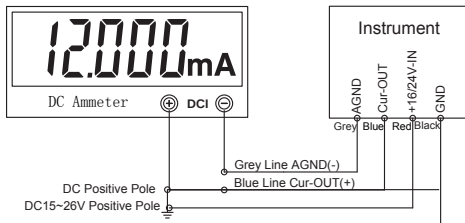
Note 1: Connecting AGND to the power ground or other GND may lead to an increased error in voltage/current output.

Note 2: Current/voltage output is exclusive to Model B. Current and voltage outputs cannot coexist simultaneously; only one type can be configured.

6.1 Current Output (Model B only)

Note: Only one output type (either current output or voltage output) can be selected at a time; both cannot be output simultaneously.

Wiring Method:



Output value calculation:

$$I_{out} = \frac{(I_{max} - I_{min}) * (D - D_{min})}{D_{max} - D_{min}} + I_{min}$$

In the equation,

I_{out} represents the output current,

I_{max} represents the maximum value of the output current

range, and I_{min} represents the minimum value of the output current range.

D represents the current measured distance.

D_{max} represents the maximum distance value for analog output, configured in register 0x1B.

D_{min} represents the minimum distance value for analog output, configured in register 0x1A.

Example Description:

The operating mode is 4-20mA output ($I_{max}=20$, $I_{min}=4$).

The maximum distance value $0x1B=5000$ (mm), and the minimum distance value $0x1A=0$ (mm). The current measured distance = 3000 (mm).

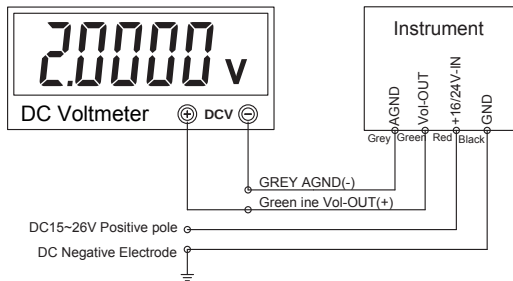
The calculation method is as follows:

$$I_{out} = \frac{(20 - 4) * (3000 - 0)}{5000 - 0} + 4 = 13.600\text{mA}$$

6.2 Voltage Output (Exclusive to Model B)

Note: Only one output type (either current output or voltage output) can be selected at a time; both cannot be output simultaneously.

Wiring Method:



Output Value Calculation:

$$U_{out} = \frac{(U_{max} - U_{min}) * (D - D_{min})}{D_{max} - D_{min}}$$

U_{out} represents the output voltage.

U_{max} represents the maximum value of the output voltage range, and U_{min} represents the minimum value of the output voltage range.

D represents the current measured distance.

D_{max} represents the maximum distance value for analog output, configured in register 0x1B.

D_{min} represents the minimum distance value for analog output, configured in register 0x1A.

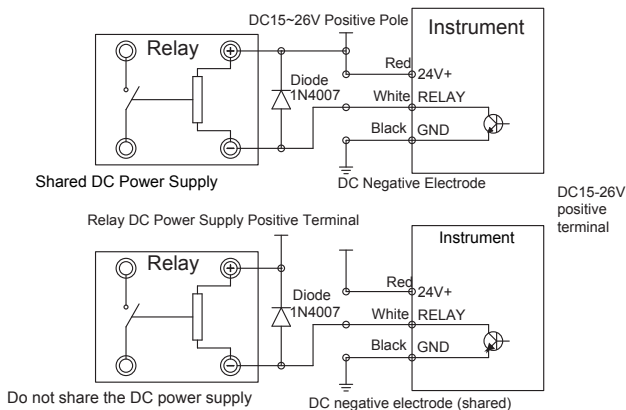
Example Description:

The operating mode is 0-5V output. The maximum distance value 0x1B=5000 (mm), and the minimum distance value 0x1A=0 (mm). The current measured distance = 3000 (mm). The calculation method is as follows:

$$U_{out} = \frac{(5 - 0) * (3000 - 0)}{5000 - 0} = 3.000V$$

6.3 Transistor Switch Output

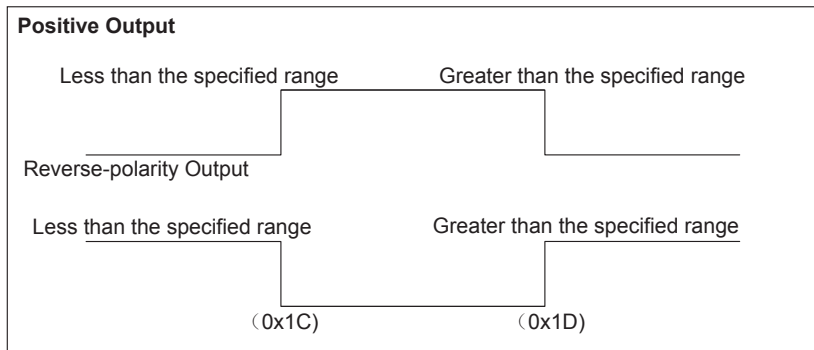
For this function, the internal circuit of the instrument is an open-drain (open-collector) output, which can only sink current and cannot directly output voltage or current. Please note that the sink current must not exceed DC 36V, 0.5A.



Note 1: When using a relay, please connect a freewheeling diode (1N4007) in parallel across both ends of the relay driver coil.

Note 2: For the transistor switch output of the instrument, when connecting external devices such as alarm horns or LEDs, the wiring method is the same as the diagram above:

The level output mode can be configured as positive polarity or negative polarity. The distance values for level switching can be set via registers 0x1C and 0x1D.

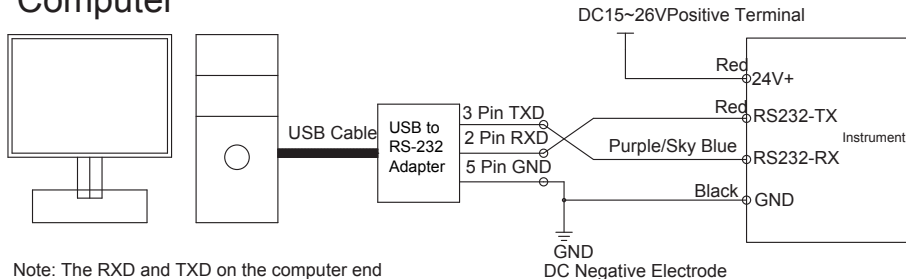


Example Description:

Assume that the level output mode is currently configured as positive polarity, the value of register 0x1C is set to 1000 (mm), and the value of register 0x1D is set to 2000 (mm).

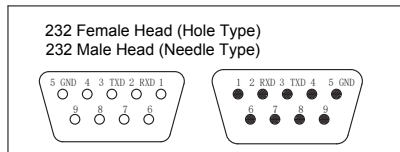
6.4 RS232 Connection Method

Computer



Note: The RXD and TXD on the computer end and the instrument end are cross-connected

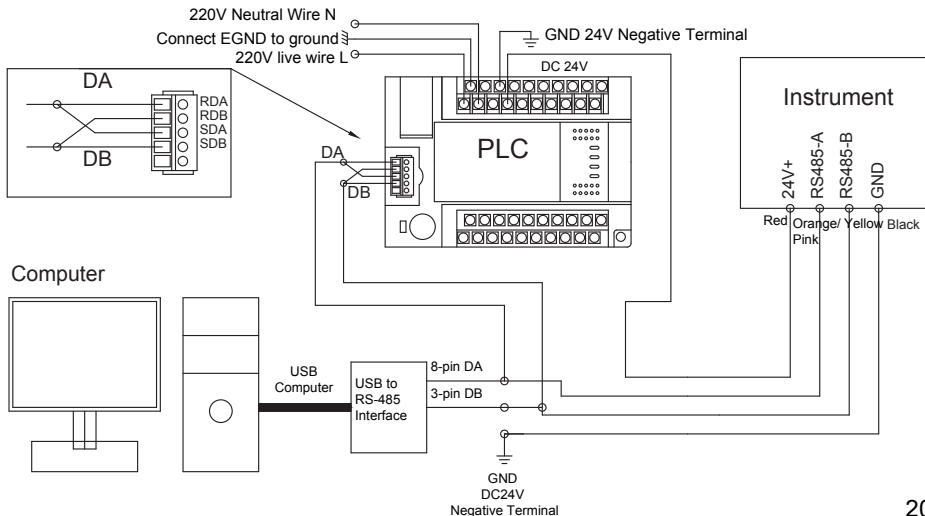
D-Sub connector RS232 pin definition



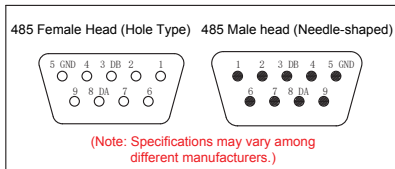
6.5 RS485 Wiring Method

Example Description: The figure below shows the wiring diagram for the joint commissioning of a Mitsubishi PLC (FX3U-16M), a computer, and the distance measuring sensor.

Note: The power supply for the instrument in the diagram is provided by the 24V output of the PLC. In the absence of a 24V power supply from the PLC, an external 15–26V DC power supply can be used instead.

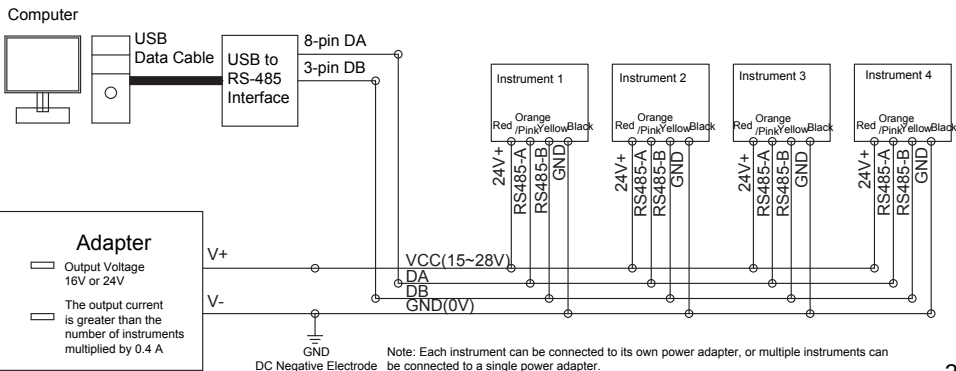


D-Sub connector RS485 pin definition



6.6 RS485 Networking Wiring Method

Example Description: The figure below shows the connection diagram for networking a computer with multiple instruments using the RS485 half-duplex communication mode. All instruments are connected to the bus, and due to address limitations, the maximum number must not exceed 64 units.



7.Communication Protocol (MODBUS RTU)

Please visit www.sndway.com to download the "Distance Sensor Reference Manual" for detailed information.

7.1 Data Transmission Format

Default format: Baud rate: 9600, Data bits: 8,
Stop bit: 1, Parity bit: N

7.2 RS485 Interface

When performing 485 networking with the instruments, each instrument (slave device) must be configured with a unique address. Since it acts as a slave device, it will not actively send data when the instrument measures data; it requires the master computer to issue commands to retrieve the data.

7.3 RS232 Interface

When the instrument measures data, this interface will actively upload the data. Its format is as follows:

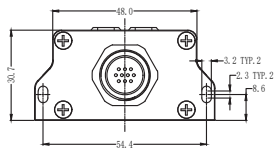


- ① 01 indicates that the slave address is 1. Only 1-64 are used in the system, and other addresses are reserved.
- ② 03 is the read function code, indicating the data read register.
- ③ 04 indicates that 4 bytes of data are returned.
- ④ The distance is 0x00010d7e (Hexadecimal) = 68990 (Decimal), indicating that the measured
- ⑤ Error check field. This field allows the host and terminal to check for errors during transmission. It occupies two bytes.

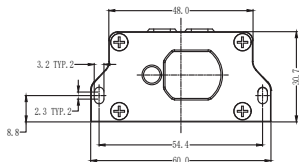
7.4 Function Register List (16-Bit Width)

Hex Address	Decimal Address	Attribute	Value Range	Function Description
0x10	16	R/W (Reserved)		
0x11	17	R/W	0 ~2	0: Close Measurement 2: Continuous Measurement
0x12	18	R/W (Reserved)		
0x13	19	R/W (Reserved)		
0x14	20	R/W	1~64	Slave Station Number
0x15	21	R		Distance Register High Byte
0x16	22	R		Distance Register Low Byte
0x17	23	R		Distance Measurement Status Register
0x18	24	R/W	1200~57600	Communication Baud Rate
0x19	25	R/W	0~4	Voltage Output 0: 0~5V 1: 0~10V Current Output : 4~20mA 3: 0~20mA 4: 0~24mA
0x1A	26	R/W	0~50000	Analog Output Minimum Value Register
0x1B	27	R/W	0~50000	Analog Output Maximum Value Register
0x1C	28	R/W	0~50000	Switch Output Minimum Distance
0x1D	29	R/W	0~50000	Switch Output Maximum Distance
0x1E	30	R/W	0~2	0: Closed; 1: Positive polarity; 2: Negative polarity
0x1F	31	R/W (Reserved)		
0x20	32	R/W (Reserved)		

8. Installation dimensions

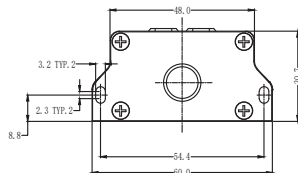


(Joint Surface)



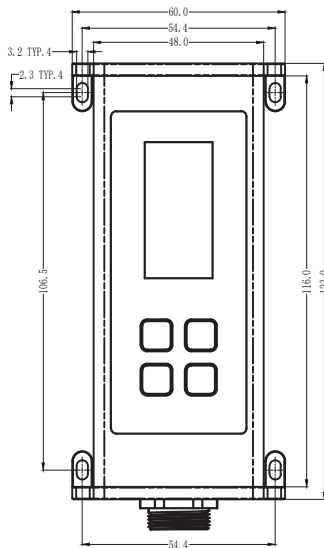
SW-LDS10A/B LDS30A/B

(Laser Emission Surface)

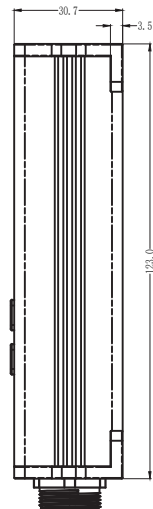


SW-LDS100A/B

(Laser Emission Surface)



(Front view of the main body)



(Side view of the main body)