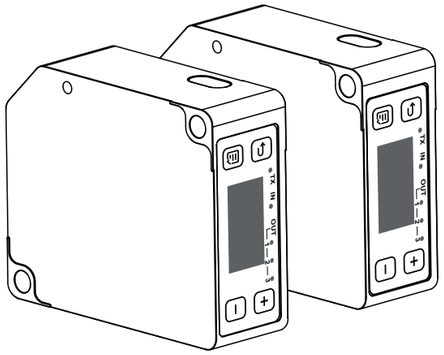
TronSight

M2 Series

Compact Laser Displacement Sensor

Quick Start Guide



Suzhou TronSight Intelligent Technology Co., Ltd.

⚠ DANGER

- Class 3B/3R laser. Do not look directly into the beam.
- Not explosion-proof. Do not use in hazardous areas.

⚠ WARNING

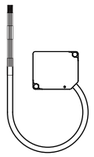
- Use correct voltage. Risk of fire, electric shock, or malfunction.
- Do not disassemble or modify the product.
- Turn off power before connecting or disconnecting cables to avoid damage.
- Do not power off during parameter setting. Data may be lost.

CAUTION

- The company does not guarantee performance or functionality for usage beyond the specified range or for modified products.
- Performance may vary depending on conditions and environment. Verify before use.
- Do not apply excessive force to the cable.
- Do not install in the following environments to avoid damage:
  - — High humidity, dust, or poor ventilation
  - — High temperature
  - — Corrosive gases
  - — Vibration or shock
  - — Exposure to water, oil, or chemicals
  - — Static-prone environments

Package Contents

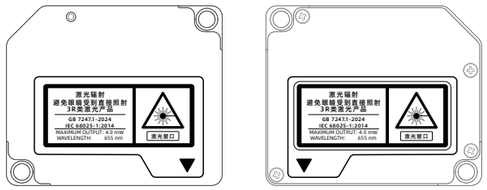
（1）Sensor



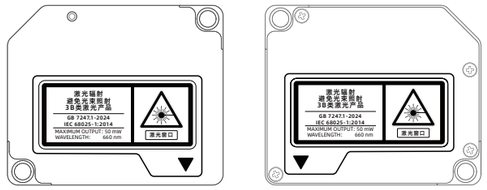
Label Stickers

The content and placement of the laser warning labels for this product are shown below, in accordance with GB 7247.1-2024 / IEC 60825-1:2014 standards.

（1）Class 3R Label



（2）Class 3B Label

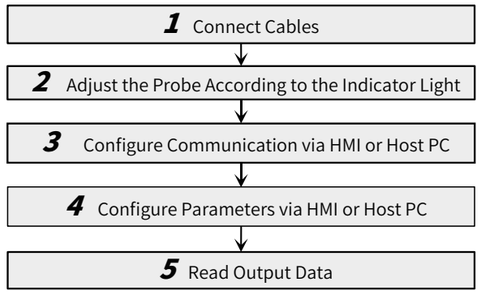


（3）SN Label



Hardware Connection

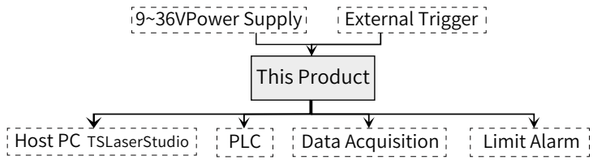
➢ Operation Procedure



Hardware Integration

➢ External Device Connection

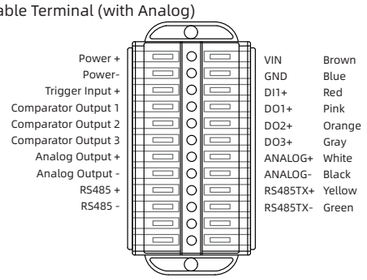
Through wiring connections, the system can communicate with a host PC, PLC controller, and data acquisition card, and support external trigger input and limit alarm output functions.



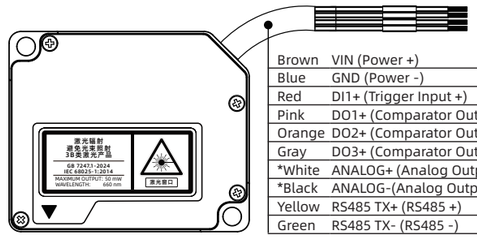
*Devices inside the dashed boxes are customer-provided equipment and are not included with this product.

➢ Terminal Connection

（1）10-core Cable Terminal (with Analog)



（2）Sensor Cable

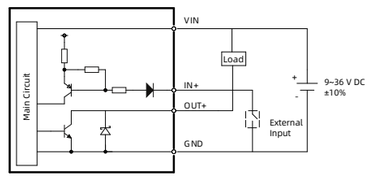


Brown	VIN (Power +)
Blue	GND (Power -)
Red	DI1+ (Trigger Input +)
Pink	DO1+ (Comparator Output 1)
Orange	DO2+ (Comparator Output 2)
Gray	DO3+ (Comparator Output 3)
*White	ANALOG+ (Analog Output +)
*Black	ANALOG-(Analog Output -)
Yellow	RS485 TX+ (RS485 +)
Green	RS485 TX- (RS485 -)

* Silver braided shielding layer for grounding

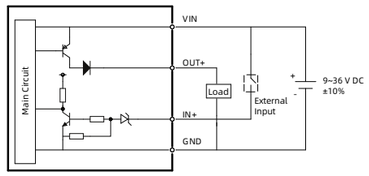
➢ NPN & PNP Interface Specifications

（1）NPN Type



NPN Input Interface Specifications	
Short-circuit Current	≈ 2 mA
Voltage (ON State)	< 1 V
Current (OFF State)	< 0.6 mA
Minimum Pulse Width	10 μs
Software Functions	External trigger (rising/falling edge, level) / Laser enable / Data reset
NPN Output Interface Specifications	
Max Sink Current	50 mA
Voltage (ON State)	< 0.5 V
Leakage Current	< 0.1 mA
Max Voltage	< 40 V
Software Functions	Comparator output / Invalid data alarm

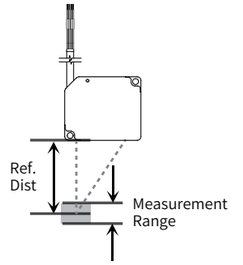
（2）PNP Type



PNP Input Interface Specifications	
Short-circuit Current	≈ 2 mA
Voltage (ON State)	< 1 V
Current (OFF State)	< 0.6 mA
Minimum Pulse Width	10 μs
Software Functions	External trigger (rising/falling edge, level) / Laser enable / Data reset
NPN Output Interface Specifications	
Max Source Current	50 mA
Voltage (ON State)	< 0.5 V
Leakage Current	< 0.1 mA
Max Voltage	< 40 V
Software Functions	Comparator output / Invalid data alarm

➢ Adjust Installation Distance

Indicator Description	
Green (Flashing)	Target position x is within the central 20% of the measurement range (|x| ≤ 10%)
Green (Solid)	Target position x is within 20-50% of the measurement range (10% < |x| ≤ 25%)
Yellow (Solid)	Target position x is within 50-100% of the measurement range (25% < |x| ≤ 50%)
Red (Solid)	Target is out of the measurement range



ⓘ For detailed measurement range specifications, refer to the product selection manual for your model.

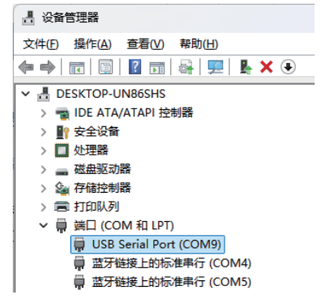
Communication Specifications

The M2 series laser displacement sensor supports RS485 connection to a host PC for parameter reading and configuration. Parameter setting is also available via HMI.

For applications with host PC connection, RS485 is recommended.

➢ Host PC Software Connection

（1）Check the module port number in Device Manager; the baud rate can be viewed and modified via the sensor display buttons.



（2）When communicating with the sensor, select the correct COM port of the USB-to-RS485 adapter and the appropriate baud rate.

* To view the raw image, connect at a baud rate of 38400 or higher.



（3）Multiple Device Connection

① To connect multiple sensors using multiple USB-to-RS485 adapters:
Click “+” to add a COM port, select the correct port, then click “Confirm”.



② To connect multiple sensors using one USB-to-RS485 adapter:

- Check “Multiple devices on one COM port”
- Same baud rate for all devices
- Unique slave addresses (set via software or buttons)
- Enter addresses in [Slave Address], separated by commas

Click “Search Device” to identify devices



(4) After communication parameters are correctly configured, the PC will display available sensors for communication. At this time, the sensor is not yet connected to the PC. Click the button to establish the connection. After successful connection, communication is enabled for parameter reading or data acquisition, and the button status changes accordingly.



(Disconnected)



(Connected)

➢ RS485 Connection (See Modbus Manual)

(1) Modbus Serial Communication Specifications

Communication Interface	RS-485 (Half-duplex, 2-wire)
Baud Rate	9600 / 19200 / 38400 / 57600 / 115200 (Default)
Data Bits	8
Parity	None
Stop Bits	1
Protocol	MODBUS RTU
Slave Address	1 (Default) - 247

(2) Function Codes (Supported: 03H, 04H, 06H))

Register Address (Dec)	Function	Range	Description
0000	Laser Enable	0	Stop
		1	Start
0001	Laser Power Mode	0	Manual
		1	Auto
0002	Laser Power Setting	5~1000	Corresponds to 0.5%~100%
0004	Moving Average Window Size	0x00	1
		0x01	4
		0x02	16
		0x03	64
		0x04	256
		0x05	1024
0006	Sampling Rate Setting	0x0F	32 µs
		0x10	40 µs
		0x11	50 µs
		0x12	62.5 µs
		0x13	80 µs
		0x14	100 µs
		0x15	125 µs
		0x16	160 µs
		0x17	200 µs
		0x18	250 µs
		0x19	320 µs
		0x1A	400 µs
0007	Set Current Value as Zero	0	Cancel zeroing
		1	Set zero
0008	Invalid Data Flag Setting	0~65535	Value 65535 indicates invalid data; otherwise valid
0020	Reset Network Parameters	1	Reset network parameters
0021	Save Parameters	1	Save current parameters to flash; resets to 0 after saving
0025	Modbus Slave Address	1~247	
0026	Modbus Baud Rate	0	9600
		1	19200
		2	38400
		3	57600
		4	115200

Holding Register List (Function Codes 03H, 06H))

Register Address (Dec)	Function	R/W
0000	Distance 1 (High 16-bit)	Read Only
0001	Distance 1 (Low 16-bit)	Read Only
0002	Peak 1 Height (High 16-bit)	Read Only
0003	Peak 1 Height (Low 16-bit)	Read Only
0004	Temperature (High 16-bit)	Read Only
0005	Temperature (Low 16-bit)	Read Only
0012	Comparator 1	Read Only
0013	Comparator 2	Read Only
0014	Comparator 3	Read Only

Input Register List (Function Code 04H)

① 03H: Read Holding Registers, reads one or more holding registers;

***Example (Read Parameters):** Slave address = 1. Read Channel 1 parameters: laser enable, auto power mode, and laser power.

Analysis: Use function code 0x03 to read holding registers. The register addresses for Channel 1 laser enable, auto power mode, and laser power are 0, 1, 2. Therefore, read 3 registers starting from address 0.

Request (Master): 01 03 00 00 00 03 05 CB

Response (Slave): 01 03 06 00 01 00 00 00 05 DC B6

Value analysis: Laser ON; auto power OFF (manual); power = 0.5.

② 04H: Read Input Registers, reads one or more input registers;

***Example (Data read):** Slave address = "1" . Read measurement data: Distance 1.

Analysis: To read Distance 1, use function code "0x04" to read the values of input registers at addresses 0 to 1. The number of registers to read is 2.

Request frame (Master): 01 04 00 00 00 02 71 CB

Response frame (Slave): 01 04 04 FF FA BD 94 9B 5E

Value analysis: The value of Distance 1 is 0xFFFABD94. Converted to a signed integer, it is -344686. The value is scaled by 1,000,000, so the actual measured value of Distance 1 is -0.344686 mm.

③ 06H: Write Single Register, writes a value to one holding register;

***Example (Parameter Setting):** Slave address = "1" . Set the sampling interval to 100 µs.

Analysis: Use function code 0x06 to write to holding register address 6. The value corresponding to the sampling interval is 20 (0x14). That is, write 0x14 to holding register address 6.

Request (Master): 01 06 00 06 00 14 69 C4

Response (Slave): 01 06 00 06 00 14 69 C4

ⓘ Parameter Notes

1. For more parameters, see the M Series Modbus Protocol manual.
2. After setting parameters, set register 0021 to 1 to save.

(3) Error Codes

Code	Description	Details
1	Illegal Function	Received function code is not supported
2	Illegal Data Address	Address exceeds valid range
3	Illegal Data Value	Data value exceeds valid range

(4) Command Frame

Byte Index	Data	Range
0	Slave Address	1~247
1	Function Code	3
2	Start Address (High Byte)	0~65535
3	Start Address (Low Byte)	
4	Register Quantity (High Byte)	1~125
5	Register Quantity (Low Byte)	
6	CRC (Low Byte)	
7	CRC (High Byte)	

(Request frame: Master → Slave)

Byte Index	Data	Range
0	Slave Address	1~247
1	Function Code	3
2	Byte Count	2 × N (N = number of registers)
3	Register Value 1 (High Byte)	
4	Register Value 1 (Low Byte)	
...	...	

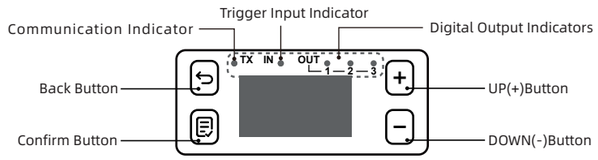
Byte Index	Data	Range
2N+1	Register Value N (High Byte)	
2N+2	Register Value N (Low Byte)	
2N+3	CRC (Low Byte)	
2N+4	CRC (High Byte)	

(Successful response: Slave → Master)

Byte Index	0	1	2	3	4
Data	Address	Function Code	Error Code	CRC (Low Byte)	CRC (High Byte)

(Error response: Slave → Master)

Panel Indicators and Buttons



➢ Panel Indicator Functions

(1) OUT Digital Output Indicators (3)
Each digital output corresponds to one indicator.
① Indicator ON when output is ON.
② Indicator OFF when output is OFF.
*When output is disabled, it remains OFF and the indicator is OFF.

(2) TX Communication Indicator (1)
Flashes when data is transmitted via RS-485.

(3) IN Trigger Input Indicator (1)
When set to external trigger, the indicator lights for 500 ms upon trigger input.
When set to internal trigger, the indicator remains OFF.

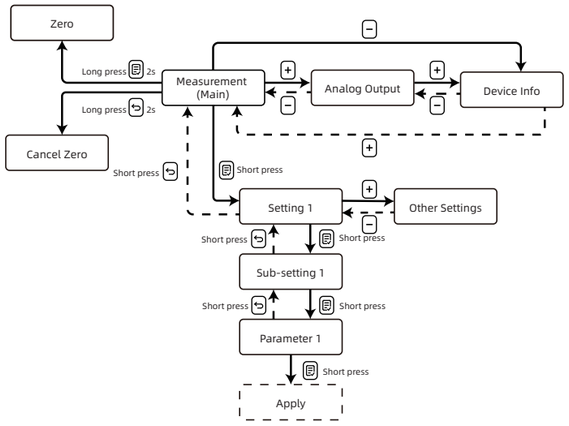
➢ Button Functions

(1) Confirm Button: Select / Edit / Confirm
(2) Back Button: Return
(3) UP (+) Button: Move to next item or increase value
(4) DOWN (–) Button: Move to previous item or decrease value

Function	Button Operation
Open settings menu	Short press [Confirm] on measurement screen
Enter settings menu	Short press [Confirm]
Switch settings menu	Short press [UP] / [DOWN]
Confirm parameter setting	Short press [Confirm]
Return to upper menu	Short press [Back]
View measurement values / analog output / device info	Short press [UP] / [DOWN]
Reset	Long press [Confirm] (>2 s) on measurement screen
Cancel reset	Long press [Back] (>2 s) on measurement screen

Display Module

The HMI includes Display and Settings interfaces. Switch to Settings: short press [Confirm] from the main display.
(*Only the main display can enter Settings. Other interfaces return automatically after 30 s of inactivity.)



(Basic Interface Flow)

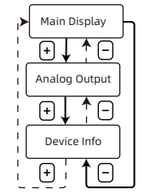
➢ Display Interfaces

Used for information display. Includes 3 interfaces:

(1) Main Display:
① Displacement value (absolute or relative)
② Zero offset indicator (shown when offset is active)
a. Invalid value is displayed as "FFFFFFFF"
b. Long press [Confirm] (>2 s): set zero, Long press [Back] (>2 s): cancel zero

(2) Analog Output, Displays the analog output value corresponding to the current displacement (theoretical value).

(3) Device Info:
① Software version
Displays current MCU firmware version
② IP address or device address and baud rate
Displays current address and baud rat

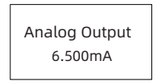


(Display Interface Switching)



(Main Display)

(Device Info - Version)

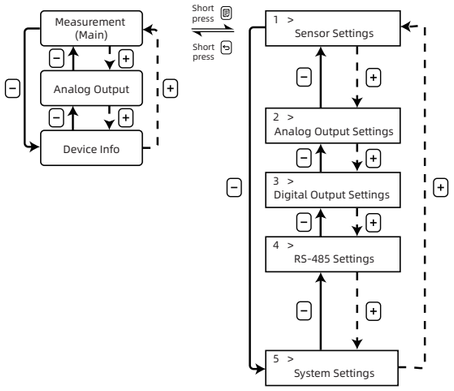


(Analog Output Value)

➢ Settings Interfaces

Used for parameter configuration, including interface switching, adjustment, and confirmation. Short press [Confirm] on the main display to enter Settings; Short press [Back] to return to the main display. The Settings interface includes 5 pages:

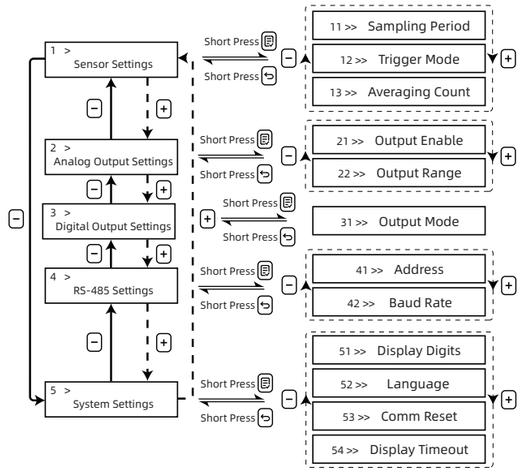
(1) SensorSettings: ①Sampling period, ②Trigger mode, ③Averaging count;
(2) Analog Output Settings: ①Output enable, ②Output range;
(3) Digital Output Settings: Output mode;
(4) RS-485 Settings: ①Device address, ②Baud rate;
(5) System Settings: ①Display digits, ②Language, ③Communication reset, ④Display timeout.



(Display & Settings Interfaces)

Each settings page has sub-pages, one parameter per page. The top shows the setting code and page level.

*Example: In System Settings, the second parameter "Language" is shown as code 52 (Page 5, Item 2).



(Settings & Sub-settings)

Short press [Confirm] to enter parameter adjustment. Short press [Back] to return. Use [UP] to move forward and [DOWN] to move back.

Parameter Save:

ⓘ Press [Confirm] to save the setting.

Without confirmation, the setting is not applied.

11 >> Sampling Period	200 µs / 250 µs / 320 µs / 400 µs
12 >> Trigger Mode	Internal / External
13 >> Averaging Count	64 / 256 / 1024 / 1 / 4 / 16
21 >> Output Enable	ON / OFF
22 >> Output Range	0~10 V / -5~5 V / -10~10 V / 4~20 mA / 0~5 V
31 >> Output Mode	NPN / PNP
41 >> Address	1~247
42 >> Baud Rate	115200 / 9600 / 19200 / 38400 / 57600
51 >> Display Resolution	0.001 / 0/ 0.1 / 0.01
52 >> Language	简体中文 / English
53 >> Comm Reset	Cancel / Reset
54 >> Display Timeout	0 s / 10 s / 20 s / 60 s / 300 s / 1200 s / 3600 s

((Parameters in Sub-settings)

Product Warranty

Please read the user manual carefully before use and operate the product strictly in accordance with the instructions.

Warranty Period

The supplier provides a 12-month warranty from the date of installation and acceptance.

Warranty Coverage

During the warranty period, failures not caused by human factors will be repaired or replaced free of charge.

The following are not covered:

- Out of warranty period
- Damage caused by use beyond specified conditions, force majeure, or human factors
- Damage caused by intentional or gross negligence, including but not limited to dropping, impact during transportation or handling, or improper operation
- Damage caused by unauthorized modification or improper use

Disclaimer

The supplier is only responsible for the specifications defined in this document and does not guarantee fitness for a particular purpose, usefulness, compatibility with other products, or other unspecified conditions.

The supplier shall not be liable for any direct, indirect, incidental, or consequential damages, except as required by applicable product liability laws.

The maximum liability of the supplier is limited to the amount paid for the defective product. Under no circumstances shall the supplier be liable for any special, consequential, or incidental damages, including but not limited to loss of profit.

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