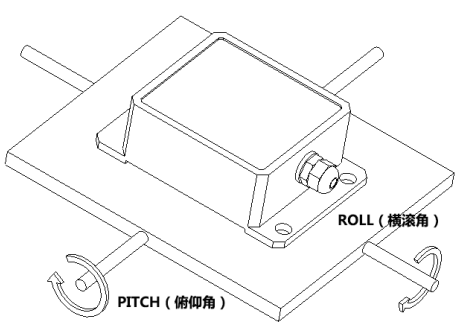
迈科传感
MSENSOR TECHNOLOGY

Domestic series tilt sensor-industrial grade design MEMS technology

Product Specification

Model: MK426T

Description: Domestic equipment manufacturing, providing independently developed products



Production Execution Standard Reference

- Enterprise Quality Management System Standard: GB/T19001-2016/ISO9001:2015 (Certificate No.: 19522Q38931R0S)
- GB/T 17626-11A Voltage sag, short interruption and voltage variation immunity
- GB/T 191 SJ 20873-2003 General Specifications for Inclinometers and Leveling Instruments
- GBT 14412-2005 Mechanical vibration and impact Mechanical installation of accelerometers
- GBT 18459-2001 Calculation method for main static performance indicators of sensors
- ROHS (Certificate No.: BSTSH190311693901CC-R1)
- CE certification (Certificate No.: BST18089710801SC)
- FCC (Certification No.: BSTSH18089710801EC)
- JJF1059.1-2012 Measurement uncertainty assessment and representation
- GJB 450A-2004 General Requirements for Equipment Reliability
- Quality Control of Key and Critical Components in GJB 909A
- GJB899 Reliability certification and acceptance test
- GJB150-3A High Temperature Test
- GJB150-4A Low temperature test
- GJB150-8A Rain test
- GJB150-12A Sand test
- GJB150-16A Vibration Test
- GJB150-18A impact test
- GJB 1846-1993 General specification for airborne radio compasses
- GJB150-23A Tilt and swing test
- GB/T 17626-3A Radio frequency electromagnetic field radiation immunity test
- GB/T 17626-5A Surge (Impact) Immunity Test
- GB/T 17626-8A Power frequency magnetic field immunity test
- Version: VT2025
- Revision date: 2024.04.30

MK426T Digital Dual-Axis Inclination Sensor (China-made Series)

1. Product Features

The MK426T is a domestically developed dual-axis digital inclinometer by Mico Sensing, supporting both industrial-standard RTU Modbus and hexadecimal 0x68 protocols. It offers optional outputs including RS232, RS485, RS422, and TTL. Designed for applications with stringent requirements on size, cost, and localization, this sensor incorporates a MEMS microelectromechanical system (MEMS) inclinometer unit. Its compact design ensures low power consumption, high consistency and stability, along with strong resistance to electromagnetic interference and shock/vibration. This innovation significantly advances domestic equipment manufacturing and breaks through technological barriers in independent R&D.

The system incorporates over 85% domestically manufactured components, featuring core elements including MCU microcontrollers, AD modules, signal processors, power circuits, and output circuits. It provides real-time posture angle output with intuitive operation, requiring no recalibration between two mounting surfaces. All components undergo rigorous pre-factory calibration, temperature compensation, and long-term aging stability testing. Each manufacturing process maintains strict precision standards, ensuring reliable performance across diverse operational conditions and extended service cycles.

II. Product Performance

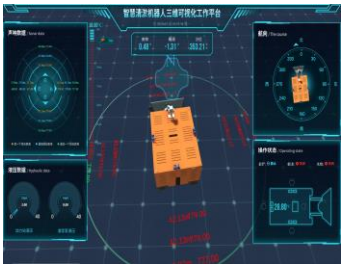
- Dual-axis tilt monitoring
- Range: 0-±90° optional
- Supports RS232, RS485, RS422, and TTL (optional)
- Input voltage 5V (DC 9-36V optional)
- IP67 protection rating (customizable to IP68)
- accuracy 0.1º
- Impact and vibration resistant
- Set the zero point freely
- Wide temperature range-40～ +85℃
- Small size (55*37*24mm) (customizable)

3. Product Applications

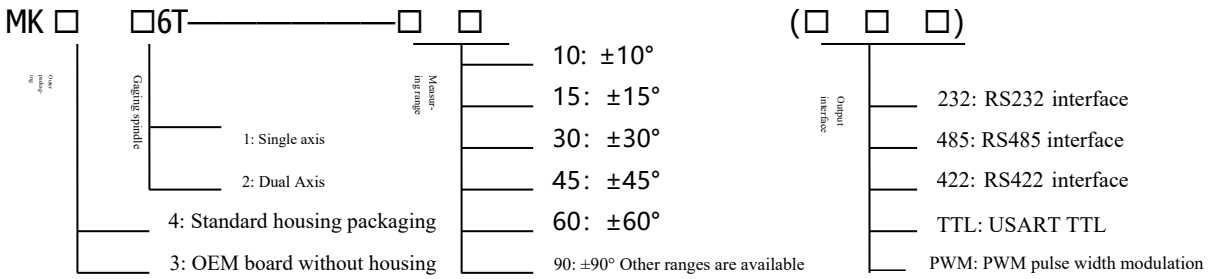
- Forklift Balance Control
- overhead working truck
- car unloader
- Anti-toppling charging pile
- Overload monitoring
- Pile driver verticality
- Angle control of various construction machinery
- Photovoltaic tracking








Product order information



For example, MK426T-30 (RS232): dual-axis/standard type/±30° measurement range/RS232 output; **horizontal installation by default**, other installation methods are required, refer to the schematic diagram of "product installation method", note when ordering.

Product Performance Specifications

Parameter	Condition	MK426T	Unit
Measuring range		±90	°
Gaging spindle		X、Y axle	
Zero-point temperature drift	-40～85°	±0.05	°/℃
Sensitivity temperature coefficient	-40～85°	≤200	ppm/℃
Frequency response	DC response	100	Hz
accuracy	-40～85℃	0.1	°
Power-on startup time		0.2	s
Response time		0.01	s
Auto-output	Set 5Hz output, 15Hz, 35Hz, 50Hz, or 100Hz		
Output signal	RS232/RS485/RS422/TTL available for order		
Average operation time	≥55,000 hours/occurrence		
Shock resistance	2600g,0.5ms, 3 times per axis		
Shockproof	10grms、10～1000Hz		
Insulation resistance	≥100MΩ		
Classification of waterproof	IP67		
Cable conductor	Standard 1.5-meter length, wear-resistant, oil-resistant, wide-temperature, shielded cable 4*0.2mm2		
Weight	55g (excluding packaging)		

Electrical specifications

Parameter	Condition	Least value	Representative value	Crest value	Unit
Service voltage			5		V
	Selectable	9	12	36	
Working current	Non-loaded		30		mA
Working temperature		-40		+85	℃
Storage temperature		-55		+125	℃

explanation of nouns：

Resolution: refers to the minimum change value that the sensor can detect and distinguish in the measurement range.

Accuracy: Absolute accuracy refers to the comprehensive error of the sensor's absolute linearity, repeatability, hysteresis, zero point deviation, and cross axis error under room temperature conditions.

Long-term stability: long-term stability refers to the deviation between the maximum and minimum values of the sensor under normal temperature conditions after a year of long-term work.

Response time: Response time is the time it takes for the sensor to reach the standard value of the sensor output for a single angular change.

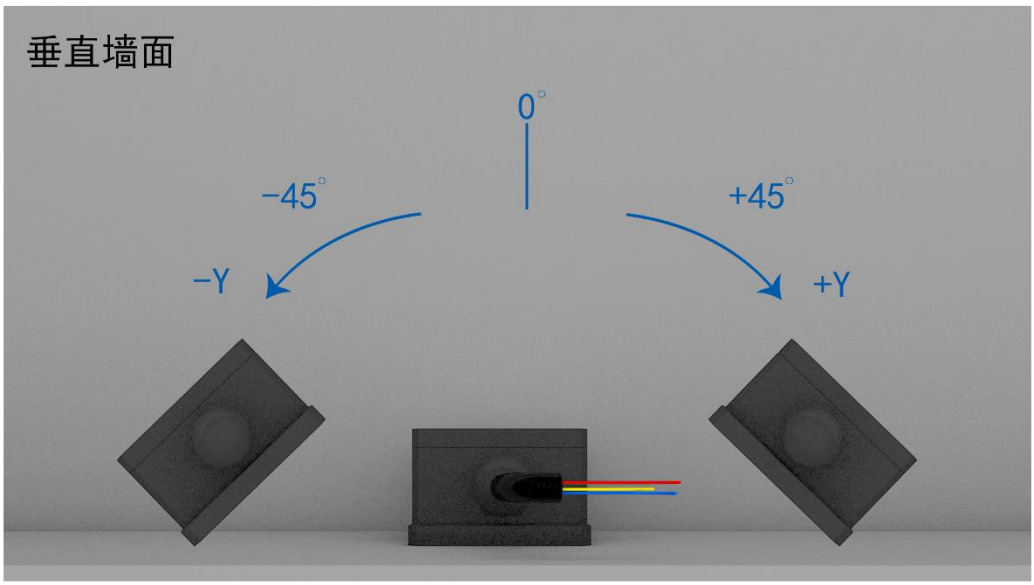
Mechanical properties

Junctor	Wiring cord (1.5m) or waterproof aviation socket (custom)
Levels of protection	IP67
Outer shell material	Aluminum alloy sanding oxide
Install	Three M4 screws

Product measurement direction & installation method

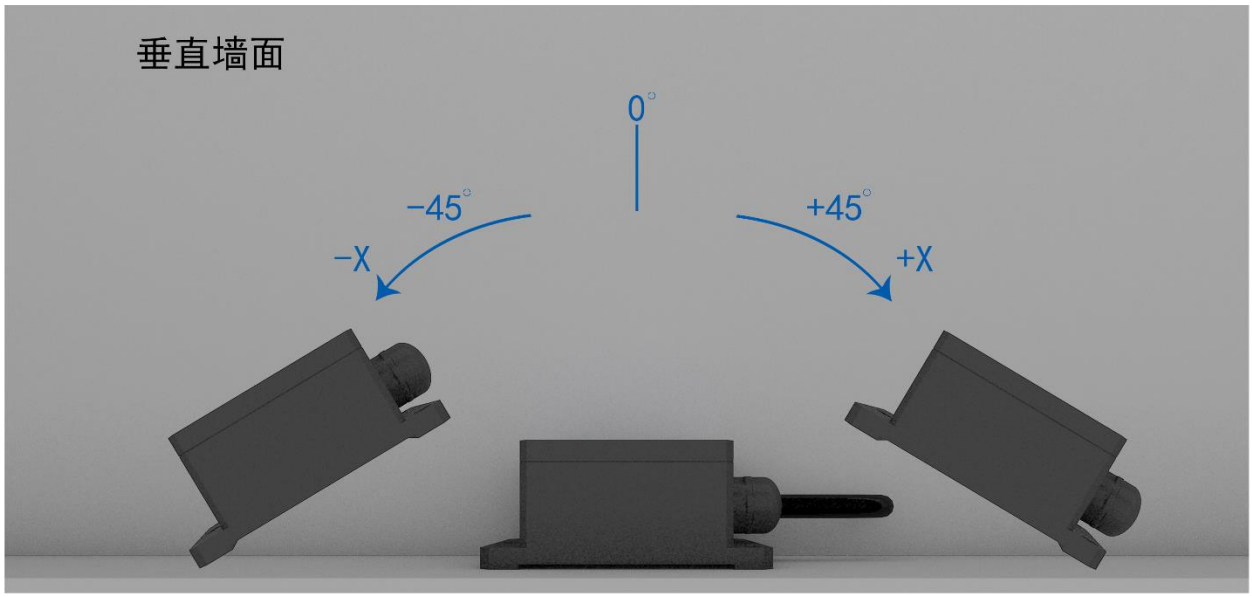
During installation, ensure the sensor surface remains parallel to the target surface. This product supports both horizontal and vertical mounting. Refer to the schematic diagram below for installation methods (**single-axis X/Y optional**):

Figure 1. Install Horizontally up and Down



地面

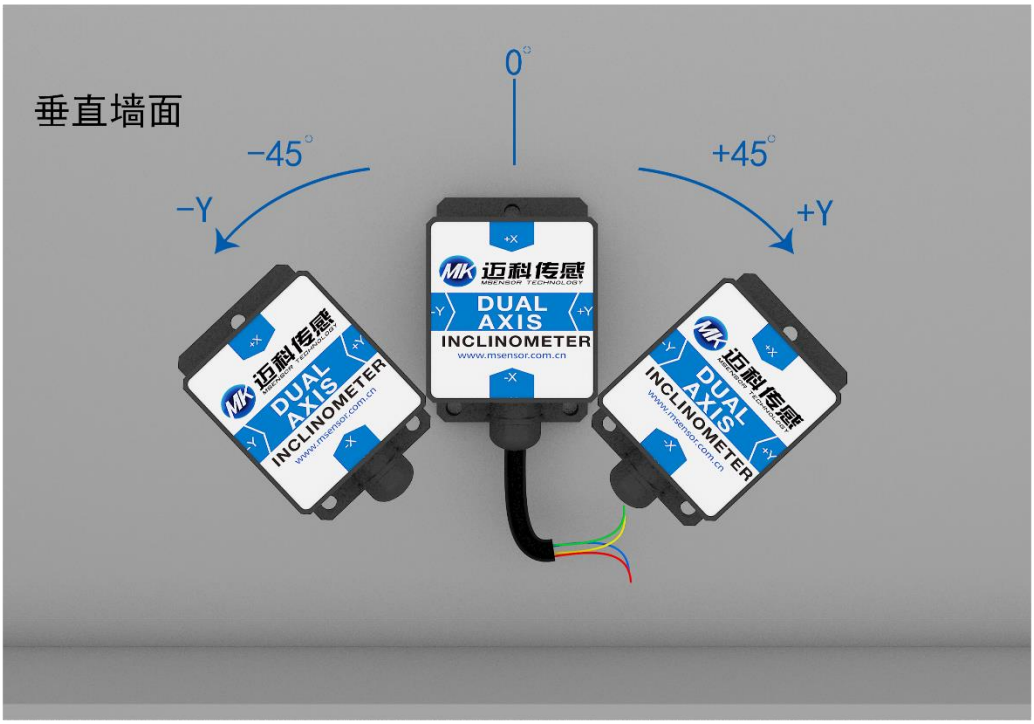
水平安装



地面

水平安装

Figure 2. Vertical Installation (upward and Downward)



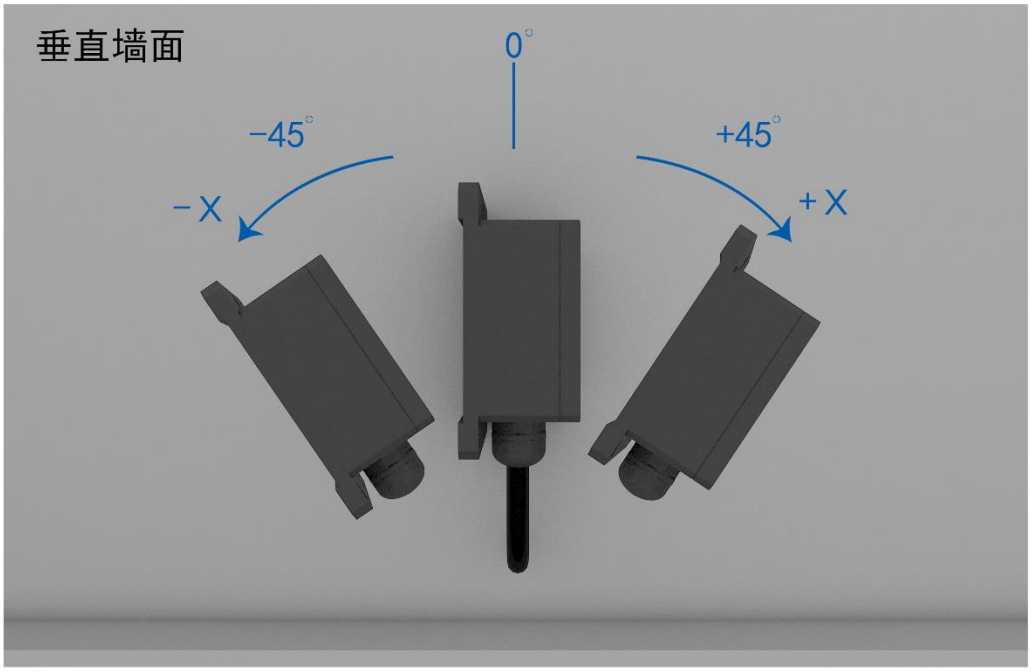
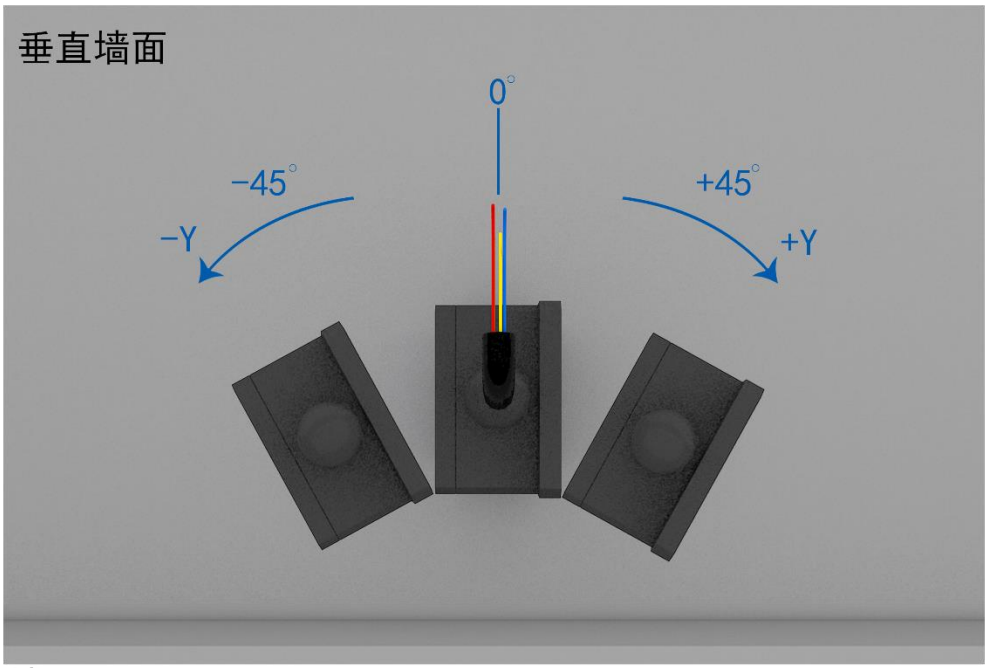
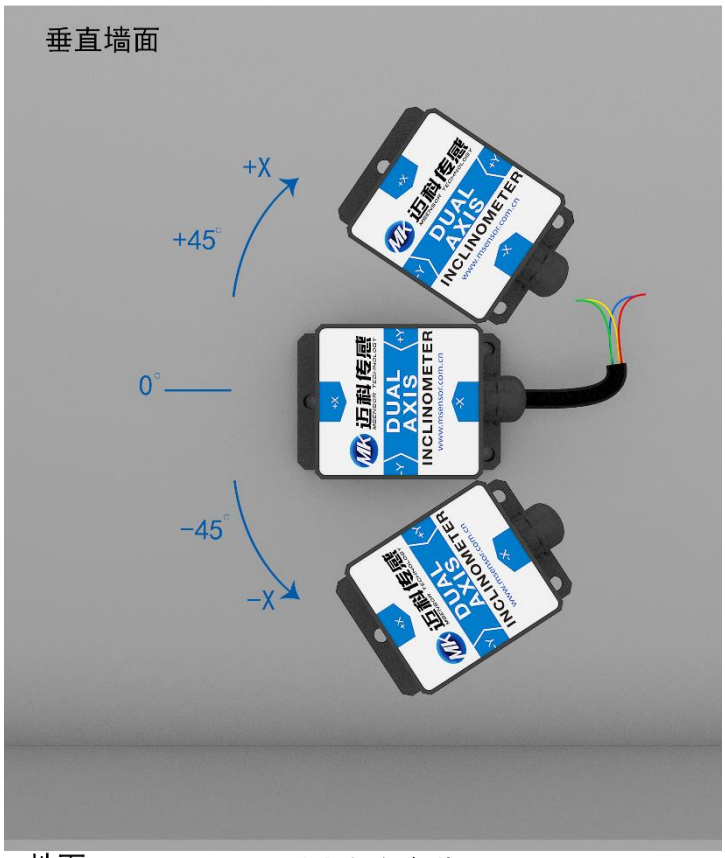


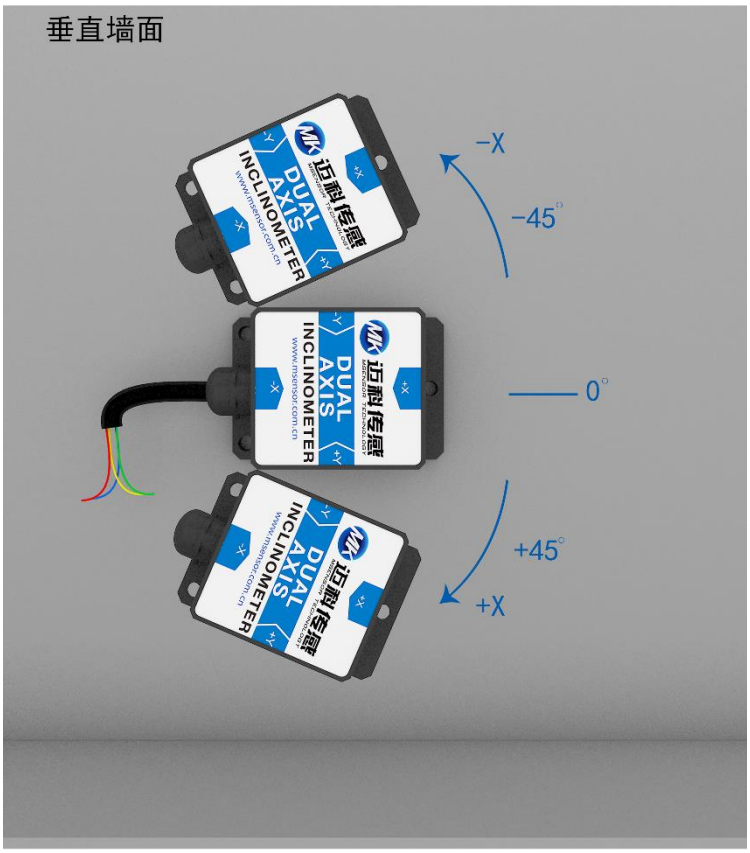
Figure 3: Install Vertically to the Left or Right



地面　　垂直向左安装



地面　　垂直向右安装



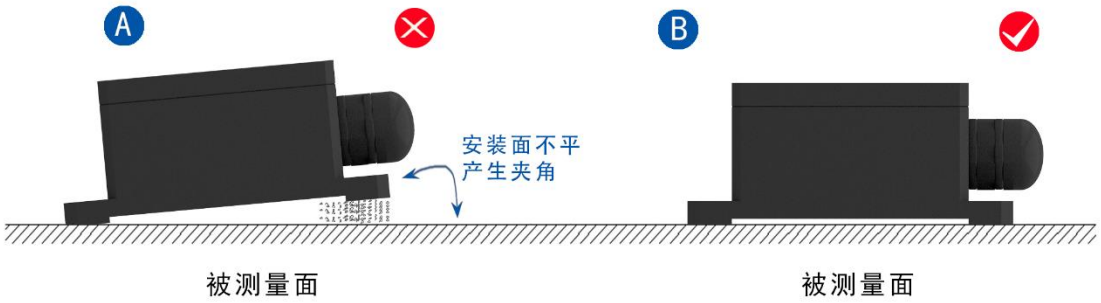
地面　　垂直向左安装

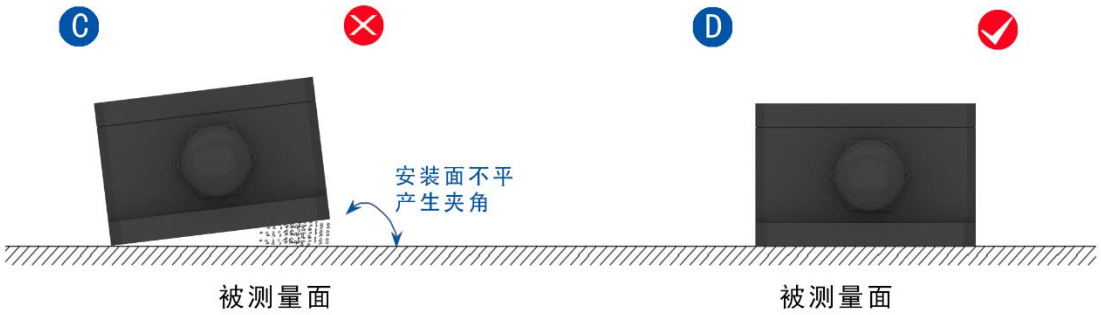
Product Installation Precautions

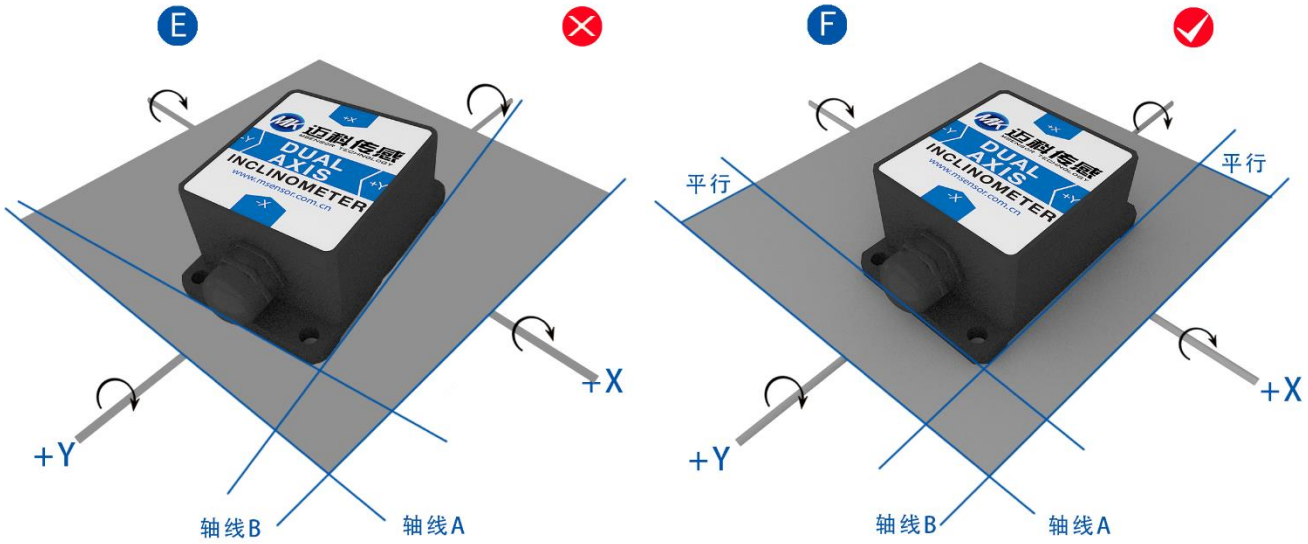
Install the tilt sensor correctly to avoid measurement errors. Pay special attention to two key aspects: 1) the surface orientation, and 2) the alignment of the lines.

1) The sensor mounting surface must be securely, flat, and stable against the measured surface. An uneven mounting surface may cause angular measurement errors. See Figures A and B.

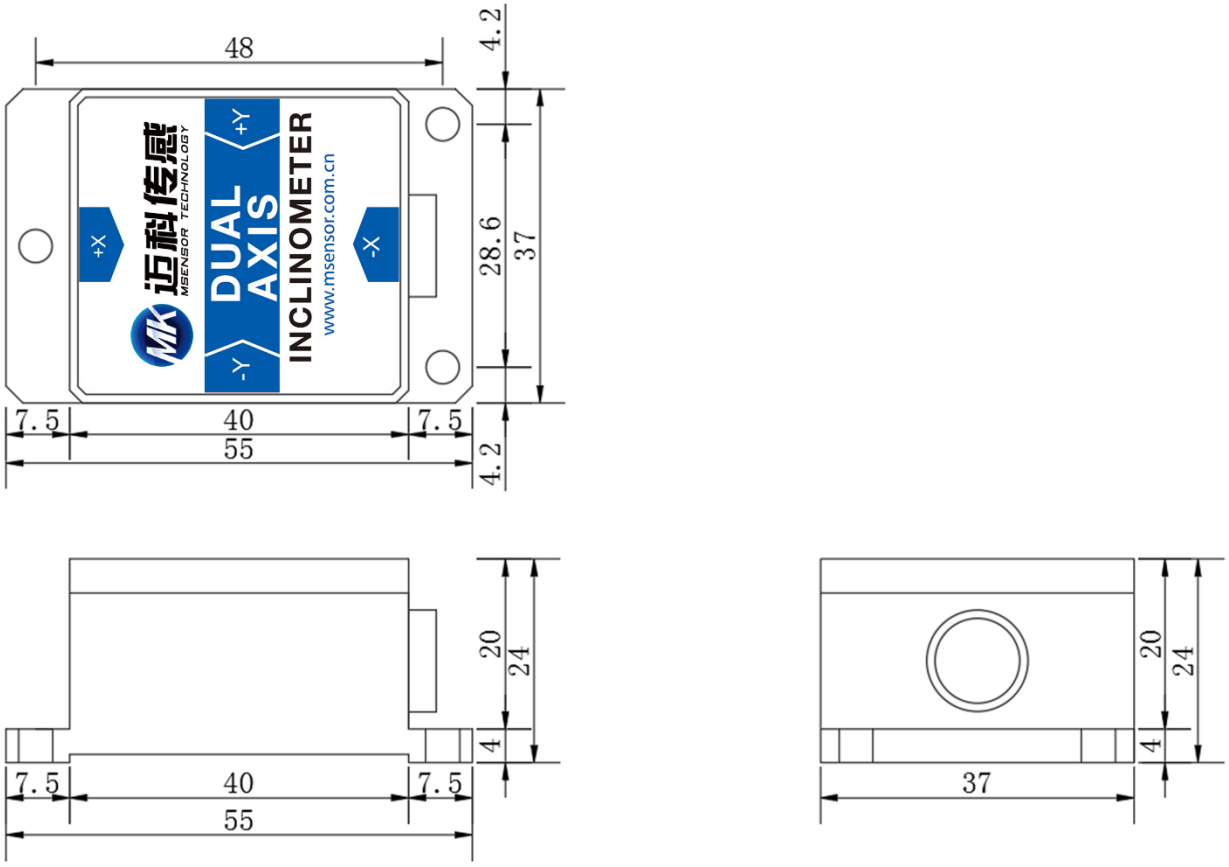
2) The sensor axis must be parallel to the measured axis, and the two axes should avoid forming an angle as much as possible. See Figures C and D.







Product Dimensions

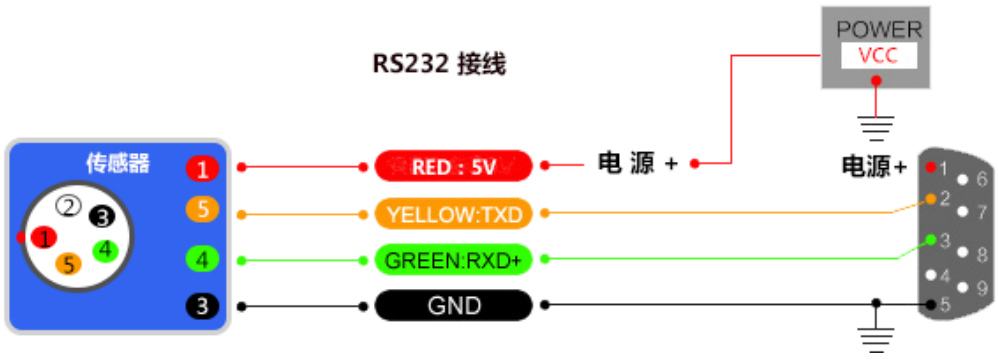


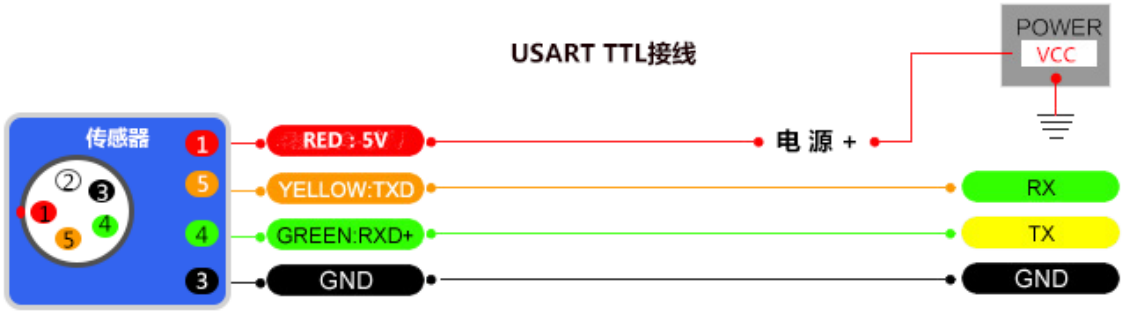
Product size: L55*W37*H24MM

Default horizontal installation: Ensure the sensor surface remains parallel to the target surface during installation. Refer to the rotation diagram for installation methods. For other installation methods, consult the "Product Installation Method" diagram and specify in the order remarks.

Product Electrical linkage

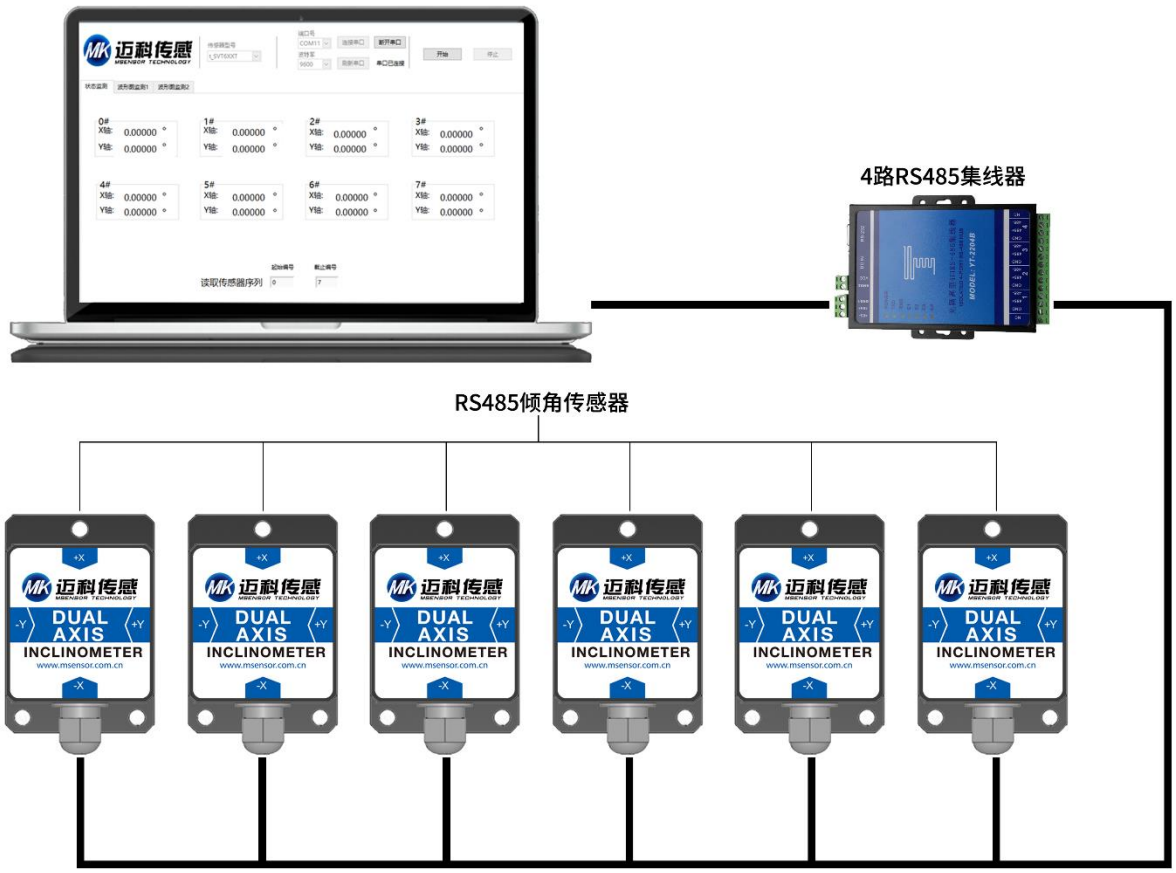
Line and Color Function Output Interface	red RED	white WHITE	lack BLACK	hispid arthraxon GREEN	Yellow
	1	2	3	4	5
RS232	VCC	NC	GND	RXD	TXD
RS485	VCC	NC	GND	(B、D-)	(A、D+)
TTL	VCC	NC	GND	RXD	TXD





Product Electrical Connections

Line and Color / Function Output Inter-face	Red RED	Black BLACK	Hispid arthraxon GREEN	Huang YELLOW	White WHITE	Palm BROWN
RS422	1	2	3	4	5	6
	VCC	GND	RXD-（B-）	RXD+（A+）	TXD+（A+）	TXD-（B-）



Debug Software

You can download the domestically developed tilt adjustment software from the official website of Maike Sensing for testing. If you wish to directly access the tilt sensor, you can do so through the tilt

The communication protocol for the corner sensor can be easily integrated into your system.

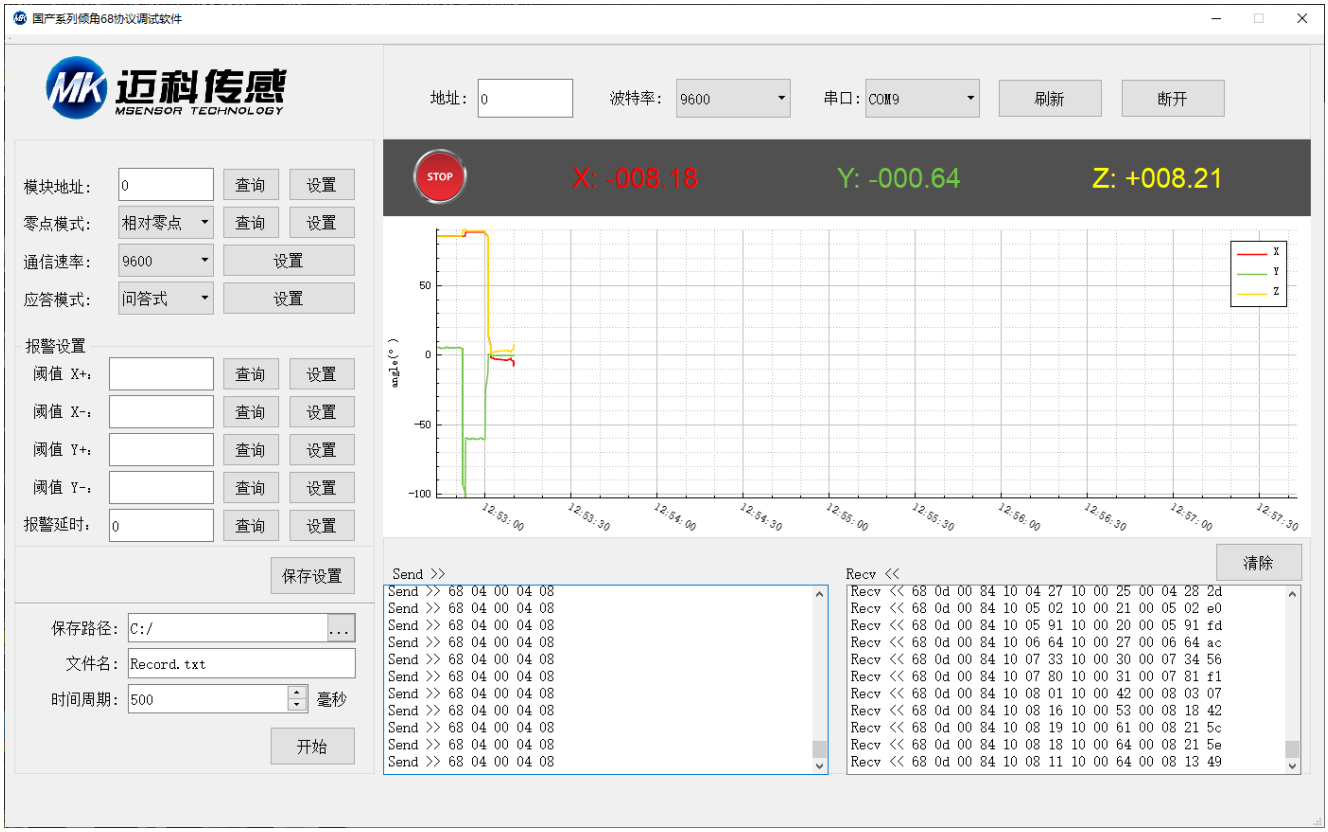


Figure 1.1 Domestic 68 Protocol Debugging Software

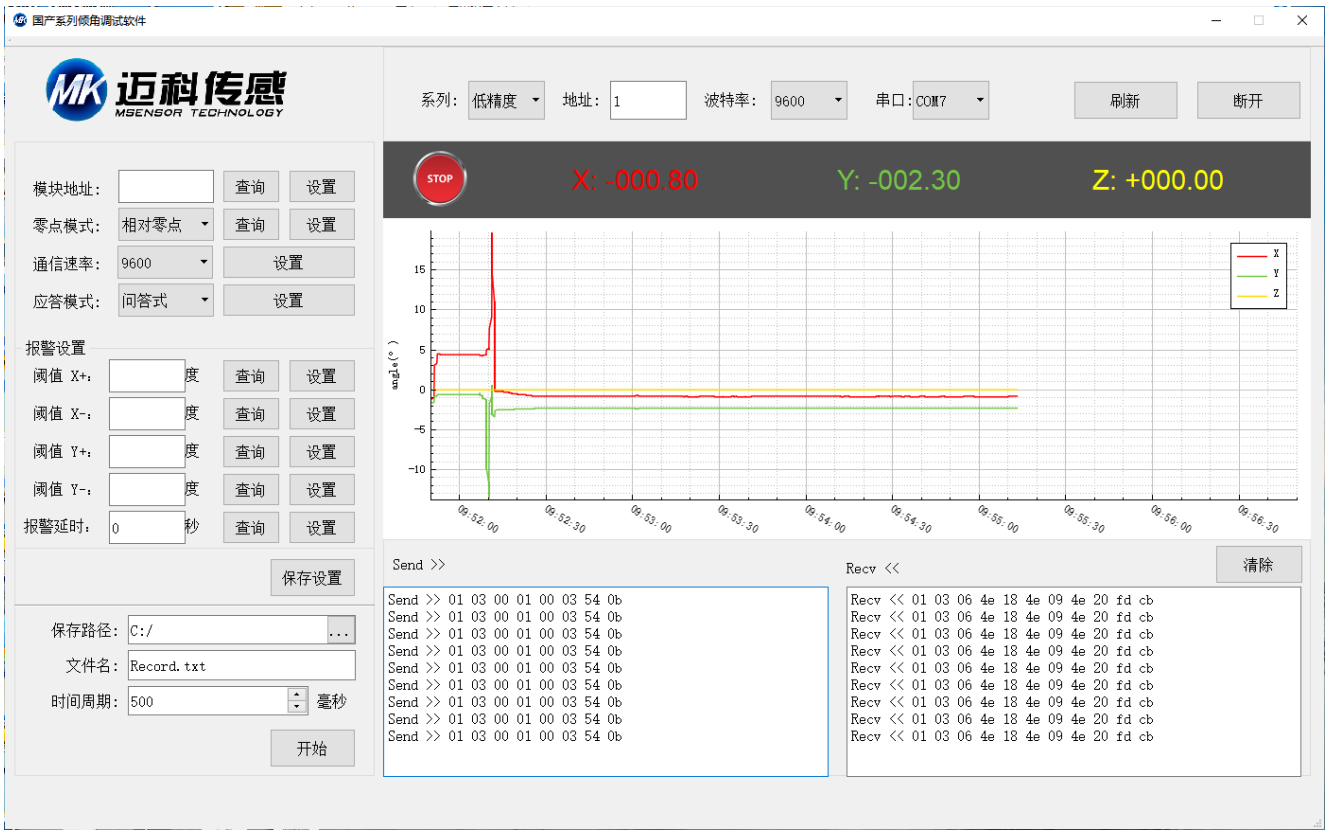


Figure 1.2 Domestic Modbus Protocol Debugging Software

Serial port: Select the COM port corresponding to the device.

Address: Enter the sensor's current address code, which is 01 by default.

Baud rate: Select the current baud rate of the sensor. The factory default is 9600. Monitoring: Connect the serial port, click Start, and collect data.

protocol

The product comes with two default protocols: industrial standard RTU Modbus and hexadecimal 0x68.

1. RTU Modbus Protocol

1 Data frame format: (RTU mode, 8-bit data bits, 1-bit stop bit, no parity, default rate 9600)

Address code	FC	Register address		Number of registers		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	NumH (1byte)	NumL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03 Read 0x06 Write	XX	XX	XX	XX	XX	XX

Data format: 16-based

Address code: factory default 0x01 (users can set it as needed, but not exceeding 0xFF)

Function code: 0x03 Read hold register 0x06 preset single register

Register address: The starting address of the register to be read or written

Number of registers: Number of registers to read and write

CRC verification: Address code, function code, register start address, register count, and CRC verification are calculated by the computer using a dedicated CRC16 verification tool. **Note:** When the address code, function code, or register start address changes, the CRC verification will also change. When you modify the command, update the CRC verification accordingly.

Note: When accessing sensor communication with the Modbus serial port assistant software, CRC check is not required; ordinary serial port debugging assistant requires

Note: Read the following items carefully before use:

1) The MODBUS protocol requires a minimum 3.5-byte time interval between data frames (e.g., at 9600 baud rate, This is the 3.5×(1/9600)×11=0.004s time. However, to leave enough margin, the sensor raises this time to more than 10ms, so leave at least 10ms time interval between each data frame.

Host sends command--10ms idle--slave responds command--10ms idle--host sends command.....

For users needing to implement CRC16 MODBUS calculation, the C program implementation is provided below for reference: unsigned short ModBusCRC (unsigned char *ptr, unsigned char size)

```
{
    unsigned short a,b,tmp,CRC16,V;
    CRC16=0xffff; //Initial value of the CRC register
    for (a=0;a<size;a++) //N 个字节
{
    CRC16=*ptr^CRC16;
    for (b=0;b<8;b++) //8 位数据
{
    tmp=CRC16 & 0x0001;
    CRC16 =CRC16>>1; // Shift right by one bit
    if (tmp)
    CRC16=CRC16 ^ 0xa001; // XOR polyno-
mial}
    *ptr++;
}
    V = ((CRC16 & 0x00FF) <<8) | ((CRC16 & 0xFF00)>> 8); // Convert to high-low
    byte order and return V;
}
```

For example, the checksum for "01 06 00 0B 00 02" is "79 C9".

2 Command Format

2.1 Read X-Axis Angle

Send command: 01 03 00 01 00 01 D5 CA

Address code	FC	Register address		Number of registers		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	NumH (1byte)	NumL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x00	0x01	0x00	0x01	0xD5	0xCA

Respond to command:

Address code	FC	Byte count	Register Data		CRC verification	
Address (1byte)	Function (1byte)	Byte Count (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x02	XX	XX	XX	XX

Note: For example, the answer reply frame: 01 03 02 4E 52 0C 19, the X-axis is the hexadecimal number of 1-2 bytes of register data (PLC or configuration software uses 16-bit register to directly read data is decimal), in which the high byte is in front and the low byte is behind;

After conversion to decimal, the angle representation is as follows:

X-axis angle real data = (data field-20000) / 100.

If the register data is 4E 52, it converts to 20050 in decimal

X-axis angle real data = (20051-20000)/ 100 = 0.5°

2.2 Read Y-Axis Angle

Send command: 01 03 00 02 00 01 25 CA

Address code	FC	Register address		Number of registers		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	NumH (1byte)	NumL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x00	0x02	0x00	0x01	0x25	0xCA

Response command:

Address code	FC	Bytes	Register Data		CRC verification	
Address (1byte)	Function (1byte)	Byte Count (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x02	XX	XX	XX	XX

Note: For example, the answer reply frame: 01 03 02 4E 0C 8D E1, the Y-axis is the hexadecimal number of 1-2 bytes of register data (PLC or configuration software uses 16-bit register to directly read data is decimal), where the high byte is in front and the low byte is behind;

When converted to decimal, the angle is expressed as follows:

Y-axis angle real data = (data field-20000) / 100

If the register data is 4E 0C, it converts to 19980 in decimal.

The Y-axis angle real data = (19980-20000)/ 100 = -0.2°

2.3 View X, Y Axis Angles

Send command: 01 03 00 01 00 02 95 CB

Address code	FC	Register address		Number of registers		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	NumH (1byte)	NumL (1byte)	CRC16L (1byte)	CRC16H (1byte)

0x01	0x03	0x00	0x01	0x00	0x02	0x95	0xCB

Respond to command:

Address code	FC	Byte count	Register Data		CRC verification	
Address (1byte)	Function (1byte)	Byte Count (1byte)	X Angle (2byte)	YAngle (2byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x04	XXXX	XXXX	XX	XX

Note: For example, the response frame: 01 03 04 4E 52 4E 0C 79 6F, the X-axis is the 1-2 bytes of register data, the Y-axis is the 3-4 bytes of register data in hexadecimal (PLC or configuration software uses 16-bit register to directly read data is decimal), where the high byte is in front and the low byte is behind;

When converted to decimal, the angle is expressed as follows:

X-axis Angle Real Data = (Data Field-20000) / 100

Y-axis angle real data = (data field-20000) / 100

For example, if the register data field is 4E 52 4E 0C 4E C0, the X-axis is 4E 52, the Y-axis is 4E 0C, and the Z-axis is 4E C0

The X-axis data is high 4E 52, which is converted to decimal 20050

The Y-axis data is high 4E 0C, which is converted into decimal 19980

The actual data of the X-axis angle = (20050-20000)/ 100 = 0.5°

Actual data of Y axis angle = (19980-20000)/ 100 = -0.2°

2.4 Set Output Mode

Send command: 01 06 00 0A 00 01 68 08

Address code	FC	Register address		Register data	CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	Data (2byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0A	0x00 00: Answer mode 0x 00 01:5HZ automatic output mode 0x 00 02:15HZ automatic output mode 0x 00 03:25HZ automatic output mode 0x 00 04:35HZ automatic output mode 0x 00 05:50HZ automatic output mode	0xXX	0xXX

The default output mode is 00 00. If the device is in non-responsive mode, it will idle for 10 seconds after each power-on restart before resuming continuous data output.

Respond to command:

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0A	0xXX	0xXX	0xXX	0xXX

Note: When using RS485 interface products, since this interface operates in half-duplex mode, the device may fail to properly receive incoming commands during automatic data transmission. In such cases, you might need to repeatedly send commands until successful reception. Therefore, if **you need to interact with the product through command transmission during RS485 interface usage, we recommend configuring the device in Q&A mode**. Additionally, when set to automatic output mode, the device will not send any data within the first 10 seconds after power-on. During this period, it can effectively receive external configuration commands.

2.5 Set Relative/absolute Zero

Send command: 01 06 00 0B 00 01 39 C8

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0B	0x00	0x01	0x39	0xC8

Note: Register data field: 0x00 00 absolute zero, 0x0001 relative zero, send 01 06 00 0B 00 00 F8 08 , set absolute zero;

Respond to command:

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0B	0x00	0x01	0x39	0xC8

Note: Register data field: 0x0000 absolute zero, 0x0001 relative zero. If set to absolute zero, the measurement angle is based on the factory-set zero point. If set to relative zero, the measurement angle is based on the current position.

2.6 Query Relative/absolute Zero

Send command: 01 03 00 0B 00 01 F5 C8

Address code	FC	Register address		Number of registers		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	NumH (1byte)	NumL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x00	0x0B	0x00	0x01	0xF5	0xC8

Respond to command:

Address code	FC	Byte count	Register Data		CRC verification	
Address (1byte)	Function (1byte)	Byte Count (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x02	XX	XX	XX	XX

Note: For example, the answer reply frame: 01 03 02 00 01 79 84 , register data 00 01 indicates that the current measurement is relative to the zero point

2.7 Set Communication Speed

Send command: 01 06 00 0C 00 04 48 0A

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0C	0x00	0x04	0x48	0x0A

Respond to command:

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0C	0x00	0x04	0x48	0x0A

Note: The register data fields are defined as follows: 0x0000 corresponds to 2400,0x0001 to 4800,0x0002 to 9600,0x0003 to 19200,0x0004 to 115200,0x0005 to 14400,0x0006 to 38400, and 0x0007 to 57600. The **default baud rate is 0x02:9600**. After each successful baud rate adjustment, the system sends a save command, transmits a response command at the original baud rate, restarts the device, and immediately changes the communication baud rate.

Note: Set the baud rate to 115200 for high-frequency output.

2.8 Set Module Address

Send command: 01 06 00 0D 00 02 99 C8

Address code	FC	Register address		Register data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0D	0x00	0x02	0x99	0xC8

Note: The default address of the sensor is 01.

Respond to command:

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x02	0x06	0x00	0x02	0x00	0x02	0x99	0xFB

1. When connecting multiple sensors to a bus like MODBUS, assign each sensor a unique address to enable separate control and response.
2. For example, if the new address is changed successfully, all subsequent commands and response packets must be changed to the new address code to take effect. Otherwise, the sensor will not respond to the command.
3. The XX module address ranges from 00 to FE.

2.9 Query Module Address

Send command: FF 03 00 0D 00 01 00 17

Address code	FC	Register address		Number of registers		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	NumH (1byte)	NumL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0xFF	0x03	0x00	0x0D	0x00	0x01	0x00	0x17

Note: The MODBUS protocol requires products to know the module address for communication. Therefore, addresses are predetermined during MODBUS communication and cannot be queried. This product uses a custom protocol to query addresses in the MODBUS protocol.

The address FF can also be queried based on the known address code.

Respond to command:

Address code	FC	Byte count	Register Data		CRC verification	
Address (1byte)	Function (1byte)	Byte Count (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x03	0x02	XX	XX	XX	XX

2.10 Factory Data Reset

Send command: 01 06 00 0E 00 00 E8 09

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0E	0x00	0x00	0xE8	0x09

Respond to command:

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0E	0x00	0x00	0xE8	0x09

Note: Factory reset takes effect after power on

Flash 2.11 Update (Save Settings)

Send command: 01 06 00 0F 00 00 B9 C9

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)
0x01	0x06	0x00	0x0F	0x00	0x00	0xB9	0xC9

Respond to command:

Address code	FC	Register address		Register Data		CRC verification	
Address (1byte)	Function (1byte)	AddrH (1byte)	AddrL (1byte)	DataH (1byte)	DataL (1byte)	CRC16L (1byte)	CRC16H (1byte)

0x01	0x06	0x00	0x0F	0x00	0x00	0xB9	0xC9

* For various parameter Settings, if the **save Settings** command is not sent after the Settings are completed, the Settings will be lost after power failure.

2. 0x68 Hexadecimal Two Protocols

1 Data frame format: (8-bit data bit, 1-bit stop bit, no check, default rate 9600)

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)		(1byte)
0x68					

Data format: 16-digit

Indicator: Fixed to 0x68

Data length: The length from the data length to the checksum (including the checksum)

Address code: The address of the collection module, which is 0x01 by default

Data field: The content and length vary according to the command word.

Check sum: The sum of data length, address code, command word, and data field, without considering carry (**Note: When the command word or data field changes, the check sum changes. When you change the data field, change the check sum accordingly.**)

2 Command Format

2.1 Read X-Axis Angle

Send command: 68 04 01 01 06

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(1byte)
0x68			0x01		

Response command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(3byte)	(1byte)

0x68			0x81	SXXX.YY	

Note: The data field returns the angle value in 3-byte BCD format, where S is the sign bit (0 for positive, 1 for negative), XXX is a three-bit integer, and YY is a decimal fraction. The same applies to other axis data. For example, 102680 represents-26.8º.

2.2 Y-Axis Angle

Send command: 68 04 01 02 07

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(1byte)
0x68			0x02		

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(3byte)	(1byte)
0x68			0x82		

2.3 View X, Y Axis Angles

Send command: 68 04 01 04 09

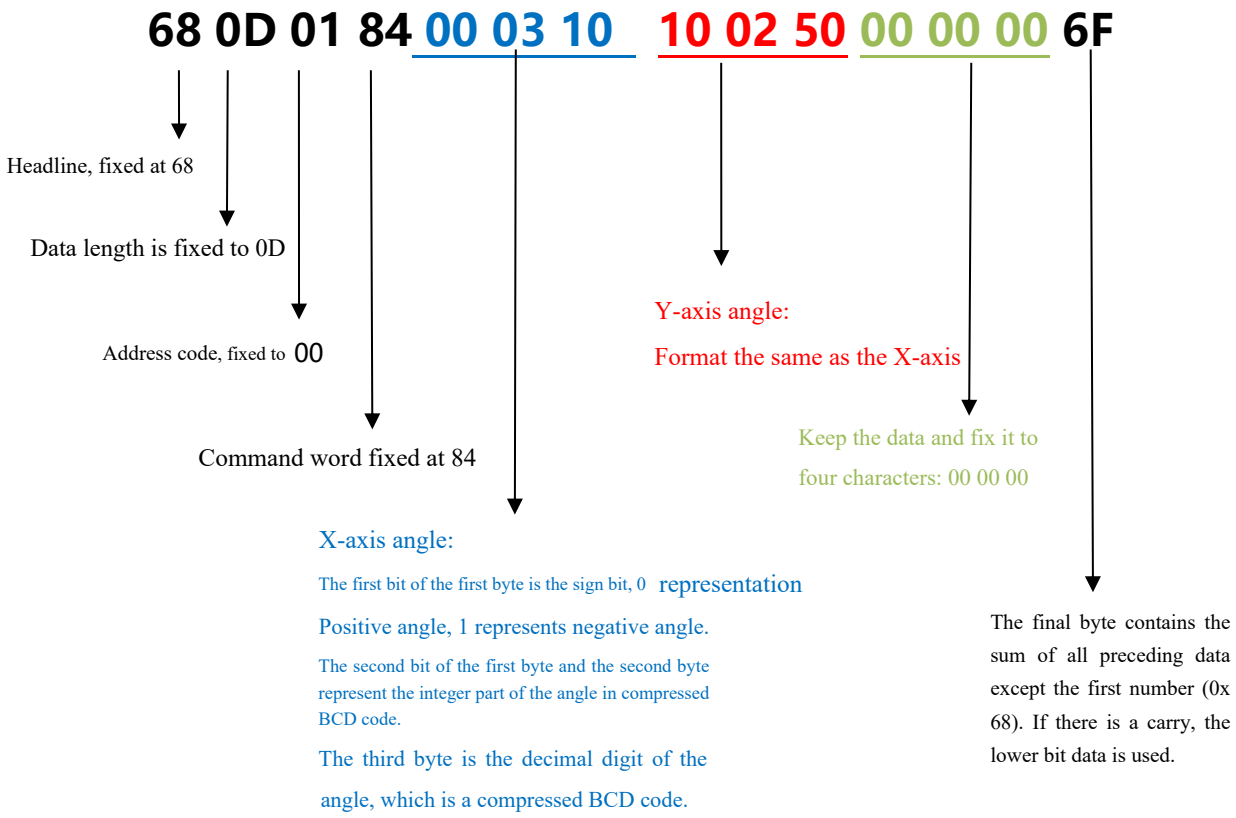
Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(1byte)
0x68			0x04		

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(9byte)	(1byte)
0x68			0x84		

Note: The returned 9-byte data is divided into three groups: x-axis angle, y-axis angle, and z-axis angle. Refer to instruction 2.1 for format interpretation.

X-axis: +03.1°, Y-axis: -02.5°



2.4 Set Relative/absolute Zero

Send Command: 68 05 01 05 00 0B

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x05	0x00: Absolute zero 0x01: Relative to zero	

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x85	0x00: Set successfully 0xFF: Failed to set	

Note: If set to absolute zero, the measurement angle is based on the factory-set zero point. If set to relative zero, the measurement angle is based on the current position. This function is the same as grounding the gray output line.

2.5 Query Relative/absolute Zero Points

Send command: 68 04 01 0D 12

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(1byte)
0x68			0x0D		

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x8D	0x00: Absolute zero 0xFF: Relative to zero	

2.6 Set Communication Speed

Send command: 68 05 01 0B 03 14

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x0B		

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x8B	0x00: Set successfully 0xFF: Failed to set	

Note: 0x00 represents 2400,0x01 represents 4800,0x02 represents 9600,0x03 represents 19200,0x04 represents 115200,0x05 represents 14400,0x06 represents 38400, and 0x07 represents 57600. The default baud rate is 0x02:9600. If the baud rate is set to 19200, the command would be 68 05 00 0B 03 13 , where 13 = 05 + 00 + 0B + 03. This pattern applies to other baud rate settings. After successfully changing the communication baud rate, the system will send a response command at the original baud rate and immediately adjust the device's baud rate.

Note: Set the baud rate to 115200 for high-frequency output.

2.7 Set Angle Mode

Send command: 68 05 01 0C 00 12

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x0C	0x00: Q&A 0x01: 5Hz Data Rate 0x02: 15Hz Data Rate 0x03: 25Hz Data Rate 0x04: 35Hz Data Rate 0x05: 50Hz Data Rate	

*Default output mode is 00. If the device is in non-response mode, it will enter a 10-second idle period after each power-on reboot before resuming continuous data output.

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x8C	0x00: Set successfully 0xFF: Failed to set	

Note: A 5Hz data rate means the device automatically transmits data 5 times per second, and so on. When using RS485 interface products, since this interface operates in half-duplex mode, the device may fail to properly receive incoming commands during active data transmission. In such cases, you might need to repeatedly send commands until the device responds. Therefore, if **you need to interact with a 485 interface device by sending commands, we recommend configuring it in Q&A mode.** Additionally, when set to auto-output mode, the device will not send any data within the first 10 seconds after power-on. During this period, it can effectively receive external configuration commands.

2.8 Set Module Address

Send command: 68 05 01 0F 01 16

Identifier	DL	Address code	CW	Data field	Check sum

(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x0F	XX Module Address	

Note: The default address of the sensor is 00.

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x8F	0x00: Set successfully 0xFF: Failed to set	

4. When multiple sensors are connected to a bus (e.g., RS485), each sensor should be assigned a unique address to enable independent control and response.
5. For example, if the new address is changed successfully, all subsequent commands and response packets must be changed to the new address code to take effect. Otherwise, the sensor will not respond to the command.
6. The XX module address ranges from 00 to EF.

2.9 Query Module Address

Send command: 68 04 00 1F

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(0byte)
68	04	00	1F		

Note: The query module address does not include the check bit

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x1F		

Flash 2.10 Update (Save Settings)

Send command: 68 04 01 0A 0F

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(1byte)
0x68			0x0A		

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x8A	0x00: Set successfully 0xFF: Failed to set	

* For various parameter settings, if the **save setting** command is not sent after the setting is completed, these settings will be lost after power failure.

2.11 Factory Data Reset

Send command: 68 04 01 0E 13

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(0byte)	(1byte)
0x68			0x0E		

Respond to command:

Identifier	DL	Address code	CW	Data field	Check sum
(1byte)	(1byte)	(1byte)	(1byte)	(1byte)	(1byte)
0x68			0x8E	0x00: Set successfully 0xFF: Failed to set	

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product model： _____ **Purchase date:** _____

Product serial number: _____

Maintenance Record

Report time: _____ **failure cause：** _____

Reporter: _____ **result of handling：** _____

customer information： _____

Note: This card is used for maintenance and upgrade services.