DHR Series

Distance Measuring Sensor

Manual

Thank you for using our company's products. This manual explains the usage and safety matters of the products.

◆Please read this manual carefully and pay attention to safety during use.

◆Please keep this manual and put it in a suitable place for reference at any time.

Guangdong Hinson Technology Co., Ltd.

Contents

1 Safety Precautions

1.1 Attention to applicable environment

Visible particles in steam, smoke, dust and air may cause the sensor to misjudge or even become unusable;

Qualified technicians need to be regularly arranged to check whether the sensor is connected and installed correctly;

Sensors should be inspected and cleaned regularly;

This product is only allowed to be used within specified limits and specified technical parameters and operating conditions at any time.

1.2 Pay attention to the wiring environment

Do not connect the power supply reversely or connect it to a voltage higher than the specified maximum working voltage, otherwise the sensor will be damaged;

If the power supply is lower than the minimum working voltage, the sensor will not work or work abnormally;

Please follow the instructions in the manual for wiring, otherwise the sensor may not be able to detect the input signal correctly;

Do not connect the device to the output signal terminal to exceed the load capacity of the sensor, otherwise it will cause sensor failure.

1.3 Note on debugging environment

Only qualified and authorized personnel are allowed to connect, install, commission and set up laser distance sensors;

Confirm that the peripheral equipment associated with the sensor is in a reliable stop operation state;

Confirm that the debugger is in a safe position;

Confirm that other people or objects are outside the range of the device.

2 Functional introduction

2.1 Parameter specifications

Parameters/Model	DHR10-11000	DHR30-11000	DHR50-11000
Performance			
Detection distance	0.05-10m	0.05-30m	0.05-50m
Measurement frequency	540K		
Repeat accuracy	±2mm		
Absolute accuracy	±3mm		
Measure resolution	0.1mm		
Measurement method	dTOF		
Response time	1ms		
Data interface			
Communication method	SSI、CAN、485、422		
Communication protocol	SSI、CANOpen、485Modbus		
Electrical/Mechanical			
Operating voltage	DC10 - 30V		
Power	≤2.5W		
Warm-up time	30s		
wavelength	660nm		
Product size	32mm*65.3mm*57.3mm		
Housing material	Aluminum alloy		
Environmental			
Ambient temperature for use	-10℃-50℃, indoor use (no frost, no condensation)		
Ambient humidity for use	＜80% RH		
Storage ambient temperature	-20℃-70℃		
Test/Standard			
Protection level	IP65		

2.2 Model Rules

DHR XX - X XX XX
DHR: Product type identification; XX: Effective output distance; X: Communication method; XX: cable length; XX: Custom bit, default standard version;

Example: DHR10-11000

3 Preparation

3.1 Packing list

*Please confirm whether the product name and model on the external label of the product packaging box are consistent with what you purchased;

*Determine the product name and model through the external label of the product;

*Please confirm whether the following items are complete after unpacking. If not, please contact our company;

Name	Model	Quantity	Describe
Distance measuring sensor	DHRxx-xxxxx	1	Sensor Unit
Hinson configuration software		1	Software for configuring and debugging sensors
Sensor Certificate		1	Sensor factory qualified certificate

Optional:

Cables	Ethernet cable & Power and IO cables	1
Reflective film	With diamond-grade reflective film	1
Reflective board	Aluminum plate with diamond-grade reflective film	1

3.2 Debugging Tools

Computer configuration	Running Windows 7 and above	1
Reflective film	Equipped with diamond-grade or above reflective film	1
Configuration software	DHR-xxx	1

3.3 Accessories description

3.3.1 Reflective film model

Model	Specifications
RF01-100*100	Diamond grade,100mm*100mm；
RF01-300*300	Diamond grade,300mm*300mm；
RF01-600*500	Diamond grade,600mm*500mm；
RF01-600*650	Diamond grade,600mm*650mm；
RF01-800*800	Diamond grade,800mm*800mm；
RF01-850*850	Diamond grade,850mm*850mm；
RF01-1150*950	Diamond grade,1150mm*950mm；
RF01-XXX*XXX	Diamond grade, size can be customized;

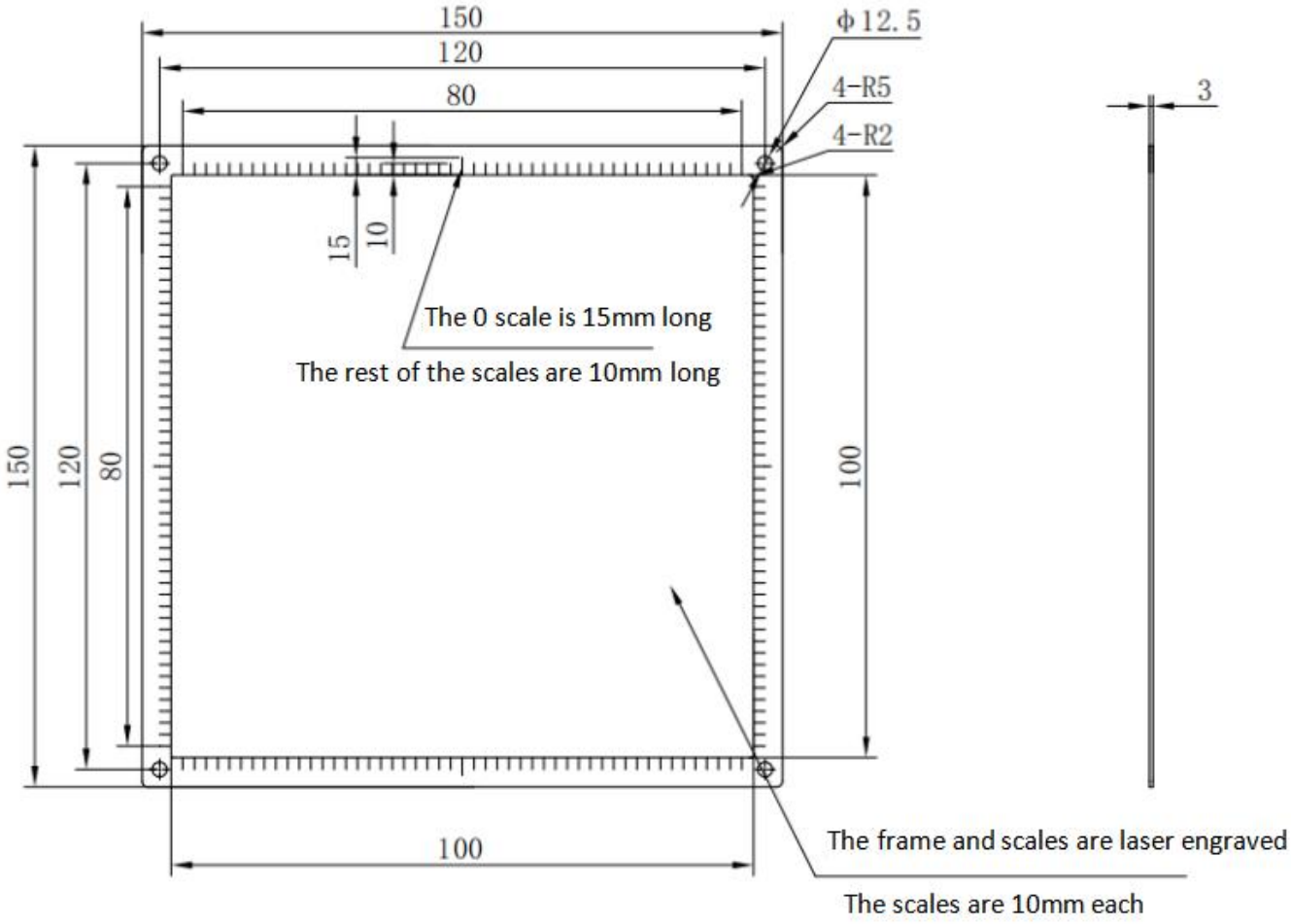
Note: Different models of reflective film must not be smaller than the following sizes

10m: 100mm*100mm

30m: 300mm*300mm

50m: 600mm*500mm

3.3.2 Reflective sheet customization

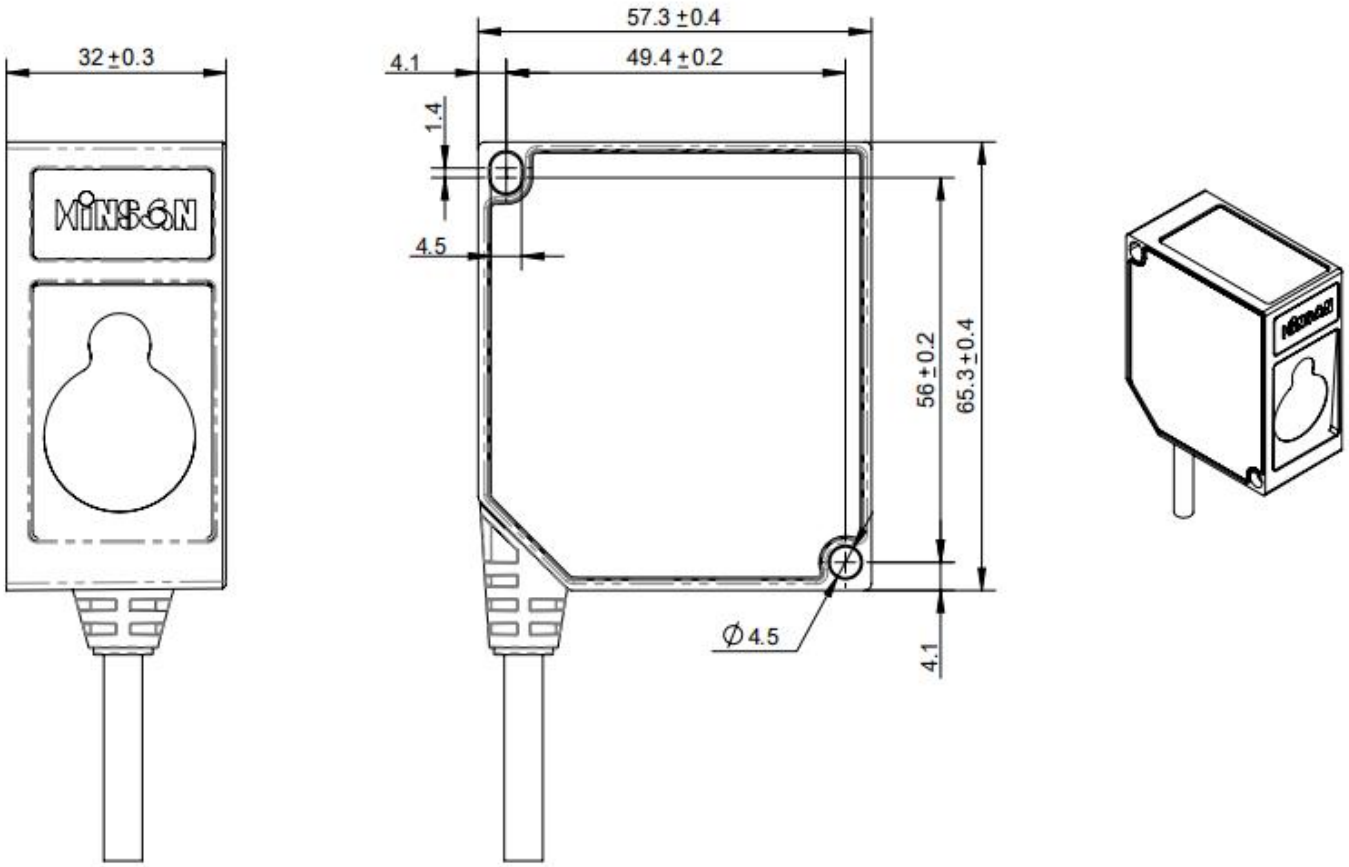


Note:

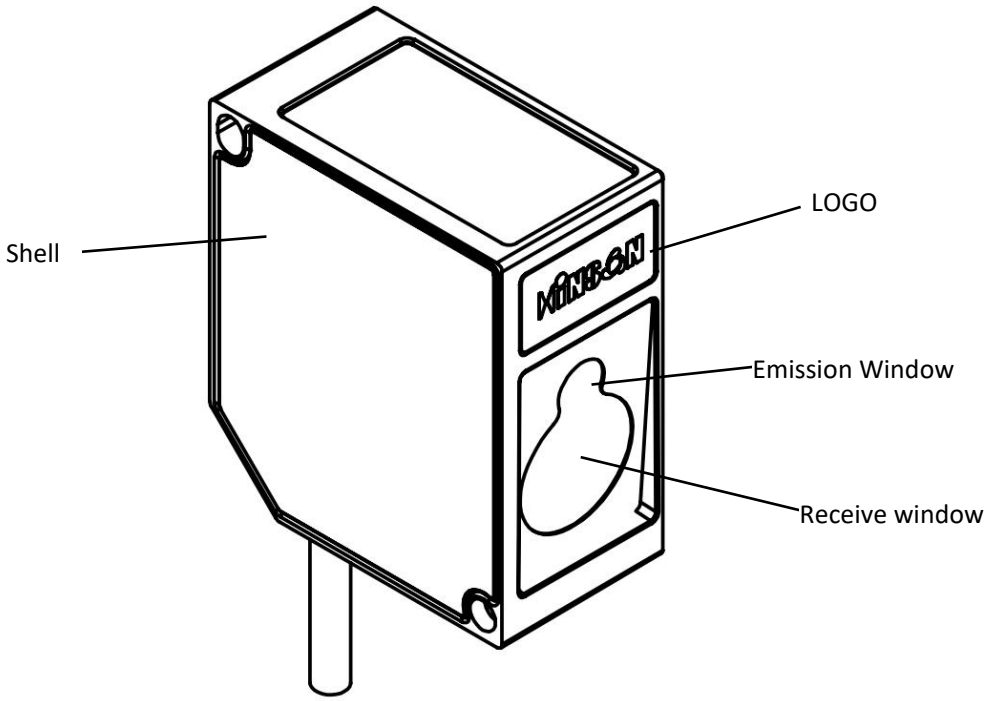
1. The reflective plate size of 150*150mm in the above picture is the standard size, which is suitable for fixing the reflective film of 100*100mm;
2. The reflective plate size is 850*850mm, which is suitable for fixing the reflective film of 800*800mm;
3. The reflective plate material is aluminum;
4. The reflective plate has 4 mounting holes to fix the reflective film;
5. Reflective plates and reflective films can be customized in special sizes;

4 Installation

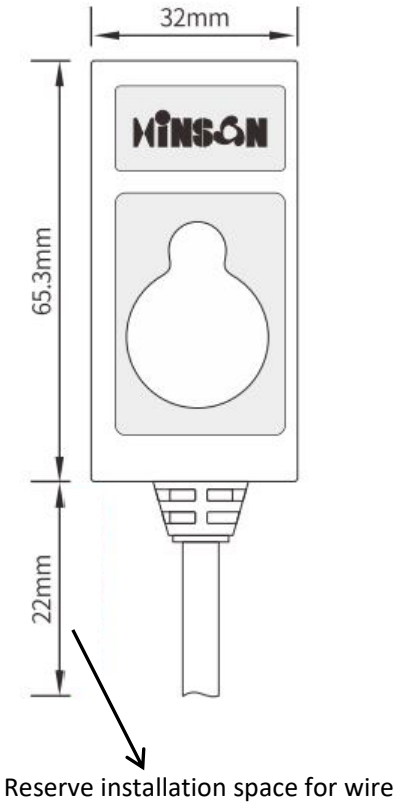
4.1 Dimension parameter



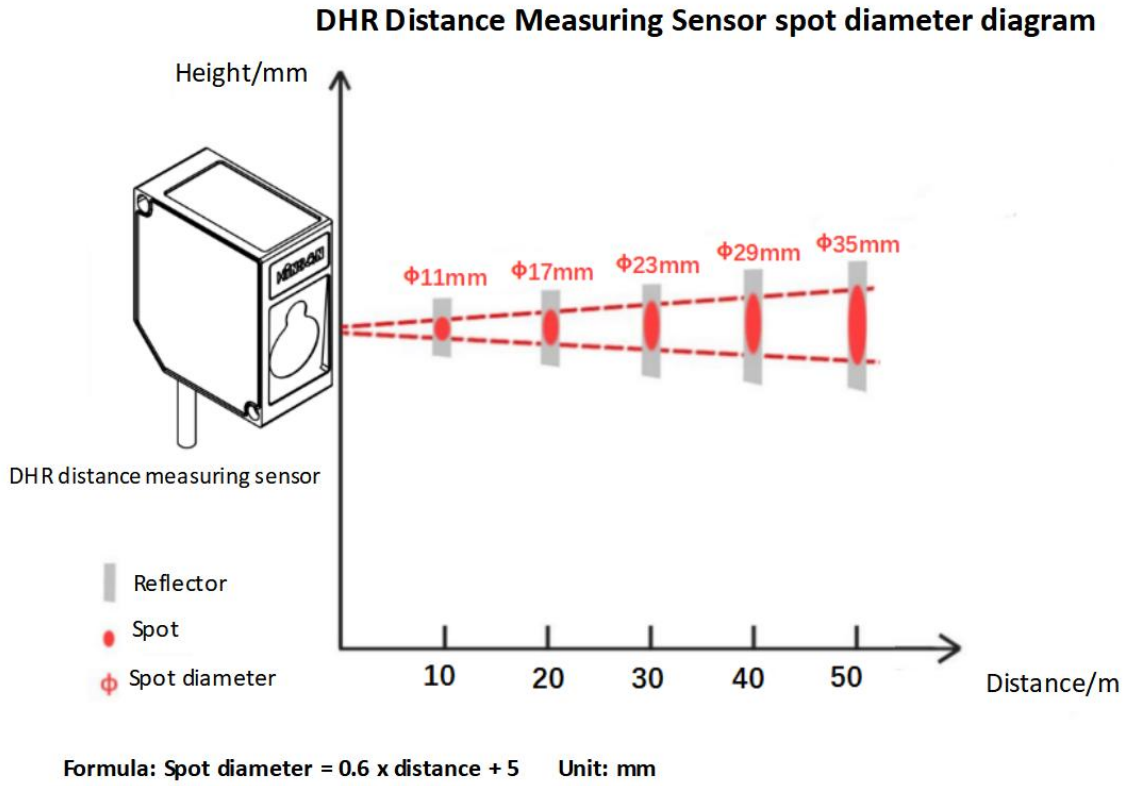
4.2 Parts description



4.3 Installation requirements



4.4 Spot diameter

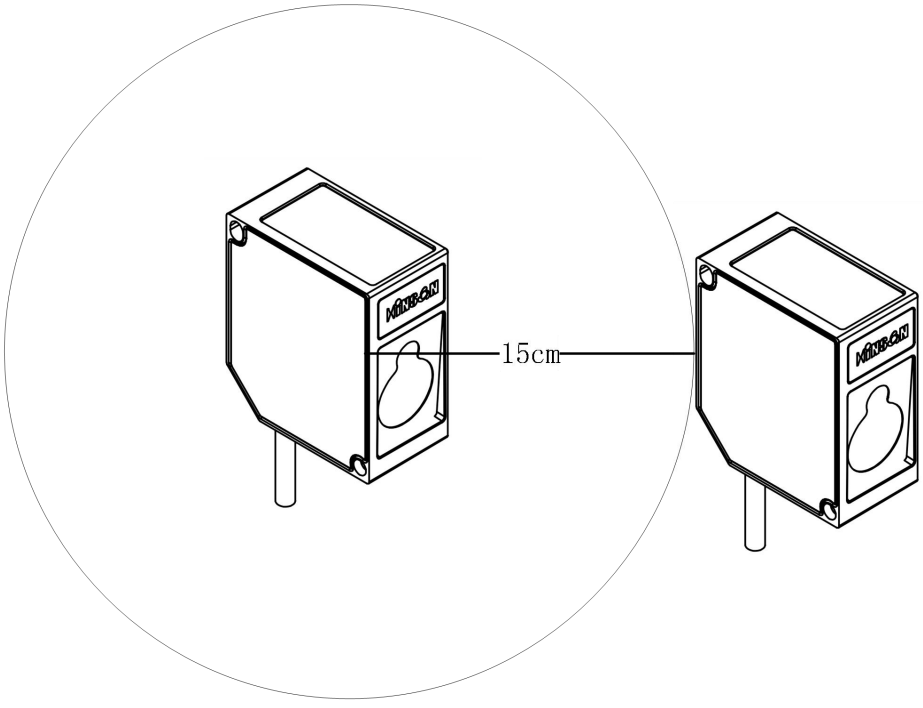


Formula: Spot diameter = 0.6 x distance + 5 Unit: mm

Note: The light spot shown in the figure is the maximum value of the light spot at a certain distance. The actual light spot size will deviate from the calculated value.

4.5 Use attention

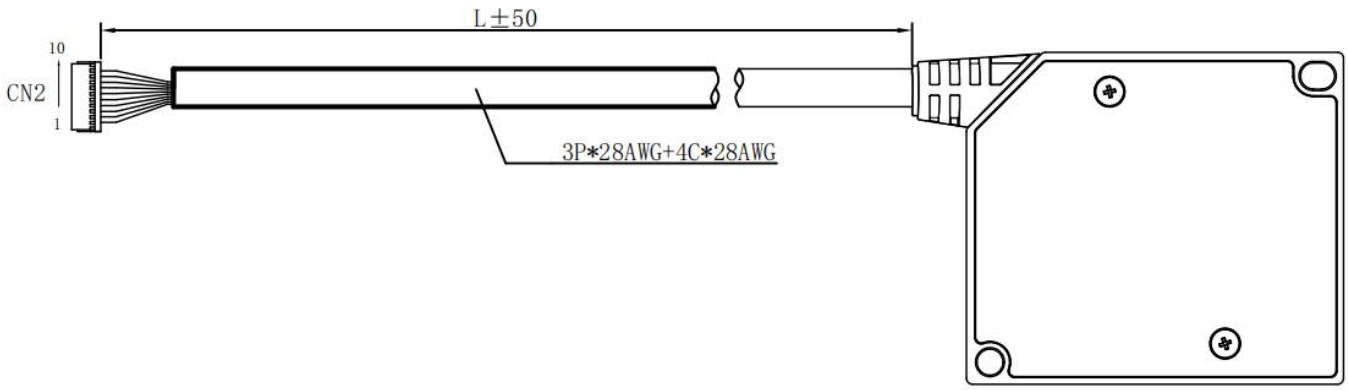
When using sensors of the same model, the interval radius must be within 15cm range to avoid affecting the distance and accuracy.



5 Cable definition

5.1 Port parameters

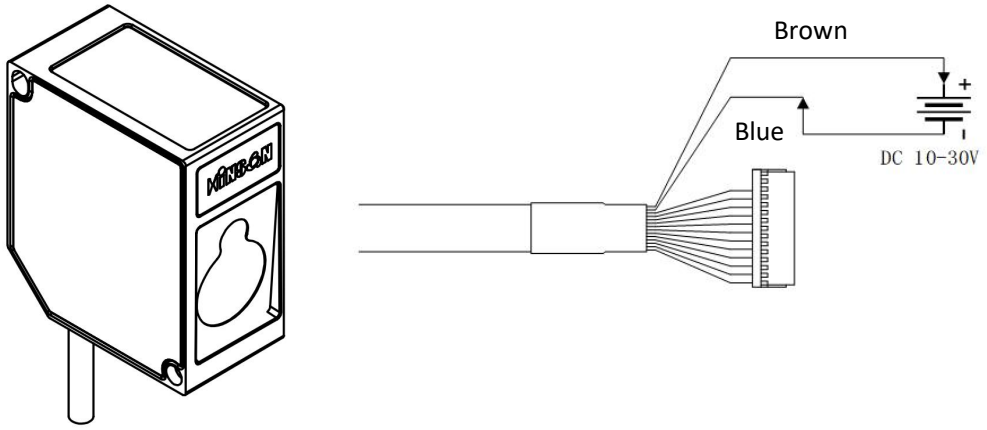
Function	IO, Power Supply, RS485,RS422,SSI,CAN
Type	Connectors
Number of pins	10 pins



Terminal	Serial number	Symbol	Color	Function description
CN2	Pin1	+VIN	Brown	Power Positive
	Pin2	-VIN	Blue	Power Negative
	Pin3	YOO	Red	IO output 1
	Pin4	YO1	White red	IO output 2
	Pin5	CAN H	White	CANOpen Communication
	Pin6	CAN L	White green	CANOpen Communication
	Pin7	RS485/RS422/SSI	White brown	SSI DATA+/485_A(Modbus)/422_TX+
	Pin8		Orange	SSI DATA-/485_B(Modbus)/422_TX-
	Pin9		Green	SSI CLK+/422_RX+/485_A(PC)
	Pin10		Purple	SSI CLK-/422_RX-/485_B(PC)

Note: RS485, RS422, and SSI interfaces use isolated communication

5.2 Power supply wiring

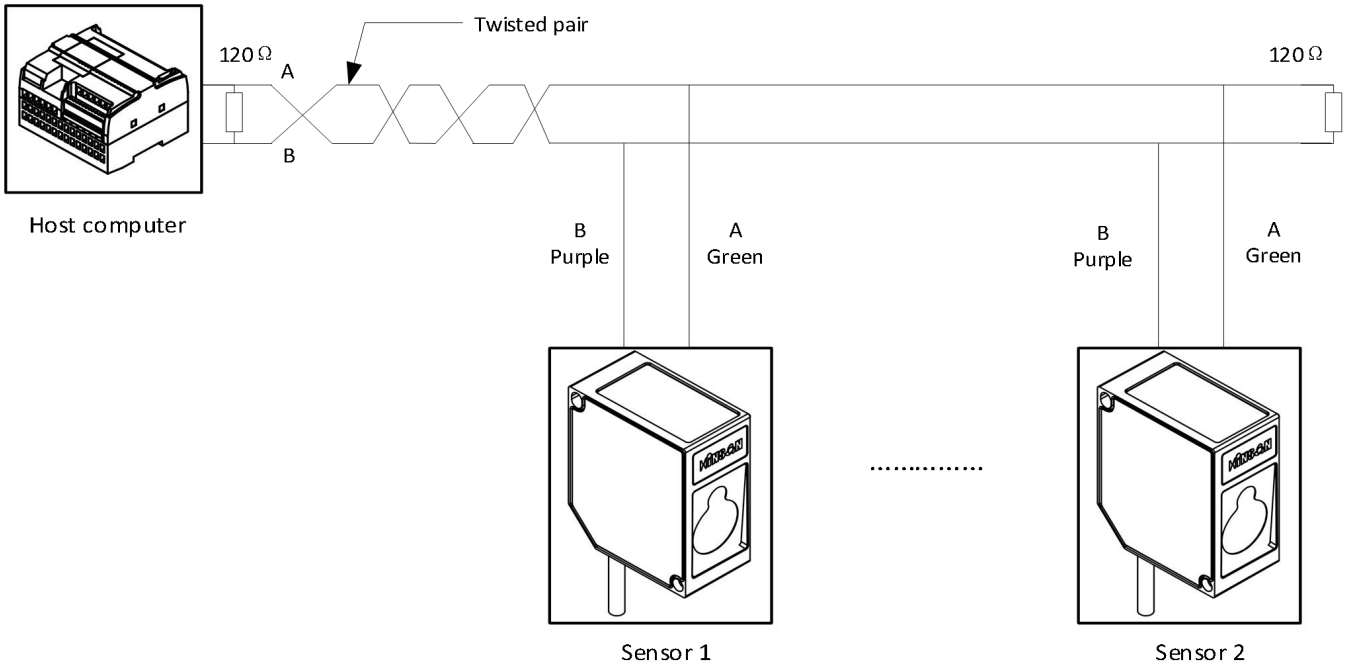


Note: The factory port is cut off directly, which will not affect the warranty;

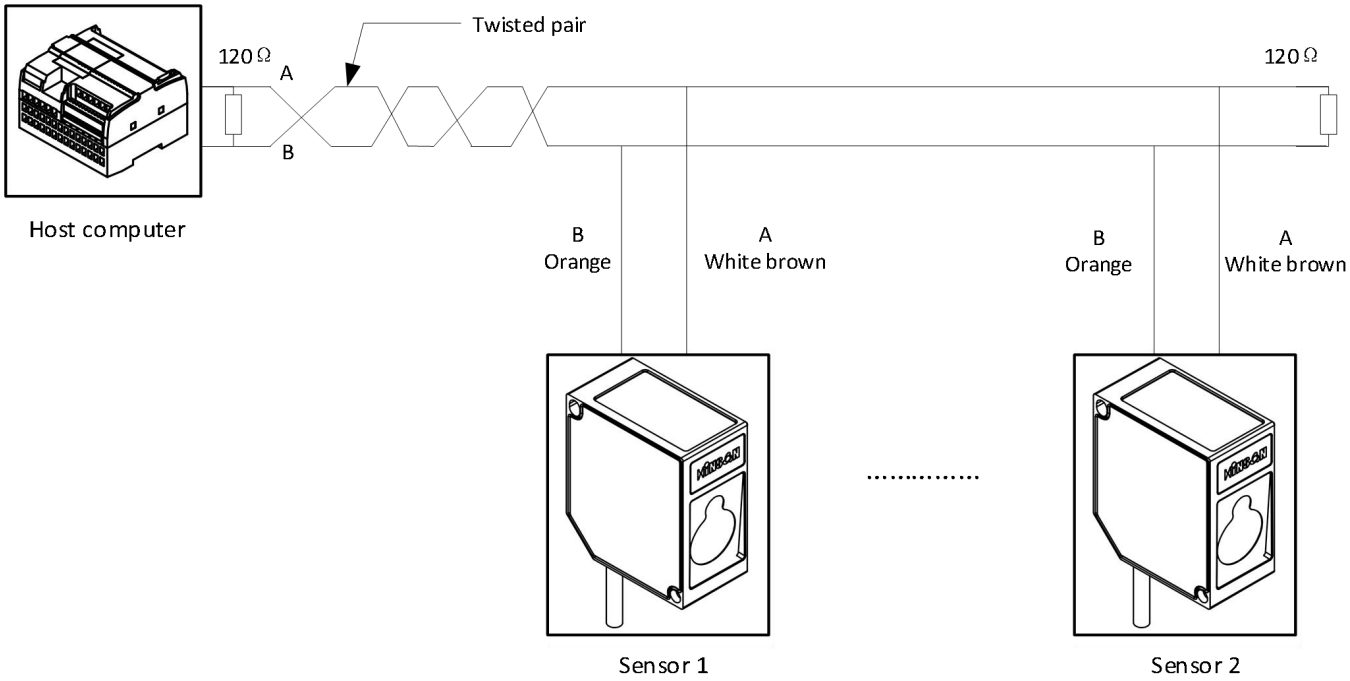
Power requirements:

Voltage range: DC 10-30V power supply capacity greater than 1A;

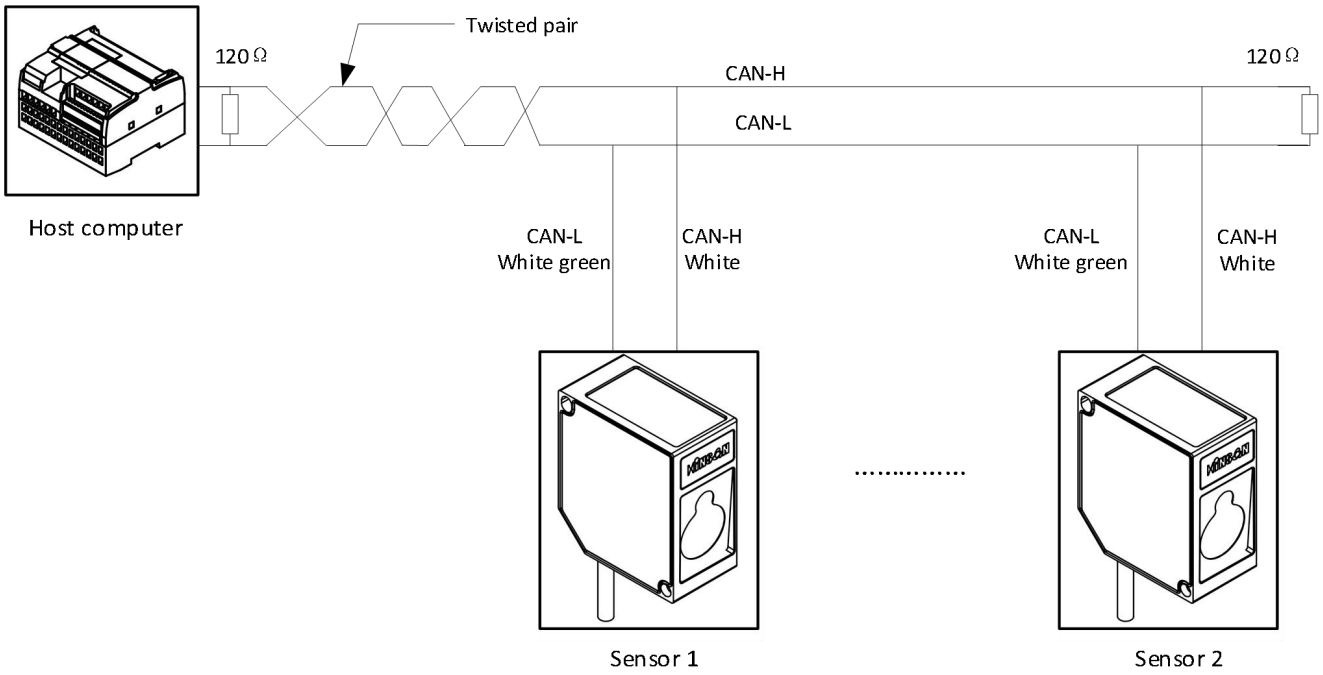
5.3 Configuration software wiring



5.4 MODBUS wiring



5.5 CAN BUS wiring



5.6 Sensor control mode settings

The sensor communication methods are shown in the figure, including SSI interface control, RS422 communication control, RS485 communication control, MB485 communication control, CAN protocol control, and CANOpen protocol control. According to their own needs, users must first use Hinson Technology's host computer to set up the sensor-control mode corresponding to the sensor.

The following explains how to select the sensor control method:

(1) Hinson host computer-Default all control methods can communicate with Hinson host computer

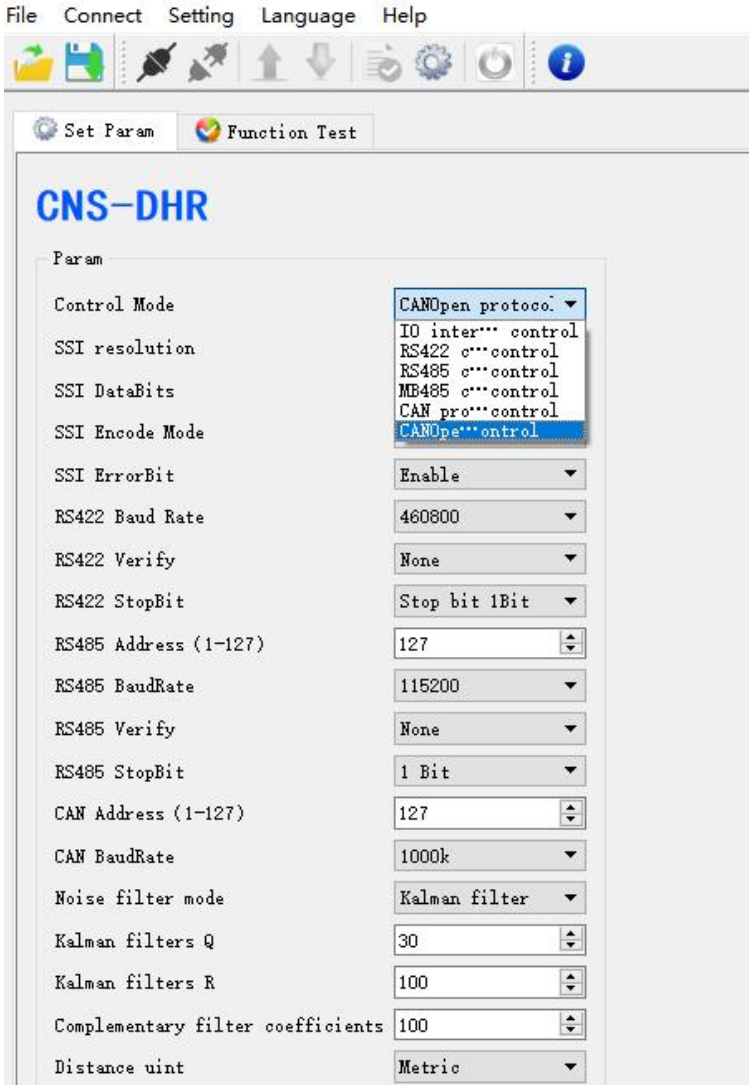
(2) SSI interface-SSI interface control

(3) RS485-MODUBUS protocol-MB485 communication control

(4) CAN equipment-CAN protocol control

(5) CANOpen device-CANOpen protocol control

When using communication control, you first need to connect to the host computer and set the sensor control mode and basic parameter configuration on the host computer; then download and upload parameters; finally, wire according to the control mode; note: power off once after uploading parameters.



6 Communication protocol

6.1 RS485-MODNUS protocol

6.1.1 Communication specifications

Before communication, it is necessary to set the basic parameters of the serial port. The following parameters are the basis for establishing communication.

	Parameters	Default settings
Communication mode	Single master/multiple slaves	
Working mode	MODBUS RTU mode	RTU Mode
Receive/send mode	Half-duplex communication mode	
Communication ID	1-127 configurable	127
Communication rate	9600bps, 19200bps, 38400bps, 576000bps, 115200bps	115200bps
Data bit	8 bits	8 bits
Parity bit	No parity; Odd parity; Even parity	No parity
Stop bit	1 bit; 2 bits	1 bit

6.1.2 Master-slave communication sequence

The communication mode of MODBUS protocol is single master/multiple slaves.

Unicast mode

The master station sends inquiries to one slave station.

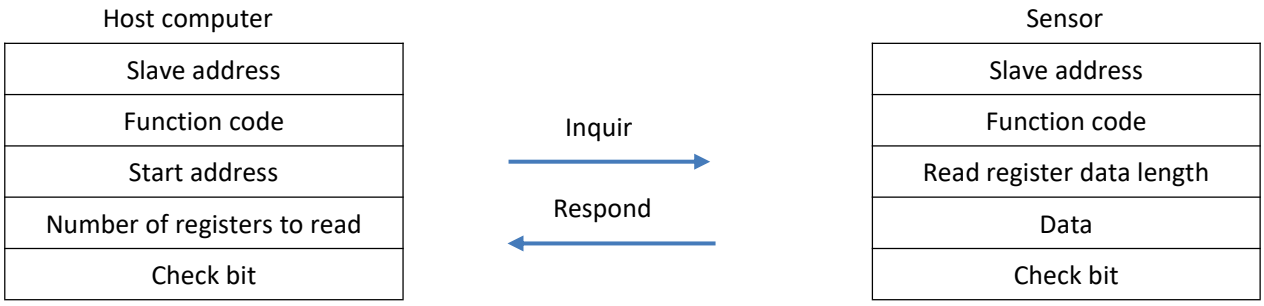
Execute processing from the station and reply with a response.

6.1.3 Data structures

When debugging modbus with sensors, it is recommended to connect the RS485 port of the host computer to PC in advance through the USB to RS485 cable. Analyze directly from modbus raw data.

According to the modbus protocol, write and read correspond to different function codes and data formats. On the PC side, the following format data needs to be detected, and you can confirm that the modbus setting on the host computer side is correct.

6.1.4 Read input register data format



◆ **Inquiry information structure**

Slave address	Function code	Start address	Number of registers to read	Check bit
1Byte	1Byte	2Byte	2Byte	2Byte

- **Slave address**

  The specified slave address, the slave sensor address set after configuring the software;

- **Function code**

  The read function code information supported by the sensor is as follows:

Function code	Function
0x04	Read input register data

- **Start address**

  The register start address read from the sensor, starting from 1000;

- **Number of registers read**

  The number of registers read starting from the start address.

- **Check bit**

  Communication check bit;

◆ **Response information structure**

After receiving the inquiry information, the slave station responds with the following response data:

Slave address code	Function code	Read register data length	Date	Check bit
1 Byte	1 Byte	1 Byte	(Number of read registers)*2 Byte	2 Byte

- **Slave address code**

  The specified slave address, the slave sensor address set by the configuration software;

- **Function code**

  The read function code information supported by the sensor is as follows:

Function code	Function
0x04	Read data from input register

- **Read register data length**

  The length of the register data that the host computer needs to read;

- **Data**

  The data of the register that the host computer needs to read, since one register is 2Byte, the length of this segment of data is the number of read registers * 2 Byte;

- **Check digit**

  Communication check digit.

Connect the sensor, host computer and computer terminal through RS485. The sensor and host computer can establish modbus communication, and then you can receive data sent by the host computer and sensor on the computer.

The host computer inquiry for hexadecimal data:

0x01	0x04	0x03 0xE8(1000)	0x00 0x08	0x71 0xBC
Slave address code	Function code	Starting address	Read the number of registers	Check bit
1Byte	1Btye	2Byte	2Byte	2Byte

The sensor responds to hexadecimal data:

Starting address

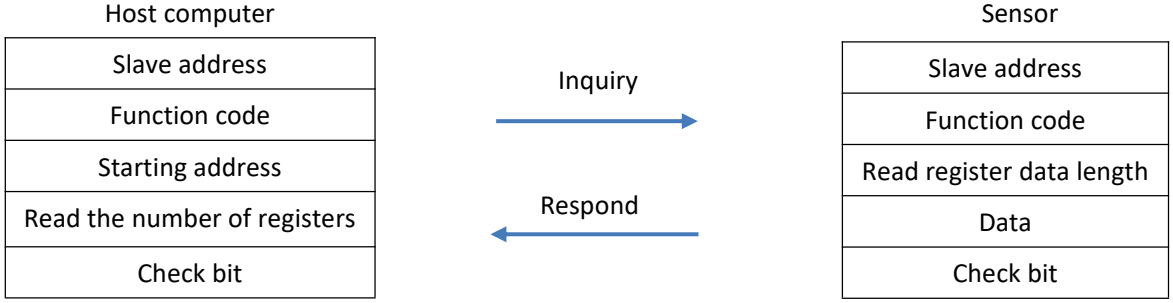
01 04 10 **00 00** 00 00 00 00 00 00 00 00 00 00 00 00 00 00 55 2C

0x01	0x04	0x10(16)	8 Register data	0x55 0x2C
Slave address code	Function code	Data length	Data	Check bit
1Byte	1Byte	1Byte	16Byte	2Byte

Data

	Data（16Byte）							
Data	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00
Corresponding registers	1000	1001	1002	1003	1004	1005	1006	1007

6.1.5 Read and hold register data format



◆ **Inquiry information structure**

Slave address	Function code	Starting address	Number of registers to read	Check bit
1Byte	1Byte	2Byte	2Byte	2Byte

- **Slave address**

  The specified slave address, the slave sensor address set after configuring the software;

- **Function code**

  The read function code information supported by the sensor is as follows:

Function code	Function
0x03	Read the hold register data

- **Start address**

  The register start address read from the driver, starting from 2000;

- **Number of registers read**

  The number of registers read starting from the start address.

- **Check bit**

  Communication check bit;

◆ **Response information structure**

After receiving the inquiry information, the slave station responds with the following response data:

Slave address code	Function code	Read register data length	Date	Check bit
1 Byte	1 Byte	1 Byte	(Number of read registers)*2 Byte	2 Byte

- **Slave address code**

  The specified slave address, the slave sensor address set by the configuration software;

- **Function code**

  The read function code information supported by the sensor is as follows:

Function code	Function
0x03	Read the hold register data

- **Read register data length**

  The length of the register data that the host computer needs to read;

- **Data**

  The data of the register that the host computer needs to read, since one register is 2Byte, the length of this segment of data is the number of read registers * 2 Byte;

- **Check digit**

  Communication check digit.

Connect the sensor, host computer and computer terminal through RS485. The sensor and host computer can establish modbus communication, and then you can receive data sent by the host computer and sensor on the computer.

The host computer inquiry for hexadecimal data:

0x01	0x03	0x07 0xD0(2000)	0x00 0x08	0x44 0x81
Slave address code	Function code	Starting address	Read the number of registers	Check bit
1Byte	1Btye	2Byte	2Byte	2Byte

The sensor responds to hexadecimal data:

Starting address

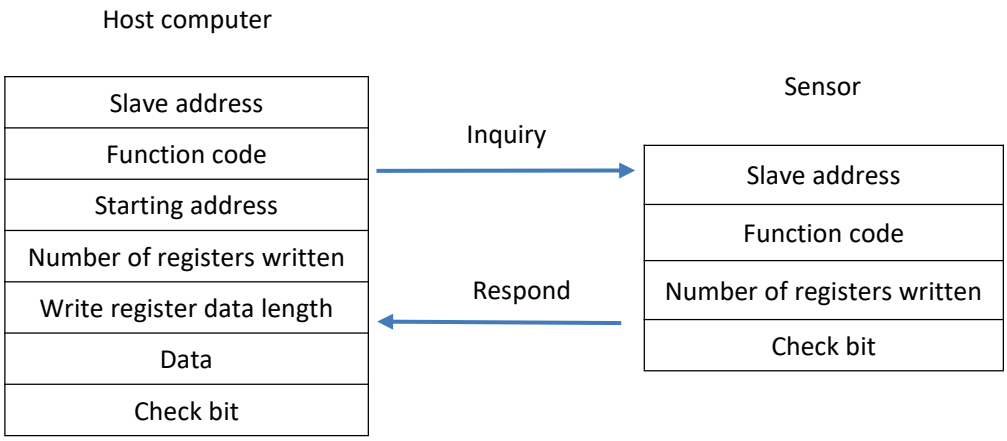
01 03 10 **00 00** 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 E4 59

0x01	0x03	0x10(16)	8 Register data	0xE4 0x59
Slave address code	Function code	Data length	Data	Check bit
1Byte	1Byte	1Byte	16Byte	2Byte

Data

	Data（16Byte）							
Data	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00	0x00 0x00
Corresponding registers	2000	2001	2002	2003	2004	2005	2006	2007

6.1.6 Write to hold register data format



◆ **Inquiry information structure**

Slave address code	Function code	Start address	Number of registers written	Data length	Date	Check bit
1 Byte	1 Byte	2Byte	2 Byte	1Byte	(Number of write registers)*2 Byte	2 Byte

- **Slave address**

  The specified slave address is the slave sensor address configured by the configuration software.

- **Function code**

  The write function code information supported by the sensor is as follows:

Function code	Function
0x10	Write the hold register data

- **Start address**

  The register start address write from the driver, starting from 2000;

- **Number of registers write**

  The number of registers write starting from the start address.

- **Data length**

  The length of the data written to the register, the number of the registers written to the registers * 2 numbers;

- **Data**

  The data that needs to be written from the starting address is the number of write registers *2Byte;

- **Check bit**

  Communication check bit;

◆ **Response information structure**

After receiving the inquiry information, the slave station responds with the following response data:

Slave address code	Function code	Start address	Number of write registers	Check bits
1 Byte	1 Byte	2 Byte	2 Byte	2 Byte

- **Slave address code**

  The specified slave address, the slave sensor address set by the configuration software;

- **Function code**

  The write function code information supported by the sensor is as follows:

Function code	Function
0x10	Write to hold register data

- **Start address**

  Start address of the sensor write to the hold register, starting from 2000;

- **Number of registers written**

  The number of registers that start writing data from the start address;

- **Check bit**

  Communication check digit;

Connect the sensor, host computer and computer terminal through RS485. The sensor and host computer can establish modbus communication, and then you can receive data sent by the host computer and sensor on the computer.

The host computer inquiry for hexadecimal data:

Start address

01 10 07 D0 00 08 10 **00 00** 00 00 00 00 00 00 00 00 00 00 00 00 00 00 BC F8

0x01	0x10	0x07 0xD0(2000)	0x00 0x08	0x10	Data in 8 registers	0xBC 0xf8
Slave address code	Function code	Start address	Number of registers written	Data length	Date	Check bit
1 Byte	1 Byte	2Byte	2 Byte	1Byte	16 Byte	2 Byte

The sensor responds to hexadecimal data:

0x01	0x10	0x07 0xD0(2000)	0x00 0x08	0xC1 0x42
Slave address code	Function code	Starting address	Number of write registers	Check bit
1Byte	1Btye	2Byte	2Byte	2Byte

6.1.7 Register address function

Keep register—function code 0x03

Register address	Data	Data content
2002		Sensor control method: 0: SSI interface control; 1: RS422 communication control; 2: RS485 communication control; 3: MB485 communication control; 4: CAN protocol control; 5: CANOpen protocol control; (default)
2003		SSI interface resolution: 0:0.01mm; 1:0.1mm; (default) 2:1mm; 3:10mm;
2004		SSI interface data bits: 15~32 (default 24)
2005		SSI interface encoding method: 0: Binary; 1: Gray code; (default)

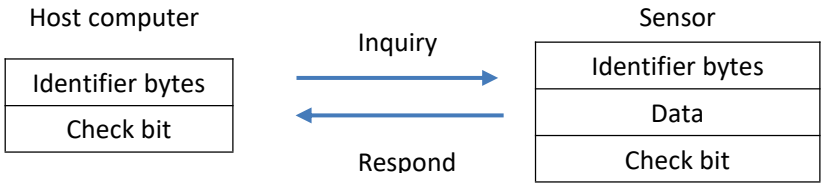
2006		SSI interface error bit: 0: Disabled 1: Enable (default)
2007		RS422 communication baud rate: 0:19200 1:57600 2:115200 3:256000 4: 460800 (default)
2008		RS422 communication check bit: 0: No check (default) 1: Odd verification 2: Even verification
2009		RS422 communication stop bit: 0: Stop bit 1Bit (default) 1: Stop bit 1.5Bit 2: Stop bit 2Bit
2010		RS485 address: 1~ 127 (default 127)
2011		RS485 communication baud rate: 0:19200 1:57600 2:115200 (default) 3:256000 4:460800
2012		RS485 communication check bit: 0: No check (default) 1: Odd verification 2: Even verification
2013		RS485 communication stop bit: 0: Stop bit 1Bit (default) 1: Stop bit 1.5Bit 2: Stop bit 2Bit
2014		CAN bus address: 1~127 (default 127)
2015		CAN bus baud rate: 0:125K 1:250K 2:500K

		3: 1000K (default)
2016		Noise filtering mode: 0: Close 1: Kalman filtering (default) 2: Complementary filtering
2017		Kalman filter Q: 0~ 65535 (default 30)
2018		Kalman filter R: 0~65535 (default 100)
2019		Complementary filter coefficients: 0~ 65535 (default 100)
2020		Distance unit: 0: Meter (default) 1: Inch
2021		Reverse Count enable: 0: Disabled (default) 1: Enable
2022		Sensor zero position_data high position: 0~ 65535 (default 0)
2023		Sensor zero position_data low position: 0~ 65535 (default 0)
2024		Fault trigger time: 0~ 500 (default 0)
2025		Failure retention time: 0~ 500 (default 0)
2026		Fault output distance: 0: Zero value 1: Maximum value (default) 2: Last value
2027		Output port enable status: 0: Disabled (default) 1: Enable
2028		Minimum distance:0~ 65535 (default 500) Unit: mm High position first, low position last
2029		Maximum distance:0~ 65535 (default 1000) Unit: mm High position first, low position last

Input register—function code 0x04

<table>
<tr><th>Register address</th><th>Data</th><th>Illustrate</th></tr>
<tr><td>1000</td><td></td><td rowspan="2"><table>
<tr><td rowspan="2">Register address</td><td colspan="2">1000</td><td colspan="2">1001</td></tr>
<tr><td>H</td><td>L</td><td>H</td><td>L</td></tr>
<tr><td>Real-time distance data</td><td>31bit</td><td></td><td></td><td>0bit</td></tr>
<tr><td colspan="5">Range: 0~ 65535 Unit: mm</td></tr>
</table>The corresponding resolution of the unit is 0.01/0.1/1/10mm;</td></tr>
<tr><td>1001</td><td></td></tr>
<tr><td>1002</td><td></td><td>Reference signal attenuation rate</td></tr>
<tr><td>1003</td><td></td><td>Target signal attenuation rate</td></tr>
<tr><td>1004</td><td></td><td>Low reference signal strength</td></tr>
<tr><td>1005</td><td></td><td>Low target signal strength</td></tr>
<tr><td>1006</td><td></td><td>Sensor exceeds the distance</td></tr>
<tr><td>1007</td><td></td><td>Output port enable</td></tr>
<tr><td>1008</td><td></td><td>Minimum value status</td></tr>
<tr><td>1009</td><td></td><td>Maximum value Status</td></tr>
<tr><td>1010</td><td></td><td>Product Code:</td></tr>
<tr><td>1011</td><td></td><td>Software version</td></tr>
<tr><td>1012</td><td></td><td>Sensor hardware version</td></tr>
<tr><td>1013</td><td></td><td>Serial number</td></tr>
<tr><td>1014</td><td></td><td>Year of production</td></tr>
<tr><td>1015</td><td></td><td>Production month</td></tr>
<tr><td>1016</td><td></td><td>Production date</td></tr>
<tr><td>1017</td><td></td><td>SensorFault
Sensor Error Status Data ==0: Sensor is normal
Sensor Error Status Bit 0==1: "Fault: Reference Signal Low"
Sensor Error Status Bit 1==1: "Fault: Target Signal Low"
Sensor Error Status Bit 2==1: "Fault: Real-time Distance Abnormal"
Sensor Error Status Bit 3==1: "Fault: FPGA Data Abnormal"
Sensor Error Status Bit 4==1: "Fault: FPGA connection is abnormal"
Sensor Error Status Bit 5==1: "Fault: Temperature is too high"
Sensor Error Status Bit 6==1: "Fault: Received Voltage is Too High"
Sensor Error Status Bit 7==1: "Fault: Received Voltage is too low"</td></tr>
<tr><td>1018</td><td></td><td>Sensor temperature value: -40℃-100℃</td></tr>
<tr><td>1019</td><td></td><td>Sensor APD receiving voltage: 80V-200V</td></tr>
</table>

6.2 Free protocol function



6.2.1 Sensor restart function

The host computer inquiry for hexadecimal data:

0x52 0x42 0x6F 0x6F 0x74	0x94 0x9E
Identifier bytes	Check bit
5Byte	2Byte

The sensor responds to hexadecimal data:

0x52 0x42 0x6F 0x6F 0x74	Restart success flag: 0: Success 1: Failure	Crc verification
Identifier bytes	Data	Check bit
5Byte	1Byte	2Byte

6.2.2 Data query function

The host computer inquiry for hexadecimal data:

0x52 0x53 0x65 0x64 0x61	0x77 0xBF
Identifier bytes	Check bit
5Byte	2Byte

The sensor responds to hexadecimal data:

0x52 0x53 0x65 0x64 0x61	UpdateDistance	UpdateRefRSSl	UpdateObjRSSl	OutPortEnable
Identifier bytes	Real-time distance data	Reference signal attenuation rate	Target signal attenuation rate	Output port enable status
5Byte	4Byte	2Byte	2Byte	2Byte

MinOutPStatus	MaxOutPStatus	RefRSSlSignalLow	ObjRSSlSignalLow	SensrOverDistance
Minimum value status	Maximum Status	Low reference signal strength	Low target signal strength	Sensor exceeds the distance
2Byte	2Byte	1Byte	1Byte	1Byte

SensorFault	SensorTemper	ReceiveVoltage	Crc verification
Sensor Error Status	Sensor temperature value	Sensor receives voltage	Check bit
2Byte	2Byte	2Byte	2Byte

Important Tips

Since RS485 communication cannot be sent and accepted simultaneously, it is recommended that the communication interval be controlled between 30-50ms during communication timing. And continue to send the next time after confirming that the last send is completed.

6.3 CAN OPEN Protocol

The sensor supports the CAN OPEN protocol under CAN BUS, and can only output distance values in CAN OPEN mode.

6.3.1 Basic Concepts

Electronic Data Document (EDS): A directory used to record and describe all parameters of CAN open nodes; through the EDS file, you can obtain all CAN open parameters such as the node type, manufacturer, serial number, version information, baud rate, etc. When using the CAN OPEN function in PLC, you need to import the EDS file first and configure it through the object dictionary recorded in the EDS.

Service Data Object (SDO): SDO is mainly used for the CAN OPEN master station to configure the parameters of the slave node. After each SDO message is sent, there will be a response message to ensure that the message is accurately delivered. In a CAN OPEN communication system, there is usually only one master station as the client, and the slave node responds to the SDO message as the SDO server. The master station client accesses and modifies the corresponding index parameters in the EDS of any node through the SOD message.

Process Data Object (PDO): PDO is used to transmit real-time data, one-way transmission, without receiving a response from the slave node. A PDO message can transmit up to 8 bytes of data, mainly used to transmit real-time data. The master node and the slave node predefine the sending data and receiving data corresponding to the PDO, so there is no need for reconfirmation during the transmission process, and there is no response time and response data, thereby improving bus utilization.

6.3.2 Communication specifications

Communication mode	Bus mode
Communication rate	1000k (default), 500k, 250k, 125k
Communication address	1-127 (default)
TPDO	4
RPDO	4
Online message	Support
Heartbeat message	Support
Heartbeat consumption	Support
SDO	Support

6.3.3 Control message

The sensor node supports the control packets (NMT Module Control packets) sent by the master station, and the control packet information does not respond.

Message format

COB-ID	DLC	Byte 0	Byte 1
0x 000	1	CS Control function code	Node-ID

CS: Control function code

Command code	NMT service	Function
0x01	Enter the operation state	The node starts the PDO sending and receiving state;
0x02	Enter the stop state	The node enters the stop state;
0x80	Enter pre-operation state	The node enters pre-operation state, used to configure PDO mapping and parameter settings;
0x81	Reset node	Reset node application layer, and the communication parameters are restored to the initial state value;
0x82	Reset communication	Reset node communication, reinitialize communication when communication is disturbed, node bus error, and bus is closed.

Node-ID: node address. When Node-ID=0, all nodes are controlled;

6.3.4 Net online message

After the sensor node is initialized after power-on, it sends a frame of online packets.

Message format

The frame ID of the node online packet is 0x700+Node-ID, the data length is 1, and the data is 00;

COB-ID	DLC	Byte 0
0x700+Node-ID	1	00

6.3.5 Heartbeat message

The sensor node supports heartbeat message sending, configures heartbeat time according to index 0x1017, and sends heartbeat messages;

Index	Sub-index	Data type	Default value	Description
0x1017	None	Uns 16	0x00	Configure the heartbeat message sending cycle, unit ms;

Message Format

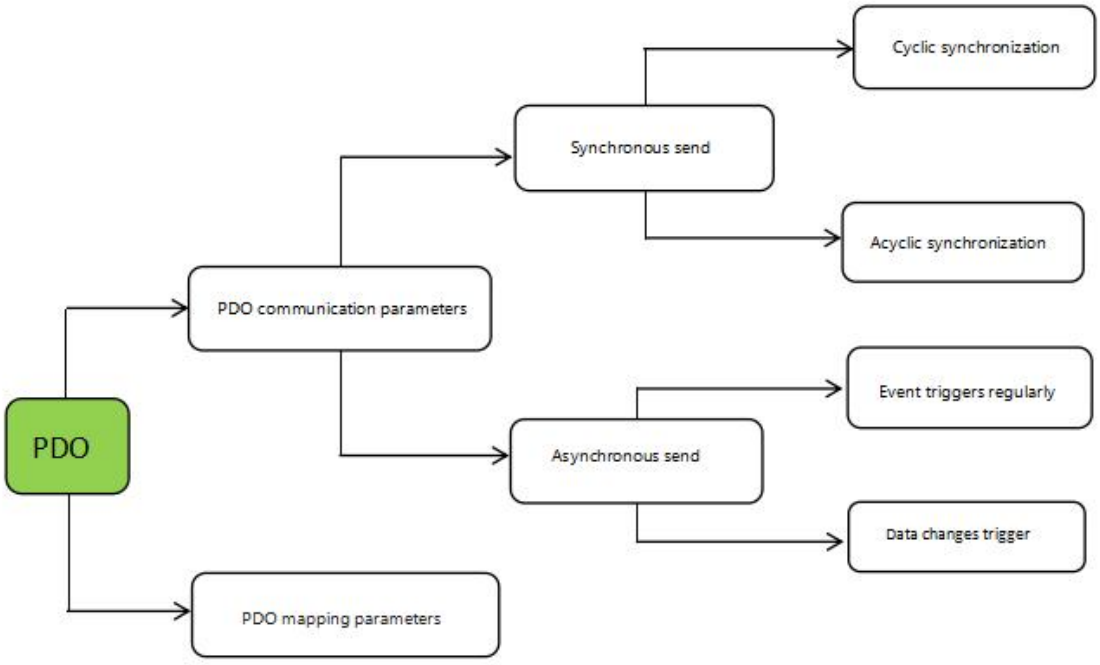
COB-ID	DLC	Byte 0
0x700+Node-ID	1	Status code

The frame ID of the node online message is 0x700 + Node-ID, the data length is 1, and the data represents the current node status.

Status code:

Status code	Status
0x05	Enter operation status
0x04	Entering stop state
0x7F	Enter pre-operation state

6.3.6 Process Data Object(PDO)



PDO send/receive is observed by the (slave) CAN node.

The sensor node defines 4 TPDO and 4 RPDO;

PDO Message format

COB-ID	DLC	Data
	1-8	1-8Byte

COB-ID

Object	COB-ID
TPDO1（Send）	0x180+Node ID
RPDO1（Receive）	0x200+Node ID
TPDO2（Send）	0x280+Node ID
RPDO2（Receive）	0x300+Node ID
TPDO3（Send）	0x380+Node ID
RPDO3（Receive）	0x400+Node ID
TPDO4（Send）	0x480+Node ID
RPDO4（Receive）	0x500+Node ID

Data (1-8Byte): The length is determined based on the mapping data within the mapping parameters.

PDO communication parameters

Index	Sub-index	Data type	Default value	Description
RPDO 0x1400--0x15FF TPDO 0x1800--0x19FF	0x00	Uns 8	0x08	Number of parameter entries
	0x01	Uns 32	0x00	COB-ID
	0x02	Uns 8	0x00	Synchronous Type
	0x03	Uns 16	0x00	Production prohibition constraint time (unit: 100us)
	0x05	Uns 16	0x00	Event timer trigger time (unit: ms)
	0x06	Uns 8	0x00	SYNC synchronization initial value

Number of parameter entries: This entry contains the number of sub-indices;

COB-ID: The frame ID of the current PDO that receive and sends;

Synchronization type:

Synchronization type	Triggering condition (B=satisfies two conditions, O=satisfies one condition)			PDO transmission
	SYNC (Synchronous message received)	RTR (Remote frame received)	Event (Data change or timer)	
00	B	-	B	Acyclic Synchronization
01-240	O	-	-	Cyclic, synchronous, (the 1-240 value represents the number of SYNC messages received between two PDO messages)

241-251	-	-	-	Reserve
252	B	B	-	Synchronize, after RTR
253	-	O	-	Asynchronous, after RTR
254	-	O	O	Asynchronous, manufacturer-specific events
255	-	O	O	Asynchronous, device subprotocol specific events

Production prohibition constraint time: The minimum interval between two PDO to avoid excessive frequent PDO transmission, resulting in increased bus load;

Event timer trigger time: PDO timing transmission cycle time;

SYNC synchronization initial value: Set the number of synchronous messages received, the PDO transmitted synchronously, and the PDO data will be replyed only after receiving the set value number of synchronous messages. For example, if set to 5, then after receiving 5 synchronized messages, respond to PDO data;

PDO mapping parameters

Set the data in the corresponding index that the current PDO needs to transmit. By setting the PDO to map to the corresponding index, the custom data transmission is completed. The PDO length of a one is the maximum 8Byte, and the length of the mapped data cannot exceed 8Byte. The sensor has a default mapping, and the mapping can be changed according to requirements;

RPDO default mapping

Only RPDO1, RPDO2, and RPDO3 are used within the default map;

Index	Sub-index	Data type	Default value	Description
RPDO1 0x1600	0x00	Uns 8	8	Number of parameter entries;
	0x01	Uns 32	0x200E0010	Map to index 0x200E, sensor communication address;
	0x02	Uns 32	0x20120010	Map as index 0x2012, CAN Bus baud rate;
	0x03	Uns 32	0x20150010	Map as index 0x2015, sensor measures frequency;

TPDO Default mapping

Index	Sub-index	Data type	Default value	Description
TPDO1 0x1A00	0x00	Uns 8	8	Number of parameter entries;
	0x01	Uns 32	0x20000010	Map to index 0x2000, the sensor measures real-time distance;
	0x02	Uns 32	0x20010010	Map to index 0x2001, the sensor measures the strength of the feedback object;
	0x03	Uns 32	0x20050010	Map to index 0x2005, the current state of the sensor;

6.3.7 Service Data Object(SDO)

Send Message format

COB-ID	DLC	LBS						MBS
0x600+Node-ID	8	Control function code	Object Index	Object sub-index	Maximum of 4 bytes			

Control function code

Command code	Description
0x40	Command word when sending message;
0x2F	Indicates that the data sent is 1 byte;
0x2B	Indicates that the data sent is 2 bytes;
0x23	Indicates that the data sent is 4 bytes;

Node response message format

COB-ID	DLC	LBS						MBS
0x580+Node-ID	8	Receive command code	Object Index	Object sub-index	Maximum of 4 bytes			

Receive command code

Command code	Describe
0x60	The SDO message was sent successfully;
0x80	An error occurred in the SDO message;
0x4F	Indicates that the received data is 1 byte;
0x4B	Indicates that the received data is 2 bytes;
0x43	Indicates that the received data is 4 bytes;

6.3.8 EDS Document

Please visit the website to obtain EDS files;

6.3.9 Index Define

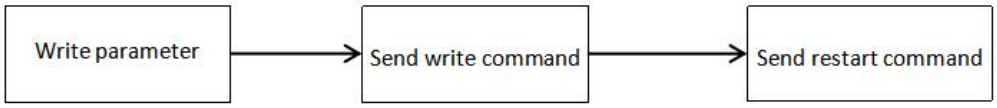
index(Hex)	Sub-index(Hex)	EDS parameter name	Parameter name	Type	Property	Write value (D): function
0x2000	0x00	CO_Distance	Current measured distance value	UNS 32	Read	Measure distance output; The corresponding resolution of the unit is 0.01/0.1/1/10mm;
0x2001	0x00	CO_RefRSSI	Reference signal attenuation rate	UNS 16	Read	Reference signal attenuation rate output;
0x2002	0x00	CO_ObjRSSI	Target signal attenuation rate	UNS 8	Read	Target signal attenuation rate output;
0x2003	0x00	CO_PortEnable	Output port enable	UNS 8	Read	Output port output enable status; 00: Not enabled; 01: Open;

0x2004	0x00	CO_MaxDisPortAct	Minimum distance for port output	UNS 8	Read	Minimum IO output distance status; 00: The output is not triggered; 01: Trigger output;
0x2005	0x00	CO_MinDisPortAct	Maximum output distance	UNS 16	Read	Maximum output distance status; 00: The output is not triggered; 01: Trigger output;
0x2006	0x00	CO_SensorFault	Sensor Error Status	INT 16	Read	Sensor error status output;
0x2007	0x00	CO_SensorTemper	Sensor temperature value	UNS 32	Read	Sensor temperature value; -40--100℃;
0x2008	0x00	CO_APDVoltage	Sensor receives voltage	UNS 16	Read	The sensor receives voltage;
0x2009	0x00	MS_SensorTypedef	Sensor types	UNS 16	Read	Type of sensors;
0x200A	0x00	MS_SensorVersions	Software version	UNS 16	Read	Software version;
0x200B	0x00	MS_FactorySerial	Sensor serial number	UNS 16	Read	Product serial number;
0x200C	0x00	MS_FactoryYear	Sensor-year	UNS 16	Read	Product production year;
0x200D	0x00	MS_FactoryMonth	Sensor-Moon	UNS 16	Read	Product production month;
0x200E	0x00	MS_FactoryDay	Sensor-Day	UNS 16	Read	Product production day;
0x200F	0x00	Para_ControlType	Sensor control method	UNS 16	Read/ Write	Sensor control method: 0: IO interface control; 1: RS422 communication control; 2: RS485 communication control; 3: MB485 communication control; 4: CAN protocol control; 5: CANOpen protocol control; (default)
0x2010	0x00	Para_SSIDataUint	SSI interface resolution	UNS 16	Read/ Write	SSI interface resolution: 0:0.01mm; 1:0.1mm; (default) 2:1mm; 3:10mm;

0x2011	0x00	Para_SSIDataSize	SSI interface data bits	UNS 16	Read/ Write	SSI interface data bits: 15~32 (default 24)
0x2012	0x00	Para_SSIEncodeMode	SSI interface encoding method	UNS 16	Read/ Write	SSI interface encoding method: 0: Binary; 1: Gray code; (default)
0x2013	0x00	Para_SSIErrorBit	SSI interface error bit	UNS 16	Read/ Write	SSI interface error bit: 0: Disabled 1: Enable (default)
0x2014	0x00	Para_RS422BaudRate	RS422 communication baud rate	UNS 16	Read/ Write	RS422 communication baud rate: 0:19200 1:57600 2:115200 3:256000 4: 460800 (default)
0x2015	0x00	Para_RS422CommVerify	RS422 communication check bit	UNS 16	Read/ Write	RS422 communication check bit: 0: No check (default) 1: Odd verification 2: Even verification
0x2016	0x00	Para_RS422StopBit	RS422 communication stop bit	UNS 16	Read/ Write	RS422 communication stop bit: 0: Stop bit 1Bit (default) 1: Stop bit 1.5Bit 2: Stop bit 2Bit
0x2017	0x00	Para_RS485IDAddress	RS485 address	UNS 16	Read/ Write	RS485 address: 1~ 127 (default 127)
0x2018	0x00	Para_RS485BaudRate	RS485 communication baud rate	UNS 16	Read/ Write	RS485 communication baud rate: 0:19200 1:57600 2:115200 (default) 3:256000 4:460800
0x2019	0x00	Para_RS485CommVerify	RS485 communication check bit	UNS 16	Read/ Write	RS485 communication check bit: 0: No check (default) 1: Odd verification 2: Even verification
0x201A	0x00	Para_RS485StopBit	RS485 communication stop bit	UNS 16	Read/ Write	RS485 communication stop bit: 0: Stop bit 1Bit (default) 1: Stop bit 1.5Bit

						2: Stop bit 2Bit
0x201B	0x00	Para_CANIDAddress	CAN bus address	UNS 16	Read/ Write	CAN bus address: 1~ 127 (default 127)
0x201C	0x00	Para_CANBaudRate	CAN bus baud rate	UNS 16	Read/ Write	CAN bus baud rate: 0:125K 1:250K 2:500K 3: 1000K (default)
0x201D	0x00	Para_DisFilterType	Noise filtering mode	UNS 16	Read/ Write	Noise filtering mode: 0: Close 1: Kalman filtering (default) 2: Complementary filtering
0x201E	0x00	Para_KalmanCovariQ	Kalman filter Q	UNS 16	Read/ Write	Kalman filter Q: 0~ 65535 (default 30)
0x201F	0x00	Para_KalmanCovariR	Kalman filter R	UNS 16	Read/ Write	Kalman filter R: 0~65535 (default 100)
0x2020	0x00	Para_CompleCoeffic	Complementary filter coefficients	UNS 16	Read/ Write	Complementary filter coefficients: 0~ 65535 (default 100)
0x2021	0x00	Para_DistanceUint	Distance unit	UNS 16	Read/ Write	Distance unit: 0: Meter (default) 1: Inch
0x2022	0x00	Para_DisReverCount	Reverse Count enable	UNS 16	Read/ Write	Reverse Count enable: 0: Disabled (default) 1: Enable
0x2023	0x00	Para_ZeroDistanceH	Sensor zero position_data high position	UNS 16	Read/ Write	Sensor zero position_data high position: 0~ 65535 (default 0)
0x2024	0x00	Para_ZeroDistanceL	Sensor zero position_data low position	UNS 16	Read/ Write	Sensor zero position_data low: 0~ 65535 (default 0)
0x2025	0x00	Para_FaultTrigerTime	Fault trigger time	UNS 16	Read/ Write	Fault trigger time: 0~ 500 (default 0)
0x2026	0x00	Para_FaultRestoreTime	Failure retention time	UNS 16	Read/ Write	Failure retention time: 0~ 500 (default 0)
0x2027	0x00	Para_FaultOutDistance	Fault output distance	UNS 16	Read/ Write	Fault output distance: 0: Zero value 1: Maximum value (default)

						2: Last value
0x2028	0x00	Para_OutPortEnable	Output port enable status	UNS 16	Read/ Write	Output port enable status: 0: Disabled (default) 1: Enable
0x2029	0x00	Para_MinOutDistance	Minimum distance	UNS 16	Read/ Write	Minimum distance: 0~ 65535 (default 500)
0x202A	0x00	Para_MaxOutDistance	Maximum distance	UNS 16	Read/ Write	Maximum distance: 0~ 65535 (default 1000)
0x202B	0x00	Flash_WriteCommand	Control sensor parameter writing	UNS 16	Read/ Write	Control the write of sensor parameters, single write, and cannot be continuously written; Write to 0x8008,;
0x202C	0x00	Flash_RebootSensor	Control sensor restart	UNS 16	Read/ Write	Control the sensor to restart, single write, and cannot be continuously written; Write 0x8008, sensor restarts, setting parameters take effect
0x202D	0x00	Warry_RefSignaLow	Low reference signal strength	UNS 16	Read	Read out the low value of the reference signal strength;
0x202E	0x00	Warry_ObjSignaLow	Low target signal strength	UNS 16	Read	Read out the target signal strength low value;
0x202F	0x00	Warry_OverDistance	Sensor exceeds the distance	UNS 16	Read	Read the sensor beyond the distance;



Write parameters: parameter index range;
Send write command: write value 0x8008 into index 0x202B;
Send restart command: write value 0x8008 into index 0x202C;

6.3.10 Parameter configuration

Configure the CAN ID address to 1;
To index 0x201B, write the value 01;

CAN-ID	DLC	Data（hex）
600h+ID	8	2B 1B 20 00 01 00 00 00

Return data;

CAN-ID	DLC	Data（hex）
580h+ID	8	60 1B 20 00 00 00 00 00

Data starting with 60h: configuration successful;
Data starting with 80h: configuration error, check the sending data;

<table>
<tr><td>Configure baud rate 500k;
Write the value 01 into index 0x201C;</td><td>
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>600h+ID</td><td>8</td><td>2B 1C 20 00 01 00 00 00</td></tr>
</table>
Return data;
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>580h+ID</td><td>8</td><td>60 1C 20 00 00 00 00 00</td></tr>
</table>
Data starting with 60h: configuration successful;
Data starting with 80h: configuration error, check the sending data;
</td></tr>
<tr><td>Send parameter write command: into index 0x202B, write value 0x8008;</td><td>
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>600h+ID</td><td>8</td><td>2B 2B 20 00 08 80 00 00</td></tr>
</table>
Return data;
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>580h+ID</td><td>8</td><td>60 2B 20 00 00 00 00 00</td></tr>
</table>
Data starting with 60h: configuration successful;
Data starting with 80h: configuration error, check the sending data;
</td></tr>
<tr><td>Send a restart command: write the value 0x8008 into index 0x202C;</td><td>
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>600h+ID</td><td>8</td><td>2B 2C 20 00 08 80 00 00</td></tr>
</table>
Return data;
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>580h+ID</td><td>8</td><td>60 2C 20 05 00 00 00 00</td></tr>
</table>
Data starting with 60h: configuration successful;
Data starting with 80h: configuration error, check the sending data;
</td></tr>
<tr><td>Heartbeat cycle 700h+ID data configuration
Configure the sending period to 64h (100ms); if you need to turn off sending, set the time to 0;
Note: Configuration needs to be performed in the pre-operation state (status code = 7F);
Need to be reconfigured after restarting;</td><td>
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>600h+ID</td><td>8</td><td>2B 17 10 00 64 00 00 00</td></tr>
</table>
Return data;
<table>
<tr><td>CAN-ID</td><td>DLC</td><td>Data（hex）</td></tr>
<tr><td>580h+ID</td><td>8</td><td>60 17 10 00 00 00 00 00</td></tr>
</table>
Data starting with 60h: configuration successful;
Data starting with 80h: configuration error, check the sending data;
</td></tr>
</table>

6.3.11 Data sending

When the customer uses the non-CAN OPEN master station function mode, the following data is sent.

The RPDO and TPDO are pre-address mapped in the sensor, and the communication parameters need to be configured;

RPDO

RPDO default configuration

Index	Subindex	Description	Data Type	Default Initial Value
1600h	00h	Number of parameters	Un8	6
	01h	COB-ID;PDO address	Un32	RPDO1: 0x200+node address
	02h	Send type	Un8	00
	03h	Production prohibition time	Un16	0000
	05h	Event timer trigger time	Un16	0000
	06h	SYNC synchronization initial value	Un8	00

RPDO data - sensor receiving data

RPDO1 sends data

Default data frame format

CAN-ID	DLC	0Byte	1Byte	2Byte	3Byte	4Byte	5 Byte
200h+ID	6	201B(H)	201B(L)	201C(H)	201C(L)	2021(H)	2021(L)
		CAN bus address		CANBU baud rate		Distance unit	

RPDO data - sensor feedback data

PDO1 communication parameter configuration SDO instruction

Send data 1, configure synchronous mode, FE--asynchronous mode; Note: Configuration needs to be performed in the pre-operation state (status code = 7F); Need to be reconfigured after restarting;	CAN-ID | DLC | Data 600h+ID | 8 | 2F 00 18 02 FE 00 00 00 Return data; CAN-ID | DLC | Data 580h+ID | 8 | 60 00 18 02 00 00 00 00 Data starting with 60h: configuration successful; Data starting with 80h: configuration error, check the sending data;
Send data 2, configure event trigger time to 10ms, TPDO sending time; Note: Configuration needs to be performed in the pre-operation state (status code = 7F); Need to be reconfigured after restarting;	CAN-ID | DLC | Data 600h+ID | 8 | 2B 00 18 05 0A 00 00 00 Return data; CAN-ID | DLC | Data 580h+ID | 8 | 60 00 18 05 00 00 00 00 Data starting with 60h: configuration successful; Data starting with 80h: configuration error, check the sending data;
Send data 3, configure the minimum interval of TPDO1 sending time to 10ms, and the TPDO sending time; Note: Configuration needs to be performed in the pre-operation state (status code = 7F); Need to reconfigure after restarting	CAN-ID | DLC | Data 600h+ID | 8 | 2B 00 18 03 0A 00 00 00 Return data; CAN-ID | DLC | Data 580h+ID | 8 | 60 00 18 05 00 00 00 00 Data starting with 60h: configuration successful; Data starting with 80h: configuration error, check the sending data;

Send startup message

CAN-ID	DLC	0Byte	1Byte
000h	2	01	00

TPDO1 data definition

CAN ID	DLC	0Byte	1Byte	2Byte	3Byte	4Byte	5 Byte	6Byte	Byte
180h+ID	6	2000h（H）			2000h(L)	2001h(H)	2001h(L)	2002h(H)	2002 h(L)
		Current measured distance value				Reference signal attenuation rate		Target signal attenuation rate	

Heartbeat data

The default sending cycle is 500ms, and starts sending after power on;

CAN ID	DLC	0Byte
700h+ID	1	7F
		Node status

Node status description:

0x00: Node online status;

0x05: Enter operating state

0x04: Enter stop state

0x7F: Enter pre-operation state

6.4 SSI Protocol

6.4.1 SSI working principle

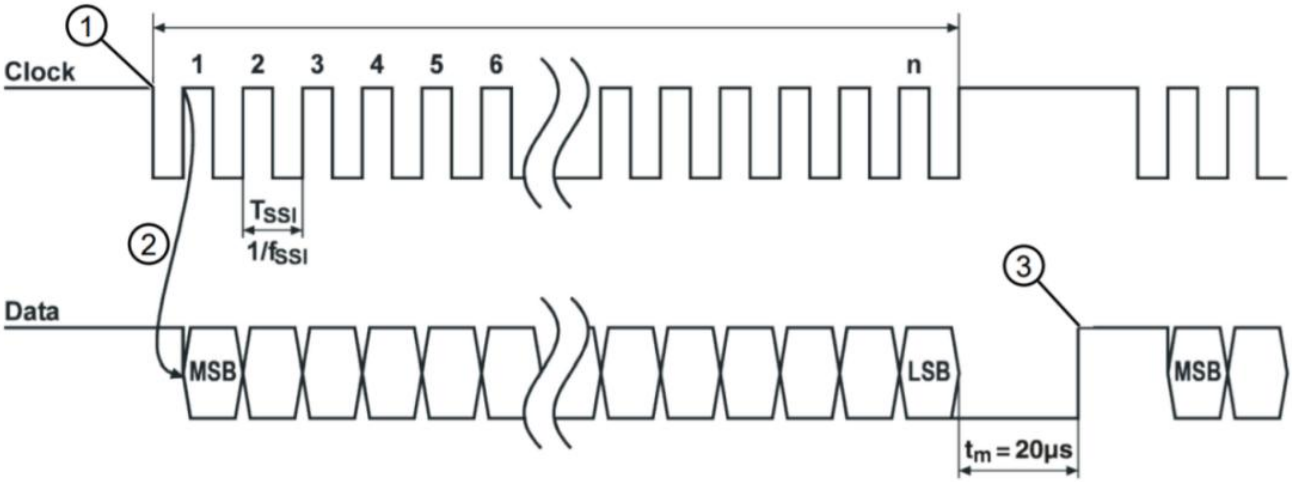


illustration: SSI transmission cycle

The SSI interface uses RS-422 differential transmission for data communication. During transmission, the position value starts from the most significant bit (MSB) and is transmitted synchronously according to the period (clock) specified by the control system.

In the idle state, both the clock line and the data line remain at a high level. On the first rising edge (1), the data in the internal register is saved, ensuring that it does not change during the serial transmission of the value.

As the next clock signal switches from low to high (2), the position value begins to be transmitted from the most significant bit (MSB). Each time the clock signal switches from low to high, the next least significant bit is set as the data line. After outputting the least significant bit (LSB), the data line switches to the low level as the clock signal last switches from low to high level, indicating that the transmission is over.

The monostable trigger triggered by the clock signal determines how long to wait before calling the SSI interface for the next transmission. This also results in the shortest pause time between two consecutive clock sequences. If time t_m= 20µs, the data line is reset to a static high level (3), indicating that the data exchange is completely over and is ready to be resent.

Clock interrupt

If the clock interrupt time of the data exceeds t_m= 20µs, a completely new transmission cycle will be started at the next clock from the new calculated value. If the new transmission cycle starts before the end of time t_m, the previous value will be output again.

Note	The SSI interface can only represent positive distance values. If a negative output value is obtained due to offset or counting direction, the output value is zero on the SSI interface. When a digital overflow occurs, all data bits are set to "1".

Data bit

The distance value data is high first (MSB). The distance value data can be transmitted in a Grey code or binary format (default: Grey code). The number of data bits determines the maximum value of the transmitted data. The number of data bits can be set to 15 to 32bits. (Default: 24 bits).

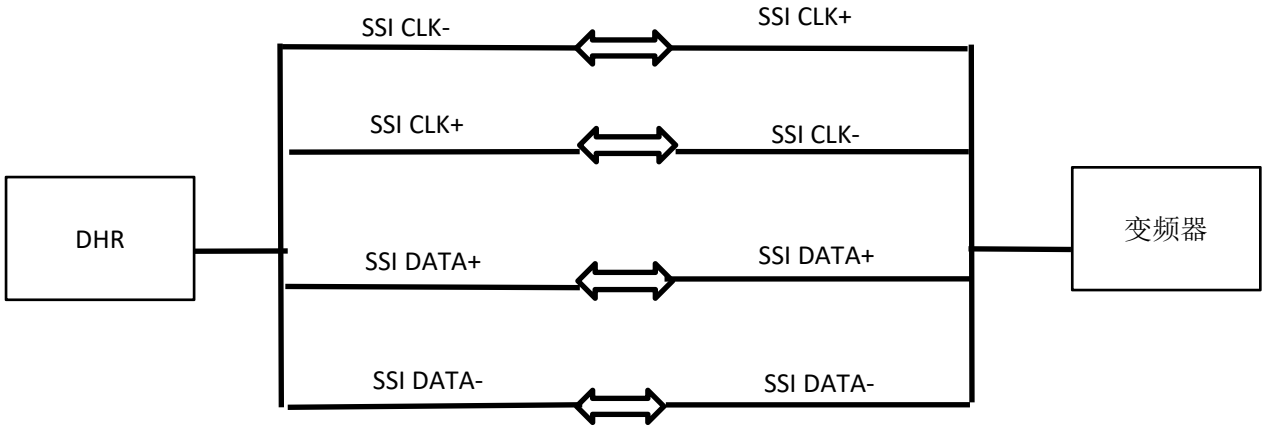
Error bit

The LSB bit is an error bit in the default settings.

The meaning of the error bit:

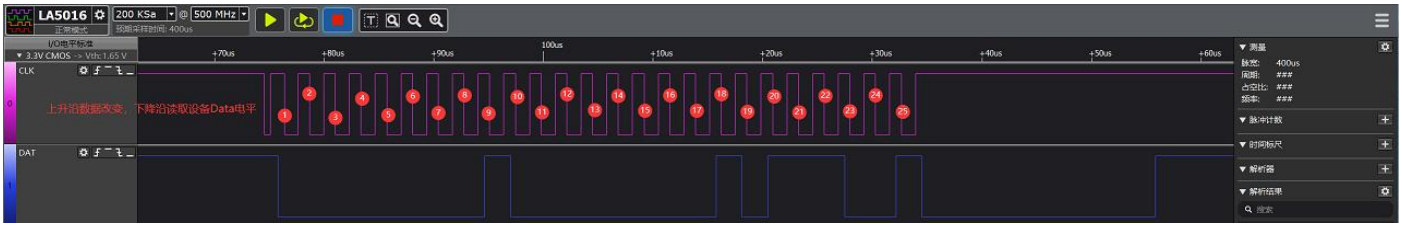
By default, the 25th bit error bit (LSB) will be attached to the 24-bit measurement value. The error bit is not included in the grey code of the measured value.

6.4.2 SSI Wring



6.4.3 Data description

Data Example:



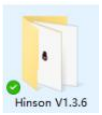
24bit data: 000000001000000001011100 (But this is the Gray code, and it needs to be converted into binary to obtain valid data)

Binary data: 000000001111111110010111(Binary data converted from Gray code, easy to read and use)

Decimal data: 65,431

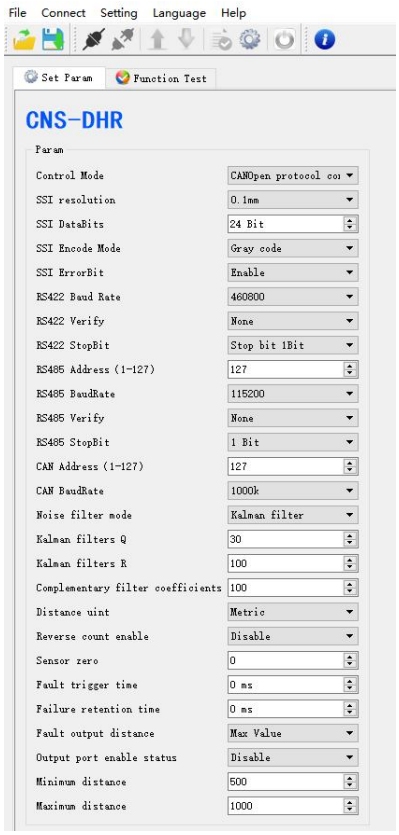
7 Configure software usage

7.1 Configure sofware operations

Get software	
1) Visit the company website to obtain www.hinson-xs.com 2) Consult sales and technical support personnel to obtain	
Software running environment	
System requirements	Windows 7 or above
Display resolution	1280*720 or above
Software decompression	
 1) Double-click to open; 2) After the file is unzipped, it will be produced in the current directory; 	

7.2 Configuration software interface introduction

7.2.1 Sensor parameter settings

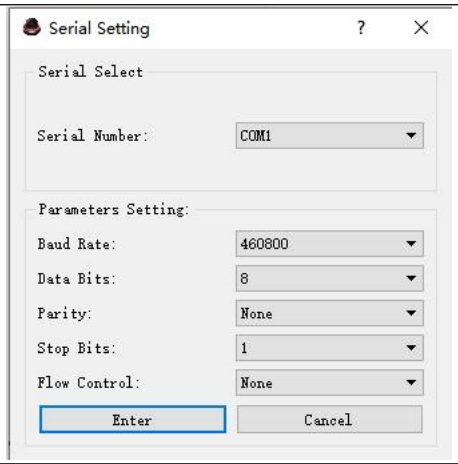


Sensor parameters

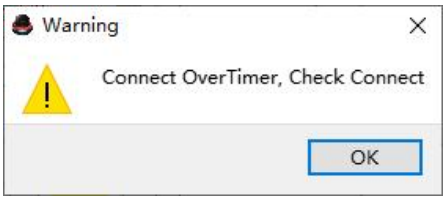
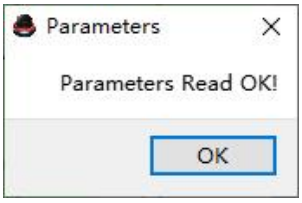
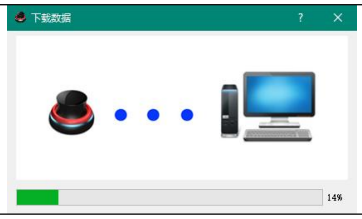
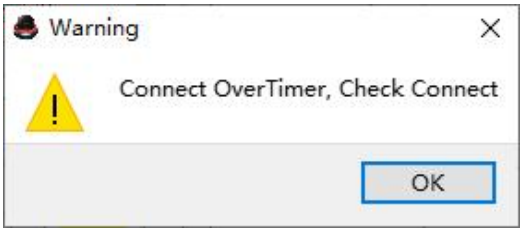
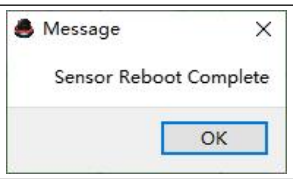
Parameter list	Parameter value	Remark
Sensor control method	SSI interface control	The control method of the sensor can be set, the default CANOpen protocol
	RS422 communication control	
	RS485 communication control	
	MB485 communication control	
	CAN protocol control	
	CANOpen protocol control	
SSI interface resolution	0.01mm	The resolution of the SSI interface can be set, default 0.1mm
	0.1mm	
	1mm	
	10mm	
SSI interface data bits	15-32Bit	SSI interface data bits 15-32Bit can be set
SSI interface encoding method	Binary	Default Gray code
	Gray code	
SSI interface error bit	Enable	Enable by default
	Disability	
RS422 communication baud rate	19200	RS422 communication baud rate, default 460800
	57600	
	115200	
	256000	
	460800	
RS422 communication check bit	No verification	No verification by default
	Odd verification	
	Even verification	
RS422 communication stop bit	Stop bit 1Bit	Default 1Bit
	Stop bit 1.5Bit	
	Stop bit 2Bit	
RS485 address (1-127)	1-127	RS485 address 1-127 can be set
RS485 communication baud rate	19200	RS485's communication baud rate, default 115200
	57600	
	115200	
	256000	
	460800	
RS485 communication check bit	No verification	No verification by default
	Odd verification	
	Even verification	
RS485 communication stop bit	1Bit	Default 1Bit
	1.5Bit	
	2Bit	
CAN bus address (1-127)	1-127	CAN bus address 1-127 can be set
CAN bus baud rate	125K	Baud rate of CAN bus

	250K	
	500K	
	1000K	
Noise filtering mode	close	Default Kalman filtering
	Kalman filtering	
	Complementary filtering	
Kalman filter Q	30	Process noise covariance can be set
Kalman filter R	100	Observed noise covariance can be set
Complementary filter coefficients	100	Can be set
Distance unit	Metric	Default metric0.001m(That is millimeters mm)
	Inch	
Reverse Count enable	Disabled	Enable by default
	Enable	
Sensor zero position	0	Sensor zero setting
Fault trigger time	0ms	Can be set, the continuous failure will trigger the action after this time
Failure retention time	0ms	Can be set, the time to keep the output after the fault is eliminated
Fault output distance	Zero value	Default maximum value
	Maximum value	
	Last value	
Output port enable status	Disabled	Default disabled, control digital output
	Enable	
Minimum distance	500	Can be set, no processing is left below this value
Maximum distance	1000	Can be set, if above this value is processed as exceeding the range

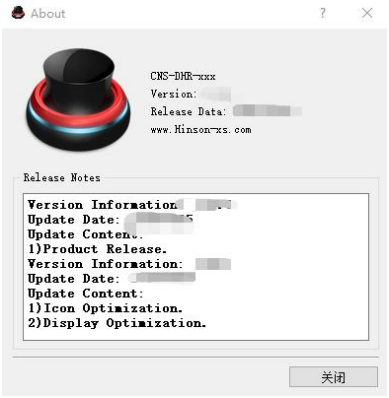
7.2.2 Serial port settings

		Set the current serial port

7.2.3 Connection and disconnection

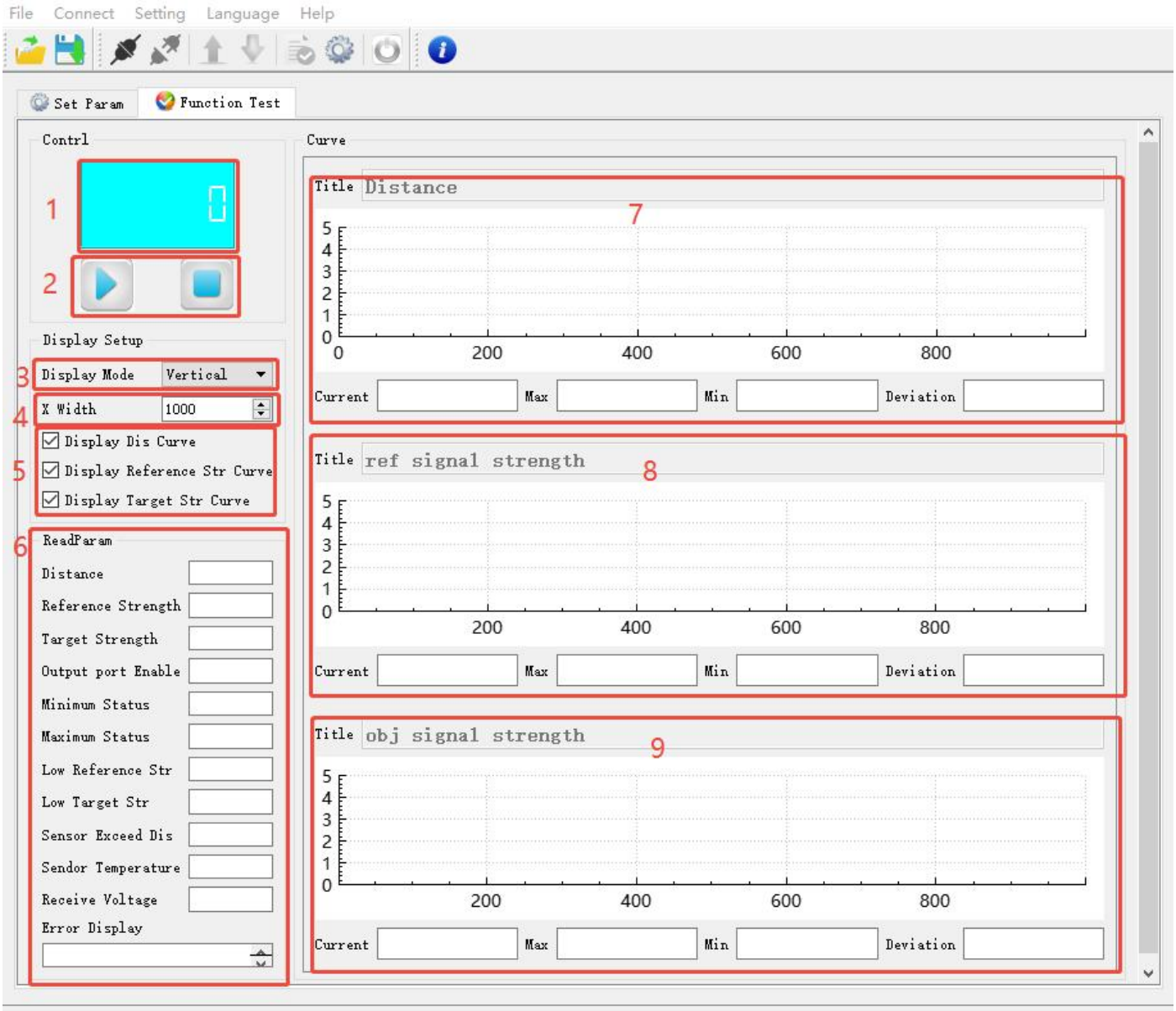
		Connect the device, read the sensor data, and disconnect it from the device. After the connection is successful, start uploading data from the sensor.
		If the device is not connected, a read and write timeout warning will be displayed. After prompting a warning, troubleshoot according to the fault status.
		Upload success prompt; Upload parameters from the sensor and read the current parameters set inside the sensor and the drawn graphic data.
		Download the parameters set by the configuration software and the drawn graphic data into the sensor.
		After the device is not connected to or the connection is disconnected, a read and write timeout warning will be displayed. After prompting a warning, troubleshoot according to the fault status.
		Control sensor restart for sensor initialization and parameter setting to take effect. The restart process is about 5 seconds.

7.2.4 Sensor firmware version

		After connecting to the sensor, click the version get button to get the current sensor version number; Get the firmware version information of the current sensor.

7.3 Introduction to the functional test interface

It can display distance, reference signal attenuation rate, and target signal attenuation rate in real time



Serial number	Description
1	Displays the number of tests. If the query distance is successful, +1 will be displayed.
2	Start pause button and clear button
3	Display mode, can display the graph vertically and horizontally
4	Customizable X-axis width
5	Which curve to display can be customized
6	Function data reading
7	Real-time display of distance graph
8	Real-time display of reference signal attenuation rate curve graph
9	Real-time display of target signal attenuation rate curve graph

8 Troubleshooting and maintenance

8.1 Fault Code

Sensor Error Status

Fault Code	Fault status
Bit0==1	Low reference signal
Bit1==1	Low target signal
Bit2==1	Real-time distance exception
Bit3==1	FPGA data exception
Bit4==1	FPGA connection exception
Bit5==1	Too high temperature
Bit6==1	The receiving voltage is too high
Bit7==1	The reception voltage is too low

8.2 Fault status handling

The sensor is abnormal in working condition, including not limited to the following situations;

Fault status	Solution
Connection failed	Check whether the serial port connection is normal; Restart the configuration software; Confirm whether the sensor is powered normally; Test after replacing the sensor;
Connection timeout	Check whether the network connection is normal; Check whether the serial port connection is normal; Confirm the communication line sequence; Test after replacing the sensor;

If none of the above measures can resolve sensor failure, please contact our staff for support..

8.3 Get support

In order to quickly locate the fault, it is difficult to obtain product information and provide it to technical support personnel;

Product model
Approximate usage time
Pictures or videos of fault problems
Reproduction process
Description of fault phenomenon
Current device parameter configuration information

8.4 Repair

Equipment repair and send back to the equipment manufacturer, and professionals are responsible;

8.5 Maintenance

Maintenance plan

Maintenance content	Time interval
Check cables, cable intermediate connectors;	according to the on-site environment, it is recommended: at least 6 months;
Detect optical windows;	decide based on the on-site environment;
Inspect fixing screws and brackets;	according to the on-site environment, it is recommended: at least 6 months;
Detection indicator light display;	decide according to the on-site environment;

8.6 Cleaning

Materials used

Cleaning cloth	Use special wipes for lenses or special wipes for lenses
Cleaning agent	Plexiglass (acrylic) cleaner

9 After-sales information

9.1 Warranty period

Hinson products provides a limited warranty. If the sensor cannot be used normally due to quality problems or design defects during the warranty period, we will provide free after-sales maintenance.

■ Warranty period: 1 year from the date of sale.

9.2 Warranty coverage

If the product is within the warranty period and falls within the warranty conditions, we will repair or replace it free of charge.

■ The warranty and after-sales service of this product are limited to mainland China;

■ The product cannot be used normally due to unpacking during transportation;

■ The product cannot work normally due to damage to its own components;

■ The product cannot be used normally due to design defects;

9.3 Disclaimer

Please pay attention to the following conditions during the use of the product. We will not provide free after-sales and warranty.

■ Failure to install the product correctly according to the instructions, resulting in product damage;

■ Use the product in an unsuitable environment and conditions, resulting in product damage;

■ Product damage caused by failure to operate in accordance with the product manual;

■ Dismantling or repairing the product without the company's permission;

■ Product damage caused by irresistible external forces such as natural disasters and fires.

9.4 Technical Support

Guangdong Hinson Technology Co., Ltd.

Tel: 0757-22218956 (8:30-17:30 on weekdays)

Website: www.hinson-xs.com

Email: hinson@hinson-xs.com

Technical support QQ: 2636178756