MINIATURE
SOLUTION

Meteorological multi-element louver box (Type **485**).

VMS-300BYH-M Ver 2.0

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directory

Chapter 1 Product Brief

1.1 Product Overview

Meteorological louver box is a fixed all-in-one ground automatic observation equipment. The observation items mainly include meteorological elements such as wind direction, wind speed, air temperature, humidity, atmospheric pressure, illuminance, carbon dioxide concentration, PM2.5, PM10, oxygen concentration, ammonia concentration, hydrogen sulfide concentration, and noise.

Meteorological louver boxes can be widely used in urban environmental measurement, agricultural monitoring, industrial governance and other environments in order to collect richer and more effective monitoring data.

1.2 Features

This product adopts high sensitivity digital probe, signal stability, high accuracy. It has the characteristics of wide measurement range, good linearity, good waterproof performance, easy to use, easy installation, and long transmission distance.

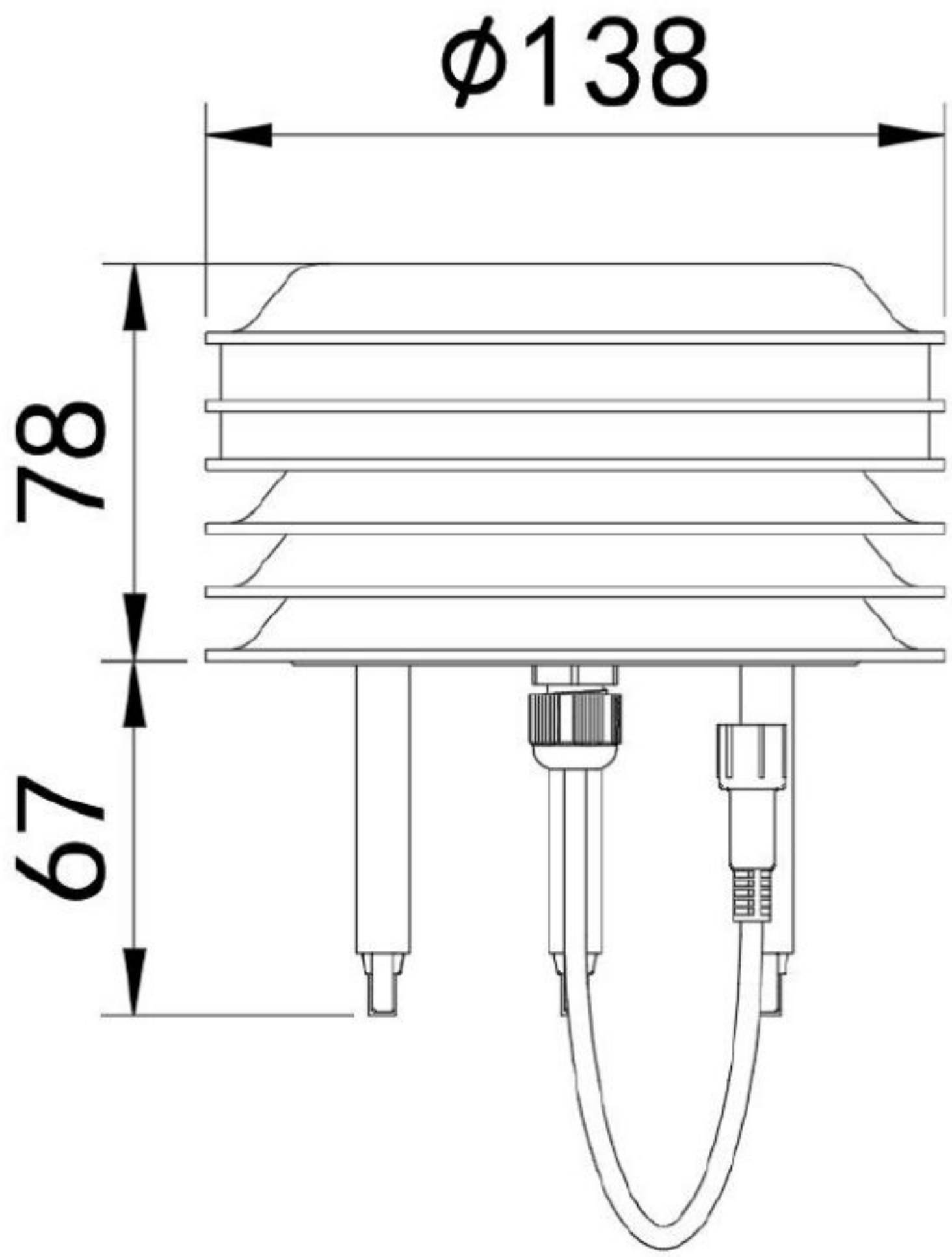
The waterproof meteorological louver box structure can adapt to the application of various environments, and the data acquisition system has accurate accuracy and stable and reliable operation. Excellent craftsmanship and good corrosion resistance.

1.3 Main parameters

DC power supply (default).	10-30VDC	
Maximum power consumption	RS485 output	0.8W
precision	humidity	±3%RH(60%RH,25℃)
	temperature	±0.5℃（25℃）
	Light intensity	±7%(25℃)
	atmospheric pressure	±0.15Kpa@25℃ 75Kpa
	noise	±3db
	PM10 PM2.5	±10%（25℃）
Range	humidity	0%RH~99%RH
	temperature	-40℃~+120℃

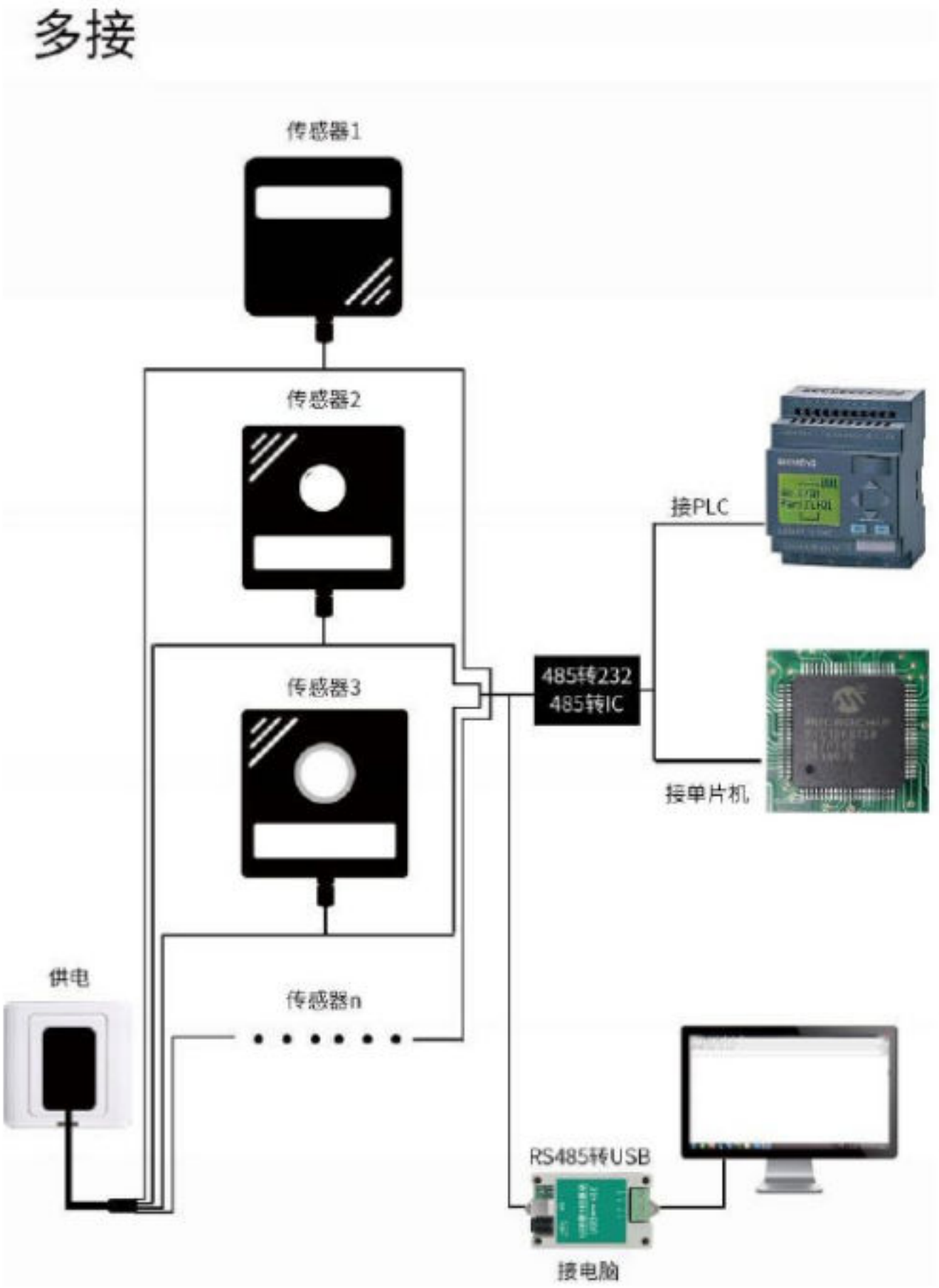
	Light intensity	0~200,000 Lux
	atmospheric pressure	0-120Kpa
	noise	30dB~120dB
	PM10 PM2.5	0-1000ug/m3
Long-term stability	temperature	≤0.1℃/y
	humidity	≤1%/y
	Light intensity	≤5%/y
	atmospheric pressure	-0.1Kpa/y
	noise	≤3db/y
	PM10 PM2.5	≤1%/y
Response time	Temperature and humidity	≤1s
	Light intensity	≤0.1s
	atmospheric pressure	≤1s
	noise	≤1s
	PM10 PM2.5	≤90S
Output signal	RS485 output	RS485 (standard Modbus communication protocol).

Shell size



1.4 System Framework Diagram

This product can also be used in combination with multiple sensors on a single 485 bus, theoretically one bus can have 254 485 sensors, and the other end is connected to a PLC with a 485 interface, via 485 The interface chip is connected to a microcontroller, or can be connected to a computer using USB to 485, and can be configured and tested using the sensor configuration tool provided by our company (only one device can be connected when using the configuration software).



Chapter 2 Hardware Connections

2.1 Equipment pre-installation check

Equipment List:

- 1 transmitter device
- Certificate of conformity, warranty card

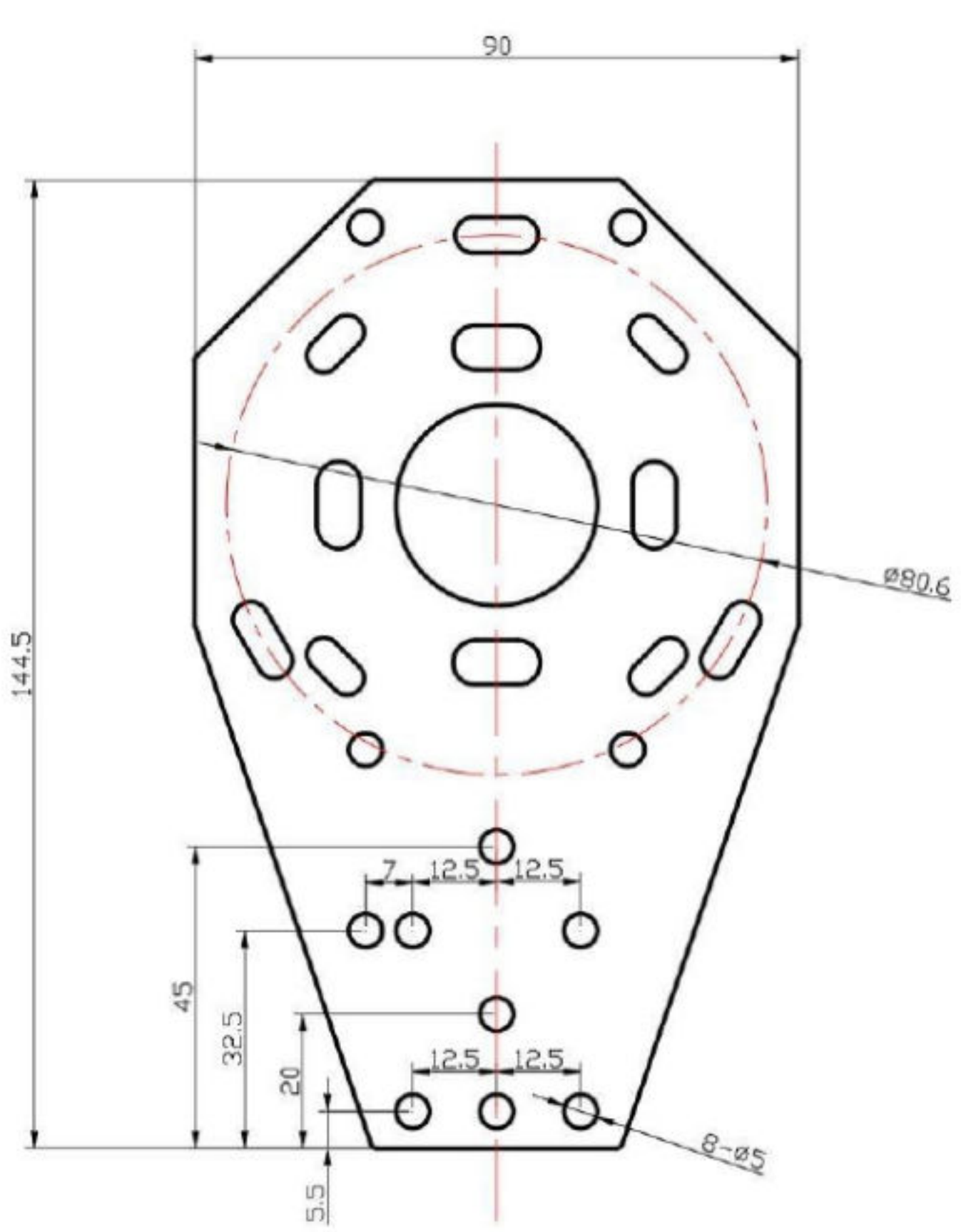
2.2 Interface Description

The power interface is wide voltage power input 10-30V . When the 485 signal line is wired, note that the A\B two lines cannot be reversed, and the addresses between multiple devices on the bus cannot conflict.

2.2.1 Sensor wiring

	Line color	illustrate
power supply	brown	The power supply is positive (10~30V DC).
	black	Power supply negative
correspondence	Yellow	485-A
	blue	485-B

2.3 Installation Methods



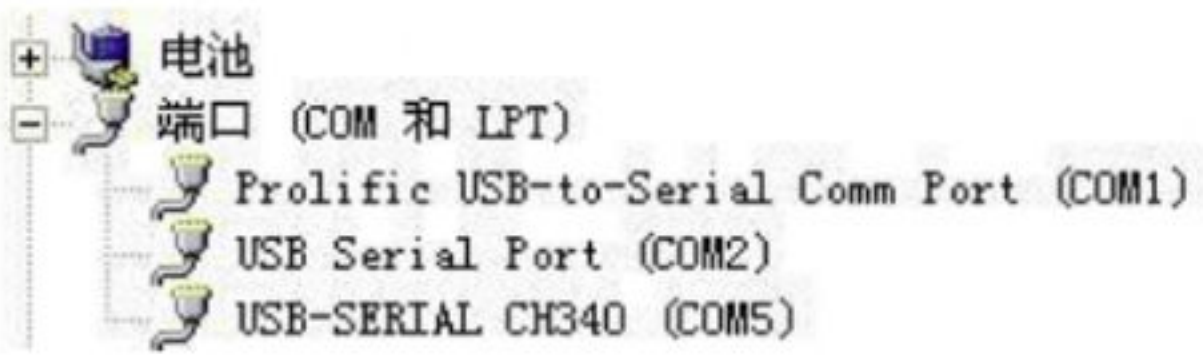
Chapter 3 Configuring Software Installation and Use

Our company provides a supporting "485 parameter configuration software", which can easily read the parameters of the sensor using the computer, and flexibly modify the device ID and address of the sensor.

Note that using software auto acquisition requires only one sensor on the 485 bus.

3.1 Connect the sensor to the computer

After you connect the sensor to the computer correctly from USB to 485 and provide power, you can see the correct COM port ("My Computer—Properties—." Device Manager—"Ports" inside to view com ports).



Open the , choos Debug the" ---" 485 Parameter ", Found Just open it。

If the COM port is not found in Device Manager, it means that you do not have the USB to 485 driver installed (included in the package) or the driver is not installed correctly, contact the technician for assistance.

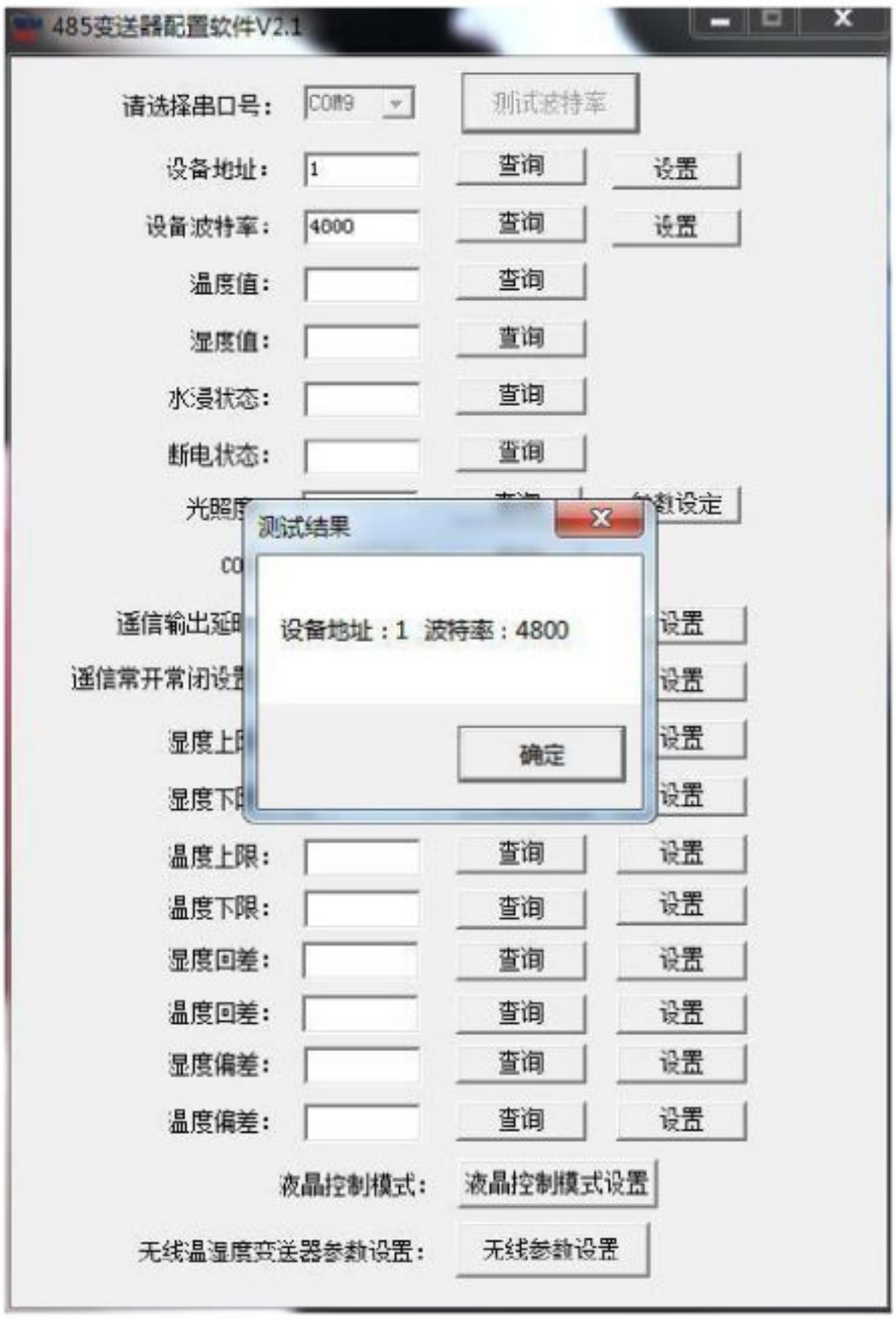
3.2 Use of Sensor Monitoring Software

①、The configuration interface is shown in the figure, first obtain the string slogan according to the method in the 3.1 section and select the correct serial port.

②、Click on the software's test baud rate, the software will test the baud rate and address of the current device, the default baud rate is 4800bit/s, the default address is 0x01.

③、Modify the address and baud rate according to the needs of use, and query the current functional status of the device.

④、If the test is unsuccessful, recheck the device wiring and 485 driver installation.



Chapter 4 Communication Protocols

4.1 Basic Parameters of Communication

encode	8-bit binary
Data bits	8 bits
Parity bits	not
Stop bit	1 bit
Error validation	CRC (Redundant Cyclic Code).
baud rate	2400bit/s, 4800bit/s, 9600 bit/s can be set, the factory default is 4800bit/s

4.2 Data frame format definition

The Modbus-RTU communication protocol is used in the following format: initial structure

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≥ 4 bytes of time address code = 1 byte

function code = 1 byte data area = N bytes

Error check = 16-bit CRC code end

structure≥4-byte time address code: the address of the transmitter, unique within the communication network (factory default 0x01).

Function code: The command issued by the host indicates that the transmitter only uses the function code 0x03 (reading register data).

Data area: The data area is the specific communication data, pay attention to the 16bits data high bytes in the front!

CRC code: A two-byte checksum code.

Host interrogate frame structure:

Address code	Function code	Register start address	Register length	Check digit low	Check digit high
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave answer frame structure:

Address code	Function code	The number of valid bytes	Data area one	Second data area	The Nth data zone	Checksum code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

4.3 Register Address

The contents of registers 500 to 507 are shown in the following table (support 03/04 function codes):

Register address	PLC or configuration address	content	operate
500	40501	Humidity value (10 times actual).	read only
501	40502	Temperature value (10 times the actual value).	read only
502	40503	Noise value (10 times the actual value).	read only
503	40504	PM2.5 value (actual).	read only

504	40505	PM10 value (actual).	read only
505	40506	Atmospheric pressure value (in Kpa, 10 times the actual value).	read only
506	40507	The Lux value of 20W is 16 bits higher (actual).	read only
507	40508	The Lux value of 20W is 16 bits lower (actual).	read only

In addition, 96 is the control register, (support 03/04/06/16 function code).

Register address	PLC or configuration address	content	operate
96	40097	Device virtual multi-address enablement Write 0: The device can be virtualized to multiple addresses (default).	Read and write
		Write 1: The multi-address feature is disabled	

4.4 Examples and explanations of communication protocols

4.4.1 Inquire about registers above **500**

For example, ask for temperature and humidity values: The device address is 03

Address code	Function code	The start address	The length of the data	Check digit low	Check digit high
0x03	0x03	0x01 0xF4	0x00 0x02	0x85	0xE7

Answer frame (e.g. read that the temperature is -10.1°C and the humidity is 65.8%RH).

Address code	Function code	The number of valid bytes	Humidity value	Temperature value	Check digit low	Check digit high
0x03	0x03	0x04	0x02 0x92	0xFF 0x9B	0x79	0xFD

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Temperature: Upload as a complement when the temperature is below 0°C

0xFF9B (hexadecimal) = -101 = > Temperature = -10.1°C

Humidity: 0x0292 (hexadecimal) = 658=> Humidity = 65.8%RH

4.4.2 Set virtual multi-address enablement

1. Turn off virtual multi-address writing data frames

Address code	Function code	Register address	Write content	Check digit low	Check digit high
0x01	0x06	0x00 0x60	0x00 0x01	0x48	0x14

Reply frame

Address code	Function code	Register address	Write content	Check digit low	Check digit high
0x01	0x06	0x00 0x60	0x00 0x01	0x48	0x14

Chapter 5 : Common Problems and Solutions

No output or possible causes of output errors:

①、The computer has a COM port and the selected port is incorrect.

②、Baud rate error.

(3) The 485 bus is disconnected, or the A and B lines are reversed.

④、Too many devices or too long wiring should be supplied to the nearest power supply, with the addition of a 485 enhancer and an increase of 120Ω termination resistance.

⑤、The USB to 485 drive is not installed or is damaged.

⑥、The device is damaged.