

Eight channel IEPE vibration sensor data high-speed synchronous network acquisition module WJ288

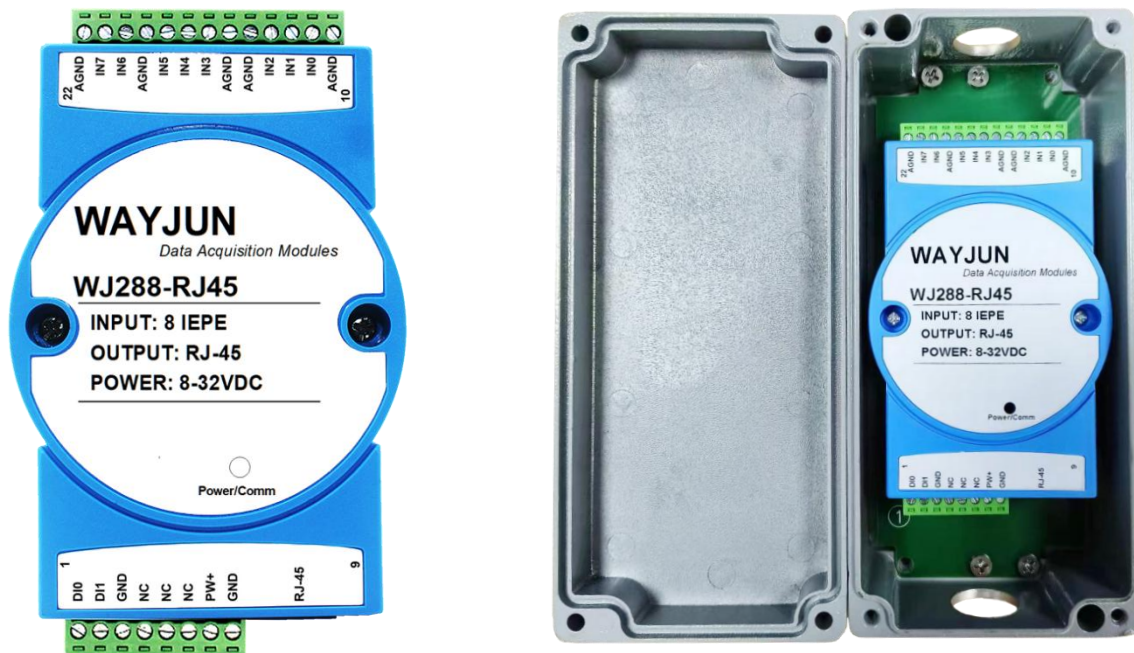


Figure 1 Appearance of WJ288 module

Product features:

- Eight way IEPE vibration sensor input RJ45 network port output
- Built in 4mA constant current source to supply power to IEPE vibration sensor
- Automatically collect and report data through UDP/TCP protocol
- Module IP and other parameters can be set through commands
- DC power supply: 24VDC
- High reliability, easy to collect, and easy to apply
- Optional metal waterproof box installation, waterproof and moisture-proof
- Can work in harsh environments such as ports and bridges
- Regular blue flame retardant shell size: 120 x 70 x 43mm
- Metal shell size: 175 x 80 x 56mm

Typical applications:

- Bridge vibration monitoring
- Measurement of vibration in skyscrapers
- Rail transit vibration detection
- Crane 3-axis vibration measurement
- Monitoring of gantry crane
- Port lifting machinery
- Motor vibration
- Microphone audio measurement
- Wind power equipment vibration monitoring system

Product Overview:

The WJ288 product is an IoT and industrial Ethernet acquisition module that enables sensor data collection and

transmission to the network. IEPE stands for Integrated Electronics Piezo Electronic, which is an integrated circuit type piezoelectric sensor. This type of piezoelectric sensor with built-in electronic components has become the standard in industrial applications. Semiconductor circuits convert high impedance signals from piezoelectric sensors into low impedance voltage signals that are easier to transmit. With IEPE, power supply and signal transmission can be achieved with just one standard cable of any length, without measurement errors caused by cable movement.

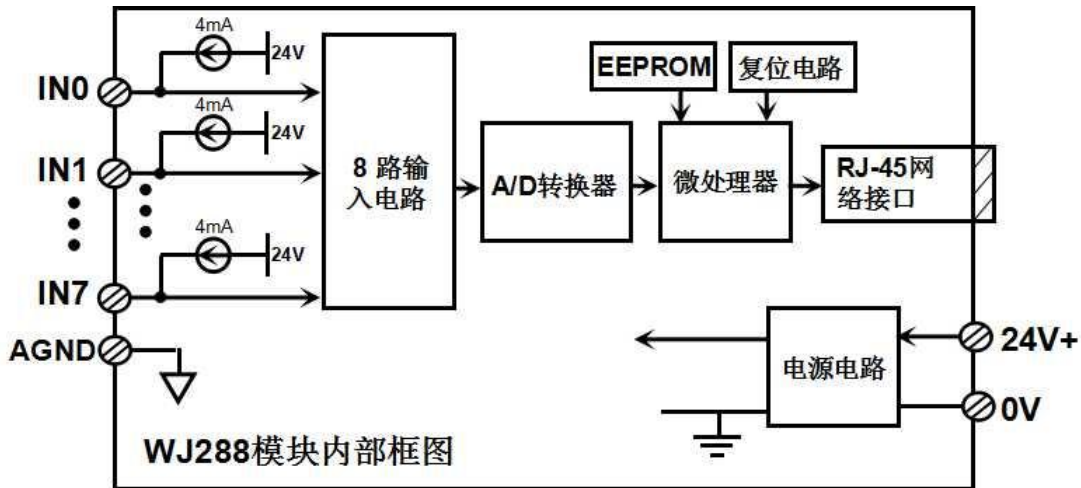


Figure 2 Internal Block Diagram of WJ288 Module

The WJ288 series products include power conditioning, analog synchronous acquisition, constant current source output, and RJ-45 network interface communication. The communication method adopts UDP/TCP protocol. Users can set module IP addresses, subnet masks, etc.

The WJ288 series products are intelligent monitoring systems based on microcontrollers, and configuration information such as module IP addresses and subnet masks set by users are stored in non-volatile memory EEPROM.

The WJ288 series products are designed and manufactured according to industrial standards, with strong anti-interference ability and high reliability. The working temperature range is -45 °C to +85 °C.

Function Introduction:

WJ288 remote I/O module can be used to synchronously measure eight IEPE analog signals. At the same time, each channel has a 4mA constant current source that can supply power to the sensor for easy measurement.

1. Analog signal input

16 bit AD acquisition, 8-channel analog signal 0- ± 10V input. Synchronous acquisition speed of 20K SPS.

2. Communication Protocol

Communication interface: RJ-45 network interface. The two indicator lights at the network port position, the Link light (green light) will light up after the network cable is plugged in, and the Data light (yellow light) will flash irregularly when there is data.

Communication protocol: UDP/TCP protocol is adopted, and data is automatically reported.

Communication response time: less than 10mS.

3. Anti interference

There is a transient suppression diode inside the module, which can effectively suppress various surge pulses and protect the module.

Product model:

WJ288 - U□ - RJ45 - □

Input voltage or current signal value shell

IEPE: IEPE sensor input (default model) Default: regular blue flame-retardant shell

U1:0-5V D: External metal casing

U2: 0-10V communication interface

U5: 0- ± 5V **RJ45:** Output is an RJ-45 network interface

U6: 0-±10V

U8: User defined

The default model of the product is WJ288-IEPE-RRJ45, and other parameter inputs need to be customized.

Selection Example 1:

Model: **WJ288-IEPE-RRJ45** indicates 8-channel IEPE sensor signal input, with an RJ-45 network interface output

Selection Example 2:

Model: **WJ288-U5-RJ45** indicates 8-channel 0- ± 5V signal input, no constant current source at the input end, and an RJ-45 network interface output

Selection Example 3:

Model: **WJ288-IEPE-RJ45-D** indicates 8-channel IEPE sensor signal input, output as RJ-45 network interface, with an additional metal casing

WJ288 General Parameters:

(Typical @+25 °C, Vs is 24VDC)

Analog input: AD accuracy: 16 bits

Input range: 0- ± 10VDC

Constant current source: 4mA (± 1mA)

Temperature drift: ± 10 ppm/°C (± 30 ppm/°C, maximum)

Input resistance: greater than 100K Ω

Sampling rate: 20K SPS

Communication: UDP/TCP communication protocol

Interface: RJ-45 network interface.

Working power supply: 24VDC (± 10%) power supply, with internal anti reverse and overvoltage protection circuits

Power consumption: less than 3W

Working temperature: -45~+80 °C

Working humidity: 10~95% (no condensation)

Storage temperature: -45~+80 °C

Storage humidity: 10~95% (no condensation)

Blue flame retardant shell size: 120 x 70 x 43mm

Metal shell size: 175 x 80 x 56mm

Pin definition:

Pin	name	Description	Pin	name	Description
one	DI0	Channel 0 switch signal input terminal	ten	AGND	Analog signal input negative terminal
two	DI1	Channel 1 switch signal input terminal	eleven	IN0	Channel 0 analog signal input positive terminal
three	GND	Switch signal input negative terminal	twelve	IN1	Channel 1 analog signal input positive terminal
four	NC	Empty feet	thirteen	IN2	Channel 2 analog signal input positive terminal
five	NC	Empty feet	fourteen	AGND	Analog signal input negative terminal

six	NC	Empty feet	fifteen	AGND	Analog signal input negative terminal
seven	PW+	Positive end of power supply	sixteen	IN3	Channel 3 analog signal input positive terminal
eight	GND	Negative end of power supply	seventeen	IN4	Channel 4 analog signal input positive terminal
nine	RJ45	RJ45 network port	eighteen	IN5	Channel 5 analog signal input positive terminal
			nineteen	AGND	Analog signal input negative terminal
			twenty	IN6	Channel 6 analog signal input positive terminal
			twenty-one	IN7	Channel 7 analog signal input positive terminal
			twenty-two	AGND	Analog signal input negative terminal

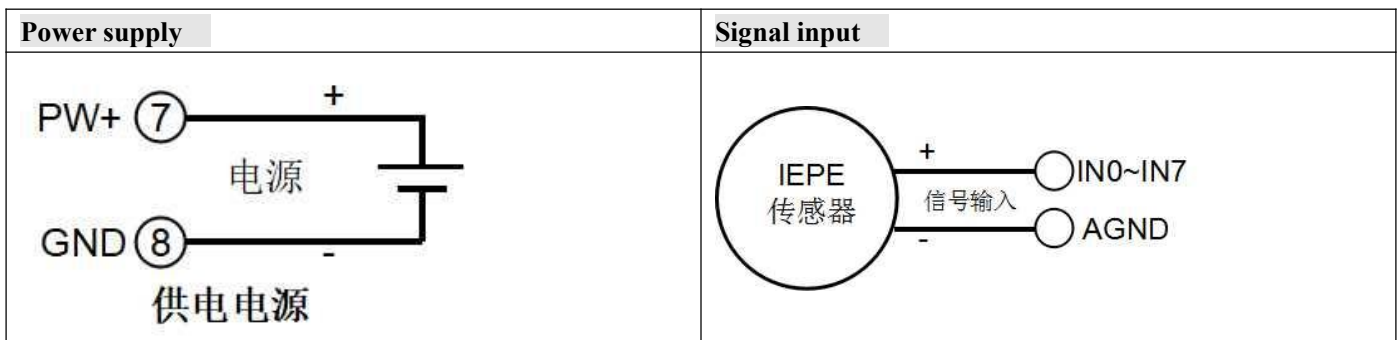
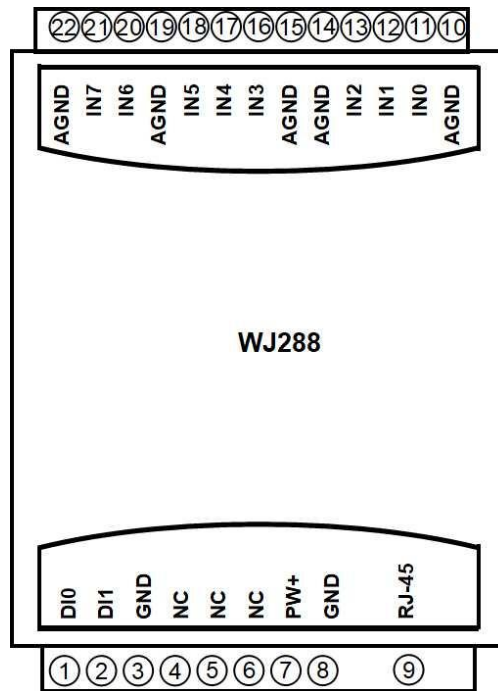


Figure 5 Wiring diagram of WJ288 module

Firstly, the WJ288 module can be configured through a mobile phone

In addition, if the network segment of the computer is 192.168.0.xx, you can also connect the module to a network cable and log in to the webpage configuration module of the module by entering the factory default IP (192.168.0.7) of the module in the browser.

	<p>1. Put the module into AP mode</p> <p>(1) Connect the power and turn the module's switch to Initiat.</p> <p>(2) Open the wireless LAN on your phone or Go to "Settings → WLAN" and find the WiFi name starting with "wifi8" to connect.</p>
	<p>The factory password for this module is: 12345678, then "Join".</p>
	<p>2. Enter the module webpage.</p> <p>After connecting to the WiFi of the module, wait a few seconds and it will automatically redirect to the built-in webpage of the module, as shown in the left figure. If the phone cannot automatically redirect, you can also open the mobile browser and enter the website 192.168.4.1 to log in.</p> <p>Click on the configuration module parameter link to enter the configuration interface</p>

09:18 5G

captive.apple.com
wifi8

< > 登录 取消

参数设置

上报方式
UDP Mode

IP地址
192.168.0.7

默认网关
192.168.0.1

子网掩码
255.255.255.0

本地端口
23

远程服务器IP地址
192.168.0.8

远程服务器端口
23

自动上报
是

数据格式
16进制

量程
10V

采样速度
20000

IEPE恒流源
打开

模块名称
C049EF67A57C

保存并重启

Mac地址:C0:49:EF:67:A5:7C; 版本:V1.1

(1)Reporting method

Supports UDP and TCP Server connection methods.

(2) IP address

The IP address of the module must be in the current WiFi network segment and not the same as the IP address of other devices in the local area network. For example, if the IP of the WiFi router is 192.168.0.1, the IP of the module can be set to 192.168.0.7

(3) Default gateway

Gateway of the module, fill in the IP address of the current WiFi router. For example, if the IP address of a WiFi router is 192.168.0.1, simply fill in this IP address

(4)Subnet mask

The subnet mask of the module. If there is no cross network segment, fill in the default value of 255.255.255.0

(5)Local port

Communication port of module

(6)Remote server IP address

Remote server IP, the server that UDP needs to connect to.

(7)Remote server port

The port of the server.

(8)Automatic reporting

Is the module automatically reported when powered on.

(9)Data format

Select data format

(10)Range

Set data range

(11)Sampling speed

Set module sampling speed

(12)IEPE constant current source

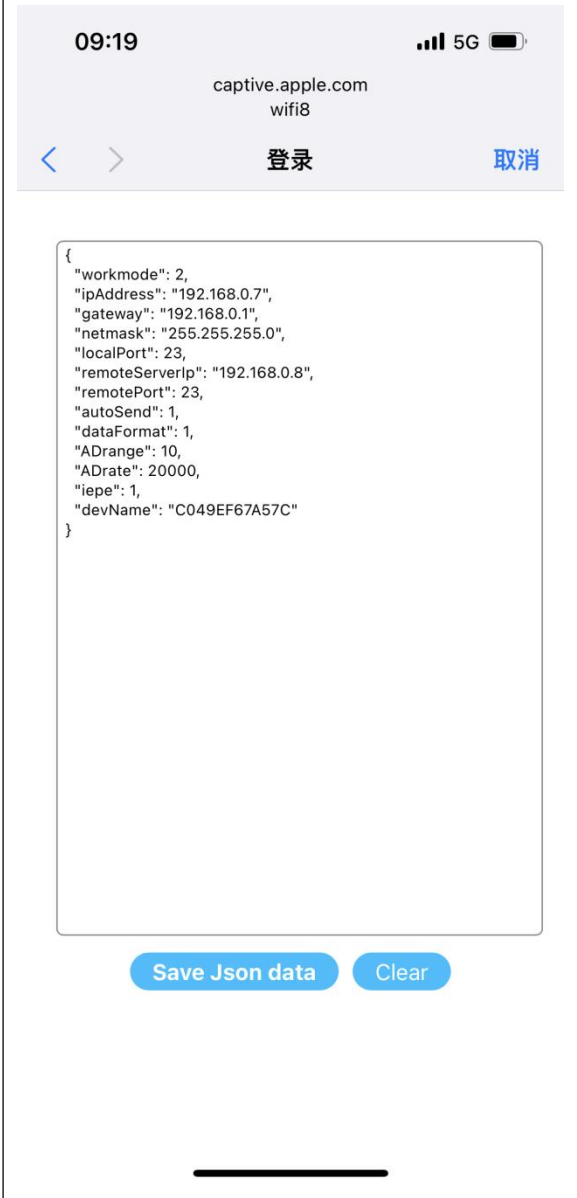
Turn on or off IEPE constant current source

(13)Module Name

Module Name



4. Remote firmware upgrade



5. Batch setting parameters

Click on the [Json Batch Configuration](#) link on the module's homepage to enter the Batch Settings interface. As shown in the left figure.


The data must be in standard JSON format, and all parameters can be set or only some parameters can be set. If there are many products to be set up, batch setting can save time.

After completing the filling, click the button Save Json data.

For example: {

```

"workmode": 2,
"ipAddress": "192.168.0.7",
"gateway": "192.168.0.1",
"netmask": "255.255.255.0",
"localPort": 23,
"remoteServerIp": "192.168.0.168",
"remotePort": 23,
"autoSend": 0,
"dataFormat": 0,
"ADrange": 10,
"ADrate": 20000,
"iepe": 1,
"devName": "C049EF67A57C"
}
    
```

	<h3>6. The module webpage can also be opened on the local area network</h3> <p>If the module is already connected to a network cable, you can enter the module IP in the computer or mobile browser, such as 192.168.0.7, to open the module webpage (provided that the computer IP or mobile IP is in the same network segment as the module, and the login operation should be based on the current module IP address), and then enter the internal webpage of the module. You can also configure modules or read module data, and the operation method is the same as the table above.</p>
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Character Communication Protocol:

The default IP address for the module at the factory is 192.168.0.7, the remote host IP is 192.168.0.8, remote port 23, and the communication protocol is UDP/TCP protocol.

TCP communication: The TCP client can connect to the module with IP 192.168.0.7 and port 23.

UDP communication: You can set the computer IP to 192.168.0.8, and UDP software can open port 23 to establish a connection with the module.

After connecting, you can issue the following string command to modify the parameters.

1. Configure the reading module

Command: [ReadConfig](#):

reply:

```
{ "workmode":2, "ipAddress":"192.168.0.11", "gateway":"192.168.0.1", "netmask":"255.255.255.0", "localPort":23, "remoteServerIp":"192.168.0.168", "remotePort":23, "autoSend":0, "dataFormat":0, "ADrange":10, "ADrate":20000, "iepe":1, "devName":"C049EF67A57C" }
```

Format Description:

"workmode"	Reporting method: 2 represents UDP; 0 represents TCP Server
"ipAddress"	IP address
"gateway"	Default gateway
"netmask"	Subnet mask
"localPort"	Local port
"remoteServerIp"	Remote server IP address
"remotePort"	Remote server port
"autoSend"	Automatic reporting: 0 represents 'no'; 1 represents 'yes'
"dataFormat"	Data format: 0 represents "hexadecimal"; 1 represents "string"
"ADrange"	Range
"ADrate"	Sampling speed
"iepe"	IEPE constant current source: 0 represents "off"; 1 represents "open"
"devName"	Module name: can be modified on the webpage as needed

2. Write the configuration of the module. The green parts are parameters that can be modified as needed, and other parameters should not be changed. The setting takes effect after the module is restarted. After the setting is complete, you can send the **Reset**: command to restart the module

Command: Send: **WriteConfig**: {"workmode": 2, "ipAddress": "192.168.0.7", "gateway": "192.168.0.1", "netmask": "255.255.255.0", "localPort": 23, "remoteServerIP": "192.168.0.168", "remotePort": 23, "autoSend": 0, "dataFormat": 0, "ADrange": 10, "ADrate": 20000, "iepe": 1, "devName": "C049EF67A57C"}

Reply: **Success!**

Individual parameters can also be configured separately, for example:

Command: **WriteConfig**: {"ipAddress": "192.168.0.11"} Modify the IP address of the module

Command: **WriteConfig**: {"remoteServerIP": "192.168.0.168", "remotePort": 23} Modify the remote host IP address and port

Command: **WriteConfig**: {"autoSend": 1} Enable automatic data reporting when powered on, 0 indicates disable, 1 indicates enable

Command: **WriteConfig**: {"devName": "m100"} Change the module name to m100

3. Other commands

Command: **Start**: Start automatic data reporting

Command: **Stop**: Stop automatic data reporting

Command: **Reset**: Restart module

Automatic reporting data format:

Set to automatically upload upon startup, or after the **Start**: command, the module will automatically send in the following format according to UDP/TCP protocol. All data are in hexadecimal format, arranged in the following order according to the table:

Data content	Byte count	Example	explain
Protocol frame header	four	0xAA55EB90	Protocol frame header, 4 fixed data
Measurement time	four	0x00000001	Measure the data of the internal clock of the measurement system, in units of us, starting from 0 after overflow
Data length	one	0x19	The length of the total data, including all data except CRC
Channel 0 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V
Channel 1 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V
Channel 2 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V
Channel 3 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V
Channel 4 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V
Channel 5 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V
Channel 6 data	two	0xFFFF	Signed 16 bit data, int16 format, 0x7FFF=10V


```
0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98, 0x88,
0x48, 0x49, 0x89, 0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42, 0x43, 0x83, 0x41, 0x81, 0x80,
0x40
};
```

```
/*-----
CRC verification
-----*/
unsigned int crc16(unsigned char *puchMsg, unsigned char usDataLen)
{
    unsigned char uchCRCHi = 0xFF ;// High CRC byte initialization
    unsigned char uchCRCLo = 0xFF ;// Low CRC byte initialization
    unsigned int uIndex ; // Index in CRC cycle
    While (usDataLen --)//Transfer message buffer
    {
        uIndex = uchCRCHi ^ *puchMsg++ ;// Calculate CRC
        uchCRCHi = uchCRCLo ^ uchCRCHi[uIndex] ;
        uchCRCLo = uchCRCLo[uIndex] ;
    }
    return (uchCRCHi << 8 | uchCRCLo) ;
}
```

Search module:

You can listen to port 9999 using UDP protocol within the local area network. The module will periodically broadcast its name, remote IP, and remote port in the following format: **name: m1, rip: 192.168.0.8, rpt: 23**

You can set the computer to the IP of the remote host, open the corresponding remote port connection module using UDP protocol, and reset the parameters. You can also log in to the module's webpage directly based on the module IP in the broadcast.

Common problems with WJ288

1, How to determine the status of a module based on lighting

The **light** is on **twice** for **1 second**: the module is waiting for the configured AP mode and can be connected to the module's WiFi 8 network settings parameters using a mobile phone.

The **light** is on **once** every **1 second**: the module is currently connected to WiFi. If it cannot be connected for a long time, please reset the WiFi parameters of the module.

The **light** is on **once** every **5 seconds**: the module has been connected to WiFi and is working normally.

2. Cross network segment issues

If the IP of the device and the communicating PC are not in the same network segment and are directly connected via Ethernet or under the same sub router, then the two cannot communicate at all.

give an example:

Device IP: 192.168.0.7

Subnet mask: 255.255.255.0

PC's IP: 192.168.1.100

Subnet mask: 255.255.255.0

Due to the device's IP being 192.168.0.7, it is unable to log in to the device's webpage or ping it on the PC.

If you want the two to communicate, you need to set the subnet mask of the device and PC, as well as the subnet mask

on the router, to 255.255.0.0, so that you can log in to the module webpage.

3. The device can ping, but the webpage cannot be opened

There may be several reasons for this:

- 1) The device has set a static IP address that conflicts with the IP addresses of existing devices in the network
- 2) The HTTP server port has been modified (default should be 80)
- 3) Other reasons

Solution: Reset the device to an unused IP address; Restore factory settings or enter the correct port when opening the browser.

4. Every once in a while, there is a disconnection and reconnection

Every once in a while, there will be a phenomenon of disconnection and reconnection

Reason: There is an issue of IP address conflict between the serial server and other devices

5. Communication is abnormal, network connection cannot be established, or search cannot be found

The firewall of the current computer needs to be turned off (in the Windows firewall settings)

Three local ports must not conflict, meaning they must be set to different values. Default values are 23, 26, and 29

Having illegal MAC addresses, such as full FF MAC addresses, may result in inability to connect to the target IP address or duplicate MAC addresses.

Illegal IP addresses, such as network segments that are not in the same network segment as the router, may not be able to access the external network.

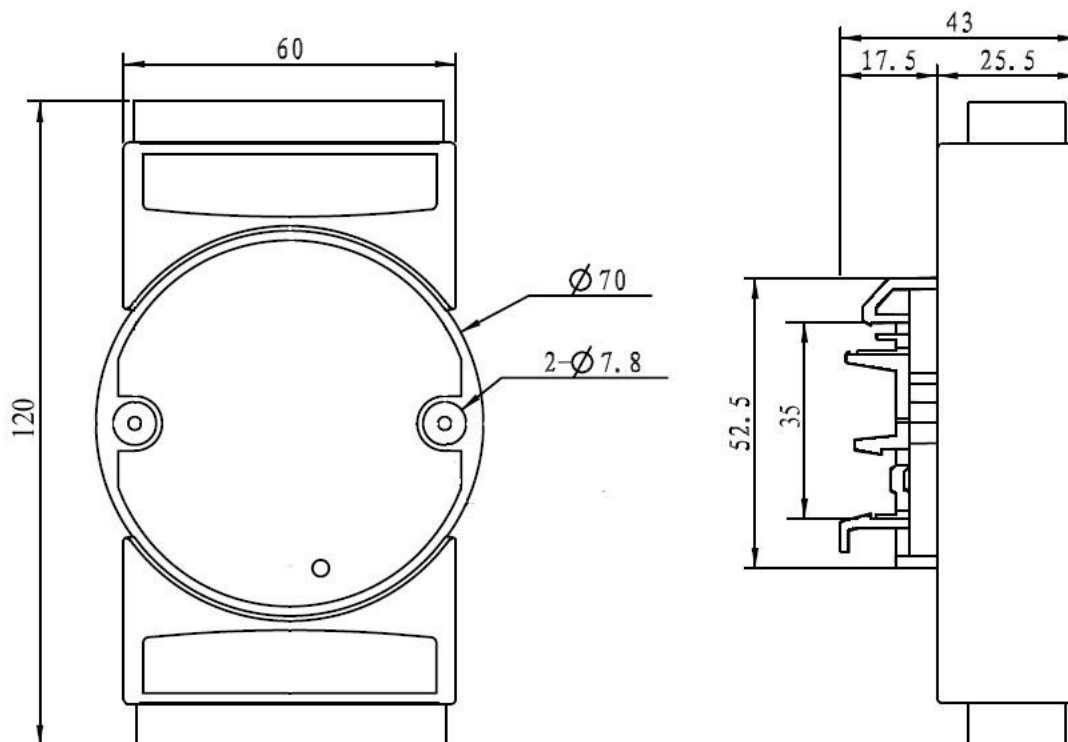
6. Hardware problem search

Poor power supply from the power adapter or poor contact of the plug

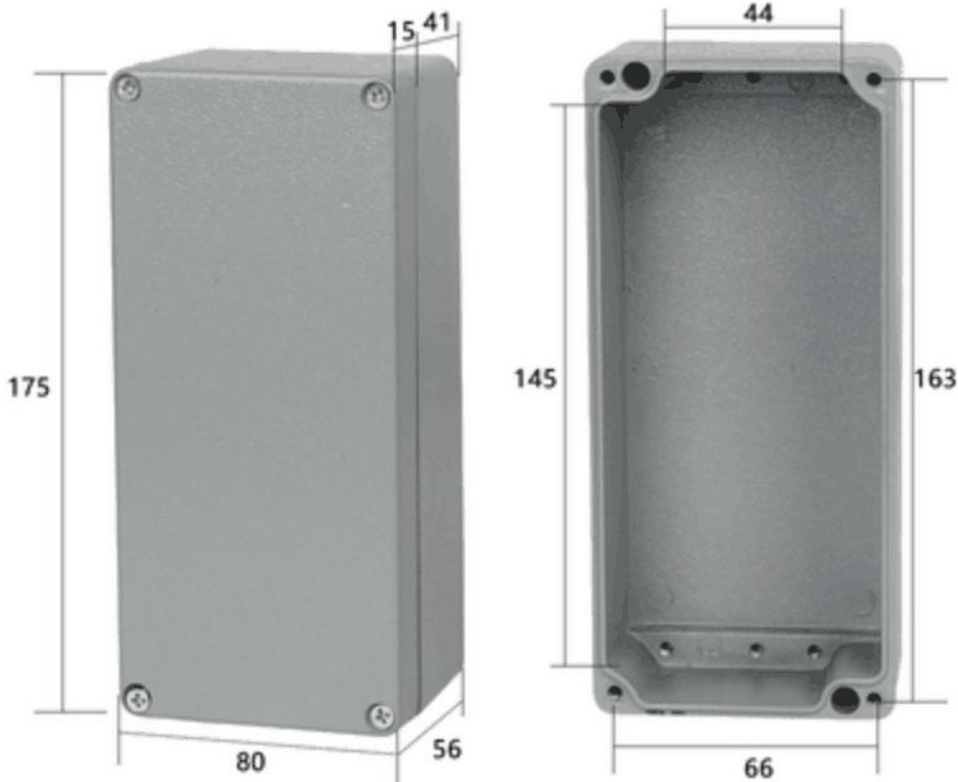
If the power light and network port light are not on, it means there is no power supply or the hardware is broken

Dimensions: (Unit: mm)

1. The size of the regular blue flame-retardant shell (unit: mm) can be installed on a standard DIN35 guide rail



2. Metal shell size: (unit: mm)

**guarantee:**

Within two years from the date of sale, if the user complies with the storage, transportation, and usage requirements and the product quality is lower than the technical specifications, it can be returned to the factory for free repair. If damage is caused due to violation of operating regulations and requirements, device fees and maintenance fees shall be paid.

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