Industrial grade high-precision temperature and humidity signal to MQTT and Modbus TCP acquisition module WJ18

Product features:

● Support MQTT timed automatic reporting of temperature and humidity
● Supports reading temperature and humidity using Modbus TCP protocol
Typical relative humidity accuracy ± 1.8% RH
Relative humidity measurement range 0~100% RH
Typical temperature accuracy ± 0.2 ℃
Temperature measurement range -40~+85 ℃
The WiFi parameters of the module can be easily set by the mobile phone
● Built in web page function, data can be queried through web pages
● Can enter low-power mode for battery powered applications
Standard USB Type-C interface with 5V power supply
● Supports screw installation and DIN35 rail installation
● Dimensions: 70mm x 45mm x 30mm

1 WJ18 Module Appearance

Typical applications:

Smart Factory
● Agricultural greenhouse
Cold chain warehousing
● Weather Station Diagram
● Hospital
● High end residential properties

Product Overview:

The WJ18 product collects humidity and temperature signals and reports them to various MQTT servers such as Alibaba Cloud, Tencent Cloud, Huawei Cloud, China Mobile IoT OneNET, Private Cloud, etc. through WiFi. It also supports accessing data through Modbus TCP protocol, and real-time temperature and humidity data can be viewed through the module's built-in webpage. The WJ18 product can also enter low-power mode for battery powered applications.

The WJ18 product can be applied to smart factory MES system, temperature and humidity collection in agricultural greenhouses, temperature and humidity monitoring in smart warehouses, data reporting from small weather stations, real-time monitoring of hospital environments, comfort testing of high-end residences, and more.

The product includes a high-precision temperature and humidity sensor and a high-performance WiFi module. The communication method adopts MQTT, character protocol or MODBUS TCP protocol. TCP is a transport layer based protocol that is widely used and a reliable connection oriented protocol. Users can directly set module IP addresses, subnet masks, etc. on the webpage, and all user set parameter settings and configuration information are stored in non-volatile memory EEPROM.

The WJ18 series products are designed and manufactured according to industrial standards, with strong anti-interference ability and high reliability. The working temperature range is -40 ℃ to+85 ℃.

Function Introduction:

The WJ18 remote I/O module can be used to measure humidity and temperature.

1、 Signal input

Humidity and temperature.

2、 Communication Protocol

Communication interface: WiFi network interface. Can connect to WiFi within the local area network.

Communication protocols: MQTT and MODBUS TCP protocols. It can also communicate with modules through TCP sockets.

Network cache: 2K bytes (for both sending and receiving)

Communication response time: less than 100mS.

Product model:

WJ18 – WiFi

Communication interface

WiFi: Output as WiFi network interface

WJ18 General Parameters:

Typical relative humidity accuracy: ± 1.8% RH (± 1.8% RH)

Relative humidity measurement range: 0~100% RH

Typical temperature accuracy: ± 0.2 ℃

Temperature measurement range: -40~+85 ℃

Maximum relative humidity accuracy (10~90% RH, 25 ℃): ± 3.6% RH

Maximum temperature accuracy (0~+60 ℃): ± 0.4 ℃

Communication: MQTT protocol, MODBUS TCP communication protocol, or TCP socket character protocol

Web page: Supports web access module and web page setting module parameters.

Interface: WiFi network interface.

Working power supply: 5V power supply for standard USB Type-C interface

Power consumption: less than 1W

Working temperature: -40~+85 ℃

Working humidity: 0~100%

Storage temperature: -40~+85 ℃

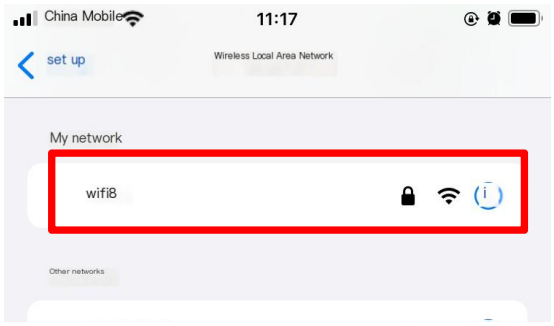
Storage humidity: 0~100%

Dimensions: 70mm x 45mm x 30mm

Accessories list: 1 WJ18 temperature and humidity acquisition module, 1 USB power supply, 1 1-meter long USB power

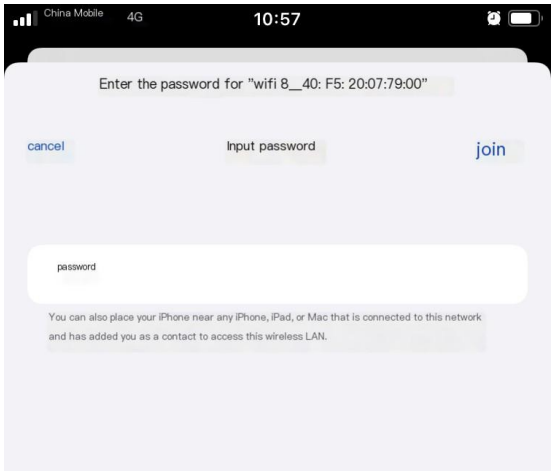
cord.

Firstly, configure the WJ18 module through your mobile phone



1. Put the module into AP mode

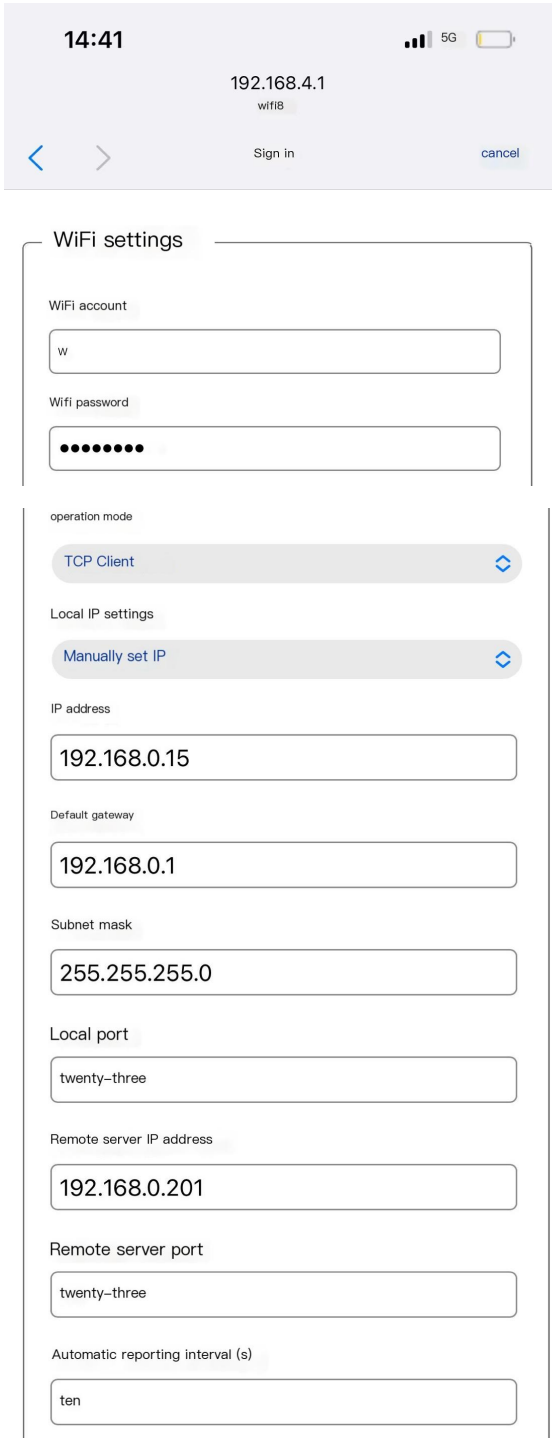
(1) Turn on the power and set the switch on the side of the module to the Initialize position.
(2) Open the wireless LAN on your phone or
Go to "Settings → WLAN" and connect to the WiFi named "wifi 8".



The factory password for this module is: 12345678, then "Join".

2. Enter the module webpage.

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.
Click on the configuration module parameter link to enter the configuration interface



3. Configure module parameters

3.1 WiFi Settings

Please modify the following parameters according to actual needs:

（1） WiFi account: Connect to the WiFi coverage in this area.

（2） WiFi password: Fill in the WiFi password, if already connected, do not re-enter.

（3） Working mode: Select the working mode and fill in according to the actual application.

Optional TCP Server, TCP Client, UDP, MODBUS TCP, Websocket, etc.

（4） Local IP settings: If only MQTT protocol is used, it can be set to automatically obtain IP. If you want to access data through Modbus TCP or web pages, it is recommended to manually set it to a fixed IP address to facilitate communication between the IP address and the module.

（5） IP address: Set the IP address of the module, which 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 192.168.0.5

（6） Default gateway: The 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

（7） 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

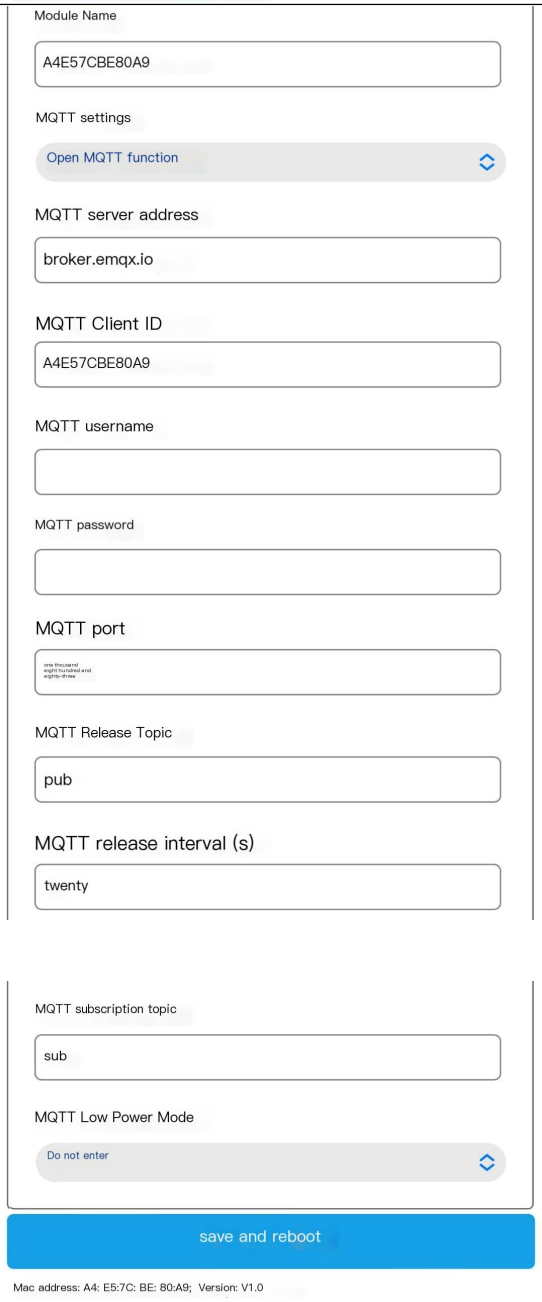
（8） Local port: The communication port of the module, and MODBUS communication generally uses port 502.

（9） Remote server IP address: The remote server IP, TCP client, and UDP server that needs to be connected to.

（10） Remote server port: The port of the server.

（11） Automatic reporting interval: The time interval for the module to report data at regular intervals, set to 0 to indicate that data will not be automatically reported.

（12） Module Name: User defined name for a module to distinguish between different modules.



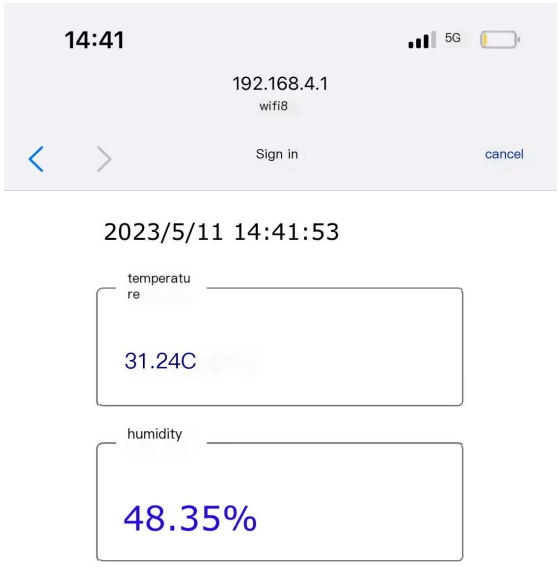
（13） MQTT settings: If MQTT communication is used, the MQTT function needs to be turned on.

（14） MQTT server address: Fill in the URL of the MQTT server,
For example: brokere.emqx.io
If the local server IP is 192.168.0.100, you can write 192.168.0.100

（15） Please fill in the MQTT client ID, username, password, port, publish topic, subscribe topic, and other parameters according to the requirements of the MQTT server. The QoS of MQTT is 0 and cannot be modified.

（16） MQTT publishing interval: The time interval in seconds during which the module automatically publishes data to the MQTT server. Set to 0 to cancel the scheduled publishing function.

（17） MQTT low-power mode: After entering low-power mode, the module will automatically shut down and sleep after MQTT reports data. The sleep time is set by the MQTT publishing time interval. The power consumption during sleep is very low and can be used in battery powered situations. The publishing time interval can be set to about 10 minutes or longer to reduce power consumption. After publishing data, the MQTT low-power mode module is in a shutdown state and cannot communicate or access. If you want to exit the MQTT low-power mode, please turn the switch to Initiat, restart the module power, and reset it in AP mode with your phone.



4. View data online on the webpage

Click on the online data viewing link on the module's homepage to enter the data viewing interface. As shown in the left figure.

If the IP address of the module is 192.168.0.5, users can also obtain JSON format data by accessing the link 192.168.0.5/readData.

temperature

31.24 ℃: is the real-time temperature measured by the module

humidity

48.35%: Real time humidity measured by the module

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.

Example 1: Only changing the WiFi account password can send:

```
{
  "WifiSsid": "w",
  "WifiPassword": "12345678",
  "setIP": 1,
  "ipAddress": "192.168.0.5",
  "gateway": "192.168.0.1",
  "netmask": "255.255.255.0",
}
```

Example 2: Only modifying MQTT parameters can send:

```
{
  "setMQTT": 1,
  "mqttHostUrl": "broker.emqx.io",
  "port": 1883,
  "clientId": "mqtt_test_001",
  "username": "",
  "passwd": "",
  "topic": "mqtt_topic_001",
  "pubTime": 2000,
  "pubonchange": 0
}
```

9. The module webpage can also be opened on the local area network

If the module is already connected to the local WiFi, you can enter the module IP in the computer or mobile browser, for example: 192.168.0.5, to open the module webpage (provided that the computer IP or mobile IP is in the same network segment as the module, login to the webpage 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.

Character Communication Protocol:

If you want to set WiFi account and password, as well as other parameters, you can turn the switch to the initialization position, and the module will enter AP configuration mode. Connect the mobile phone to the AP with the WiFi 8 name generated by the module to enter the configuration interface. Please turn the switch to the normal position after setting is complete.

MQTT protocol: After a successful connection, a command is sent to the MQTT subscription topic of the module, and the replied data is displayed on the MQTT publication topic of the module.

Under working modes such as TCP Server, TCP Client, UDP Mode, Web Socket, etc.: After a successful connection, commands can be sent and data can be received.

If automatic reporting is set for WiFi communication, the reported data format is the same as the reply format of (1. Read data command).

1、 Read data command

Send: # 01 (WiFi communication, if timed automatic reporting is set, there is no need to send commands, the module will report data at regular intervals)

Reply: {"devName": "18FE34F7D3C5", "time": 1825036, "temperature": "28.39", "humility": "73.21"}

Format Description:

The module name 'devName' can be modified on the webpage as needed

The internal time of the 'time' module, measured in mS.

The temperature value measured by "temperature" is in "℃"

The relative humidity value measured by "humidity" is in "% RH"

It is also possible to read a single set of data, such as reading encoder counters:

Send: # 01>temperature

Reply: {"temperature": "28.39"}

For example, reading the actual engineering value of the encoder:

Send: # 01>Humidity

Reply: {"humility": "72.96"}

Read other parameters and send the corresponding parameter characters.

2. Read configuration commands

The configuration parameters of the reading module can also be viewed directly on the webpage.

Send:% 01ReadConfig

Reply: "WifiSide": "w", "WifiPassword": "12345678", "work mode": 0, "setIP": 1, "ipAddress": "192.168.0.5", "gateway": "192.168.0.1", "netmask": "255.255.255.0", "localPort": 23, "remoteServerIP": "192.168.0.201", "remotePort": 23, "sendTime": 10, "devName": "18FE34F7D3C5", "setMQTT": 0, "mqttHostURL": "broker. emqx. io", "Port": 1883, "Client ID": "18FE34F7D3C5", "username": "", "passwd": "", "topic": "pub", "pubTime": 10, "sleepMode": 0, "subtopic": "sub", "version": "V1.0", "Mac": "18:FE: 33:F7: D3:16"}

3. Set configuration commands

The configuration parameters of the module can also be set directly on the webpage. You can set all or some parameters, and the module will automatically restart after setting.

send out:

%01WriteConfig{"WifiSsid":"w","WifiPassword":"12345678","workmode":0,"setIP":1,"ipAddress":"192.168.0.5","gateway":"192.168.0.1","netmask":"255.255.255.0","localPort":23,"remoteServerIp":"192.168.0.201","remotePort":23,"sendTime":10,"devName":"18FE34F7D3C5","setMQTT":0,"mqttHostUrl":"broker.emqx.io","port":1883,"clientId":"18FE34F7D3C5","username":"","passwd":"","topic":"pub","pubTime":10,"sleepMode":0,"subtopic":"sub"}

You can also set only a single parameter, such as IP address:% 01WriteConfig {"ipAddress": "192.168.0.16"}

For example, setting not to automatically report data:% 01WriteConfig {"sendTime": 0}

Reply:! 01 (cr) indicates successful setting? 01 (cr) indicates a command error

Modbus TCP communication protocol:

If you want to set WiFi account and password, as well as other parameters, you can turn the switch to the initialization position, and the module will enter AP configuration mode. Connect the mobile phone to the AP with the WiFi 8 name generated by the module to enter the configuration interface. Please turn the switch to the normal position after setting is complete.

Modbus TCP communication requires setting the module's working mode to MODBUS TCP in the configuration page first.

The **register table** is **as follows (supporting function code 03):**

Address 4X (PLC)	**Address (PC, DCS)**	**Data content**	**attribute**	**Data Explanation**
forty thousand and one	0	temperature	read-only	The data is a 16 bit signed integer (int16), The actual temperature value is obtained by dividing the read value by 100, and the unit is "℃"
forty thousand and two	one	relative humidity	read-only	The data is a 16 bit signed integer (int16), The actual relative humidity value is obtained by dividing the read value by 100, and the unit is "% RH"
40011~40012	10~11	temperature	read-only	The data is a 32-bit floating point number (float) stored in CDAB order. The read value is the actual temperature value, measured in "℃"
40013~40014	12~13	relative humidity	read-only	The data is a 32-bit floating point number (float) stored in CDAB order. The read value is the actual relative humidity value, measured in "% RH"
forty thousand two hundred and eleven	two hundred and ten	Module Name	read-only	High bit: 0x00 Low bit: 0x18

Communication example: 03 (0x03) Read hold register

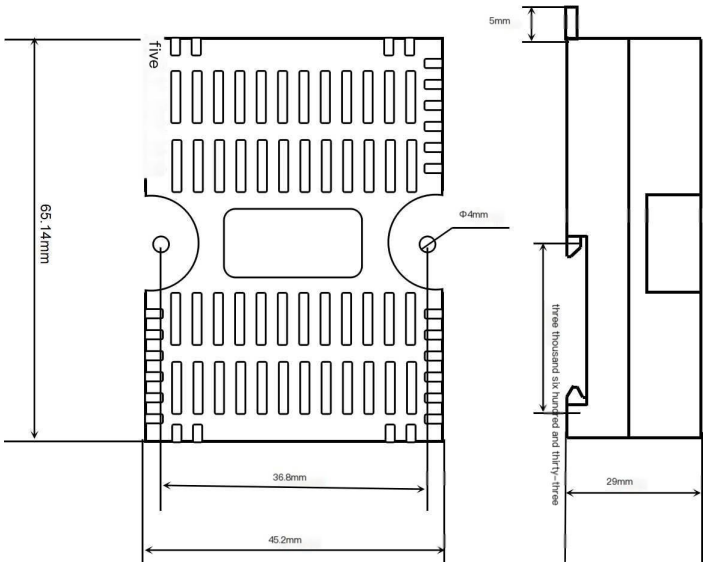
In a remote device, use this function code to read the contents of consecutive blocks in the hold register. The request PDU specifies the starting register address and the number of registers. Address registers from scratch. Therefore, addressing registers 1-16 are 0-15. In the response message, each register has two bytes, with the first byte

being the data high bit and the second byte being the data low bit. The response data indicates a temperature of 28.51 ℃ and a relative humidity of 69.00% RH

Example of Function Code 03:

request			response		
Field Name		**hexadecimal**	**Field Name**		**hexadecimal**
MBAP message header	Transmission identification	01	MBAP message header	Transmission identification	01
		00			00
	Protocol Logo	00		Protocol Logo	00
		00			00
	length	00		length	00
		06			07
	Unit identifier	01		Unit identifier	01
Function code		03	Function code		03
Starting address Hi		00	Byte count		04
Starting address Lo		00	Register value Hi		0B
Register number Hi		00	Register value Lo		twenty-three
Register number Lo		02	Register value Hi		1A
			Register value Lo		F4

Dimensions: (Unit: mm)



Can be installed on standard DIN35 rails

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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