



WF-WM410

WiFi Wireless High Speed High Precision
Inclinometer
Technical Manual



Introduction

WF-WM410 WiFi wireless high speed high precision inclinometer sensor is a miniaturized intelligent digital tilt sensor designed for structural health monitoring. Using rechargeable lithium battery, it can work continuously for 24 hours on a single charge (continuous measurement and data transmission), and can be quickly charged by an external special charger. Can meet the needs of high-precision and high-frequency monitoring With remote control and management functions, you can transfer data to the cloud by connecting to a wireless router. In terms of network connection, the sensor has an automatic disconnection and reconnection function, which effectively avoids problems caused by connection loss caused by network abnormalities and server maintenance.

The sensitive mechanism adopts the latest technology, the tilting unit of the micro-electromechanical production process, small size, low power consumption, consistency and stability High, because it is a digital tilt sensor module, the linearity is easier to correct. Working temperature reaches industrial grade $-25^{\circ}\text{C} \sim +85^{\circ}\text{C}$.

Characteristics

- Resolution 0.001°
- Biaxial inclination measurement range $\pm 90^{\circ}$
- More user-friendly design, more in line with the actual deployment needs on site
- Accuracy 0.01°
- Standard industrial grade design, very suitable for outdoor

Function

- Working frequency band 2412~2484MHz
- Power output
- Temperature output
- Small form factor, light weight and easy installation
- Connect to the Internet via a wireless router, Wireless data transmission to the cloud

Application

- Dangerous building monitoring
- Bridge pylon survey
- Dam monitoring
- Slope disaster prevention
- Ancient building protection monitoring
- Tunnel monitoring
- Foundation pit inclinometer
- Tower tilt monitoring

Product Introduction

Mechanical Characteristic

Connectors	Aviation plug
Protection level	IP65
Housing material	Magnesium aluminum alloy anode oxidation
Install	Three M4 screws

Performance Specifications

Measuring range(°)		±90
Measuring axis		X-Y
Accuracy(°)	At room temperature	0.01
Resolution(°)	Completely stationary	0.001
Zero temperature drift(°/°C)	-40~+85°C	±0.001
Cross-axis error(°)	25°C	0.01
Output frequency (Hz)		Up to 50
Mean Time Between Failure	≥100000 hours	
Electromagnetic compatibility	Accordance to GBT17626	
Insulation resistance	≥100 MΩ	
Impact-resistant	2000g, 0.5ms, 3Times/axis	
Size (mm)	L109*W65*H72.5	
Weight (g)	640 (±10)	

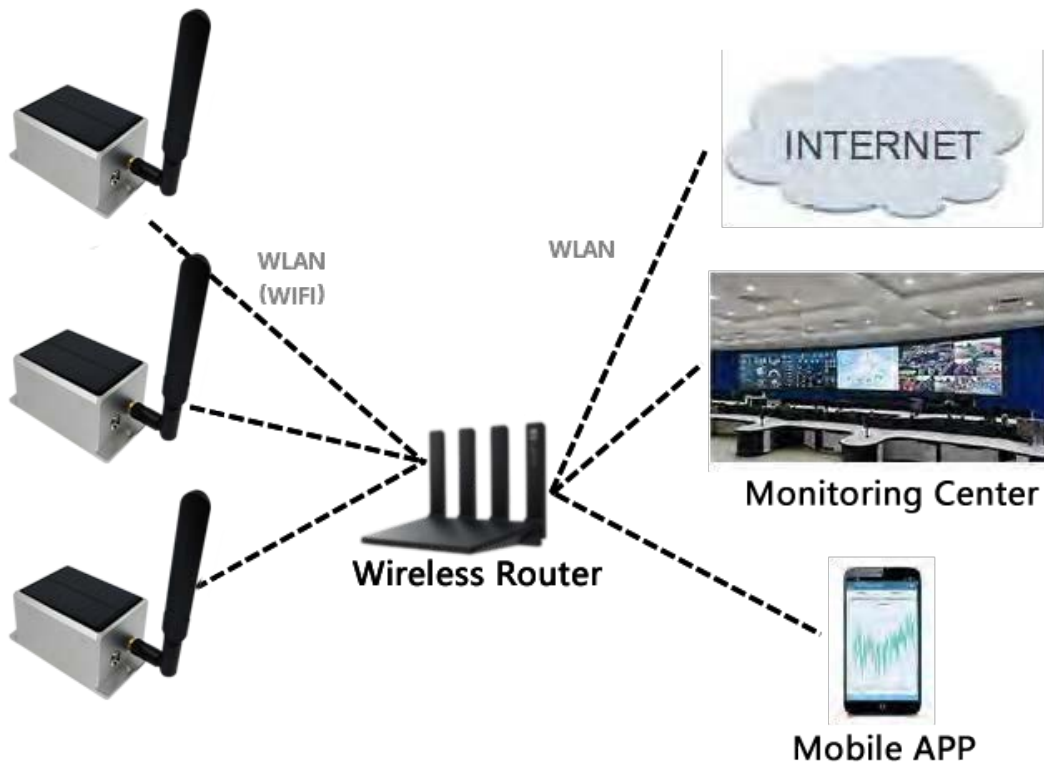
Resolution: The measured minimum change value that the sensor can detect and resolve within the measurement range.

Accuracy: The error between the actual angle and the Root mean square(RMS) of the measured angle of the sensor (≥ 16 times).

Electrical Specifications

Supply voltage	Charging voltage	4.2V DC
	Charging current	1000mA
	Operating current	80mA(Typical value)
	Sleep current	6 μ A (Typical value)
	Battery capacity	6000mAH
Transmit power	13~16 dBm	
Receiving sensitivity	-90~-67dBm	

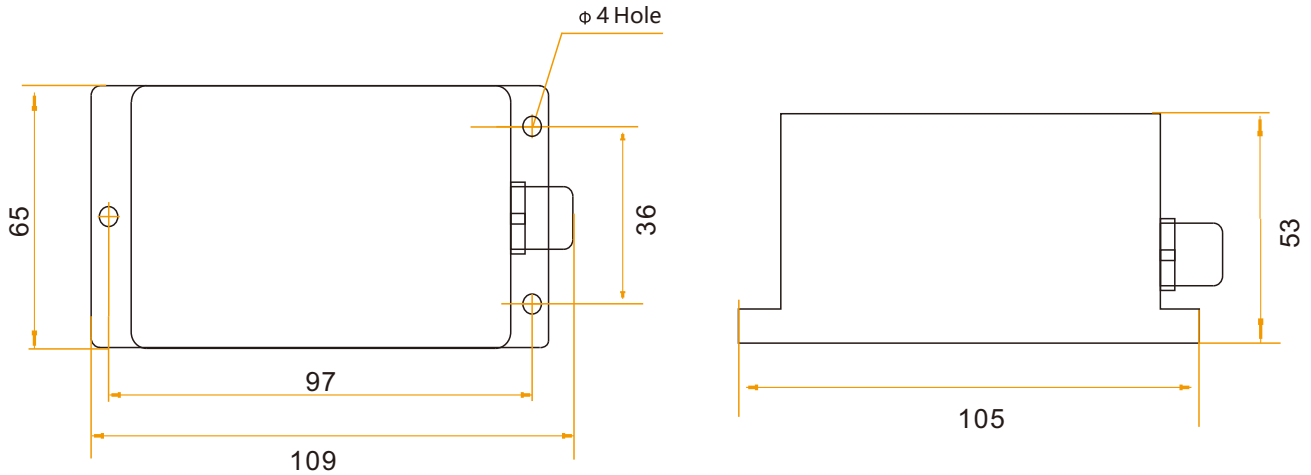
Network Topology



Package size

Product Size: L109*W65*H53 (mm)

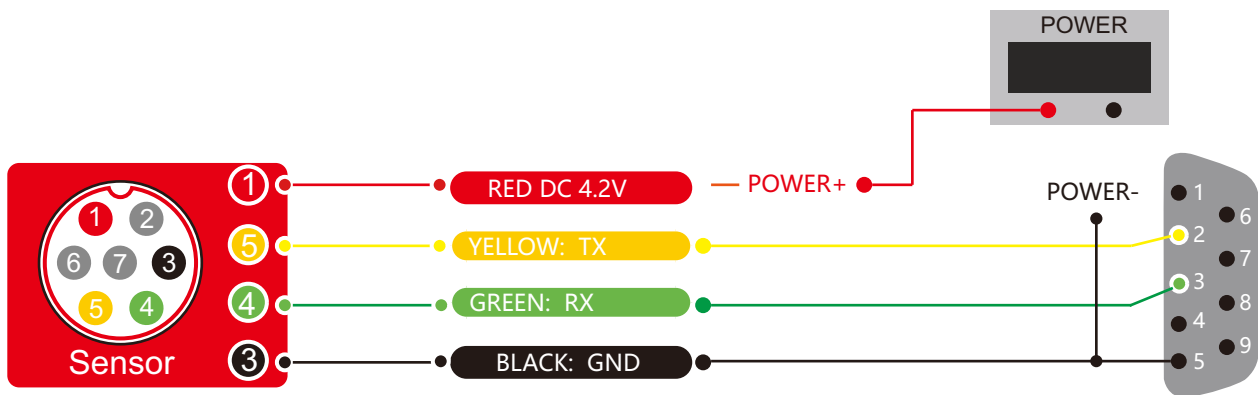
Note: ±1mm error for length and width dimensions, please refer to actual size.



Electrical connections

Definition of Aviation Plug Wiring

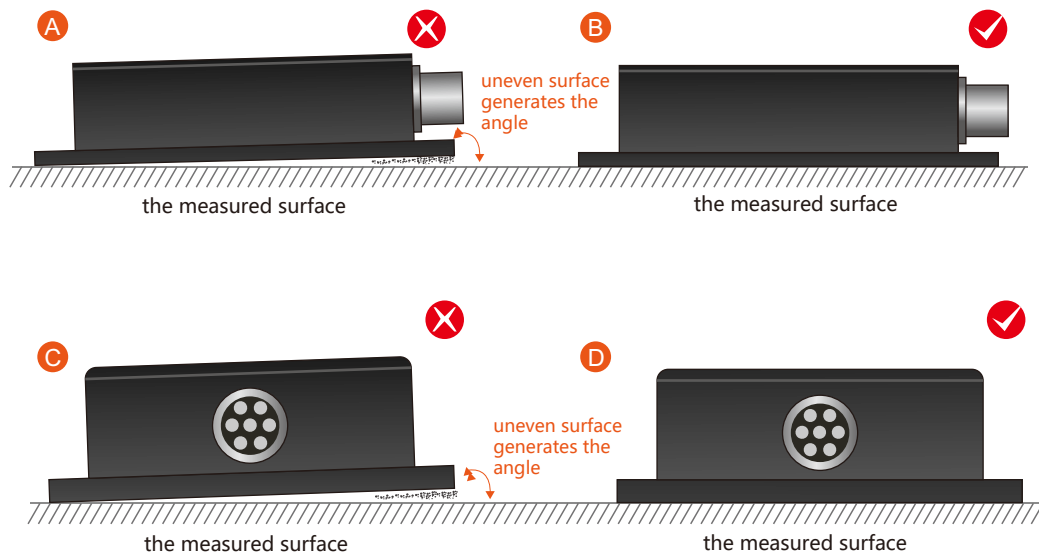
	RED		BLACK		GREEN		YELLOW
Color & function	1		3		4		5
	4.2V		GND		RX		TX



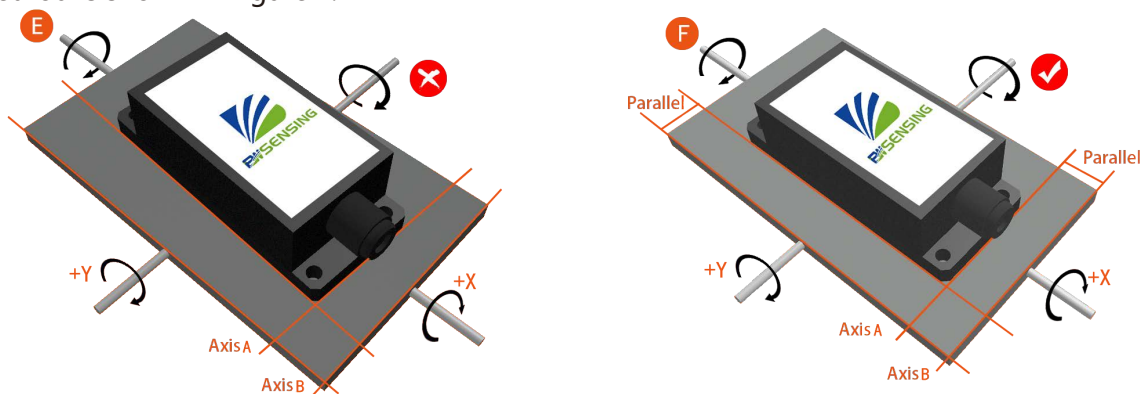
Product installation

The correct installation method can avoid measurement error. The following points should be made when installing the sensor:

First of all, to ensure that the sensor mounting surface and the measured surface completely close, the measured surface should be as horizontal as possible, can not have the angle shown in Figure A and Figure C, the correct installation is shown in Figure B and Figure D.



Secondly, the bottom cable of the sensor and the axis of the measured object shouldn't generate the angle shown in E. When installing, the bottom cable of the sensor should be kept parallel or orthogonal to the rotation axis of the measured object. This product can be installed horizontally or vertically (vertical installation requires customization). The correct installation method is shown in Figure F.



Finally, the installation surface of the sensor must be fixed with the measured surface tightly and smoothly, to avoid measurement error that may be caused by the acceleration and vibration.

Debugging method

1 Serial debugging tool

1-1 The company's serial tool iCOM serial debugging assistant

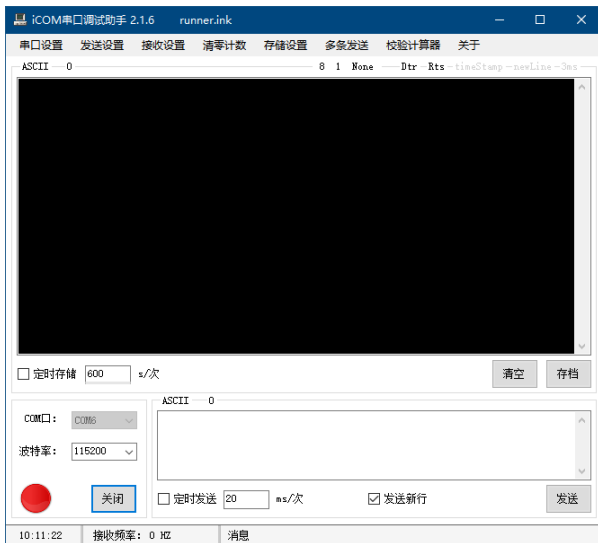
download link:

<http://www.bwsensing.com.cn/download.html>

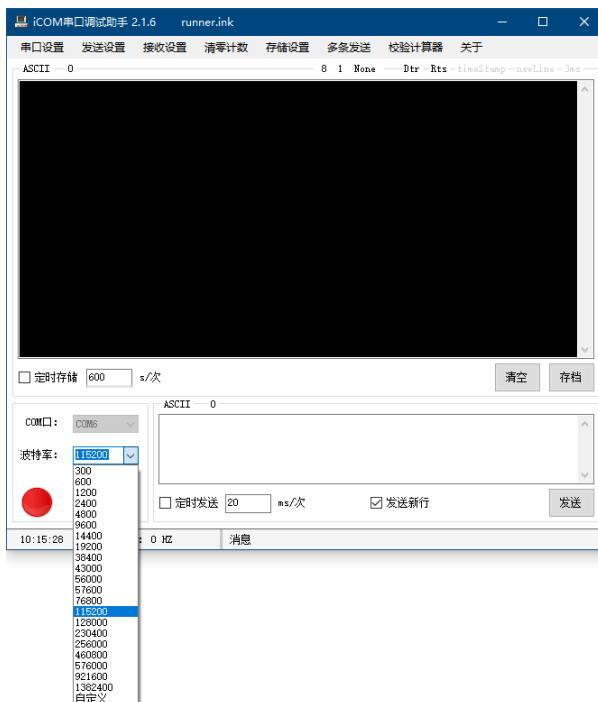
[http://www.bwsensing.com.cn/upload/userfile/Bewis Sensing iCOM serial port debugging assistant 2.0_9_.zip](http://www.bwsensing.com.cn/upload/userfile/Bewis_Sensing_iCOM_serial_port_debugging_assistant_2.0_9_.zip)

Instructions:

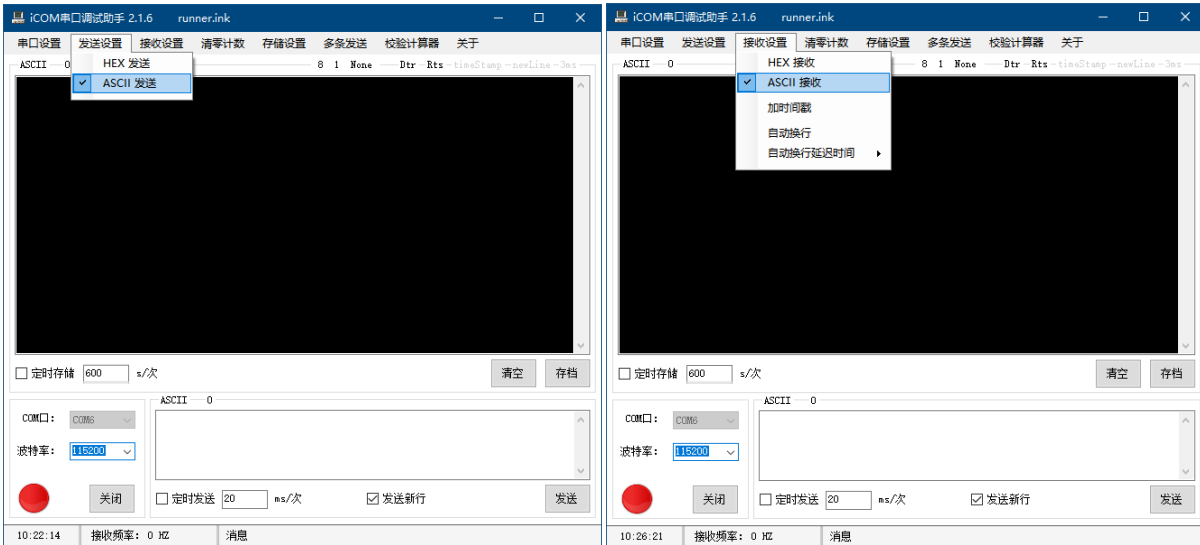
a Open the software and automatically connect to the serial port. If there are multiple serial ports, you can click Close, and then click Open after changing the COM port;



b Choose a baud rate of 115200;



c When using string commands for configuration, set the sending and receiving modes to both ASCII mode, and check Send New Line; when using HEX commands for configuration, select HEX for both sending and receiving modes;



d Enter the command to be sent and click Send.

1-2 Open source software PuTTY

This tool does not support the use of HEX commands for sensor configuration (HEX commands are not necessary), but special information can be marked with different colors when using string commands for configuration, and it also supports Linux systems.

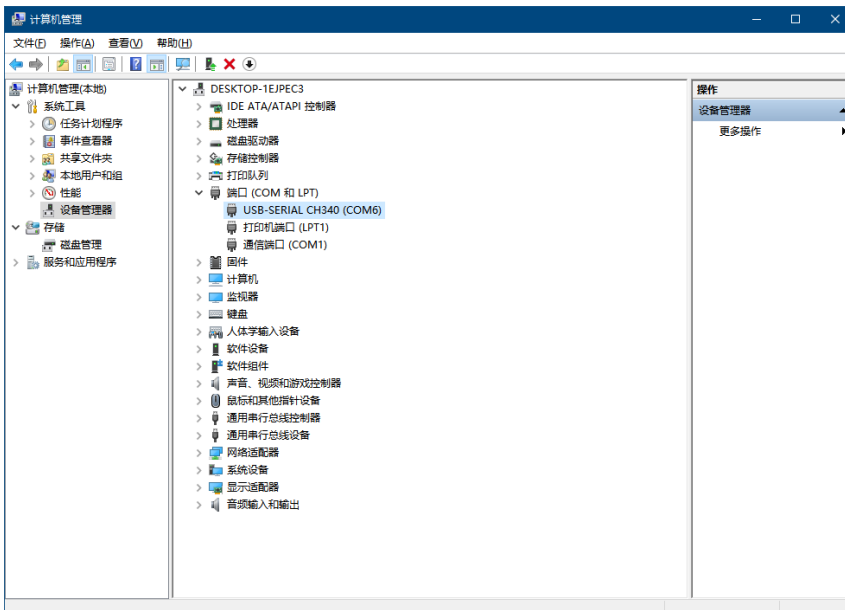
Download link:

<https://putty.org/>

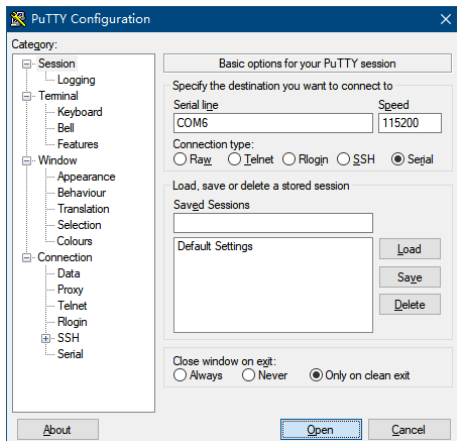
<https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html>

Instructions:

a Get the serial port number, right-click "This computer" -> Management -> Device Manager -> expand "Ports (COM and LPT)", if there are multiple COM*, you can try them one by one, but generally not COM1;



b Open the software;



c Click Serial, select serial port mode;

d Enter the serial port number (Serial line: COM*) and baud rate (Speed: 115200 by default);

e Click Open to open the serial port;



f Enter a command, and press Enter after typing a command.

Note: Except for Enter and Backspace, please do not press any non-printing characters (such as up, down, left, and right, ESC, etc.), otherwise the input command may be wrong, and if not necessary, please do not enter a space, the same Will cause command errors.

2 Network debugging tools

Note: Network debugging tools generally only transmit data to a single or a small number of network connections. When the number of sensors is large, it is recommended to open multiple debugging tools for multiple port transmission, and each port connects 2-4 sensors, otherwise the debugging tool may be seriously stuck It even crashes, if you use special software to receive, theoretically it is not subject to this restriction.

Note: Some ports may have special functions in the operating system. Please avoid using these ports for debugging when debugging, otherwise you may not be able to establish a connection or receive data. According to the regulations of IANA, it is recommended to use the ports 1024~49151 for data reception first.

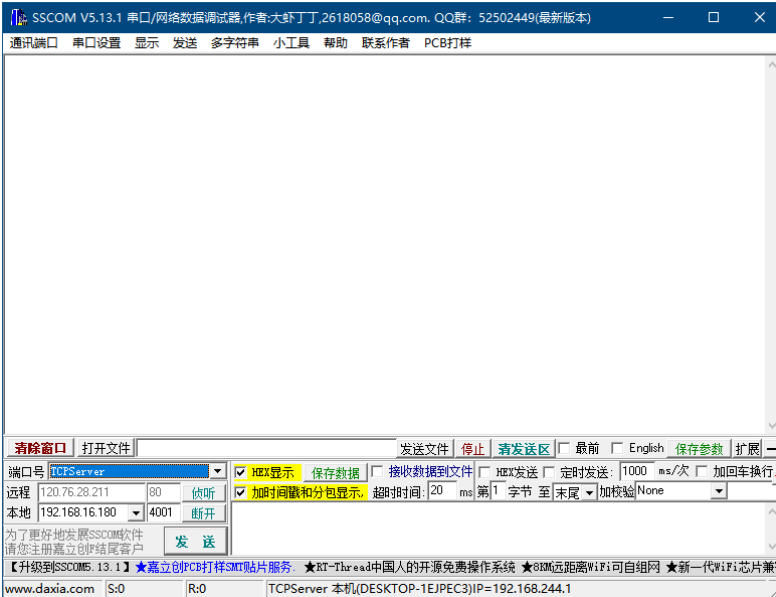
2-1 TCP/UDP debugging tool SSCOM

Download link:

<http://www.daxia.com/sscom/>
<http://www.daxia.com/sscom/sscom5.13.1.rar>

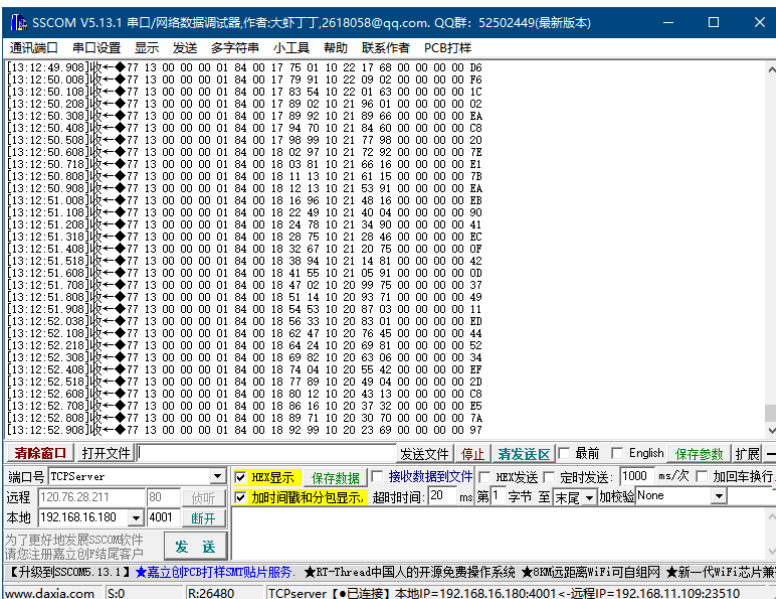
Instructions:

- a Open the software;
- b Port number select TCPServer (TCP protocol, debugging tool as server) or UDP (UDP protocol), set local IP and local port;

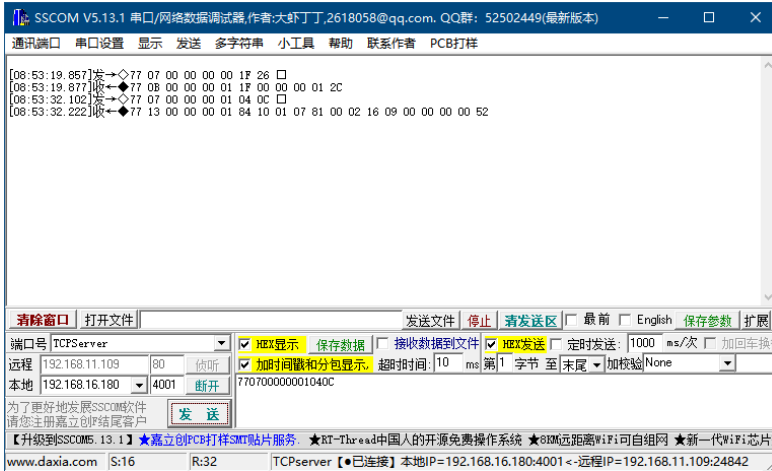


c Check "HEX Display" and "HEX Send" when using HEX commands for configuration or receiving automatic output data in HEX format; do not check "HEX Display" when using string commands for configuration or receiving automatic output data in string format And "HEX send", but check "Add carriage return and line feed"; you can check "Time stamp and subpackage display";

d Click Listen to start receiving data. If there is a pop-up window prompting network access, click Allow, the sensor will automatically connect, and the receiving effect is shown in the figure:



Enter the HEX command or string command, and click Send, you can control via WLAN, as shown in the figure:



Note: If the Socket is disconnected abnormally or the network is abnormal, it may cause the listening to stop, please pay attention to restart the listening.

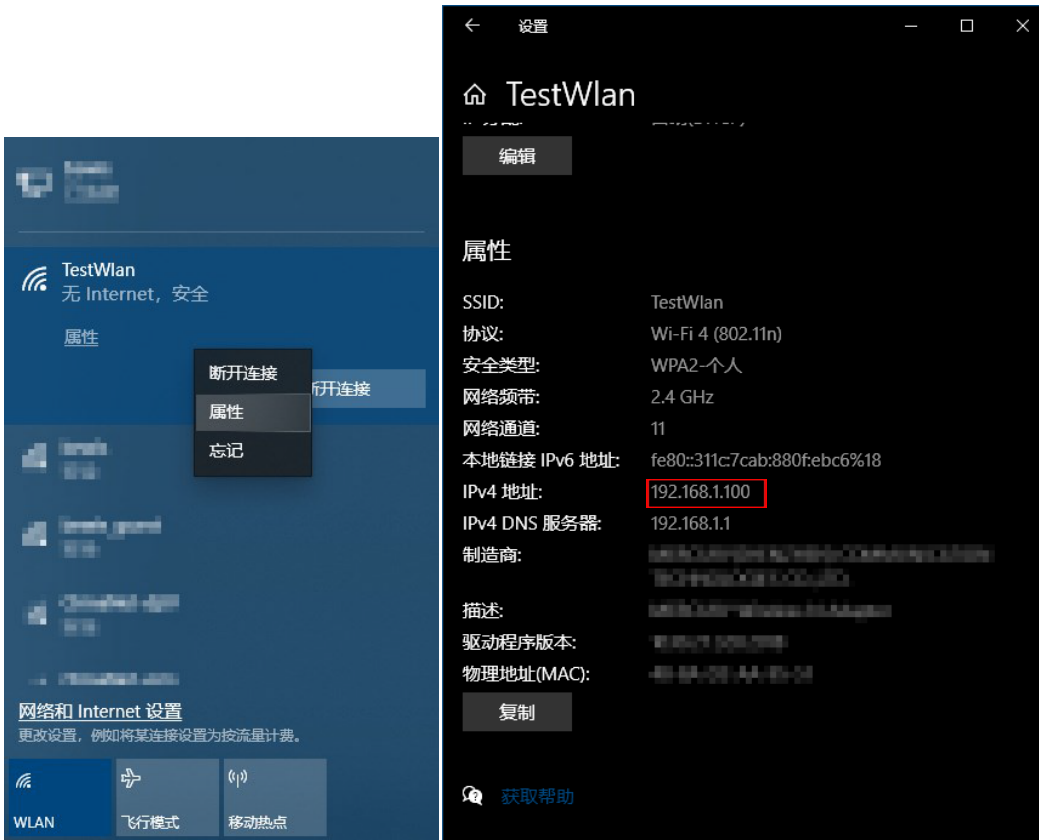
Quick start

1 Basic data collection

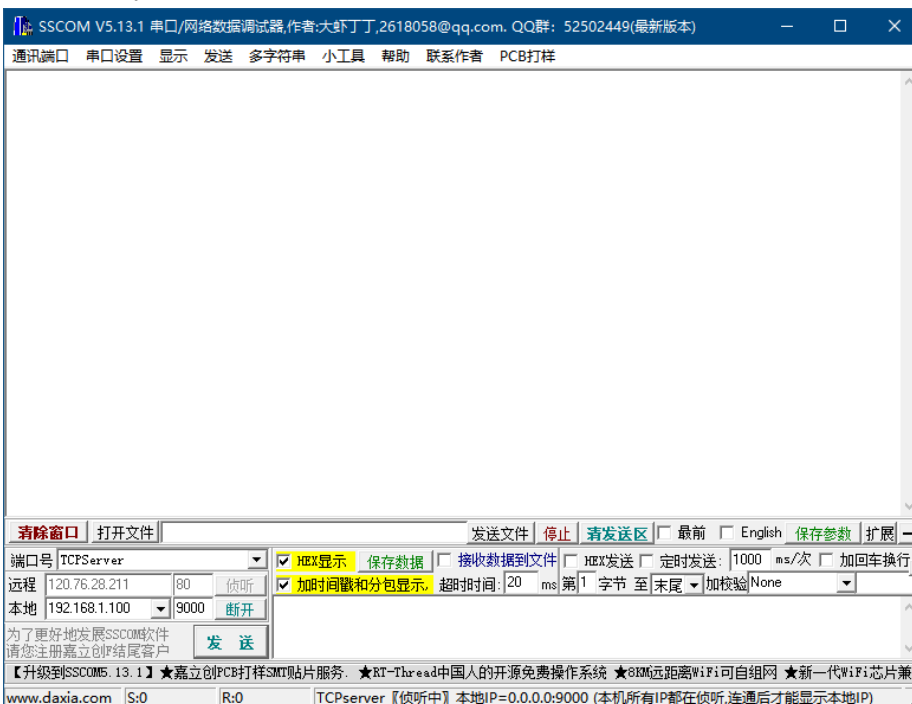
a Connect the computer to the router to which the sensor will be connected via WLAN or Ethernet.



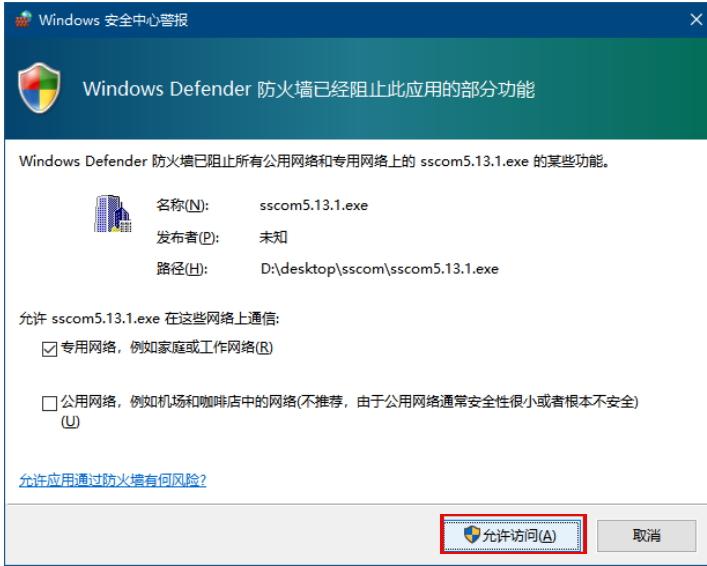
After connecting, check the network properties and record the IPv4 address (here, 192.168.1.100). This address is to set the receiver IP of the sensor.



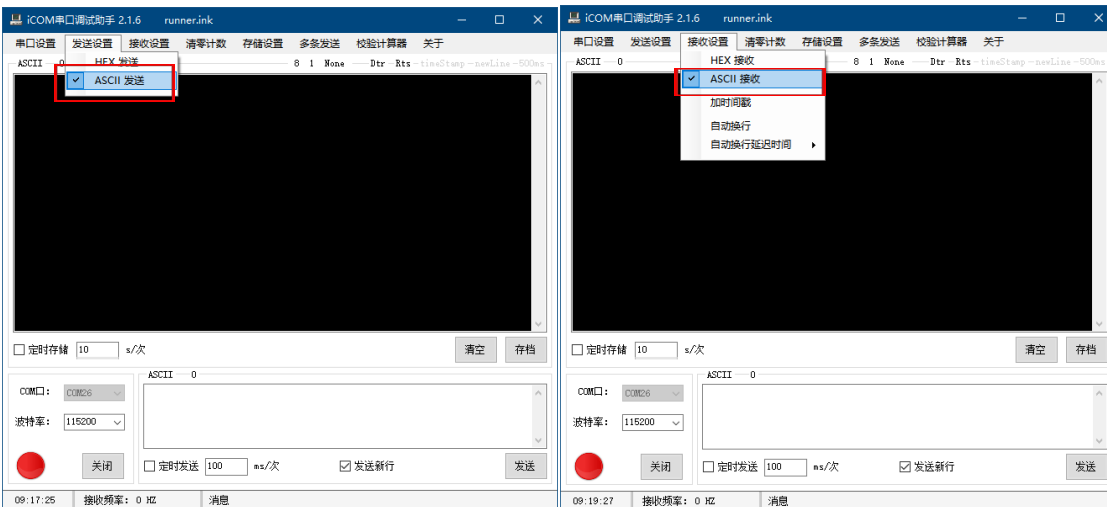
b Refer to section 2-1 in "Debugging Method" to open the network debugging tool SSCOM; select "TCPServer" as the port number; set the port to be listened to (any unoccupied port can be used, here is port 9000 as an example), This port is to set the receiver port of the sensor; check "HEX display", check "timestamp and sub-packet display" (optional); click listen, ready to receive data.



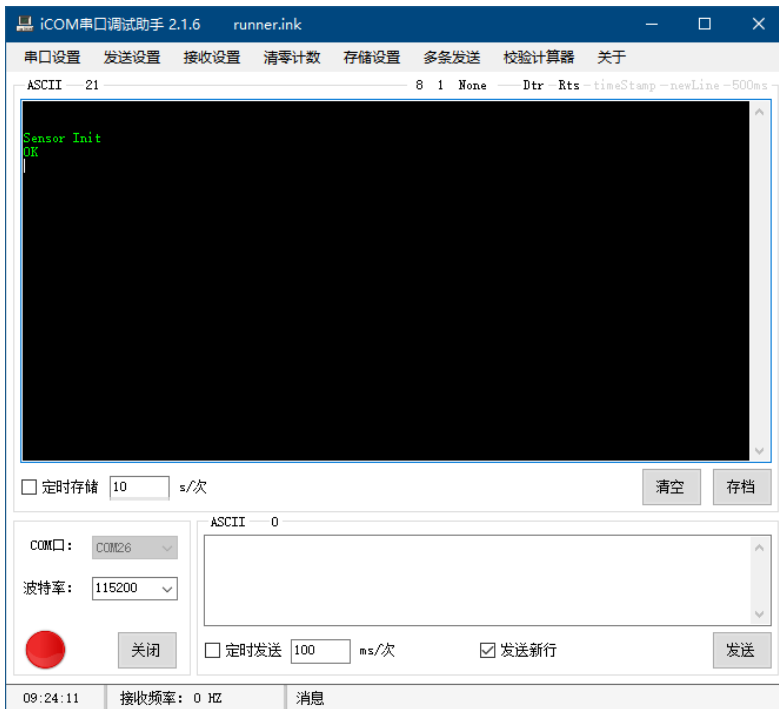
If you are prompted whether to block network activity, select Allow access.



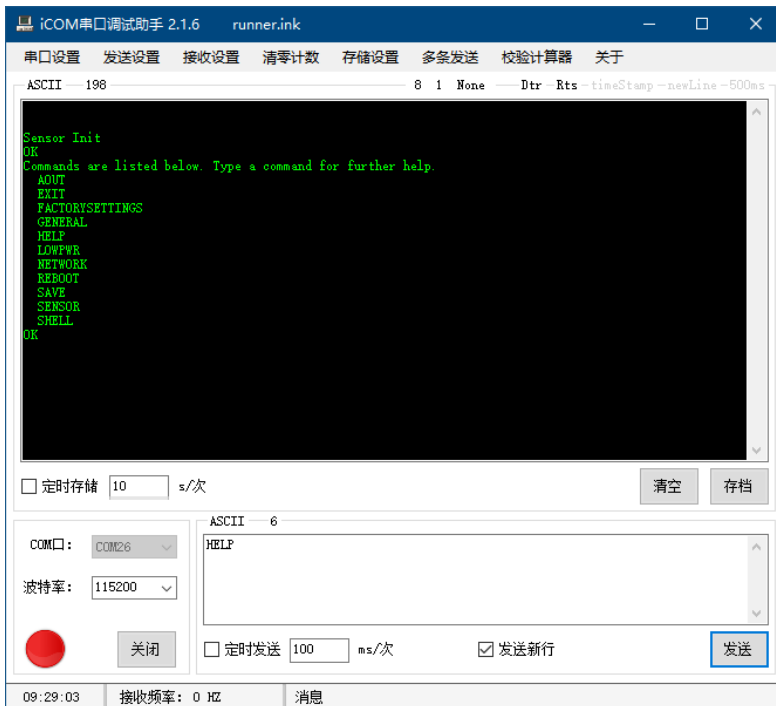
c Use a serial cable (USB to TTL serial port) to connect the sensor and the computer. Refer to section 1-1 in "Debugging method" to open the iCOM serial port debugging tool; select the COM port connected to the sensor (if there are multiple COM ports available); select the ASCII mode in both the sending and receiving settings; select the baud rate For 115200, check to send a new line.



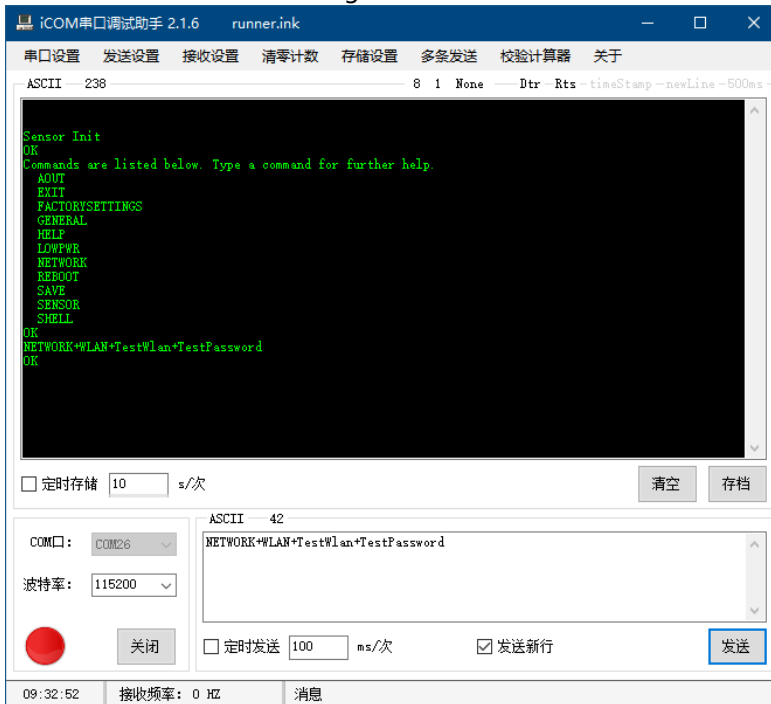
d Turn on the sensor switch, the serial port tool receives the following information, indicating that the sensor has been started normally.



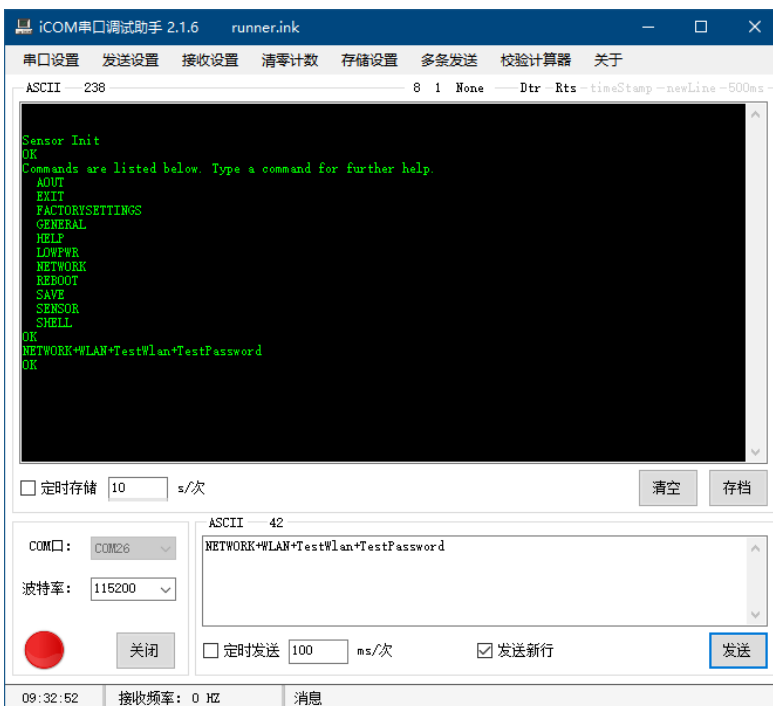
e Send any identifiable string command (HELP is used here) to make the sensor exit silent mode (the command sent in silent mode is not echoed). This step is not necessary. Sending subsequent commands directly is also valid. Enter the command HELP and click "Send".



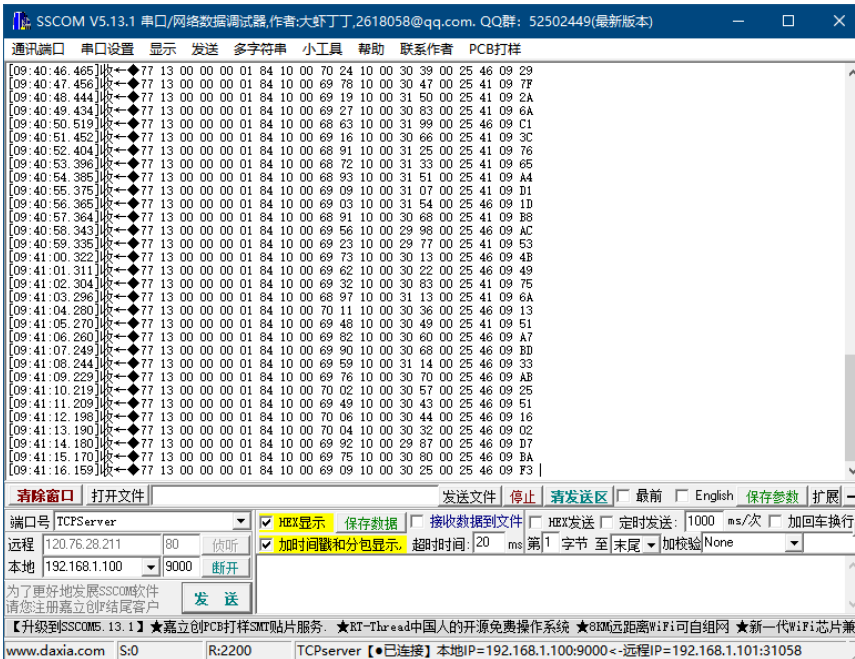
f Set WLAN information, send the command NETWORK+WLAN+TestWlan+TestPassword, where TestWlan is the WLAN name (SSID), TestPassword is the WLAN password, these two parameters are the same as in step a. For command details, refer to section 1-7-1 in "String Command".



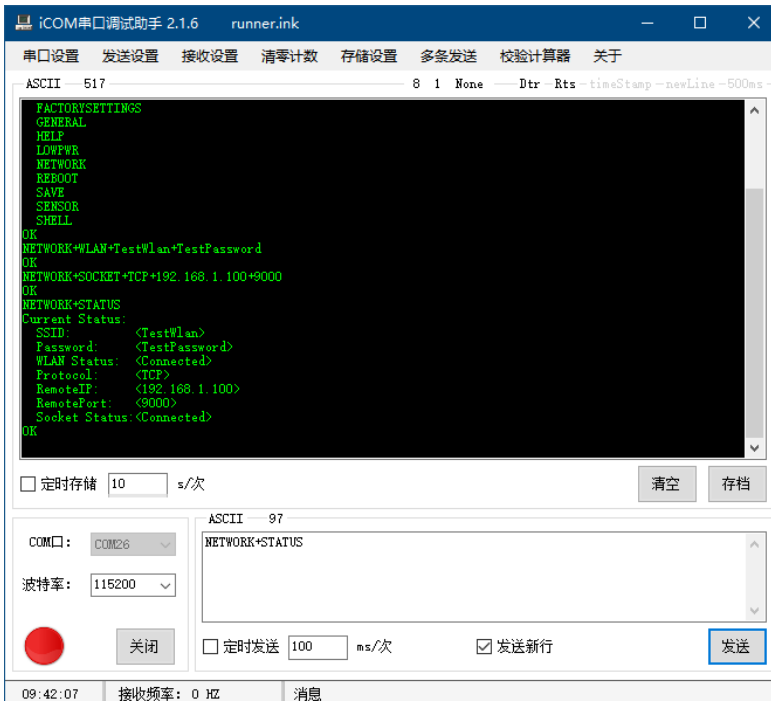
g Set Socket information and send the command NETWORK+SOCKET+TCP+192.168.1.100+9000. Among them, 192.168.1.100 is the receiving end IP, and 9000 is the receiving end port. The IP is the same as in step a, and the port is the same as in step b. For command details, refer to section 1-7-2 in "String Command".



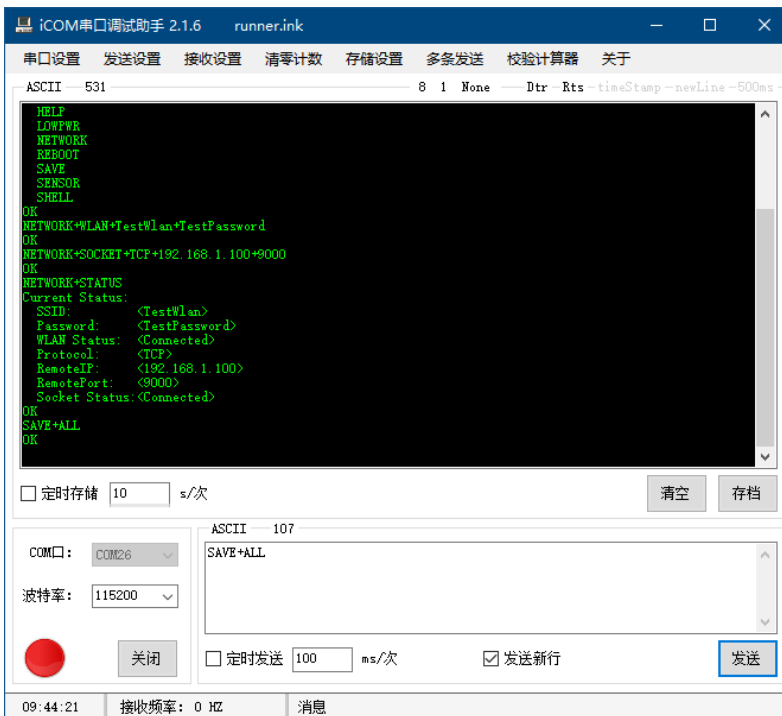
After waiting for several milliseconds to several seconds, the network connection is established, and the received data can be seen in the network tool SSCOM. For the default data analysis, please refer to section 2-2-3 of "HEX Command".



If the data is not received, you can send the command NETWORK+STATUS to check whether the network configuration is correct and whether the WLAN and Socket are connected.



g Send SAVE+ALL to save the configuration.



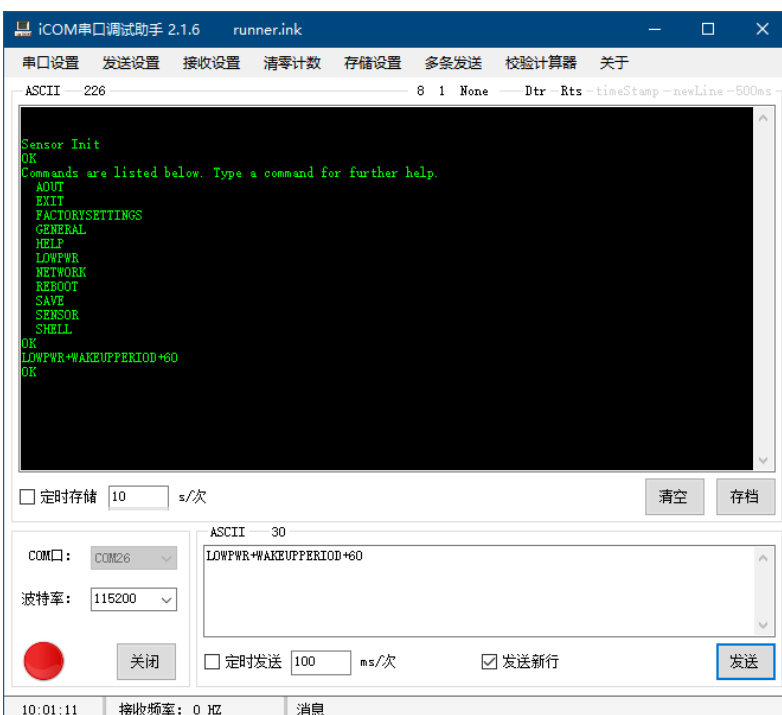
2 Low-power operating mode configuration

If the frequency of collecting data is low (for example, the frequency is less than once per minute), configuring the sensor to work with low power consumption can greatly increase the standby time of the sensor and reduce the charging frequency. After the sensor has been able to send data to the receiving device via WLAN, perform the following operations to configure the sensor to work in low power consumption.

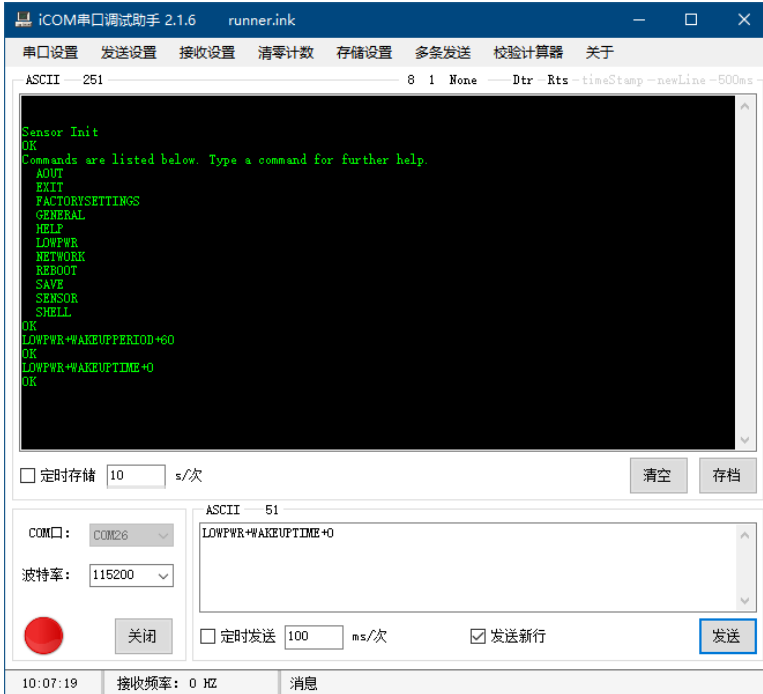
Assuming that the WLAN and Socket information have been correctly configured, the data can be received normally.

a Send any recognizable string command (such as HELP) to make the sensor exit silent mode. This step is not necessary.

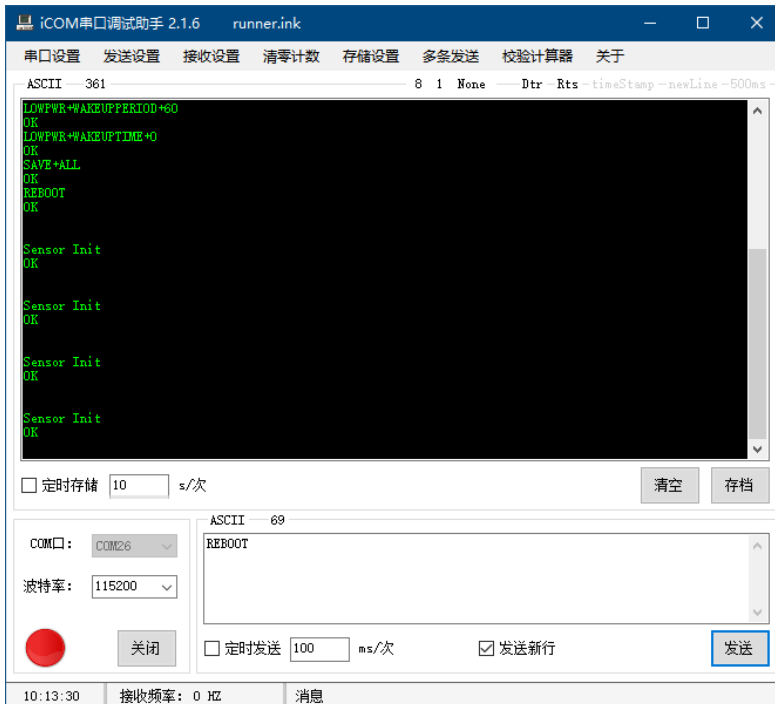
b Send LOWPWR+WAKEUPPERIOD+60, and set the sleep wake-up period to 60 seconds. Set to 0 or any value not greater than the wake-up hold time to turn off the sleep function. For command details, refer to section 1-6-1 in "String Command".

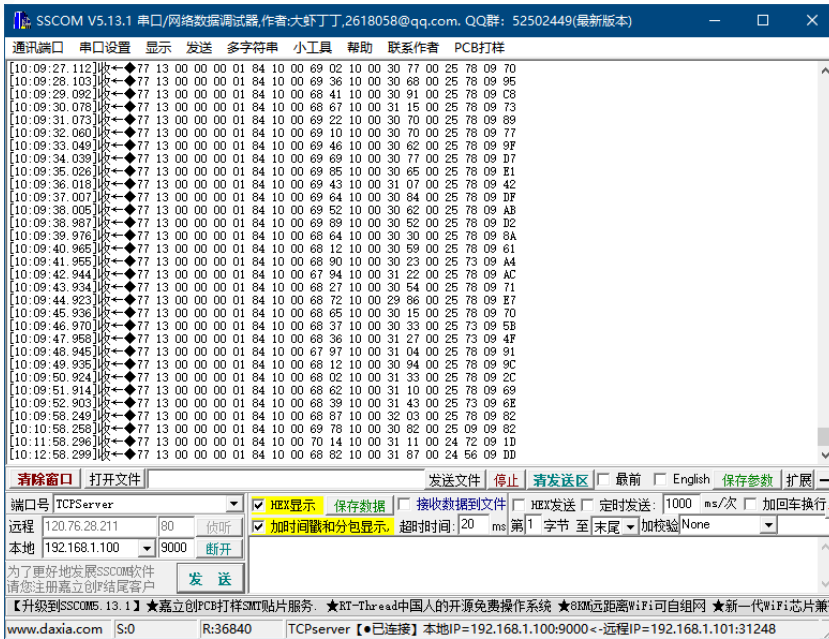


c Send LOWPWR+WAKEUPTIME+0, set the wake-up hold time to 0 seconds, that is, after each wake-up, it will go to sleep immediately after successfully sending the first data via WLAN. If the network connection uses the UDP protocol, it is recommended to set a certain length of wake-up hold time and set a shorter automatic output period to avoid difficulty in receiving data due to network problems. For command details, refer to section 1-6-2 in "String Command".



d Send SAVE+ALL to save the configuration. Send REBOOT or power on to restart the sensor. The low-power-related configuration will take effect after restarting.





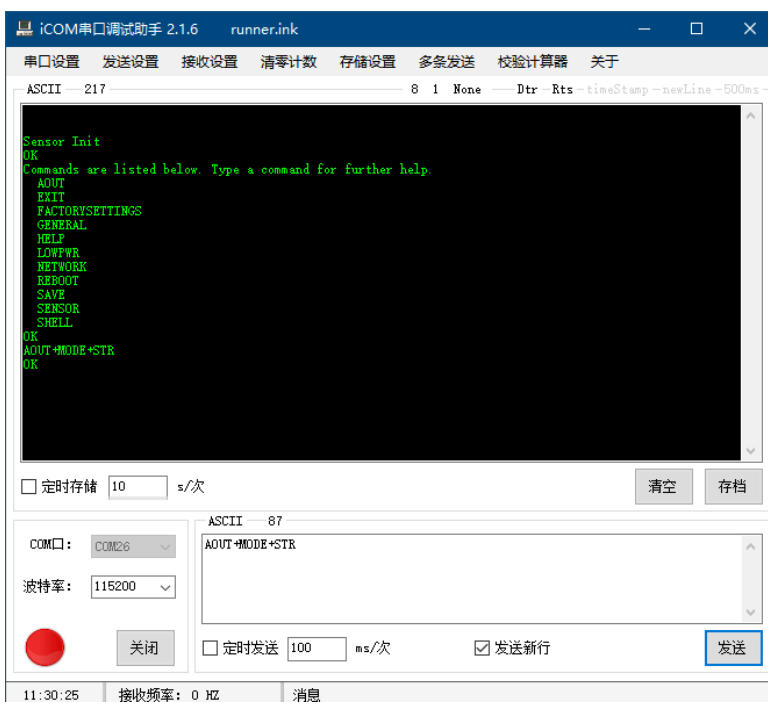
e To change the sensor configuration, please send any identifiable command (such as HELP) before sleeping after the next wake-up to prevent sleep. In addition, after the sensor is stable for a period of time, tilt it to a certain angle, and the sensor can be waked up immediately by the motion wake-up function.

3 Send data to Beiwei Cloud

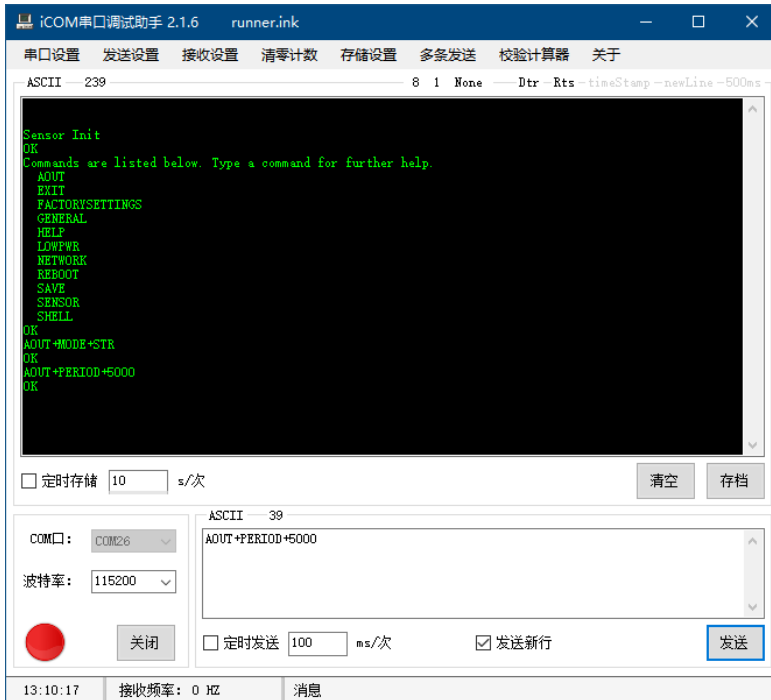
The sensor data can be sent to Beiwei Cloud through the following operations. Please ask the sales staff for the specific Beiwei Cloud account and sensor ID allocation. Note that when sending sensor data to Beiwei Cloud, the sensor ID is a 9-digit BCD code form of decimal number, not an 8-digit hexadecimal number; and the automatic data output cycle cannot be less than 5 seconds.

It is assumed that the WLAN information has been configured correctly.

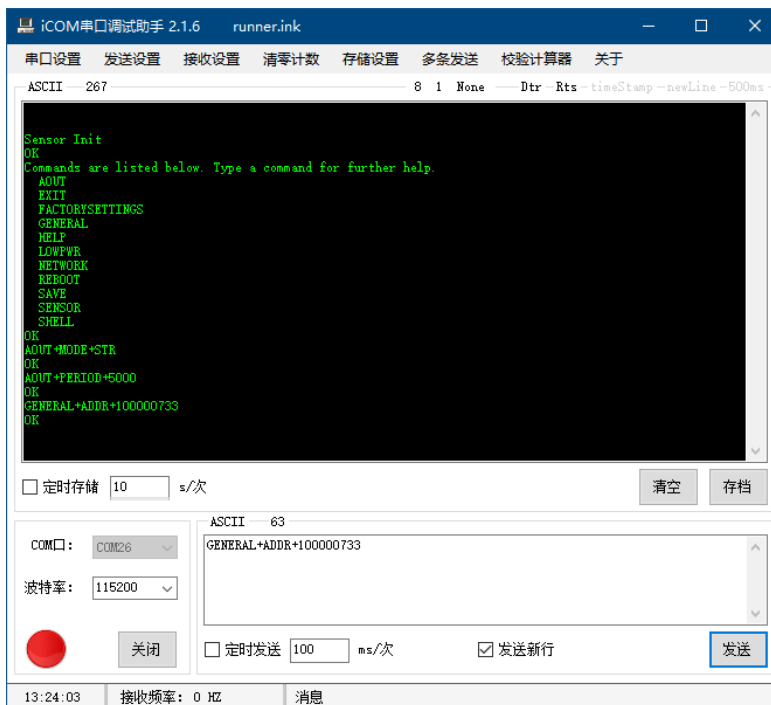
- a Send any recognizable string command (such as HELP) to make the sensor exit silent mode. This step is not necessary.
- b Send AOUT+MODE+STR to set the automatic output format of the sensor to STR mode.



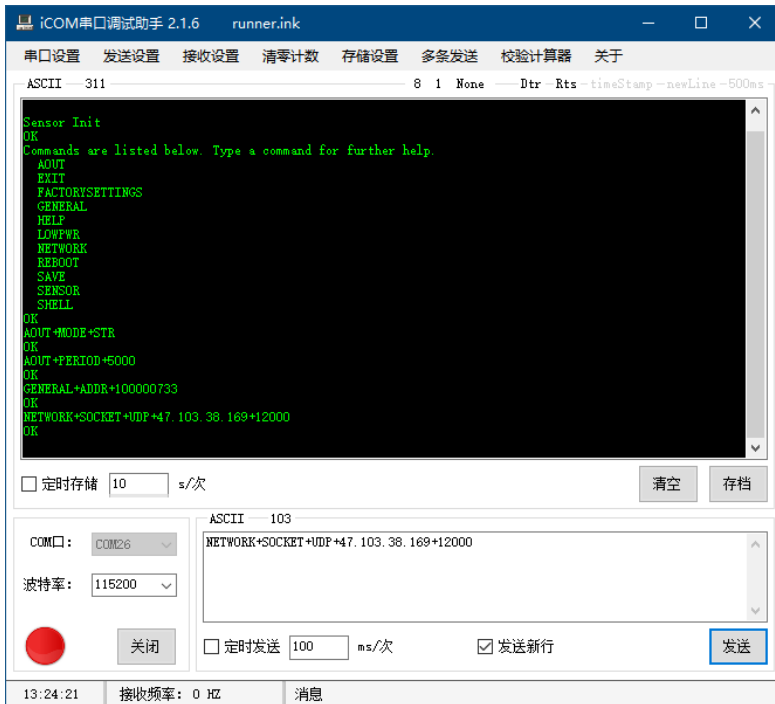
c Send AOUT+PERIOD+5000 and set the sensor's automatic output frequency to 5 seconds (slightly higher than 5 seconds is recommended). For command details, refer to section 1-1-1 in "String Commands".



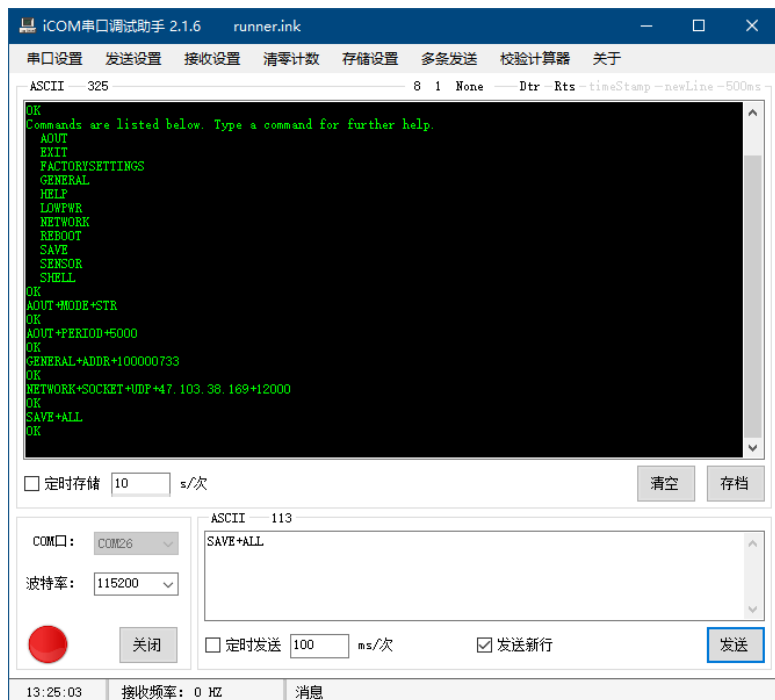
d Set the sensor ID, here is 100000733 as an example, send `GENERAL+ADDR+100000733`.



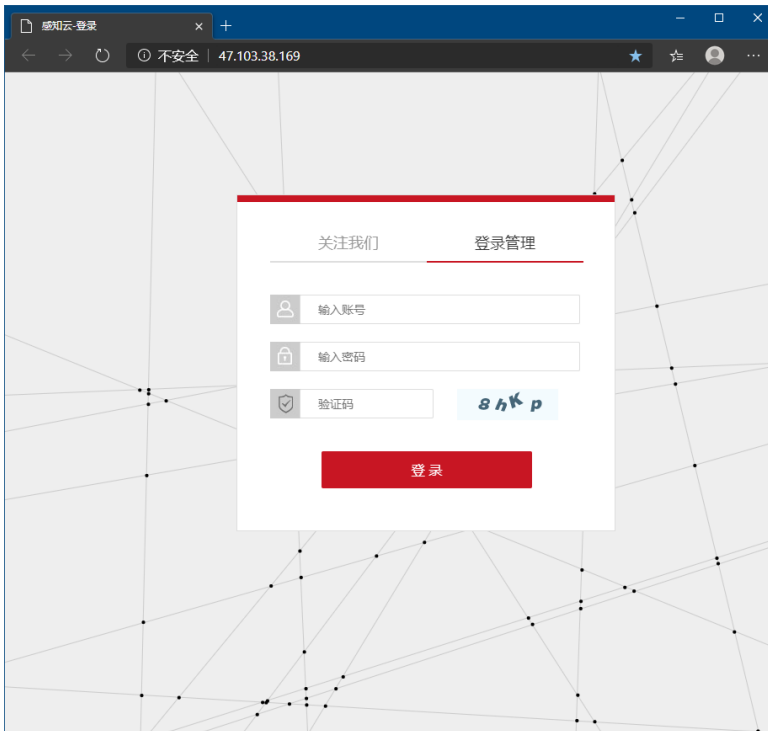
e Send NETWORK+SOCKET+UDP+47.103.38.169+12000, and set the target IP and port of the sensor to the IP and port of Beiwei Cloud.



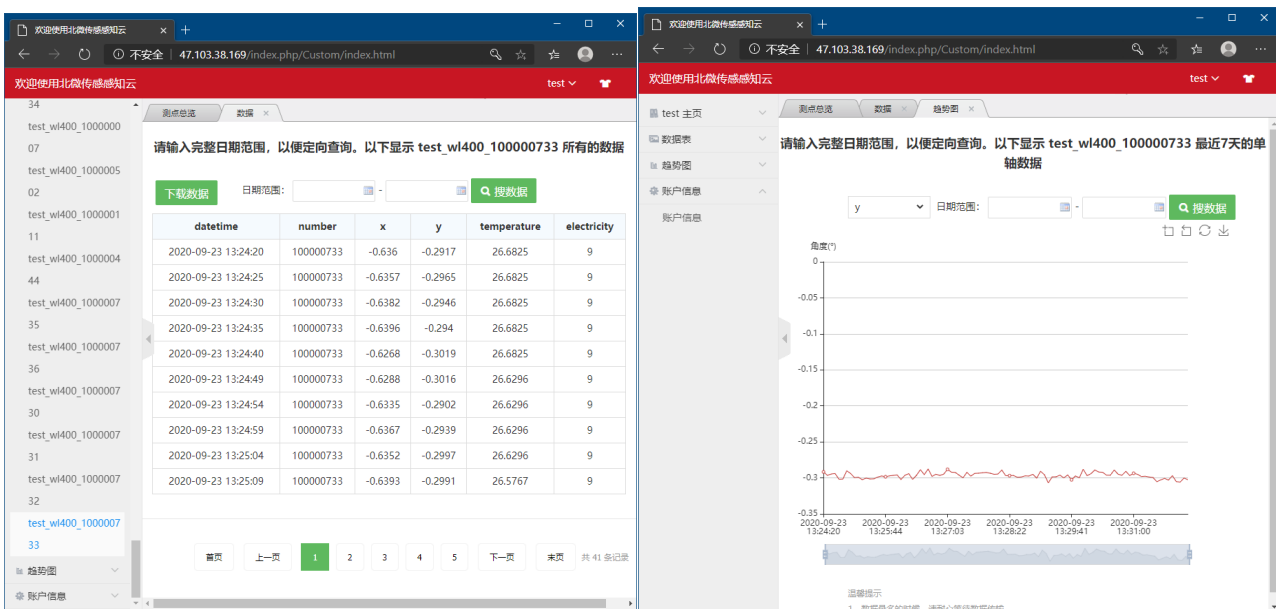
f Send SAVE+ALL to save the configuration.



g Log in to the Beiwei Cloud website at <http://47.103.38.169/>. Log in with the provided account and password.



Select the sensor corresponding to the ID in the "Data Table" column on the left to view and export the collected data. You can also view the change curve in the "Trend Graph" column.



Command list

The following commands can configure the basic parameters of the sensor through the serial port. When the WLAN is connected, it can also be configured through the network. The default configuration of the serial port is 115200bps, 8-bit data length, 1 stop bit, and no parity bit. For the use of debugging tools, please refer to the "Debugging Methods" section.

HEX command starts from P35.

The sensor is set to automatically send data after power-on by default. To disactive this function, please follow this command below.

String mode:

AOUT+PERIOD+0 or AOUT+P+0 【Disactive automatic output】

HEX mode:

77 0B 00 00 00 00 0C 00 00 00 00 17 【Disactive automatic output】

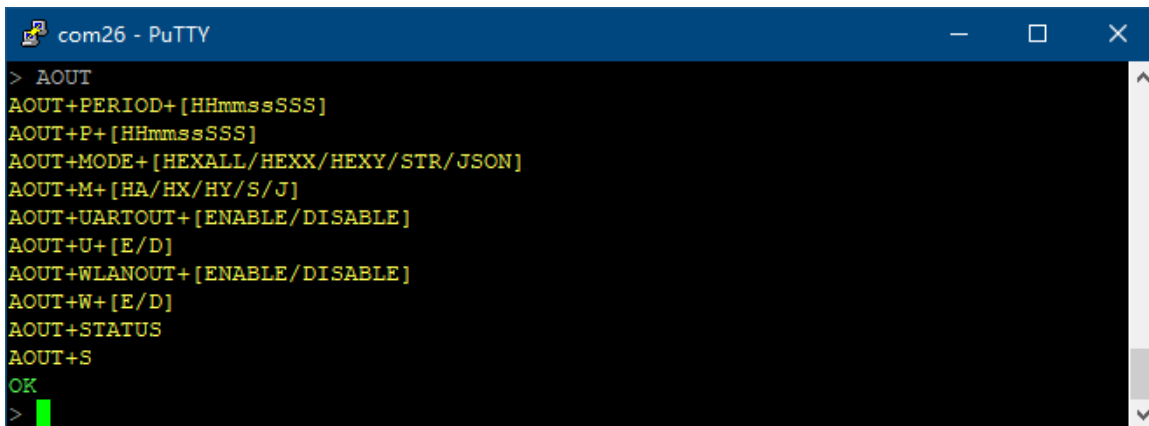
1 String command

The pictures are all using the serial port tool PuTTY and the sensor display mode is set to the advanced mode.

After the sensor is powered on, it enters the silent mode, and there is no echo when sending a string command, but all commands are valid. After sending any recognizable string command, it will automatically exit the silent mode, and there will be a command echo in the non-minimal mode. No matter what string command is sent, OK or ERROR (actually "OK\r\n" or "ERROR\r\n") will be returned at the end.

1-1 Automatic output setting AOUT

The following commands can configure the automatic output cycle, data format, and automatic output path. You need to send the save command SAVE+AOUT or SAVE+ALL to save.



```
com26 - PuTTY
> AOUT
AOUT+PERIOD+[HHmmssSSS]
AOUT+P+[HHmmssSSS]
AOUT+MODE+[HEXALL/HEXX/HEXY/STR/JSON]
AOUT+M+[HA/HX/HY/S/J]
AOUT+UARTOUT+[ENABLE/DISABLE]
AOUT+U+[E/D]
AOUT+WLANOUT+[ENABLE/DISABLE]
AOUT+W+[E/D]
AOUT+STATUS
AOUT+S
OK
>
```

1-1-1 Set automatic output cycle

The format of the cycle time is 9 digits HHmmssSSS, the 1-3 digits from right to left are milliseconds, 4-5 digits are seconds, 6-7 digits are minutes, 8-9 digits are hours, and the 0 on the left can be omitted. For example, 123456 means 1 minute, 23 seconds, and 456 milliseconds. When the automatic output period is set to 0, it will only output once after each reset or wake-up. The default is 1 second.

Send: **AOUT+PERIOD+HHmmssSSS**

or **AOUT+P+HHmmssSSS**

Return: **OK**



```
com26 - PuTTY
> AOUT+PERIOD+1000
OK
>
```

1-1-2 Set automatic output content format

There are a total of 5 automatic output content formats, namely: dual-axis angle and temperature power (HEXALL/HA) in HEX format, and X-axis angle in HEX format (HEXX/HX), Y-axis angle in HEX format (HEXY/HY), dual-axis angle in string format and temperature power (STR/S), dual-axis angle in JSON string format and temperature power time information (JSON/ J). The default HEXALL format.
For the data format of the first three HEX formats, please refer to sections 2-2-1 to 2-2-3 in "HEX Command".

The data in string format is as follows:

000000001,+000.6351,-000.3956,+027.2645,9

The length of this data is fixed, 000000001 is the sensor ID, +000.6351 is the X-axis angle in degrees (deg), -000.3956 is the Y-axis angle in degrees (deg), +027.2645 is the temperature in degrees Celsius, and 9 is the power level, The highest is 9 and the lowest is 0. After each data frame, there is a line break.

The data in JSON string format is as follows:

{"Addr": "00000001", "X": 0.4010, "Y": -0.7471, "Temp": 27.26, "Batt": 9, "Date": "20-09-21", "Time": "10:23:20"}

This data is in full compliance with the JSON format, "Addr": "00000001" is the sensor ID, "X": 0.4010 is the X-axis angle in degrees (deg), "Y": -0.7471 is the Y-axis angle in degrees (deg), "Temp": 27.26 is the temperature in degrees Celsius, "Batt": 9 is the power level, "Date": "20-09-21" is the date, the order of year, month and day can be modified in the GENERAL command, "Time ": "10:23:20" is the time. In the 12-hour format, the time information also contains AM/PM information. After each data frame, there is a \r\n line break.

Send: AOUT+MODE+HEXALL or HEXX or HEXY or STR or JSON

Or AOUT+M+HA or HX or HY or S or J

Return: OK



```
com26 - PuTTY
> AOUT+MODE+HEXALL
OK
>
```

1-1-3 Set the automatic output enable of the serial port

This command can set whether the automatic output content is output from the serial port. If both the serial port and WLAN output are enabled, the serial port will automatically output only when the WLAN is connected, and the output content of the two is exactly the same.

Send: AOUT+UARTOUT+ENABLE or DISABLE

Or AOUT+U+E or D

Return: OK



```
com26 - PuTTY
> AOUT+UARTOUT+DISABLE
OK
>
```


1-1-4 Set the automatic output enable of WLAN

This command can set whether the automatically output content is output from WLAN.

Send: AOUT+WLANOUT+ENABLE or DISABLE

Or AOUT+W+E or D

Return: OK



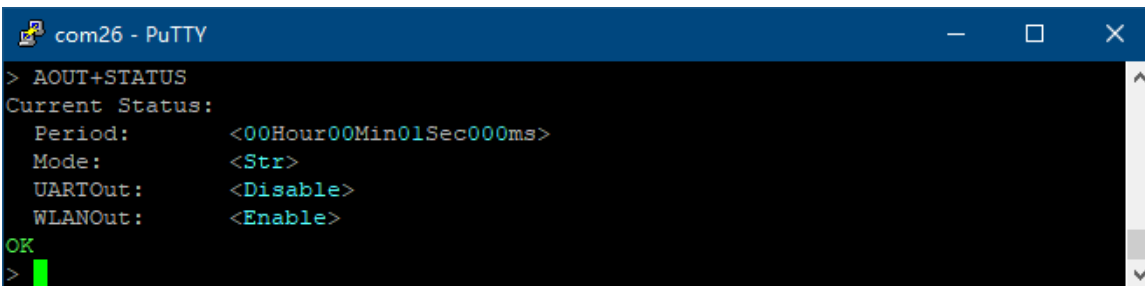
```
com26 - PuTTY
> AOUT+WLANOUT+ENABLE
OK
>
```

1-1-5 View all automatic output configurations

Send: AOUT+STATUS

Or AOUT+S

Return: configuration information and OK



```
com26 - PuTTY
> AOUT+STATUS
Current Status:
  Period:      <00Hour00Min01Sec000ms>
  Mode:        <Str>
  UARTOut:     <Disable>
  WLANOut:     <Enable>
OK
>
```

1-2 Enter silent mode EXIT

After entering the silent mode, the sent data will no longer be displayed, but all commands are still valid. Sending any identifiable string command can exit the silent mode.

Send: EXIT

Return: OK

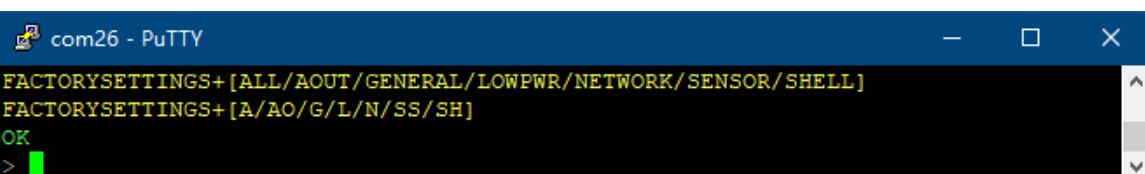
At the same time the sensor enters silent mode



```
com26 - PuTTY
> EXIT
OK
>
```

1-3 Restore factory settings FACTORYSETTINGS

You can reset some or all of the configuration and save the default configuration.



```
com26 - PuTTY
FACTORYSETTINGS+[ALL/AOUT/GENERAL/LOWPWR/NETWORK/SENSOR/SHELL]
FACTORYSETTINGS+[A/AO/G/L/N/SS/SH]
OK
>
```

Send: FACTORYSETTINGS+ALL or AOUT or GENERAL or LOWPWR or NETWORK or SENSOR or SHELL or FACTORYSETTINGS + A or AO or G or L or N or SS or SH

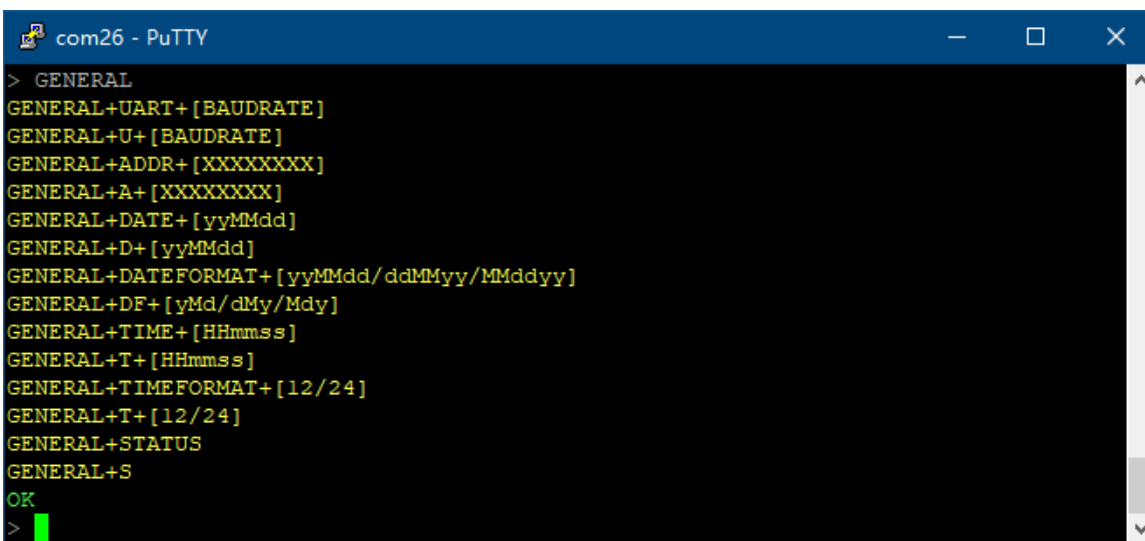
Return: OK



```
com26 - PuTTY
> FACTORYSETTINGS+ALL
OK
```

1-4 General settings GENERAL

The following commands can set the serial port baud rate, ID, date, date format, time, and time format of the sensor. In addition to the date and time, you need to send the save command SAVE + GENERAL or SAVE+ALL to save.



```
com26 - PuTTY
> GENERAL
GENERAL+UART+ [BAUDRATE]
GENERAL+U+ [BAUDRATE]
GENERAL+ADDR+ [XXXXXXXX]
GENERAL+A+ [XXXXXXXX]
GENERAL+DATE+ [yyMMdd]
GENERAL+D+ [yyMMdd]
GENERAL+DATEFORMAT+ [yyMMdd/ddMMyy/MMddy]
GENERAL+DF+ [yMd/dMy/Mdy]
GENERAL+TIME+ [HHmmss]
GENERAL+T+ [HHmmss]
GENERAL+TIMEFORMAT+ [12/24]
GENERAL+T+ [12/24]
GENERAL+STATUS
GENERAL+S
OK
>
```

1-4-1 Set the serial port baud rate

The recommended serial port baud rate range is 2400~460800bps. The baud rate changes after receiving the return information.

Send: GENERAL+UART+Baud rate

Or GENERAL+U+Baud rate

Return: OK



```
com26 - PuTTY
> GENERAL+UART+115200
OK
>
```

1-4-2 Set sensor ID

The sensor ID can be used to distinguish multiple sensors when automatically outputting and receiving HEX commands. This ID is 8-digit hexadecimal data. When configured as a 9-digit ID, the highest bit can only be 0-9, and it is only valid in the automatic output data in string format (STR). The high-order 0 can be omitted.

Send: GENERAL+ADDR+ID

Or GENERAL+A+ID

Return: OK



```
com26 - PuTTY
> GENERAL+ADDR+00000001
OK
>
```

1-4-3 Set sensor date

The default date format is yyMMdd, yy is the last two digits of the year, MM is the month, and dd is the date. For example, 010203 means February 03, XX01. The order of year, month and day can be set with the GENERAL+DATEFORMAT command, and the format of the configured date is consistent with the order of setting.

Send: GENERAL+DATE+Date

Or GENERAL+D+date

Return: OK



```
com26 - PuTTY
> GENERAL+DATE+200101
OK
>
```

1-4-4 Set the sensor date format

The optional formats are year, month, day (yyMMdd), day, month, year (ddMMyy), and month, day, year (MMddy). All date formats are the same as those set here, and the default is yyMMdd.

Send: GENERAL+DATEFORMAT+yyMMdd or ddMMyy or MMddy

Or GENERAL+DF+yMd or dMy or Mdy

Return: OK



```
com26 - PuTTY
> GENERAL+DATEFORMAT+yyMMdd
OK
>
```

1-4-5 Set sensor time

The format of time is HHmmss, HH is hour, mm is minute, ss is second, 24 hour system, for example, 123456 means 12:34:56.

Send: GENERAL+TIME+time

Or GENERAL+T+time

Return: OK



```
com26 - PuTTY
> GENERAL+TIME+120000
OK
>
```

1-4-6 Set the sensor time format

You can choose 12-hour clock or 24-hour clock, and the default is 24-hour clock.

Send: GENERAL+TIMEFORMAT+12 or 24

Or GENERAL+TF+12 or 24

Return: OK



```
com26 - PuTTY
> GENERAL+TIMEFORMAT+24
OK
>
```

1-4-7 View all common configurations

Send: GENERAL+STATUS

Or GENERAL+S

Return: configuration information and OK



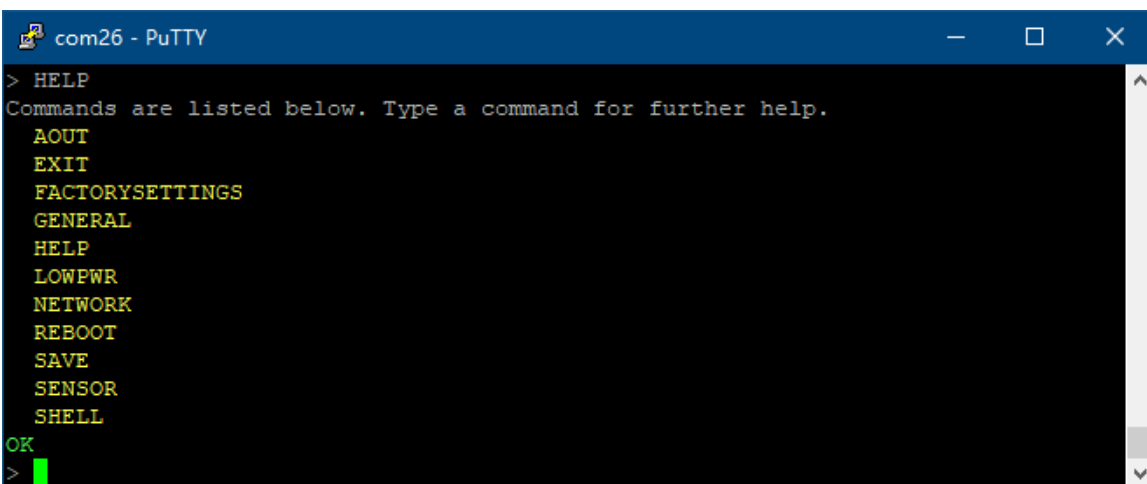
```
com26 - PuTTY
> GENERAL+STATUS
Current Status:
UART:      <115200bps>
Addr:      <0x00000001>
Date:      <20-01-01>
Date Format: <yyMMdd>
Time:      <12:06:37>
Time Format: <24H>
OK
>
```

1-5 Get help HELP

You can display a list of commands. When you enter any command (except EXIT, HELP, REBOOT) without any parameters, you can display further prompts.

Send: HELP

Return: Prompt message and OK



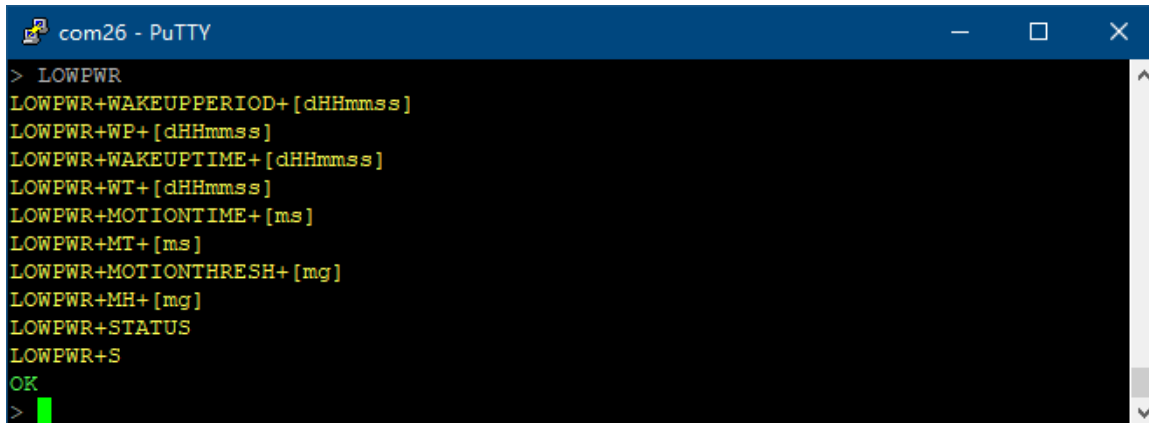
```
com26 - PuTTY
> HELP
Commands are listed below. Type a command for further help.
AOUT
EXIT
FACTORYSETTINGS
GENERAL
HELP
LOWPWR
NETWORK
REBOOT
SAVE
SENSOR
SHELL
OK
>
```

1-6 Low power setting LOWPWR

The following commands can set the sleep wake-up period, wake-up hold time, change threshold of sports wake-up, and minimum exercise duration for sports wake-up. The sleep function is only valid when the sleep wake-up period is greater than the wake-up hold time and the WLAN automatic output is enabled.

When the acceleration component of any axis of the sensor is greater than the threshold and keeps exceeding the minimum motion duration, the sensor will be awakened. But exercise wake-up can only be triggered after power-on or after a certain period of time after wake-up. Continuous exercise cannot trigger wake-up.

Sending any recognizable string command or HEX command will prevent the sensor from sleeping. You need to send SAVE+ALL or SAVE+LOWPWR to save the configuration, and all configurations will take effect after reset or power-on.



```
com26 - PuTTY
> LOWPWR
LOWPWR+WAKEUPPERIOD+ [dHHmmss]
LOWPWR+WP+ [dHHmmss]
LOWPWR+WAKEUPTIME+ [dHHmmss]
LOWPWR+WT+ [dHHmmss]
LOWPWR+MOTIONTIME+ [ms]
LOWPWR+MT+ [ms]
LOWPWR+MOTIONTHRESH+ [mg]
LOWPWR+MH+ [mg]
LOWPWR+STATUS
LOWPWR+S
OK
>
```

1-6-1 Set sleep cycle

The format of the sleep wake-up period is dHHmmss, d is the number of days, HH is the hour, mm is the minute, and ss is the second. The 0 on the left can be omitted. For example, 123456 represents 0 days, 12 hours, 34 minutes, and 56 seconds. The maximum sleep period is not allowed to exceed 7 days. When the sleep wake-up period is less than or equal to the wake-up hold time, sleep is disabled. The default is 0, sleep is prohibited.

Send: LOWPWR+WAKEUPPERIOD+period

Or LOWPWR+WP+period

Return: OK



```
com26 - PuTTY
> LOWPWR+WAKEUPPERIOD+60
OK
>
```

1-6-2 Set wake-up hold time

The format of the wake-up hold time is dHHmmss, d is the number of days, HH is the hour, mm is the minute, and ss is the second. The 0 on the left can be omitted. For example, 123456 represents 0 days, 12 hours, 34 minutes, and 56 seconds. When sleep is allowed and the wake-up hold time is set to 0, the sensor will sleep immediately after automatically outputting data through WLAN for the first time, or force sleep when it fails to send any data within 60 seconds. The default is 10

Send: LOWPWR+WAKEUPTIME+time

Or LOWPWR+WT+time

Return: OK



```
com26 - PuTTY
> LOWPWR+WAKEUPTIME+10
OK
>
```

1-6-3 Set the threshold for wake-up changes

The range is 0-2047, and the unit is mg (one thousandth of the acceleration due to gravity, to be precise, $2000/2048=0.9765625\text{mg}$). When the sensor is absolutely level, if the threshold is set to 500mg, the threshold will be reached when the inclination angle is greater than or equal to $\arcsin(500\text{mg}/1000\text{mg})=30^\circ$. The default is 200mg.

Send: LOWPWR+MOTIONTHRESH+threshold

Or LOWPWR+MH+threshold

Return: OK

```
com26 - PuTTY
> LOWPWR+MOTIONTHRESH+500
OK
>
```

1-6-4 Set the minimum exercise duration for exercise wakeup
The range is 0-20400, the unit is milliseconds (ms), and the accuracy is 80ms. The default is 400ms.

Send: LOWPWR+MOTIONTIME+time
Or LOWPWR+MT+time
Return: OK

```
com26 - PuTTY
> LOWPWR+MOTIONTIME+400
OK
>
```

1-6-5 View all low-power configurations

Send: LOWPWR+STATUS
Or LOWPWR+S
Return: configuration information and OK

```
com26 - PuTTY
> LOWPWR+STATUS
Current Status:
WakeupPeriod: <0Day 00Hour 01Min 00Sec>
WakeupTime: <0Day 00Hour 00Min 10Sec>
MotionTime: <400ms>
MotionThresh: <500mg>
OK
>
```

1-7 Network configuration NETWORK

The following commands can configure the WLAN information and Socket information of the sensor. Need to send SAVE+ALL or SAVE+NETWORK to save the configuration

```
com26 - PuTTY
> NETWORK
NETWORK+WLAN+SET+[SSID] (+[PASSWORD])
NETWORK+W+S+[SSID] (+[PASSWORD])
NETWORK+SOCKET+SET+[TCP/UDP]+[REMOTEIP]+[REMOTEPORT]
NETWORK+SK+S+[T/U]+[REMOTEIP]+[REMOTEPORT]
NETWORK+STATUS
NETWORK+S
OK
>
```

1-7-1 Set Wi-Fi information

If the WLAN name (SSID) or password appears +, \, ", please add " on both sides of the WLAN name or password, and use \\ instead of \ and \" instead of ". If there is no password, leave it alone.

Send: NETWORK+WLAN+WLAN name (+password)

Or NETWORK+W+WLAN name (+password)

Return: OK



```
com26 - PuTTY
> NETWORK+WLAN+SSID+PASSWORD
OK
>
```

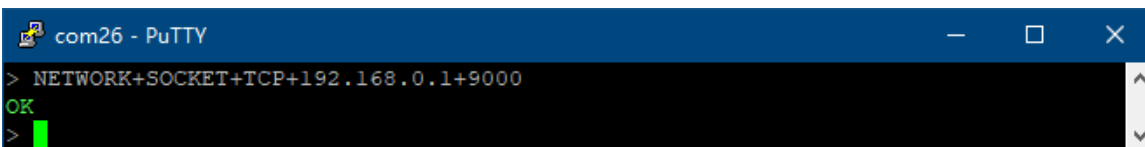
1-7-2 Set Socket information

The protocol can be TCP or UDP. TCP has higher reliability and theoretically no packet loss. UDP has higher real-time performance and efficiency, but packet loss may occur. The set protocol, receiver IP, and receiver port must be exactly the same as the receiving device, and must ensure that the two can establish a connection.

Send: NETWORK+SOCKET+TCP or UDP+ receiver IP+ receiver port

Or NETWORK+SK+T or U+receiving IP+receiving port

Return: OK



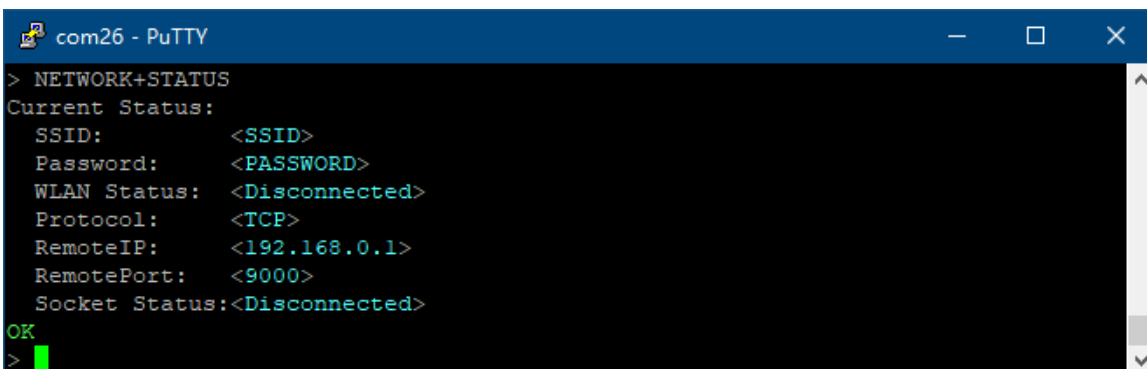
```
com26 - PuTTY
> NETWORK+SOCKET+TCP+192.168.0.1+9000
OK
>
```

1-7-3 View all network configuration

Send: NETWORK+STATUS

Or NETWORK+S

Return: configuration information and OK



```
com26 - PuTTY
> NETWORK+STATUS
Current Status:
SSID: <SSID>
Password: <PASSWORD>
WLAN Status: <Disconnected>
Protocol: <TCP>
RemoteIP: <192.168.0.1>
RemotePort: <9000>
Socket Status:<Disconnected>
OK
>
```

1-8 Restart REBOOT

All unsaved configurations (except date and time) will be lost.

Send: REBOOT

Return: OK

At the same time the sensor restarts

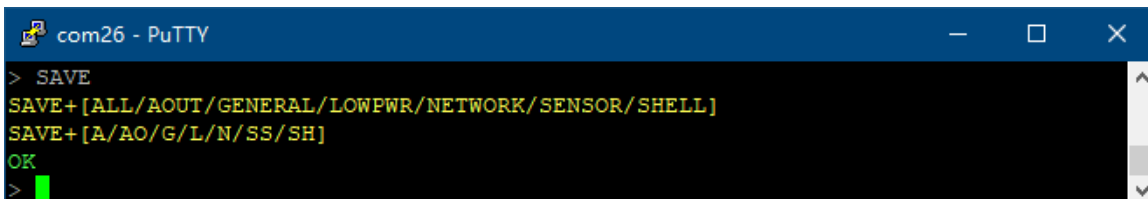


```
com26 - PuTTY
> REBOOT
OK

Sensor Init
OK
```

1-9 Save

You can save all the configuration of a module or all modules, and the configuration will remain after power off.



```
com26 - PuTTY
> SAVE
SAVE+ [ALL/AOUT/GENERAL/LOWPWR/NETWORK/SENSOR/SHELL]
SAVE+ [A/AO/G/L/N/SS/SH]
OK
```

Send: SAVE+ALL or AOUT or GENERAL or LOWPWR or NETWORK or SENSOR or SHELL or SAVE+ A or AO or G or L or N or SS or SH

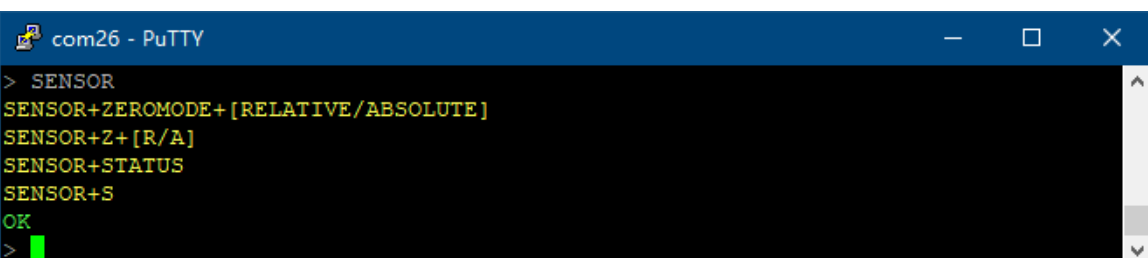
Return: OK



```
com26 - PuTTY
> SAVE+ALL
OK
```

1-10 Sensor configuration SENSOR

The following commands can set the zero mode of the sensor (absolute zero or relative zero). Need to send SAVE+ALL or SAVE+SENSOR to save the configuration



```
com26 - PuTTY
> SENSOR
SENSOR+ZEROMODE+ [RELATIVE/ABSOLUTE]
SENSOR+Z+ [R/A]
SENSOR+STATUS
SENSOR+S
OK
```


1-10-1 Set zero mode

It can be configured as absolute zero (ABSOLUTE) or relative zero (RELATIVE). If configured as relative zero, the current angle will be regarded as the zero point. The default is absolute zero.

Send: SENSOR+ZEROMODE+RELATIVE or ABSOLUTE

Or SENSOR+Z+R or A

Return: OK



```
com26 - PuTTY
> SENSOR+ZEROMODE+RELATIVE
OK
>
```

1-10-2 View all sensor configuration and information

Send: SENSOR+STATUS

Or SENSOR+S

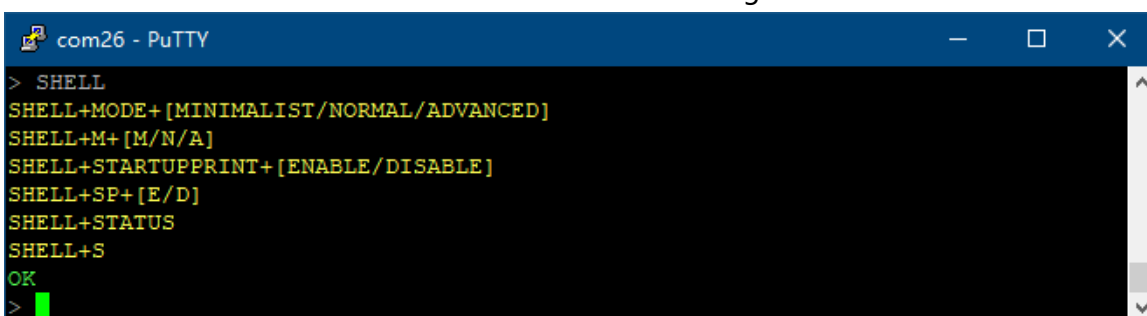
Return: All configuration and information and OK



```
com26 - PuTTY
> SENSOR+STATUS
Current Status:
ZeroMode: <RELATIVE>
Angle_X: <0.0021deg>
Angle_Y: <-0.0034deg>
Temperature: <27.52C>
BatteryLevel: <9>
OK
>
```

1-11 Display configuration SHELL

The following commands can configure the sensor's echo mode and power-on printing. Need to send SAVE+ALL or SAVE+SHELL to save the configuration

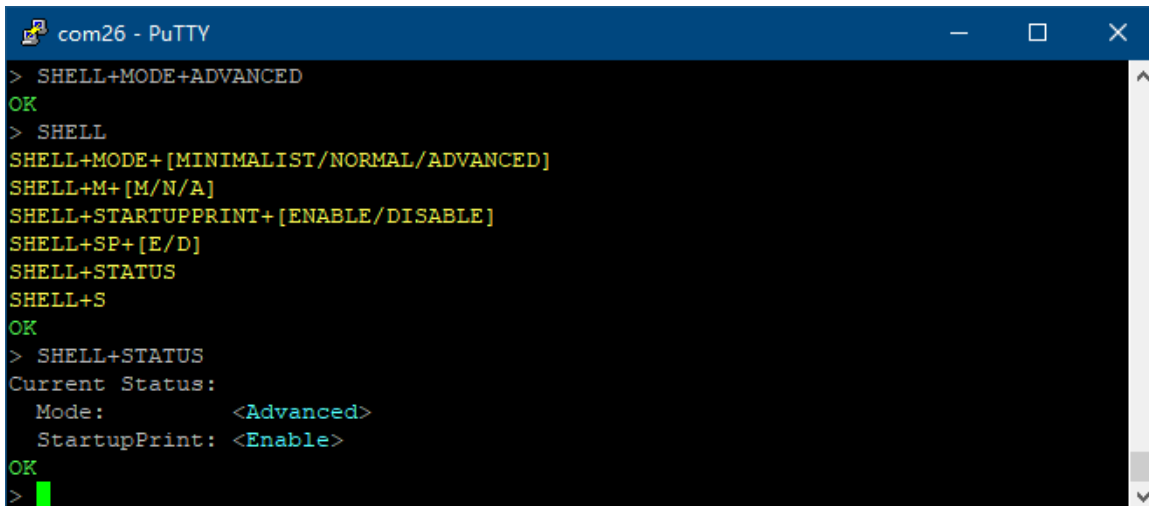


```
com26 - PuTTY
> SHELL
SHELL+MODE+ [MINIMALIST/NORMAL/ADVANCED]
SHELL+M+ [M/N/A]
SHELL+STARTUPPRINT+ [ENABLE/DISABLE]
SHELL+SP+ [E/D]
SHELL+STATUS
SHELL+S
OK
>
```

1-11-1 Configure echo mode

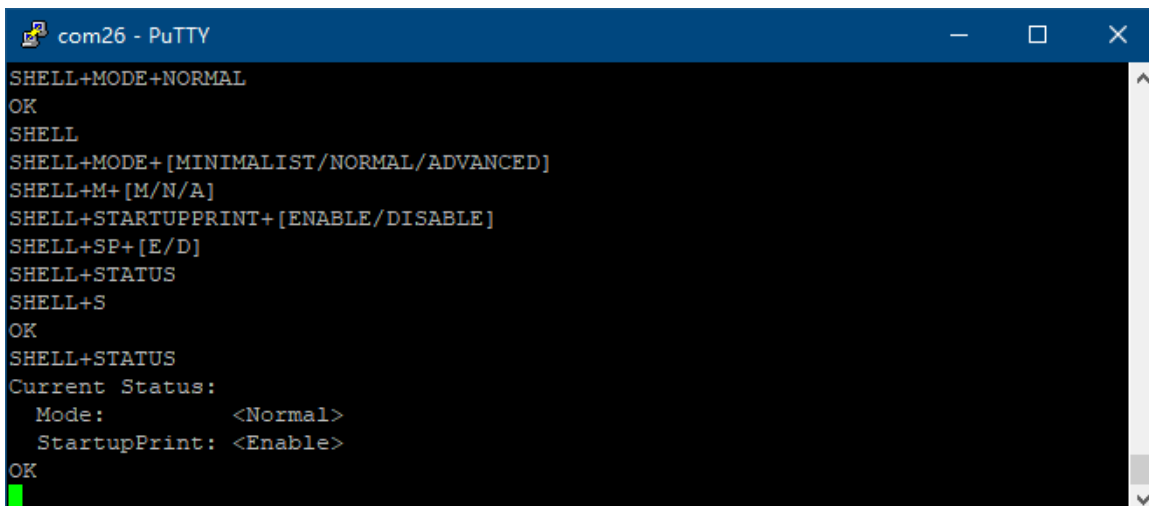
The echo mode can be configured as minimal (MINIMALIST), standard (NORMAL) or advanced (ADVANCED), and the default is standard.

In advanced mode, in the serial port tool that supports Linux special characters, special information will be marked with different colors, which can be viewed and operated more conveniently.



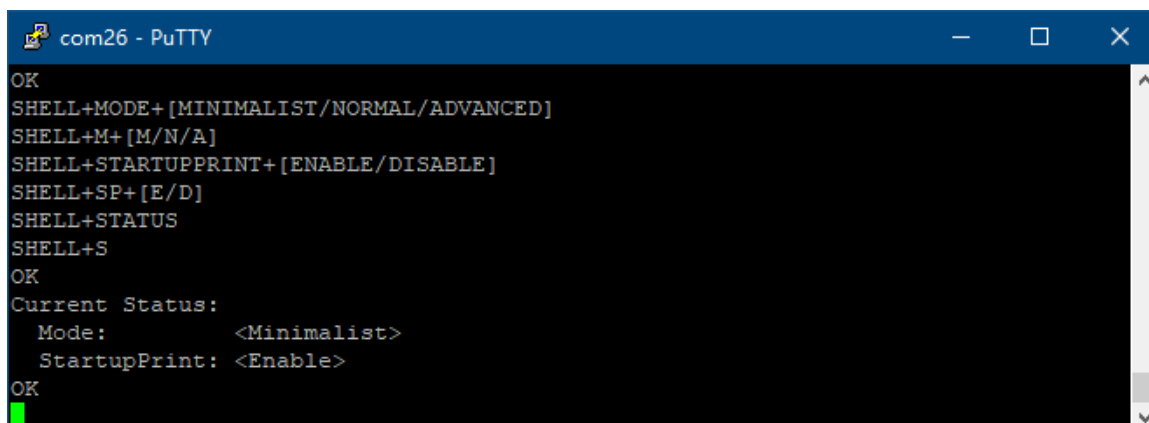
```
com26 - PuTTY
> SHELL+MODE+ADVANCED
OK
> SHELL
SHELL+MODE+ [MINIMALIST/NORMAL/ADVANCED]
SHELL+M+ [M/N/A]
SHELL+STARTUPPRINT+ [ENABLE/DISABLE]
SHELL+SP+ [E/D]
SHELL+STATUS
SHELL+S
OK
> SHELL+STATUS
Current Status:
  Mode:      <Advanced>
  StartupPrint: <Enable>
OK
>
```

In normal mode, there is no color and start mark, but other contents are exactly the same.



```
com26 - PuTTY
SHELL+MODE+NORMAL
OK
SHELL
SHELL+MODE+ [MINIMALIST/NORMAL/ADVANCED]
SHELL+M+ [M/N/A]
SHELL+STARTUPPRINT+ [ENABLE/DISABLE]
SHELL+SP+ [E/D]
SHELL+STATUS
SHELL+S
OK
SHELL+STATUS
Current Status:
  Mode:      <Normal>
  StartupPrint: <Enable>
OK
```

In minimalist mode, the echo is completely turned off, and any unrecognized commands will not cause error output (but identifiable but invalid commands will still cause error output). This mode is completely consistent with silent mode, which can be better Compatible with HEX commands and string commands.



```
com26 - PuTTY
OK
SHELL+MODE+ [MINIMALIST/NORMAL/ADVANCED]
SHELL+M+ [M/N/A]
SHELL+STARTUPPRINT+ [ENABLE/DISABLE]
SHELL+SP+ [E/D]
SHELL+STATUS
SHELL+S
OK
Current Status:
  Mode:      <Minimalist>
  StartupPrint: <Enable>
OK
```

**Send: SHELL+MODE+MINIMALIST or NORMAL or
ADVANCED or SHELL+M+M or N or A**
Return: OK

1-11-2 Configure power-on printing

If the power-on printing is turned off, the startup information will not be printed through the serial port after power-on, restart, and wake-up, but the data output will not be affected. The default is enabled.

Send: SHELL+STARTUPPRINT+ENABLE or DISABLE

Or SHELL+SP+E or D

Return: OK



```
com26 - PuTTY
> SHELL+STARTUPPRINT+ENABLE
OK
>
```

1-11-3 View all display configurations

Send: SHELL+STATUS

Or SHELL+S

Return: OK



```
com26 - PuTTY
> SHELL+STATUS
Current Status:
Mode: <Advanced>
StartupPrint: <Enable>
OK
>
```

2 HEX command

The configuration function realized by any HEX command can be realized by string commands. These commands only provide a relatively efficient alternative and are compatible with some Beiwei upper computers.

The following 0x means that the data is hexadecimal data. Please do not include 0x when sending commands. Do not send all commands in ASCII format.

2-1 Data frame format:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (n byte)	Checksum (1 byte)
0x77					

Data format: Hexadecimal

Identifier: fixed at 77

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

Address code: the address of the acquisition module, the default is 0X00000001

Data field: according to the different content and length of the command word changes accordingly.

Checksum: The sum of data length, address code, command word and data field does not consider carry.

2-2 Detailed commands:

2-2-1 Read X axis angle Command: 77 07 00 00 00 00 01 08

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x01		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (4 byte)	Checksum (1 byte)
0x77	0x0B		0x81	0xSXXXYYYY	

Data field is a 4-byte return angle value, which is a compressed BCD code, S is the sign bit (0 positive, 1 negative) XXX is a three-digit integer value, and YYYY is a decimal value. The other axis data is the same. For example, 10268010 means -26.801 degrees.

2-2-2 Read Y-axis angle Command: 77 07 00 00 00 00 02 09

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x02		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (4 byte)	Checksum (1 byte)
0x77	0x0B		0x82	0xSXXXYYYY	

2-2-3 Read all data Command: 77 07 00 00 00 00 04 0B

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x04		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (12 byte)	Checksum (1 byte)
0x77	0x13		0x84		

The data field is 12 Bytes, divided into four groups, namely x-axis angle, y-axis angle, temperature, and battery power. Each group of angle 4 bytes is the compressed BCD code, the first bit is the sign bit (0 positive, 1 negative), three integer values, four decimal places; the temperature 3 bytes is the compressed BCD code, the first bit is the sign bit (0 positive, 1 Negative), three-digit integer value, two decimal places; battery power is one byte.

Example:

Send: 77 07 00000001 04 0C

Return: 77 13 00000001 84 10008680 10052000 002677 09 89

Among them:

77 is the prefix Identifier;

13 is the byte length from the second digit to the last digit (19 in decimal);

00000001 is the address (factory default is 00000001);

84 is Command stands for reading angle;

The last digit 89 is the sum of the hexadecimal digits from the second digit (07) to the penultimate digit (89) (round up);

10008680 10052000 002677 09 is the data bit.

Data bit:

1 000 8680 represents the X axis angle is -0.868°;

1 005 2000 represents the Y-axis angle is -5.2°;

0 026 77 represents a temperature of 26.77°C;

The battery power of the 09 generation, the range is 00~09, the maximum power is 09 (full power state), and the minimum is 00 (requires charging).

The red font above is the sign bit (0 is positive, 1 is negative), the blue font is the integer bit (BCD code), and the purple font is the decimal bit (BCD code).

2-2-4 Set relative/absolute zero point Command: 77 08 00 00 00 00 05 00 0D

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x05	0x00 Absolute zero 0x01 Relative zero	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x85	0x00 Set successfully 0xFF Setup failed	

If it is set to absolute zero, the measurement angle is based on the factory-set zero point. If it is set to relative zero, the measurement angle is based on the current position as the zero point. The factory default is absolute zero. After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-5 Query relative/absolute zero point Command: 77 07 00 00 00 00 0D 14

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x0D		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x8D	0x00 Absolute zero 0xFF Relative zero	

2-2-6 Set automatic output cycle Command: 77 0B 00 00 00 00 0C 00 00 01 00 18

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (2 byte)	Checksum (1 byte)
0x77	0x0B		0x0C	0xHHmmssSS	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x8C	0x00 Set successfully 0xFF Setup failed	

The data part is 8-bit compressed BCD code, HH is hour, mm is minute, ss is second, SS is SS*10 milliseconds. After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-7 Set automatic output format Command: 77 08 00 00 00 00 56 00 5E

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x56	0x00 ~ 0x04	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x56	0x00 Set successfully 0xFF Setup failed	

Data part:

0x00 is the two-axis angle, temperature and power data in HEX format (refer to Section 2-2-3 of "HEX Command");

0x01 is the X-axis angle in HEX format (refer to section 2-2-1 of "HEX Command");

0x02 is the Y-axis angle in HEX format (refer to section 2-2-2 of "HEX Command");

0x03 is the dual-axis angle, temperature and power data in string format (refer to section 1-1-2 of "String Command");

0x03 is the dual-axis angle, temperature, power, date, and time data in JSON string format (refer to section 1-1-2 of "String Command").

After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-8 Set module address Command: 77 0B 00 00 00 00 0F 00 00 00 01 1B

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (4 byte)	Checksum (1 byte)
0x77	0x08		0x0F	0XXXXXXXXX	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x8F	0x00 Set successfully 0xFF Setup failed	

The module address is 8-digit hexadecimal data, the factory default is 0x00000001, and it will take effect immediately after modification (including the response command). After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-9 Query module address Command: 77 07 00 00 00 00 1F 26

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07	0x0000000	0x1F		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x0B		0x9F	0XXXXXXXX	

2-2-10 Set the serial port baud rate Command: 77 08 00 00 00 00 0B 04 17

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x0B	0x00~0x07	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x8B	0x00 Set successfully 0xFF Setup failed	

Data part: 0x00: 2400bps, 0x01: 4800bps, 0x02: 9600bps, 0x03: 19200bps, 0x04: 115200bps, 0x05: 38400bps, 0x06: 57600, 0x07: 460800bps. After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-11 Set sleep cycle Command: 77 0B 00 00 00 00 46 00 00 00 00 51

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (4 byte)	Checksum (1 byte)
0x77	0x0B		0x46	0xddHHmmss	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x8B	0x00 Set successfully 0xFF Setup failed	

Data part: ddHHmmss is a compressed BCD code, dd means days, HH means hours, mm means minutes, ss means seconds, and the maximum sleep wake-up period cannot exceed 7 days. After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-12 Query sleep and wake-up period Command: 77 07 00 00 00 00 47 4E

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x47		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x0B		0x47	0xddHHmms	

Data part: ddHHmms is a compressed BCD code, dd means days, HH means hours, mm means minutes, and ss means seconds.

2-2-13 Set wake-up hold time Command: 77 0B 00 00 00 00 4C 00 00 00 10 67

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (4 byte)	Checksum (1 byte)
0x77	0x0B		0x4C	0xddHHmmss	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x4C	0x00 Set successfully 0xFF Setup failed	

Data part: ddHHmmss is a compressed BCD code, dd means days, HH means hours, mm means minutes, ss means seconds, and the maximum sleep wake-up period cannot exceed 7 days. After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-14 Query wake-up hold time Command: 77 07 00 00 00 00 4D 54

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x4D		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (4 byte)	Checksum (1 byte)
0x77	0x0B		0x4D	0xddHHmms	

Data part: ddHHmms is a compressed BCD code, dd means days, HH means hours, mm means minutes, and ss means seconds.

2-2-15 Set the exercise threshold for exercise wake-up Command: 77 09 00 00 00 00 42 02 00 4B

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (2 byte)	Checksum (1 byte)
0x77	0x09		0x0B	0xXXXX	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x42	0x00 Set successfully 0xFF Setup failed	

Data part: XXXX is a compressed BCD code, the unit is mg (one thousandth of the acceleration of gravity), and the range is 0-2047. After setting, you must send a save command to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-16 Set the minimum exercise duration for exercise wakeup Command: 77 09 00 00 00 00 43 00 40 8C

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (2 byte)	Checksum (1 byte)
0x77	0x09		0x43	0xXXXX	

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x43	0x00 Set successfully 0xFF Setup failed	

Data part: XX is a compressed BCD code, the unit is 10ms, and the range is 0-2040. After setting, you must send the save command (77 07 00000000 0A 11) to write to the internal storage, otherwise the previously saved configuration will be restored after reset.

2-2-17 Save Settings Command: 77 07 00 00 00 00 0A 11

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x0A		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x8A	0x00 Set successfully 0xFF Setup failed	

2-2-18 Reset Command: 77 07 00 00 00 00 0E 15

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x0E		

Response Command:

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (1 byte)	Checksum (1 byte)
0x77	0x08		0x0E	0x00 Set successfully 0xFF Setup failed	

2-2-19 Reboot Command: 77 07 00 00 00 00 44 4B

Identifier (1 byte)	Data length (1 byte)	Address code (4 byte)	Command (1 byte)	Data field (0 byte)	Checksum (1 byte)
0x77	0x07		0x44		

Troubleshooting

1 No response to send string command

Maybe the voltage is too low or the switch is not turned on;

The baud rate of the serial port debugging tool may be inconsistent with the serial port baud rate of the sensor (115200bps by default);

The wrong serial port number may be selected;

It is possible that the sensor is in silent mode, and any identifiable string command is sent to exit the silent mode. In the silent mode, the command is valid but there is no echo;

Perhaps the sensor display mode is MINIMALIST mode. In this mode, the command is valid but there is no echo. You can refer to section 1-11-1 of "String Command" for configuration.

2 The data receiver cannot receive the data

Maybe the WLAN or Socket is not connected. You can check the current connection status through the command NETWORK+STATUS. If it displays Disconnected, it means there is no connection;

It is possible that the automatic output cycle is 0, and the current automatic output frequency can be viewed through AOUT+STATUS. When the automatic output cycle is 0, the data will only be output once every time it restarts or wakes up.

3 WLAN can't connect

Maybe the WLAN signal is not covered or there is no wireless signal that the sensor can recognize, the sensor can only connect

2.4GWLAN (802.11b, 802.11g, 802.11n);

Perhaps the wireless router has set up mechanisms such as whitelisting;

It is possible that the WLAN name or password contains +, \, " characters but is not set in accordance with the prescribed format. Please refer to section 1-7-1 of "String Command" for setting.

4 Socket cannot connect

Maybe the WLAN is not connected, and the Socket can only be connected after the WLAN is connected;

It is possible that the Socket configuration of the sensor and the Socket configuration of the server do not match, including the protocol (TCP/UDP), IP or port inconsistency; It is possible that the sensor and the data receiving terminal are not in the same local area network where a connection can be established, and the receiving terminal is not using the public IP Or the port that has been mapped to the public IP;

When the receiving terminal is connected to multiple local area networks, the IP that the receiving terminal is listening may not be the IP of the network where the sensor is located; the wireless router may be equipped with mechanisms such as AP isolation.

Executive standard

- Enterprise quality system standard: ISO9001:2015 standard (certificate number: 23919Q10455R0S)
- CE certification (certificate number:M.2019.103.UY1151)
- RoHS (Certificate: G190930099)

WF-WM410

WiFi Wireless High Speed High Precision
Inclinometer

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