WiFi Indoor Air Quality Monitor

Models: TON-0018C, TON-0018D, TON-0016C, TON-0016D, TON-0028C, TON-0028D, TON-0023C, TON-0023D
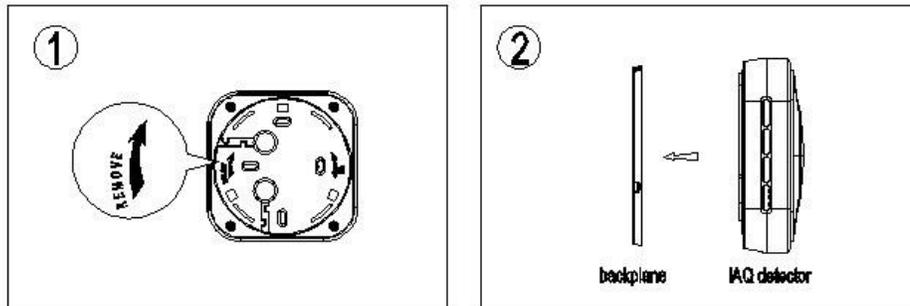
- **Real-time CO2, Temperature, Humidity, Particle (PM2.5, PM10) and VOC Level Control & Monitor**
- **Circle Light indicator changes color depending on air quality**
- **WiFi or RS485 models to configure or read data**

Specifications

General Data	
Detection Parameters	PM2.5, PM10, CO2, TVOC, Temperature, %Relative Humidity
Output	RS485(Modbus RTU) Models 0016, 0018 WIFI Models 0023, 0028
Operating Environment	Temperature: 0 -~122°F (0~50℃), Humidity: 0~99%RH
Storage Conditions	14°F~122°F (-10℃~50℃) Humidity: 0~95%
Power Supply	18~24VDC or 100~240VAC
Overall Dimension	5.1 x 5.1 x 1.8 in. (130 x 130 x 45mm)
Material of Shell & IP Level	PC / ABS fire-proof material / IP30
Certification Standard	CE
PM2.5/PM1 Data	
Sensor	Laser particle sensor, Light scattering method
Measuring Range	PM2.5: 0~400µg/m^3 PM10: 0~500µg/m^3
Output Resolution	0.1µg/m^3
Zero Point Stability	±5 µg/m^3
Accuracy	10% of reading
Temperature and Humidity Data	
Sensor	Digital integrated temperature and humidity sensors
Measuring Range	Temperature: 32°F~122°F (0℃~50℃). Humidity: 0~99%
Output Resolution	Temperature: 32.18°F (0.01℃), Humidity: 0.01%

Accuracy	Temperature: < ±0.5°F (0.5℃) @ 77°F (25℃) Humidity: < ±3.0%（20%~80%RH）
CO2 Data	
Sensor	Non-Dispersive Infrared Detector (NDIR)
Measuring Range	0～5,000ppm
Output Resolution	1ppm
Accuracy	±40ppm + 3% of the indication @ 77°F (25°C), 5 ~ 60%RH
TVOC Data	
Sensor	TVOC
Measuring Range	$0 - 2.0mg/ m^3$
Output Resolution	$0.001mg/m^3$

Models Guide

Model.	PM2.5	PM10	Temp/ RH	CO_2	TVOC	18~24VDC Power supply	100~240VAC Power supply	outputs
TON-0018C	●	●	●	●	●	●		RS485 (Modbus RTU)
TON-0018D	●	●	●	●	●		●	
TON-0016C	●	●	●	●		●		
TON-0016D	●	●	●	●			●	
TON-0028C	●	●	●	●	●	●		WIFI
TON-0028D	●	●	●	●	●		●	
TON-0023C	●	●	●	●		●		
TON-0023D	●	●	●	●			●	

## Dimension and Mounting Holes

Installation

1. To separate the backboard and the detector, rotate the backboard clockwise according to the direction of the arrow (Pic.1&Pic.2)

2. Use a screwdriver to pry the threading hole on the backboard and

remove the cover of the threading hole (Pic.3).

3. Let the cable on the wall go through the threading hole (Pic.4 & Pic.5).

4. Unplug the terminal block from the contact pin (Pic.6).

5. Contact the cable to the terminal block (Pic.11 & Pic.12), then tightly lock

the mounting screw (Pic.7).
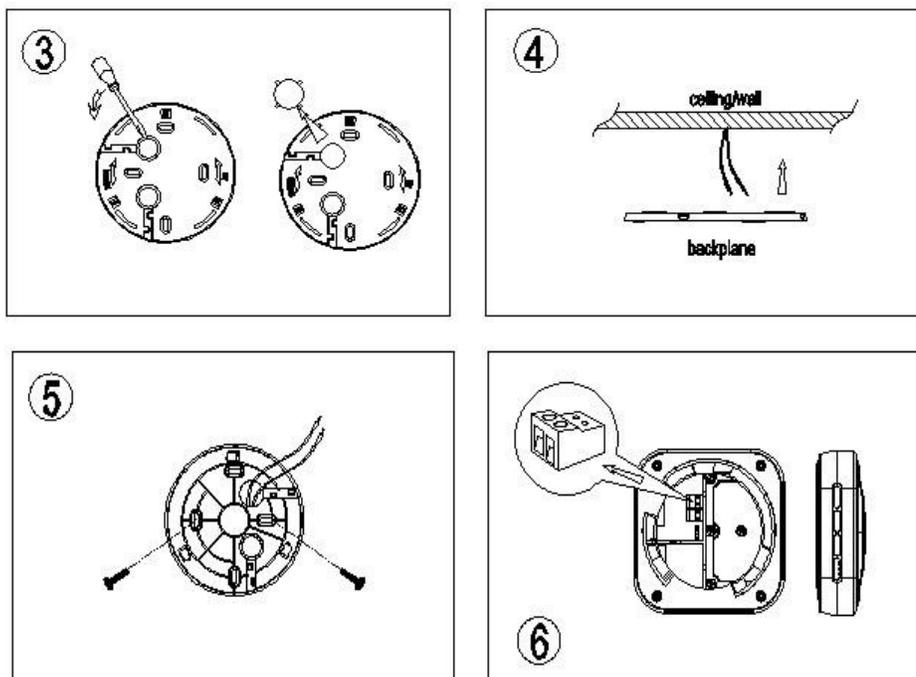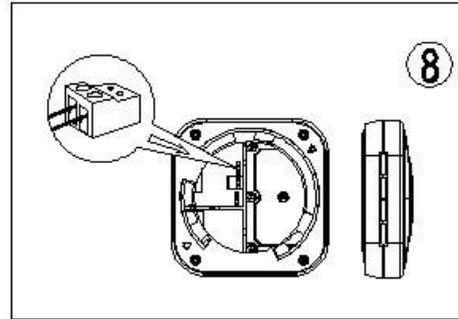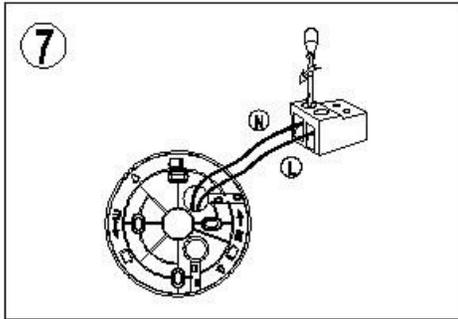
6. Plug the contacted terminal block back into the contact pin (Pic.8).
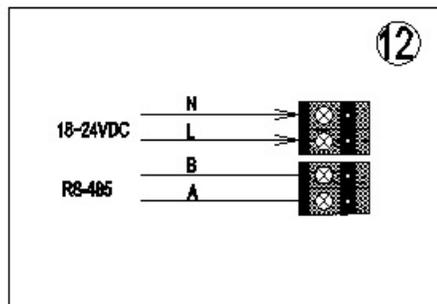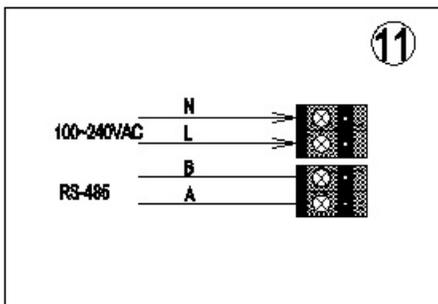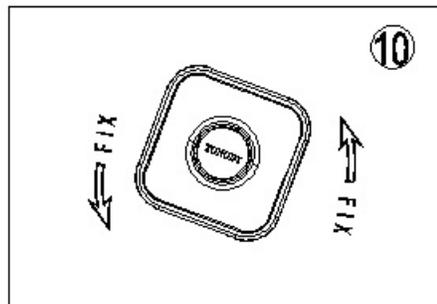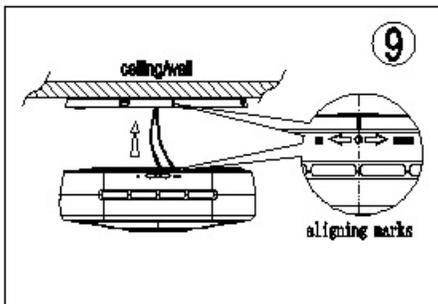
7. Aim the dot located in the middle of two arrows on the side of the detector with the vertical lines on the backboard (Pic. 9). Then rotate detector following the FIX' direction until it is tight (Pic.10).

8. The installation is completed.

Work Indicator

On all of the Tongdy models you will find a glowing ring display which will indicate the proper CO2 levels by color coding in the center of the housing. This indicator light is used to show concentration range of measured value.

This indicator light can be controlled by any measured values among PM2.5 or CO2 or TVOC through RS485 communication command, and also change the color of indicator light depending on the concentration.

Meanwhile, the measured value of the change of indicator light can be selected with one minute average value or one hour average value of 24 hours average value in the communication command.

The indicating light is controlled by one minute average value of PM2.5 as factory default.

	DIP1	DIP2	DIP3	
Green Normally ON	OFF	OFF	ON	
Three-color Indicator	ON	ON	OFF	Default
Indicator OFF	OFF	OFF	OFF	

Active indicators

There is a light ring in the middle of the shell, which indicates the measuring range of CO2 concentration.

The indicator light can be chosen to be controlled by PM2.5, CO2 or TVOC using the Modbus RS485 interface, and varies according to its concentration.

The measurement value that changes the indicator light can be the average value of one minute, one hour or 24 hours in the communication instruction.

Factory Default：The light is controlled by the average PM2.5 measurement value of one minute.

Below is indicator color changes corresponding to the measured arrange:

PM2.5	<35ug/m^3 Green	35~75ug/ m^3 Yellow	>75ug/m^3 Red
CO2	<600ppm Green	600~1000ppm Yellow	>1000ppm Red
TVOC	<0.25mg/m^3 Green	0.25~0.50mg/m^3 Yellow	>0.50mg/m^3 Red

WIFI Settings

In the side of the MSD, there is a reset button in the hole under "RESET".

1. After the MSD is power on, insert a thin rod (a paper clip or a toothpick, etc.) in the RESET hole, and long press the RESET button for 6 seconds.
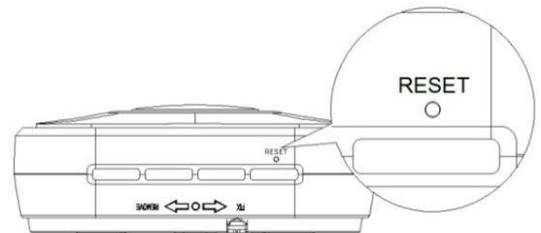
2. Open the WLAN function of the mobile device, search "MXCHIP_" at the beginning of hot spots, then connect it.

Note: researched WIFI hotspot is like MXCHIP_07E711, MXCHIP_ is an invariant format, 07E711 is a unique serial number for a WIFI module. Different WIFI modules have different serial numbers. It will be shown on the surface of the WIFI module.

3. Use the browser of the mobile device, go to the site 10.10.10.1

4. If you need to log into the account, input User Name：admin，Password：admin. Then "LOG IN".

5. At this point, get into the WIFI module Settings interface. We will need to modify the parameters setting. The majority changes concentrate in "Wifi Mode Select", "Station Mode Setting" and "Network Setting". This interface language is default in Chinese, users can switch to English interface in the upper right-hand corner.

6. On the right side of the interface, Select "Wifi Mode Select", and in the interface, click and select "Station Mode", then "Save".
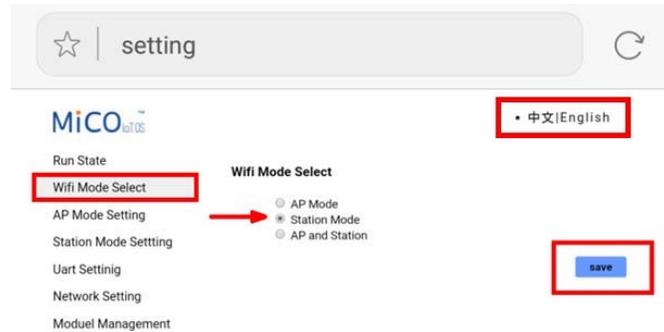
7. At this point, the restart module prompts appear in the interface, be careful NOT to click "Yes". After all the parameters are set, restart the module at all.
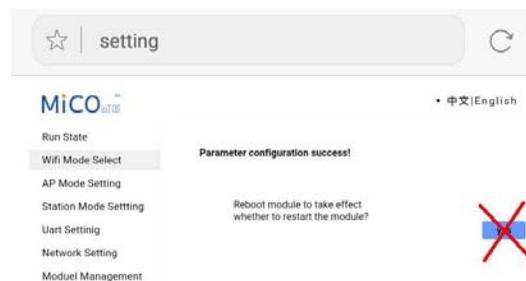

If customers are not careful to restart the module, need to start again from step 1.

8. On the right side of the interface, select " Station Mode Setting", and in the interface, click "Scan" directly, then connect to the hot spots.

9. In the interface, select the hot spot which the device will be connected with, such as "TONGDY_3", then confirm it. Back to the previous interface, encryption based hot spots can be decided on whether you need encryption or not. Does not need encryption: Disable; Encryption: Enable.When you choose to need encryption, you need to key in a password to connect to the hot spots in the increased option, finally "Save". The same do not restart the module.

10. On the right side of the interface, select "Network Setting", and in the interface, for "protocol" click and select "TCP Client" and "save". The same do not restart the module.
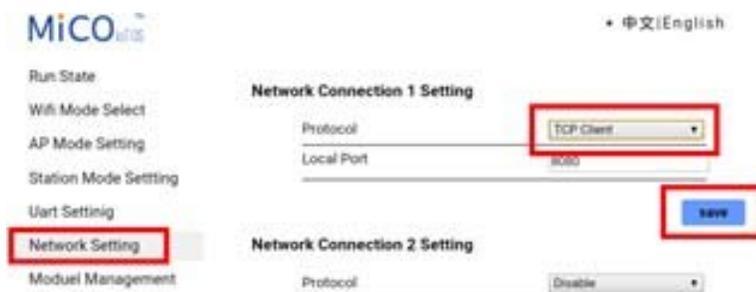
11. After entering other interface, and then get back to the "Network Setting" interface, shown as the following figure, in the "remote port" and the "server address", key in the server information where the device will upload data, for example, the corresponding parameters of Qlear platform.
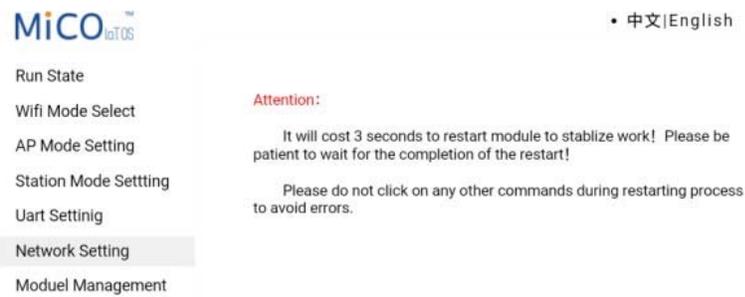
Remote Port: 20011

Server Address (IP)：119.254.103.119

At this point all the parameter settings are done, restart the module.

12. When the module restarts successfully, there will be the following interface.

13. Set up completed, now you can add equipment, and check data on the corresponding server site.

Starting Register Decimal	Data Description	Function	Read/ Write	Data Length	Format	Decimals	Data Range, Data Description
0	PM2.5 An hourly Average measuring value	4	R	2	Float-BigEndian	1	0~1,000.0μg/m^3
2	PM10 An hourly Average measuring value	4	R	2	Float-BigEndian	1	0~1,000.0μg/m^3
4	Temperature An hourly Average measuring value	4	R	2	Float-BigEndian	2	-20.00℃~60.00℃
6	Humidity An hourly Average measuring value	4	R	2	Float-BigEndian	2	0~100.00RH%
8	CO_2 An hourly Average measuring value	4	R	2	Float-BigEndian	0	0～5,000ppm

10	TVOC An hourly Average measuring value	4	R	2	Float-BigEndian	3	0~3.500mg/m³
12	PM2.5 One minute Average measuring value	4	R	2	Float-BigEndian	1	0~1,000.0μg/m³
14	PM10 One minute Average measuring value	4	R	2	Float-BigEndian	1	0~1,000.0μg/m³
16	Temperature One minute Average measuring value	4	R	2	Float-BigEndian	2	-20.00℃~60.00℃
18	Humidity One minute Average measuring value	4	R	2	Float-BigEndian	2	0~100.00RH%
20	CO_2 One minute Average measuring value	4	R	2	Float-BigEndian	0	0~5,000ppm
22	TVOC One minute Average measuring value	4	R	2	Float-BigEndian	3	0~3.500mg/m³
24	PM2.5 24-hour Average measuring value	4	R	2	Float-BigEndian	1	0~1,000.0μg/m³
26	PM10 24-hour Average measuring value	4	R	2	Float-BigEndian	1	0~1,000.0μg/m³

28	Temperature 24-hour Average measuring value	4	R	2	Float-BigEndian	2	-20.00℃~60.00℃
30	Humidity 24-hour Average measuring value	4	R	2	Float-BigEndian	2	0~100.00RH%
32	CO_2 24-hour Average measuring value	4	R	2	Float-BigEndian	0	0~5,000ppm
34	TVOC 24-hour Average measuring value	4	R	2	Float-BigEndian	3	0~3.500mg/m³
36	Primary pollutant 24-hour average measuring value (one of PM2.5/ PM10/ CO_2/ TVOC),	4	R	2	Float-BigEndian		PM2.5: 0~1,000.0μg/m³ PM10: 0~1,000.0μg/m³ CO_2: 0~5,000ppm TVOC: 0~3.500mg/m³
38	Primary pollutant (one of PM2.5/ PM10/	2	R	1	INT16		1-PM2.5; 2-PM10; 3-CO_2; 4-TVOC

	CO₂/ TVOC)							

39	Index level of the primary pollutant	2	R	1	INT16			Level 1-Excellent； Level 2-Good ； Level 3-Light pollution； Level4-Medium pollution； Level 5-Heavy pollution； Level 6-Severe pollution
40	AQI value of the primary pollutant	2	R	1	INT16			0~400
41	PM2.5 AQI value	2	R	1	INT16			0~400
42	PM10 AQI value	2	R	1	INT16			0~400
43	CO₂ AQI value	2	R	1	INT16			0~400
44	TVOC AQI value	2	R	1	INT16			0~400
45	PM2.5 Pollution index level	2	R	1	INT16			1~6
46	PM10 Pollution index level	2	R	1	INT16			1~6
47	CO₂ Pollution index level	2	R	1	INT16			1~6
48	TVOC Pollution index level	2	R	1	INT16			1~6
78	3-color circle light status	2	R	1	INT16			0- OFF 1- Green 2- Yellow 3- Red

Starting Register Decimal	Data Description	Function	Read/ Write	Data Length	Format	Decimals	Data Range， Data Description	Default
0	Modbus Address	3/6	R/W	1	UINT16		1~247	1
1	Modbus rate （bps）	3/6	R/W	1	UINT16		1-4800;　　　2-9600; 3-14400;　　4-19200; 5-38400;　　6-56000; 7-57600;　　8-115200	2
2	Modbus Parity check bit	3/6	R/W	1	UINT16		1- None/ 1 Stop_Bit; 2- None/2 Stop_Bit; 3- Odd/1 Stop_Bit;	1

							4- Even/ 1 Stop_Bit
4	Temp. Correction	3/16	R/W	2	Float-Big Endian		-3.0~3.0℃/-6.0~6.0F
6	Hum. Correction	3/16	R/W	2	Float-Big Endian		-5.0~5.0%RH
12	TVOC Correction	3/16	R/W	2	Float-Big Endian		-1.000~1.000mg/m^3
14	CO_2 Correction	3/6	R/W	1	INT16		-300~300ppm
373	3-color circle light controlled mode	3/6	R/W	1	INT16		0- LED turn off 1- LED controlled by the measure value 2- LED 3-color light circle
374	Circle light controlled by the Measurement	3/6	R/W	1	INT16		0- PM2.5 1- PM10 2- CO2 3- TVOC
375	Light controlled by Average measurement	3/6	R/W	1	INT16		0-1 minute average 1-1 hour average 2-24 hours average
376	PM2.5- Green/Yellow Switch Point	3/16	R/W	2	Float-Big Endian		0.0~1,000.0
380	CO2- Green/Yellow Switch Point	3/16	R/W	2	Float-Big Endian		0~5000
382	TVOC- Green/Yellow Switch Point	3/16	R/W	2	Float-Big Endian		0.000~3.500
388	PM2.5- Yellow/Red Switch Point	3/16	R/W	2	Float-Big Endian		0.0~1,000.0
392	CO2- Yellow/Red Switch Point	3/16	R/W	2	Float-Big Endian		0~5000
394	TVOC-Yellow/Red Switch Point	3/16	R/W	2	Float-Big Endian		0.000~3.500

Modbus RS485 Communication Parameters

Mode: Modbus RTU (MSB First)

Baud Rate: 1-4800；2-9600；3-14400；4-19200；5-38400；6-56000；7-

57600；8-115200

Default: 2-9600bps

Start Bits: 1
Data Bits: 8
Stop Bits: 1 / 2   Default: 1
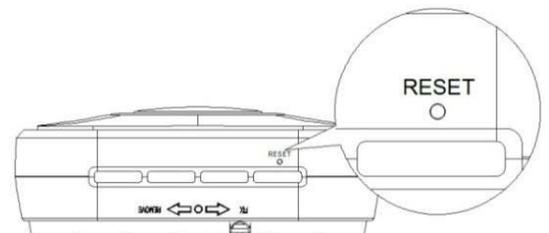Parity: None / Odd / Even   Default: None

Register Map

Support Function: 3   4   16RJ45
Communications Configuration Instructions

1. Create virtual serial port

First install USR-VCOM and Modbus Poll on PC.

1.1 USR-K2 network port restore factory settings

Device in the power-off state, hold down the button
"RESET" on the bottom of the device, then power on the device again, after 5
seconds, release the button. If the RJ45 module is the first configuration, no need
to reset.

Open ▢ software,in the open interface, click on the "create automatically".
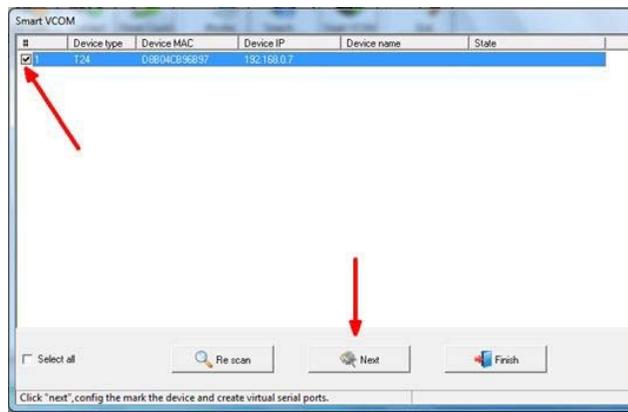
The software will automatically find the device, select the device demanded, and click on the "next", then, finally click on the "finish".

At this point, the status bar will show "finish->COM2", and pop up dialog box "A virtual serial port is created". Remember the "COM2" virtual serial port. In the following step, the device address settings will need it.

2. **Modify the IP and gateway for the PC connection**

14
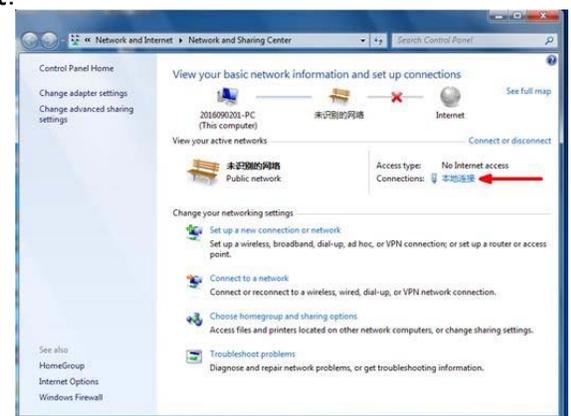
Only when IP and gateway are in the same frequency band, and are specified parameters, PC can be connected, and set the USR-K2 port.

Enter PC local connection, in the pop-up "local connection state" get into the "property".

Double click on the "Internet protocol version 4 (TCP/IPv4)" to set the parameters, the specific parameters are as follows,
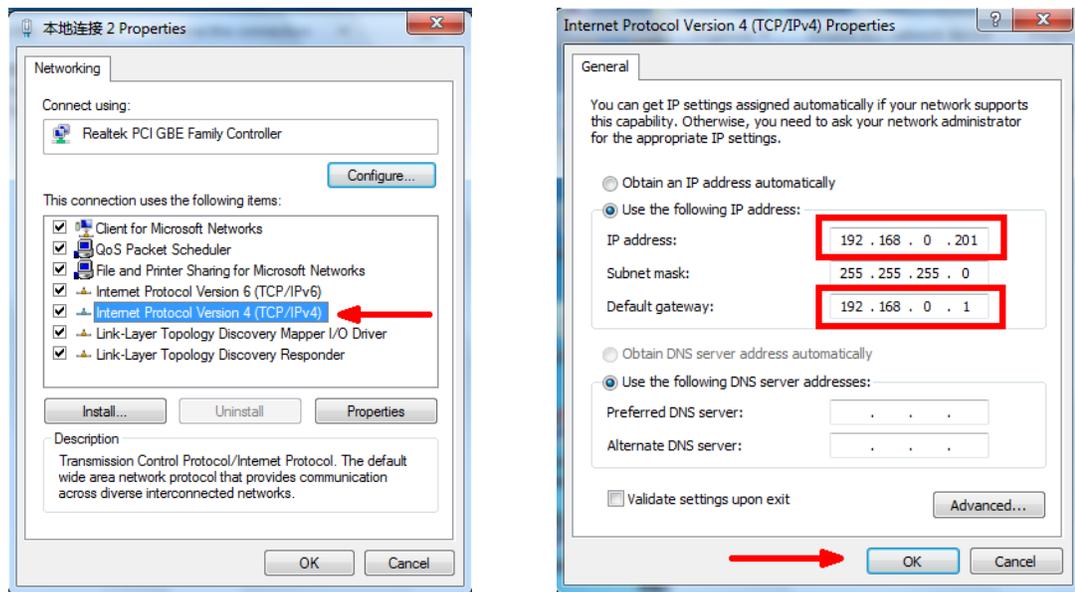
Finally, click the "OK" to save the settings.

3.   Configure USR-K2 parameters

3.1 USR-K2 network port restore factory settings.

Device in the power-off state, hold down the button "RESET" on the bottom of the device, then power on the device again, after 5 seconds, release the button.

3.2   In the PC browser change into the "192.168.0.7", on the authentication page, enter the "admin" for both the user name and password.

3.3   In the interface, mainly set the "Local IP Config" and the "RS232/RS485" two settings.

3.3.1   In the "Local IP Config" interface, IP mode select the "DHCP/Auto IP", and save.

3.3.2   In the "RS232/RS485" interface, set parameters according to the QLEAR site, and save. Specific settings as shown below, If the customer does not use
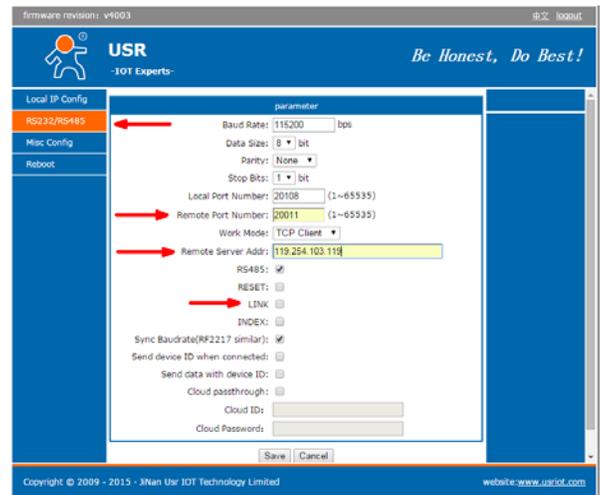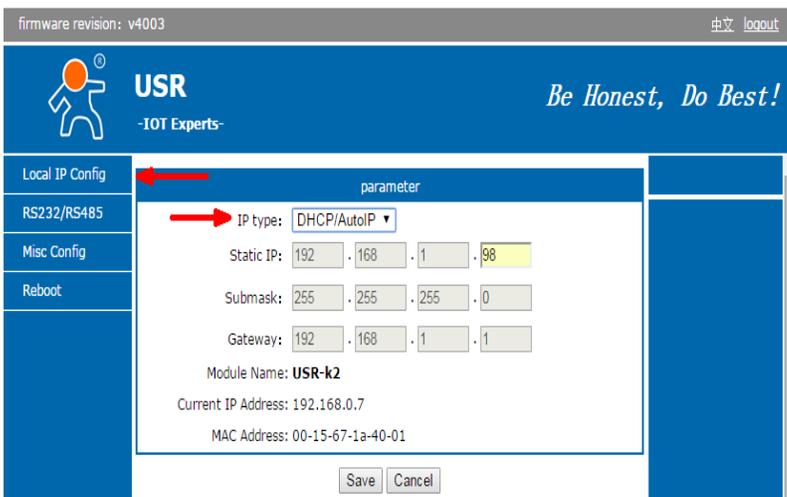
the site to collect data, the corresponding parameters will make the corresponding changes.

Set up completed, click on the "Reset Module", then the system will pop up the prompt of set up successfully.

Special Notice

This IAQ monitor is designed for detecting indoor air quality. The product contains multiple gas sensors and dust sensors, so the product should not be used in construction site or decoration site. If there is going to be a construction project, the monitor should be removed until the project is over.

In addition, this monitor is a precise measuring device, if customers need to decorate the house after installation the unit, please protect it by wrappages from paint coating and dust entering the unit.
Do not cover the monitor with other pigments, avoid plugging stoma, and paint in the gas chamber.

THIS IAQ monitor is suitable for ceiling or wall installation. Do not use this product outdoors straightly. Product installation location should be selected: to prevent direct sunlight, away from the heat source, away from the power or electrostatic precipitator equipment to avoid affecting product accuracy.

The monitor should not be dropped. impact caused by sensor beam deviation in the gas chamber can lead deviation of CO_2 measurement. The TVOC sensor should not have long-term exposure to high concentrations of total organic volatile gases, or sensor poisoning can result (for example, if the concentration is several times greater than the TVOC range).

When multiple monitors are wired and connected and sharing a 24VAC / 24VDC power supply, make sure that the power supply wiring uses the same polarity for all the units. The wrong connection will damage the equipment.

The monitor should be maintained every 6 months. if the room where it is used is dusty, the maintenance interval should be shorter. Maintenance includes: clean the strainer, use an air pump or air suction tube to clean the dust inside the product. Each time after being placed in construction site, the product needs to be maintained to keep on normal using.

If the measured value deviation, or interring dust and debris cannot be cleaned, please go back to the factory to re-clean and calibration (paid maintenance).

Do not use the cigarette to test PM2.5 measurements. Because most of the cigarette particles are in the area of 0.1 to 0.5 microns. While particles are less than 0.3 microns, the resolution of laser detection is greatly reduced, so the cigarette concentration does not represent the true PM2.5 concentration.

For example, if you try to test using a 1/3 burning cigarette placed in a sealed box with the monitor, the concentration will be higher than 10,000ug/m3. However, if you blow cigarette smoke into the box and then close the box, the concentration would be approximately 5,000ug/m3. Therefore, PM2.5 measurements with cigarettes can cause too much deviation of the measured value.

Contact us: We're here to help!

If the troubleshooting guide above doesn't help you solving your problem or for more information, please contact us using the information below.
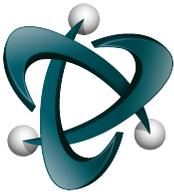

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