

6-channel IAQ Display

Model: CTR230-6
Operation Manual

V1.06



JNC technology
銘祥科技實業股份有限公司

Catalogue

PART 1. PREFACE AND NOTES	1
PART 2. PRODUCT DESCRIPTION	2
2.1 SPECIFICATION	2
2.2 DEVICE NAME AND FUNCTION DESCRIPTION	3
2.3 INSTALLATION NOTES	4
2.4 WIRING DIAGRAM	5
PART 3. WEB SERVICE DESCRIPTION(MOBILE VERSION)	6
3.1 MOBILE MAIN SCREEN	6
3.2 LOGIN PAGE	7
3.3 FUNCTION TABLE	7
3.4 BROWSE THE HOMEPAGE AND INTRODUCE VARIOUS SETTINGS	8
3.5 RUN CHART	19
3.6 EVENT RECORD	20
PART 4. WEB SERVICE DESCRIPTION (PC VERSION)	21
4.1 MAIN SCREEN	21
4.2 FUNCTION TABLE	22
4.3 SETTING PAGE	23
4.4 RUN CHART	24
4.5 TIME CONTROL	25

PART 5. INSTRUCTIONS FOR USING USB RECORD FILE	26
PART 6. WEB/USB DATA IMPORT INSTRUCTIONS	27
6.1 HOME SCREEN	27
PART 7. CO2 CALIBRATION METHOD	36
7.1 ZERO POINT CALIBRATION - ZERO POINT CALIBRATION USING ZERO GRADE STANDARD GAS N2	36
7.2 FULL FRAME CALIBRATION - FULL-SCALE CALIBRATION USING STANDARD CARBON DIOXIDE GAS	36
7.3 EASY CALIBRATION MODE - USING OUTDOOR BACKGROUND VALUE CORRECTION MODE	36
7.4 STANDARD COMPARISON AND CALIBRATION - COMPARISON CALIBRATION USING HANDHELD CERTIFIED STANDARD INSTRUMENTS	36
PART 8. TROUBLE CLEARING	37
PART 9. APPENDIX	38
9.1 GLOSSARY	38
9.2 AIR QUALITY INDEX (AQI):	39
9.3 INDOOR HUMAN COMFORT INDEX (CI):	40
9.4 MODBUS COMMUNICATION PROTOCOL REFERENCE TABLE	41
9.5 INSTRUCTIONS FOR MULTI-MODULE CONNECTION WITH THE SAME IP ADVANCED SETTING	41

Part 1. Preface and Notes

□ Preface

Thank you very much for purchasing the **6-channel IAQ Display (CTR230-6)**. In order to ensure that you use this product correctly, please read this operation manual carefully. This product all in one can monitor six indoor air quality at the same time: temperature/humidity/CO₂/formaldehyde/CO/PM_{2.5}. It is very convenient to use; at the same time, it has the functions of hourly average record and 8-hour average display, which meets the requirements of regulations on indoor air quality management.

□ Warnings and Safety Precautions

Precautions for safe use	
	Do not use in areas with high vibration or strong electromagnetic interference, so as not to cause product damage, ERROR, and measurement errors.
	Before any repair or maintenance, please remove the power cord to prevent personal injury or product damage due to accidental contact with the power supply.
	When installed in a polluted environment with conductive substances (such as metal dust, water, etc.), proper ventilation, filtration or sealing measures should be taken.
	Do not operate the product if any components or modules have been removed or disassembled, and contact the dealer as soon as possible.
	The company is not responsible for compensation for the influence and damage caused to the reliability of the product due to failure to follow the correct use method in this operation manual or exceeding the application mode or environmental conditions described in the product specification.
Installation Precautions	
	Avoid installing electrical appliances that generate heat within 1 meter below the product, because it will affect the accuracy of the temperature and humidity of the product.
	Avoid installing the product within 1 meter of human activities, because it will affect humidity.
	The best installation height for CTR230-6 is two meters, and the best installation height for Sensor is between 1.6 meters and 1.8 meters.

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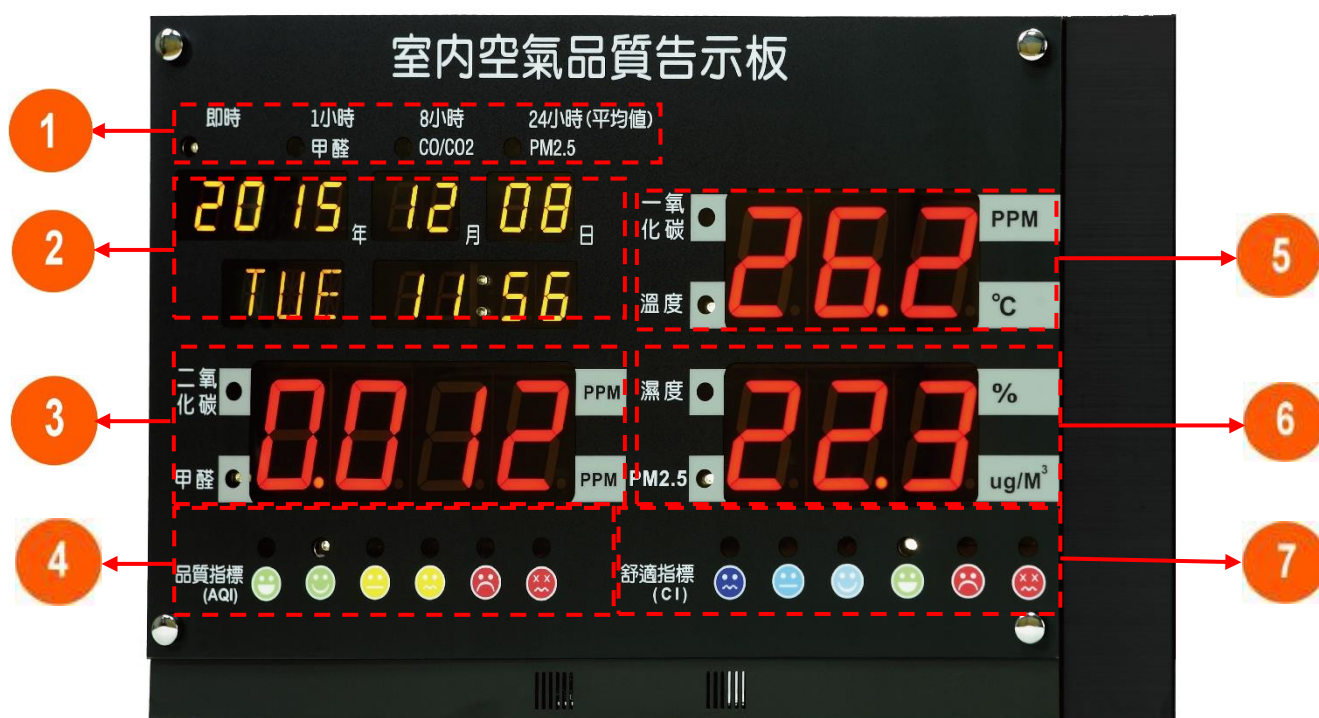
Part 2. Product Description

2.1 Specification

Power supply	Transformer	♦AC input : 100 ~ 240V (50/60Hz) ♦DC output : 24V Maximum 1A current	
	Equipment	♦DC input : 9 ~ 36V ♦Power consumption : 11.4W	
Environment	Working Temp.	-20~60°C	
	Relative Humidity	0 ~ 95%RH non-condensing	
	Storage Temp.	-30~70°C	
Alarm control output	Control output points	3 points	
	Relay contact capacity	90~250VAC≤1A	
Communication function	Ethernet interface	RJ-45 Ethernet line with Web Service function, protocol Modbus TCP	
	Communication interface	RS-485 /RS-232*1 port (JUMP choose one);RS-485 *1 port	
	Communication protocol	Modbus RTU	
Signal output (AO)	Output points	3 points	
	Output signal	4-20mA(can be set as AO, PID or manual output control)	
Display screen	Numerical display	2.3 inch red LED	
	Date/day/time display	1.0 inch yellow LED	
	Display mode	Instant 、1H 、8H 、24H average (optional)	
	Comfort index	6-segment LED indicator light (refer to environmental regulations)	
	Pollution index	6-segment LED indicator light (refer to environmental regulations) or set by yourself	
Physical conditions	Product	CTR230-6	Sensor (CH2O/CO/PM2.5)
	Product size(mm)	590x 368x 30.2 (WxHxD)	104x135x40 (WxHxD)
	Product Weight	About ≤3kg	128g
Shell	Material	Cast iron painted	ABS
Record	USB recording function, maximum support up to 64GB		
Software	USB reading software		
Safety certification	FCC PART 15 B AND CISPR 22 Class A · EN55022:2010 Class A · EN61326-1:2006 · IEC61000-4-2:2008 · IEC61000-4-8:2009 · IEC61000-4-3:2006+A1:2007+A2010		
Patent	R.O.C. Patent No. M455143 / M474956/ M490090 China Patent No. 3110165 / 3968342/ 3968253		

Sensor	Range	T90	Operating Temp.	Resolution	Accuracy	Warm-up time	Detection principle
Temp	-40~125°C	<60 S	-20~60°C	0.1°C	±0.4°C	10min	Resistive
RH	0~100%	<60 S	-20~60°C	0.1%	±3%	10min	Capacitive
CO2 Infrared	0~10,000ppm	<120 S	0~50°C	1ppm	±30ppm ±2% of Reading	≤20s	Infrared
PM2.5	0~1000μg / m ³	<90 S	-10°C~65°C	0.1μg/m ³	±10μg/m ³ ±5% of Reading	5min	Laser
HCHO	0.01~2.00ppm	<120 S	-10°C~50°C	0.01ppm	±0.02ppm±2% of Reading	10min	Electrochemical formula
CO	0~100ppm	<180 S	0°C~50°C	0.1ppm	±5ppm	10min	Electrochemical formula

2.2 Device Name And Function Description



Code	Name	Function Description
1	Mode display	◆Instant: instant data ◆1 hour: 1-hour average data ◆8 hours: 8 hours average data ◆24 hours: 24 hours average data
2	Date time display	Sort by: Year/Month/Day Week/Hour/Minute
3	Carbon dioxide/ CH2O display	Carbon dioxide display 0~9999 CH2O display 0.001~2.000
4	Air Quality Index (AQI)	P39 9.2 Description of quality indicators
5	Temperature/CO display	Temperature display range -99~99.9 Carbon monoxide display 0.0~100
6	Humidity/PM2.5 display	Humidity display 0.0~99.9 PM2.5 display 0.0~600
7	Comfort Index (CI)	P40 9.3 Description of Indoor Human Comfort Index (CI)

2.3 Installation Notes

2.3.1 How to remove the right cover



The position marked by the red frame will be fixed with screws as shown in the picture above. You need to loosen the two screws first, then you can lift the right cover, as shown in the figure below.



Loosen the screw



open the right cover



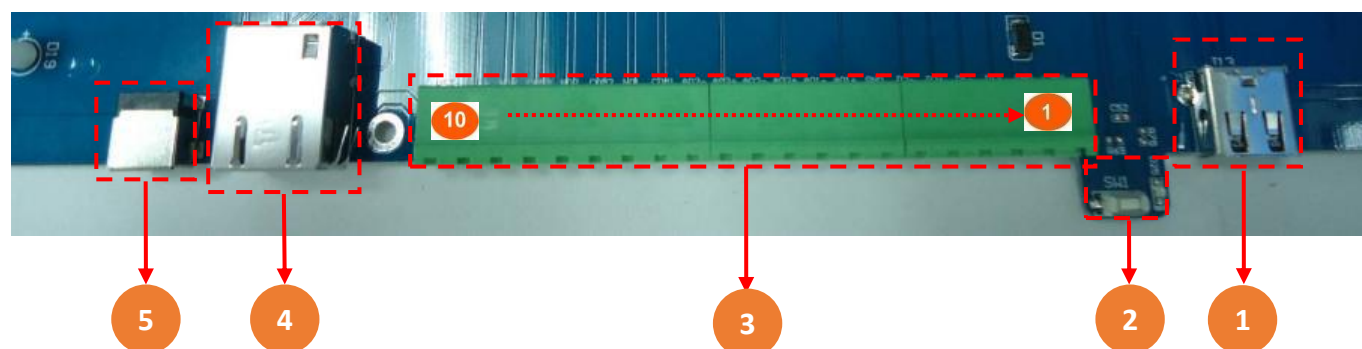
Right cover opened

2.3.2 Power switch position



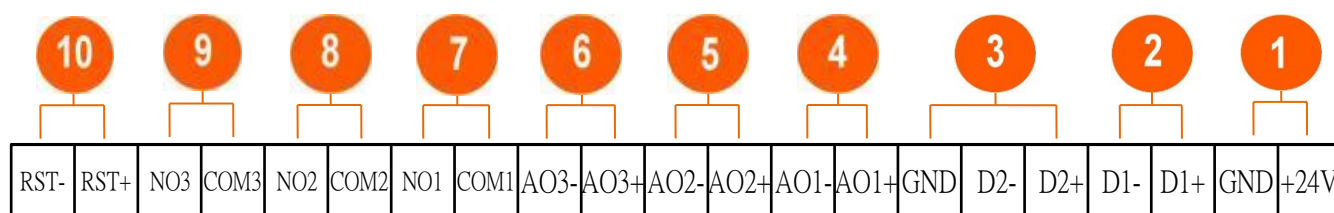
2.4 Wiring Diagram

2.4.1 Hardware IO



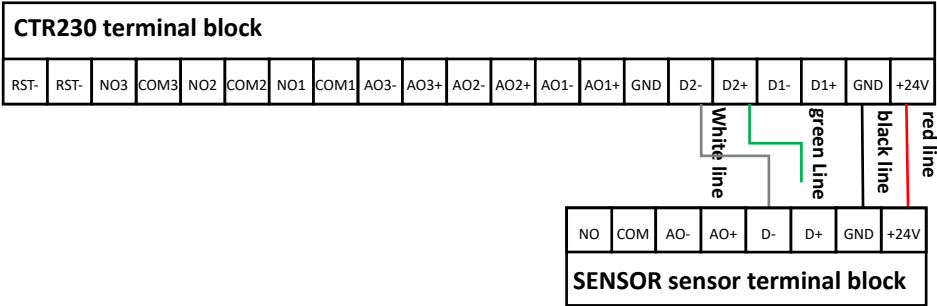
Code	Name	Function Description
1	USB recording jack	Use of storage interface (optional)
2	RST button	Press and hold for 7 seconds to reset the system ※The system reset will restore all internal parameters to the factory values.
3	European terminal block	Refer to the following "Terminal Block Wiring"
4	RJ45	Ethernet usage
5	Power plug	Power supply I/P: 110~240VAC, O/P: 24VDC 1A

2.4.2 Terminal Block Wiring



Code	Name	Function Description	Code	Name	Function Description
1	+24V/GND	Power	6	AO3+ / AO3-	4-20mA output
2	D1+ / D1-	RS-485 / RS-232	7	COM1 / NO1	Relay 1
3	D2+ / D2-	External sources	8	COM2 / NO2	Relay 2
4	AO1+ / AO1-	4-20mA output	9	COM3 / NO3	Relay 3
5	AO2+ / AO2-	4-20mA output	10	RST+ / RST-	External reset contact

2.4.3 SENSOR Wiring



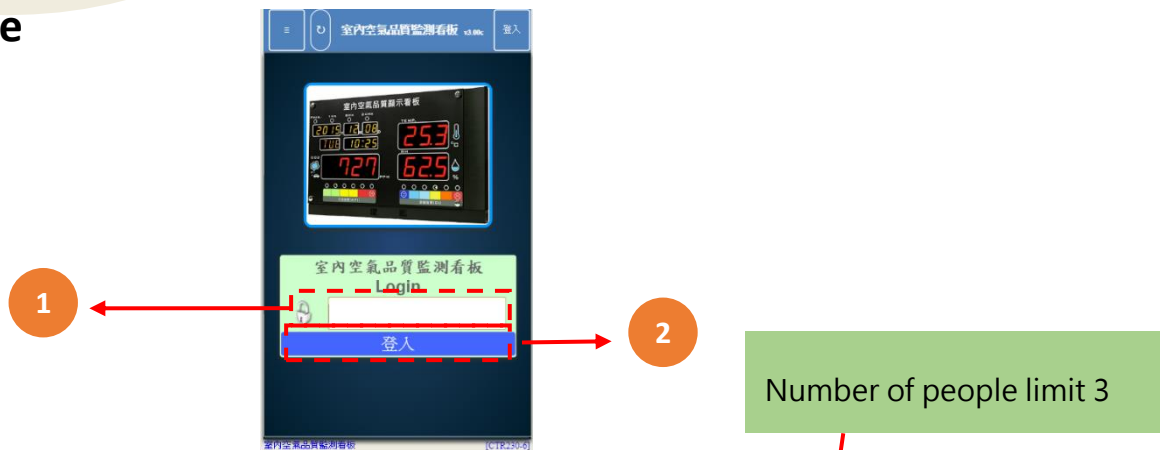
Part 3.WEB SERVICE Description(Mobile version)

3.1 Mobile main screen



Code	Name	Function Description
1	Function	Function Button
2	Reorganize	Reorganize Button
3	System name	System name of this device
4	Firmware version	Current firmware version name
5	Login	Login system button

3.2 Login page



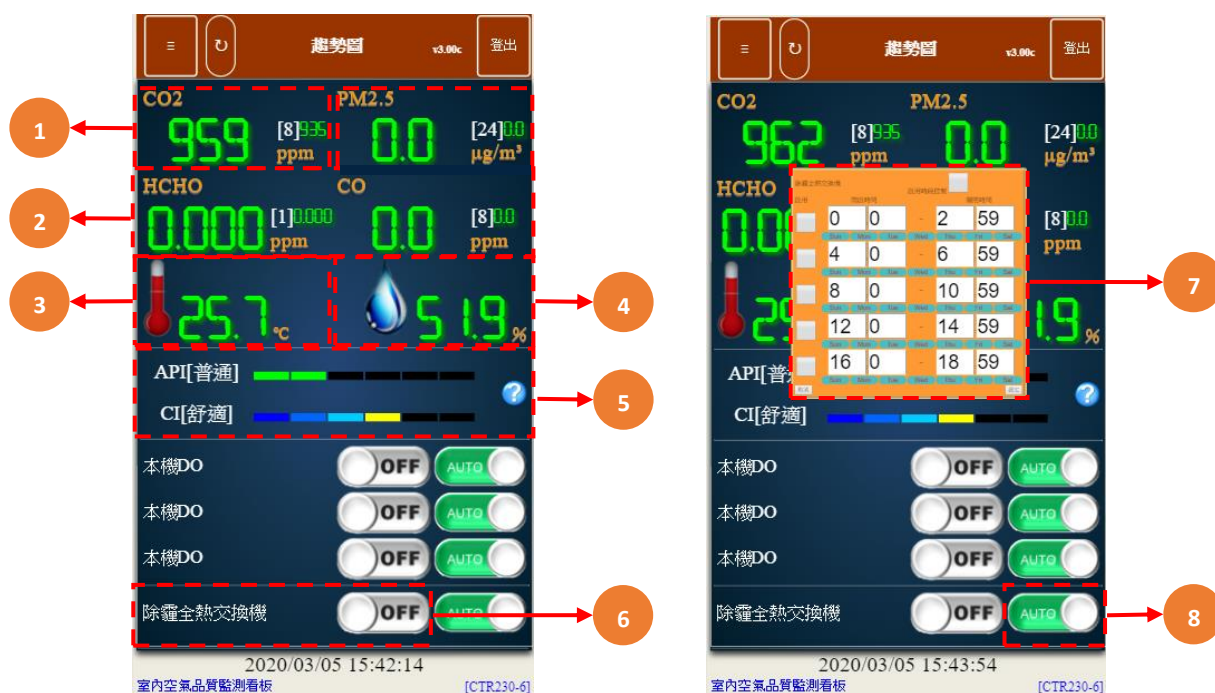
Code	Name	Function Description
1	Password input	Login is divided into two types of permissions: browsing permissions and setting permissions. (1) The browsing permission password is: 0000 (2) The setting permission password is: 1234
2	Login button	Login button

3.3 Function table



Code	Name	Function Description
1	Setting button	More functions will be available after successful login
2	More options	◆Settings: Enter the setting page ◆Language : Three languages to choose from (Traditional Chinese, Simplified Chinese, English) ◆Download : Four download modes (USB history, USB hour, USB event, built-in history) ◆Historical trend chart: You can enter and view the historical trend chart ◆Instant time trend chart: You can enter and view the instant time trend chart ◆Event record: Display alarm record events ◆Close: Close the menu screen

3.4 Browse the homepage and introduce various settings



Code	Name	Function Description
1	CO2	Carbon dioxide (CO2) concentration numerical display
2	PM2.5/HCHO/CO	PM2.5/HCHO/CO value display
3	Temperature	Temperature value display
4	Humidity	Humidity value display
5	AQI (Air Quality index)	For AQI, please refer to Figure 1 on p.39
6	CI (Comfort Index)	Please refer to Figure 3 on p.40 for CI
7	Haze removal full heat exchanger start switch	Activate/disable the haze removal total heat exchanger; point the cursor to "Haze removal total heat exchanger" to enter the setting screen
8	time period setting	Set the mode and time period when the haze removal all-heat exchanger starts automatic mode.

3.4.1 Introduction to setting up home page



Code	Name	Function Description
1	Setting items	System project settings
2	Button	Return to browse homepage button

3.4.2 IP settings



Code	Name	Function Description
1	IP	IP location
2	Mask	Subnet mask
3	Gateway	Default gateway
4	Mac	Mac code
5	Name	Equipment system name, up to 15 characters can be entered. Chinese: 15 characters. English: 15 characters.
6	Settings	After the setting is completed, the machine will automatically restart to load the new IP settings.
7	Button column	◆<Previous page: Previous setting page ◆Setting homepage: Return to setting homepage ◆Browse home page: Return to browse home page ◆Next page>: Next setting page

3.4.3 Pollution indicator setting (API)



Code	Name	Function Description
1	Display settings	Constant light mode/flash mode
2	Display mode	Instant time data/1-hour average/8-hour average/24-hour average
3	Settings	Click the setting button and the system will transfer the setting values to the device.

3.4.4 Time setting



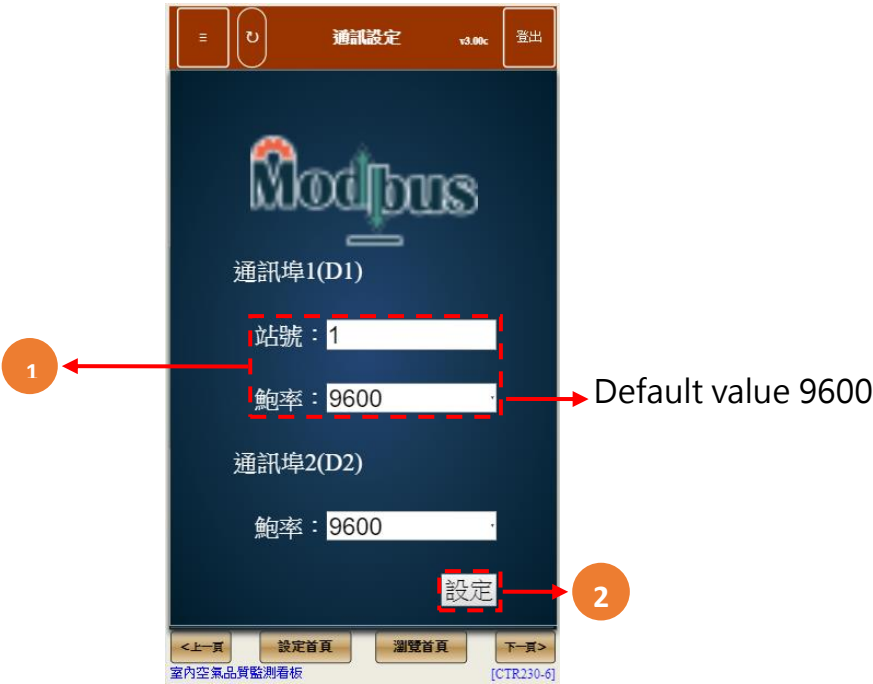
Code	Name	Function Description
1	Monitor	Show current time and date
2	Manual	After checking, you can manually enter the calibration time.
3	Change time	After checking Manual, you can change the current year/month/day hour/minute/second day of the week
4	Settings	Click the setting button, and the system will transfer the setting values to the device.

3.4.5 Password setting



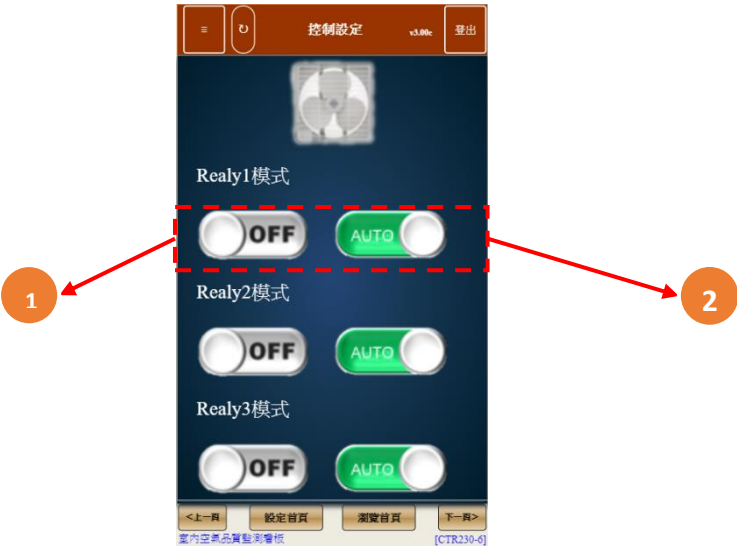
Code	Name	Function Description
1	Select permissions	Whether to enable browsing permissions
2	Settings	Click the setting button, and the system will transfer the setting values to the device.
3	Password change	You can change the password by yourself, enter the old password/new password/enter the new password again

3.4.6 Communication settings



Code	Name	Function Description
1	Set input	Set the station number and baud rate of communication port 1 (D1)
2	settings	Click the setting button and the system will transfer the setting values to the device.

3.4.7 Control settings



Code	Name	Function Description
1	Relay mode setting	Relay mode sets manual/automatic and manual on or off ON/OFF
2	settings	Click the automatic and manual switch and the system will transfer the set value to the device.

3.4.8 AO settings



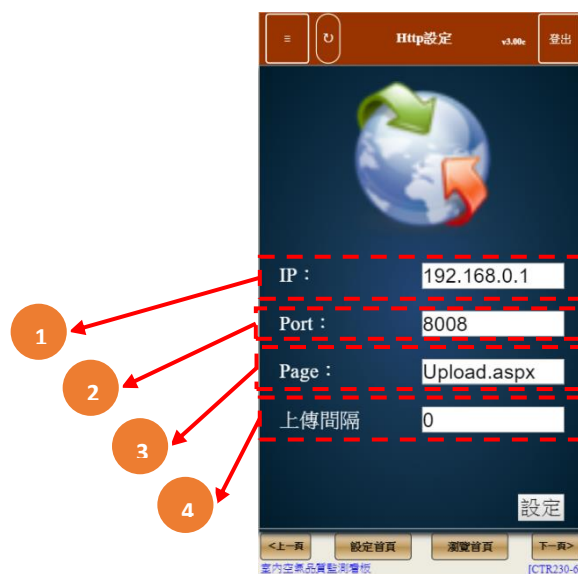
Code	Name	Function Description
1	AO settings (content)	AO output mode: (1) AO re-output: AO output based on instant time value. (2) PID control: PID controls AO output. (3) Manual adjustment: AO output can be set by yourself. PID control full open point: AO signal 20mA PID control full closing point: AO signal 4mA Manual output adjustment (0-100%): AO output opening ratio can be directly set AO output corresponding maximum value (mA): You can set the AO output corresponding Range maximum value by yourself Minimum value corresponding to AO output (mA): You can set the minimum value corresponding to Range for AO output. AO output adjustment offset: 4-20mA is used for correction in addition and subtraction. AO output adjustment gain value: Use 4-20mA for correction by multiplying AO output type: (1) 4-20 mA (2) 0-20 mA (3) 0-5V requires a parallel resistor of 250 ohms (4) 0-10V requires a parallel resistor of 500 ohms
2	Channel settings	The corresponding AO output value can be selected as temperature, humidity or carbon dioxide

3.4.9 Sensor settings



Code	Name	Function Description
1	Sensor options	System Sensor options TEMP/PM2.5/Humidity CO2/HCHO/CO
2	Numerical display	Sensor instant time data display
3	Basic parameters	◆Offset: used for calibration in the form of addition and subtraction ◆Gain value: used for calibration in the form of multiplication
4	Alarm settings	◆Alarm delay (seconds): When an alarm occurs, if the alarm continues for more than this number of seconds, the alarm will be triggered. ◆Alarm insensitive zone: When an alarm occurs, the alarm value must be lower than the hysteresis zone before it will reset. ◆High High point alarm: trigger the first section of high point alarm, you can choose RELAY ◆High alarm: trigger the second high point alarm, you can choose RELAY ◆Low point alarm: Trigger the first low point alarm, you can choose RELAY ◆Low low alarm: Trigger the second low point alarm, you can choose RELAY
5	Channel settings	It is a drop-down menu, you can select the Relay output yourself: None, Relay1, Relay2, Relay3 ※If the Relay is selected in manual mode, manual text will be displayed and the Relay cannot be selected.
6	Source (Except temp., humidity, and carbon dioxide, all other sensors can be set)	◆Interface: RTU via RS-485 for external source/TCP via network for external source ◆Station number: ID number of the data source ◆Address: the data address of the data source ◆Data type: data type of data source (UInt16/UInt32/Int16/Int32/DATA/Float) ◆Gain value: revise data by multiplying ◆Offset: Modify data by adding or subtracting
7	Haze removal system	◆Enable: The value of this channel is linked to the haze removal system ◆Enable value: When the channel value is greater than the value, start the haze removal system ◆Close value: When the channel value is less than the value, the haze removal system will be turned off.

3.4.10 Http settings



Code	Name	Function Description
1	Http upload address	Upload data IP
2	Port	Port
3	Page	Enter the specified page
4	Upload interval	Adjust the seconds and set the interval for uploading data (0 seconds means no startup)

3.4.11 Inverse



Code	Name	Function Description
1	Inverse settings	Whether to enable Inverse You can choose to upload by IP or URL
2	Modbus Port	Set Modbus Port (Default: 10502)

3.4.12 Calibration page



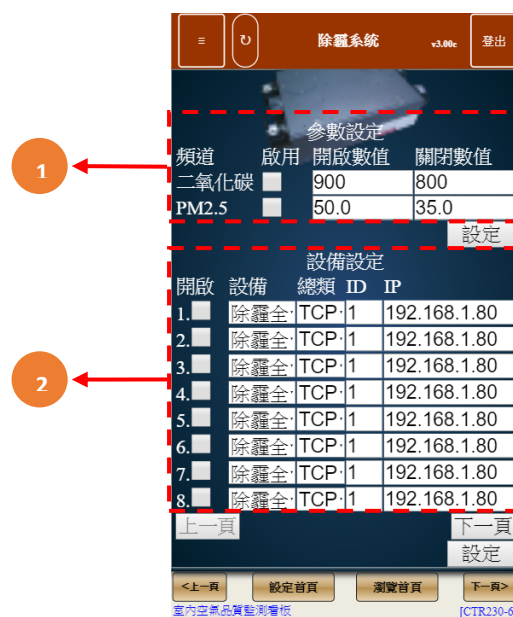
Code	Name	Function Description
1	Auto calibration button	Pressing the button will automatically calibrate the CO2 value data
2	Custom input calibration value	You can input calibration values according to CO2, temperature and humidity respectively. ◆Zero point: known standard point as calibration point ◆Comparison: Use instruments or known values as calibration points
3	Historical calibration value	The latest nine correction data

3.4.13 Display settings



Code	Name	Function Description
1	Upper right/lower right right/lower left	The channel displayed when the light signal is on The channel displayed when the light is off Turn off display when none is selected
2	Alternate time	Set the alternating time of changing data, the set value time expires, and the alternating LED display data

3.4.14 Haze removal system



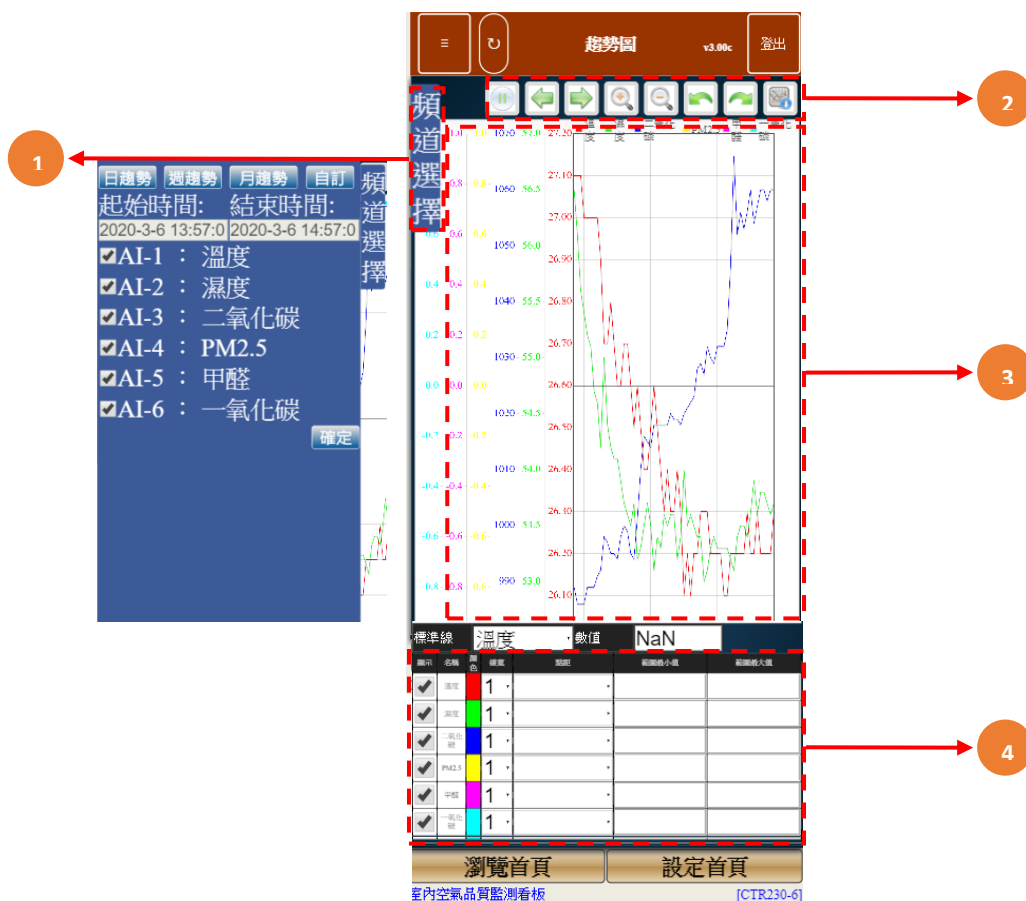
Code	Name	Function Description
1	Parameter settings	The haze removal system set with 3.4.9 Sensor
2	Device settings	Set the calibration method of the haze remover to be linked

3.4.15 Firmware update



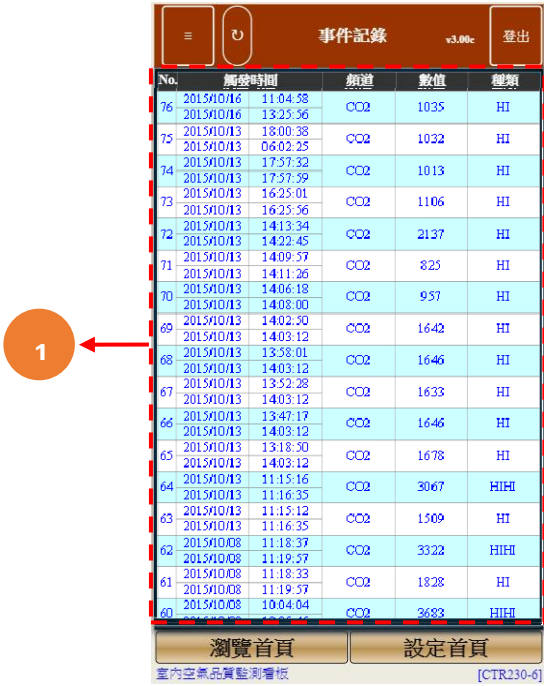
Code	Name	Function Description
1	Web page update	Web version updated via USB

3.5 Run chart



Code	Name	Function Description
1	Channel selection/ Trend chart type	Daily Trend Chart/Weekly Trend Chart/Monthly Trend Chart
2	Trend chart menu	Trend : Pauseable instant time trend chart Go one page forward : Trend chart timeline moves forward Go back one page : Trend chart time axis moves backward Enlarge : Trend chart timeline zoom Zoom out : Trend chart timeline zoom Previous : Return to previous step Next step : Repeat next step Trend chart download : Download trend chart
3	Run chart	Trend chart display content
4	Trend chart settings	Display: Check the trend chart to display channel lines Name: Channel name Color: The color represented by the channel Width: Line width Range minimum value: Minimum value of Y-axis of each channel Range maximum value: Maximum value of Y-axis of each channel

3.6 Record



Code	Name	Function Description
1	Record	The content is a maximum of 100 alarm records, including alarm start time, end time, channel, value, and alarm type.

Part 4. WEB SERVICE DESCRIPTION (PC version)

4.1 Home screen



Code	Name	Function Description
1	Enter the Web	Enter the IP address in the browser URL (Default IP: 192.168.0.230)
2	Language	Language: Traditional Chinese, Simplified Chinese, English
3	Log in	Login is divided into two types of permissions: browsing permissions and setting permissions. (1) The password for browsing permission is: 0000 (2) Set the permission password to: 1234
4	Browse instant time values	(1) The display order is: CO2/PM2.5/HCHO/Temperature/Humidity/CO (2) Green words represent the normal status of the channel / Red words indicate that the channel is in alert status (3) CI and API light status display

4.2 FUNCTION TABLE



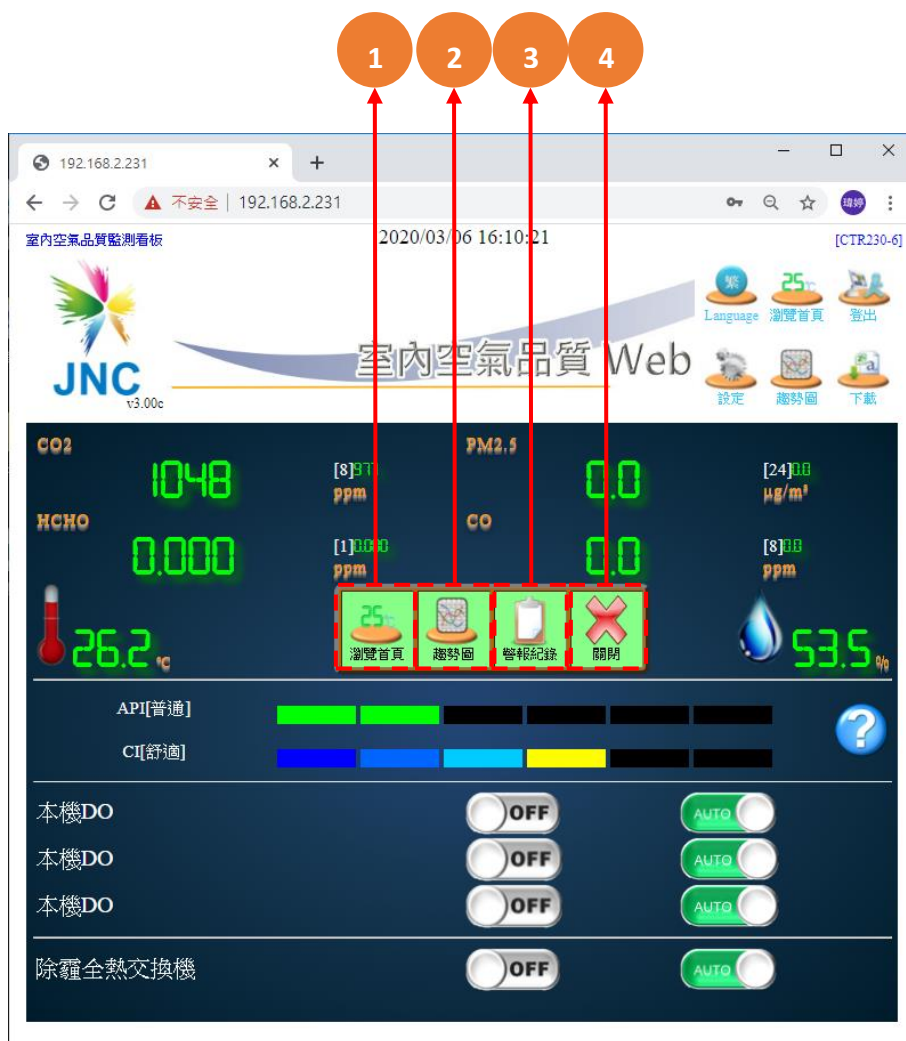
Code	Name	Function Description
1	Instant time data	Displays real-time values of carbon dioxide concentration (CO2), temperature, humidity, PM2.5, HCHO (formaldehyde), and CO (carbon monoxide). Please refer to page 8 for the homepage introduction.
2	Settings	Open the setting interface
3	Browse home page	Return to browse home page
4	Sign out	Log out of the system
5	Download	Four download modes (USB history, USB hour, USB event, built-in history)
6	Trend	Open the trend graph selection interface (trend graph/alarm record)

4.3 Setting page



Code	Name	Function Description
1	IP settings	For IP setting method, please refer to p.9
2	Pollution indicator setting	For how to set pollution indicators, please refer to p.10
3	time setting	For time setting method, please refer to p.11
4	Password setting	For password setting method, please refer to p.11
5	Communication settings	For communication setting method, please refer to p.12
6	Control settings	For control setting methods, please refer to p.12
7	AO settings	For AO setting method, please refer to p.13
8	Sensor settings	Sensor setting method, please refer to p.14
9	Http settings	Http setting method, please refer to p.15
10	Inverse	For Inverse setting method, please refer to p.15
11	Correction page	For page correction method, please refer to p.16
12	display settings	For display setting method, please refer to p.17
13	Haze removal system	Set the operating parameters of the haze removal system and select the user interface p.17
14	Firmware update	For firmware update method, please refer to p.18

4.4 RUN CHART



Code	Name	Function Description
1	Browse home page	Return to browse homepage
2	Trend	Turn on the instant time/historical trend graph. Please refer to p.19 for the operation method.
3	Alarm record	Alarm trigger time record, please refer to p.20 for operation method
4	close	Close the trend graph selection interface

4.5 TIME CONTROL

除霾全熱交換機

啟用時段控制 ☐

啟用 ☐

開啟時間 關閉時間

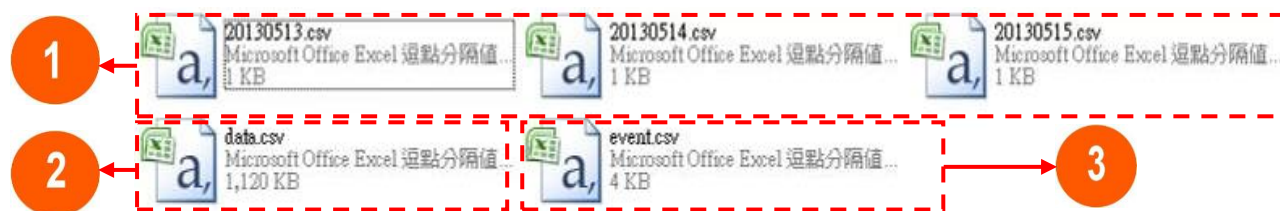
0	:	0	~	2	:	59
Sun		Mon		Tue		Wed
4	:	0	~	6	:	59
Sun		Mon		Tue		Wed
8	:	0	~	10	:	59
Sun		Mon		Tue		Wed
12	:	0	~	14	:	59
Sun		Mon		Tue		Wed
16	:	0	~	18	:	59
Sun		Mon		Tue		Wed

取消 設定

- Click "Haze removal full heat exchanger" on the homepage to set it

Code	Name	Function Description
1	Enable time period control	After activation, 5 groups of time periods can be set below
2	Time period and week	Force the haze-removing full heat exchanger to operate when the time period coincides with the day of the week

PART 5. INSTRUCTIONS FOR USING USB RECORD FILE



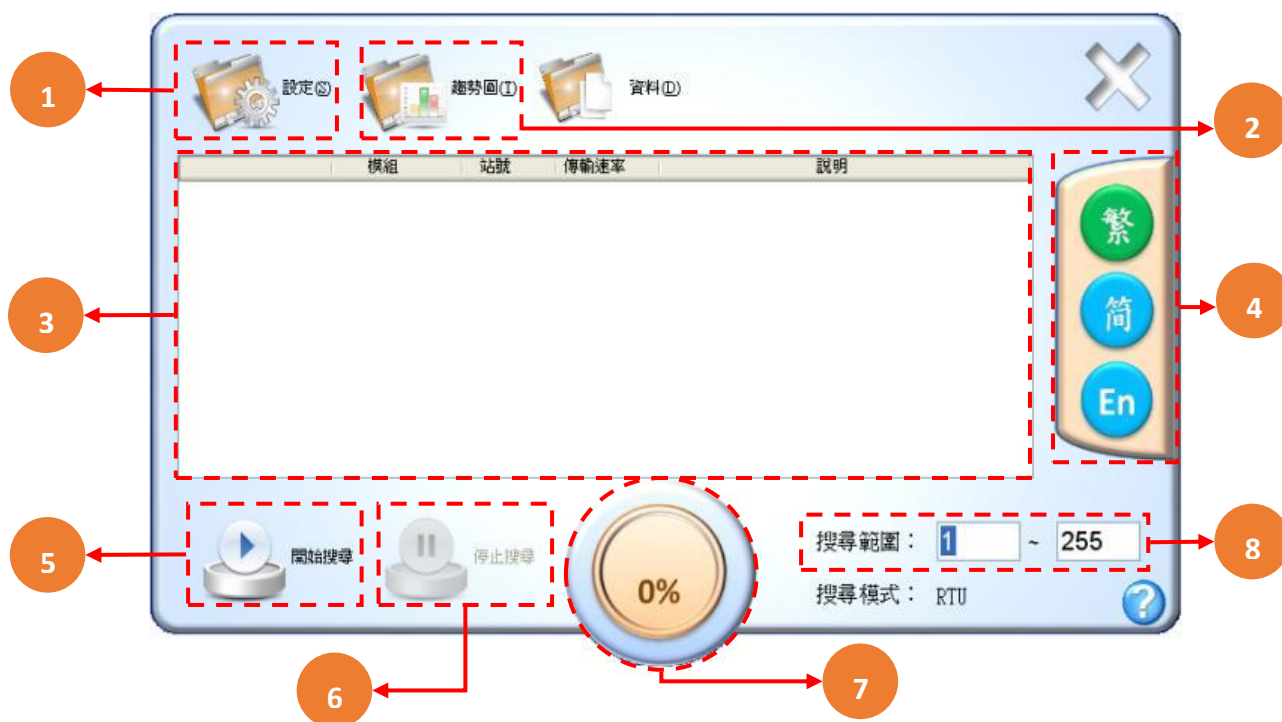
Code	Name	Function Description
1	YYYYMMDD.csv (File names are based on date)	Daily hourly log files
2	Data.csv	Log files per minute
3	event.csv	Alarm event event record file

※Instructions for use :

- 1 When the USB storage device is not plugged in, the recording will be written to the internal memory.
- 2 When the internal memory is full, the oldest data will be removed and new data will be written, which means that the latest data will be retained.
- 3 Internal memory capacity description
 - 3-1 There is internal buffer space for 32 data records per hour, and a maximum of 32 hours of data can be recorded.
 - 3-2 There is a buffer space for 1,000 data records per minute and can be recorded for up to 16 hours.
 - 3-3 The alarm record has internal buffer space for 100 pieces of data. The occurrence and reset of an alarm each occupy one space. That is to say, when an alarm occurs and then reset, it will occupy two data spaces.
- 4 After plugging in the USB storage device without plugging it in for a long time, it will take a long time to write, which may be up to 2 minutes, the measurement and recording functions will not be affected during this period.
- 5 Stored in USB recording space, each transaction is about 36 bytes. The hourly csv files and per-minute csv files generated every day are about 41.35KB in total. The storage space size is about 15MB based on 365 days in a year. Using USB 4G space, it can be stored for about 273 years. .

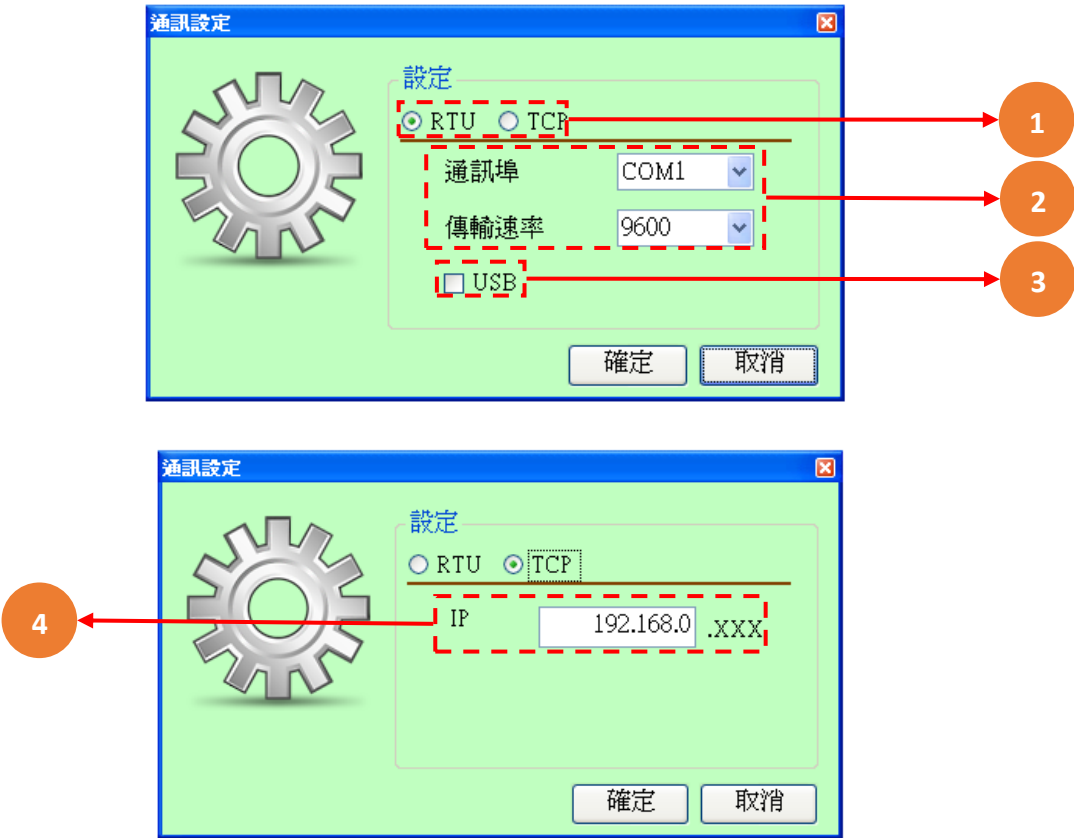
PART 6.Web/USB Data Import Instructions

6.1 Home screen



Code	Name	Function Description
1	Communication settings	Communication setting button
2	Trend	View trend graph button
3	Search results	Searched module information
4	Language selection	Choose Traditional Chinese/Simplified Chinese/English
5	Button	Start search
6	Button	End search
7	Search progress	Display the current module search progress
8	Search range	Search ID station number range, you can set the range yourself

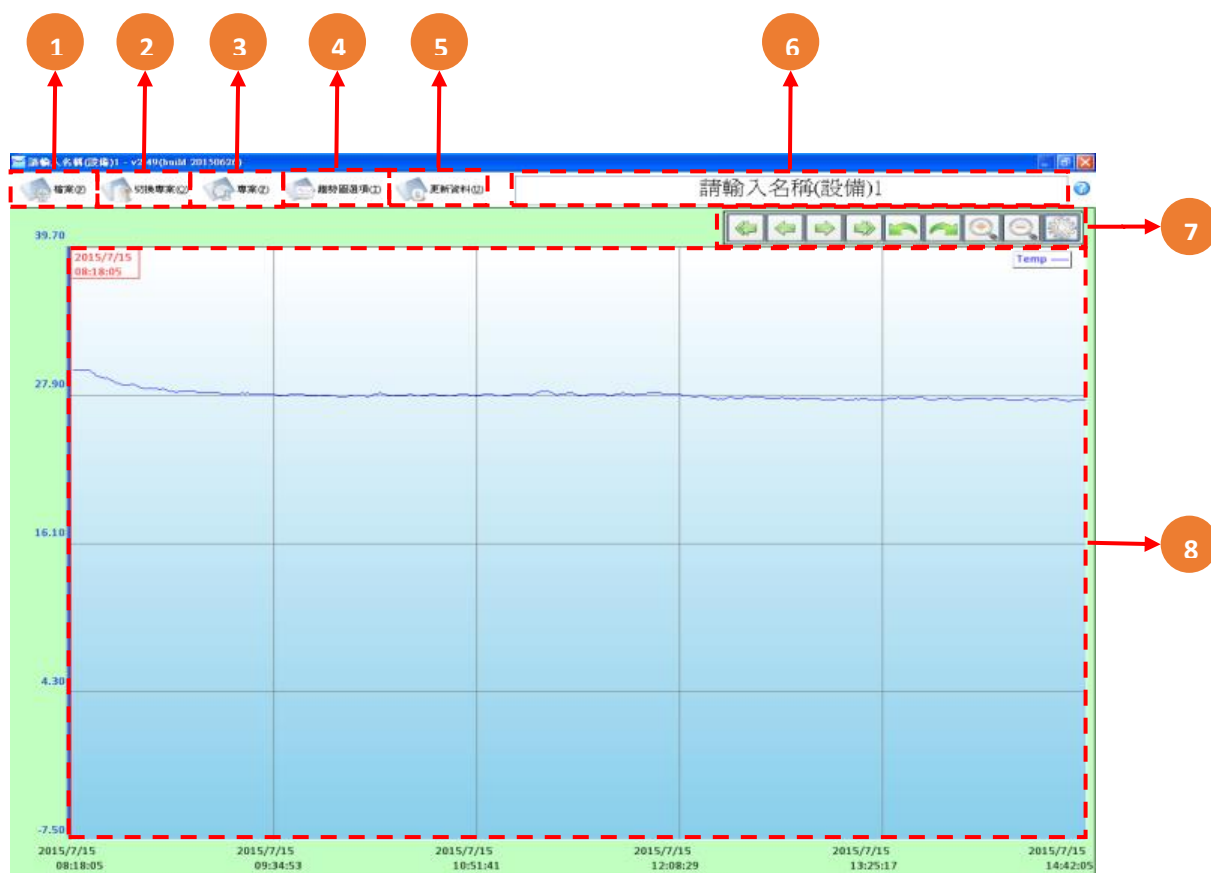
6.1.1 Communication settings -RTU/TCP



Code	Name	Function Description
1	Communication mode	Select RTU communication mode
2	communication port	Select communication port
3	Transmission rate	Select transfer rate
4	Communication mode	Select TCP communication mode
5	IP	Enter IP location
6	USB	Only for four-point controllers

6.1.2 Trend graph settings and usage instructions

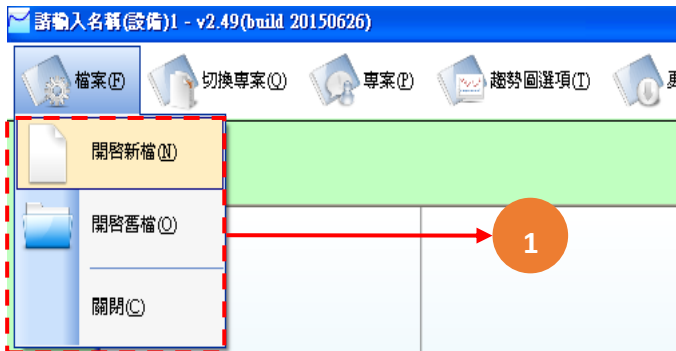
Trend chart main screen



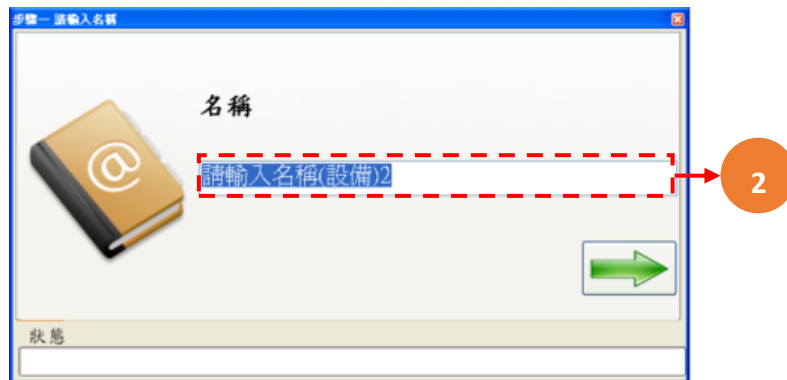
Code	Name	Function Description
1	File	Open new file/Open old file/Close
2	Switch project	Switch trend chart projects for each device
3	Project	Project options
4	Trend graph options	Details/Filter/Standard Line/Report Output/Print
5	Updates	Update to latest data
6	Name	This project name
7	Toolbar	One page forward/half page forward/half page back/one page back/previous step/next step/zoom in/zoom out/hide toolbar (from left to right)
8	Display area	Trend chart display area

6.1.3 Trend Chart Options-Open New File Steps

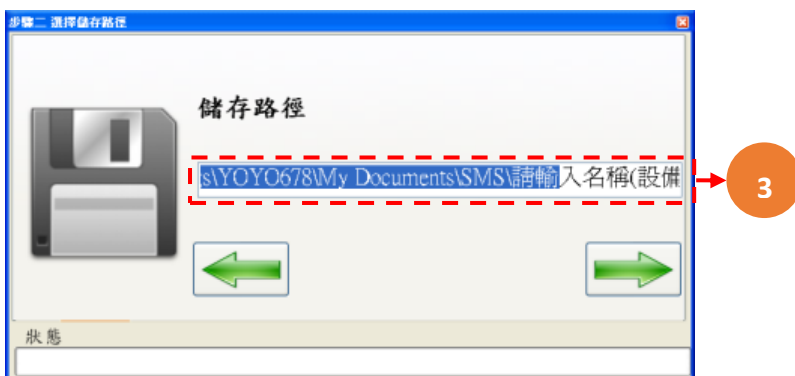
Step 1: Click on the upper left corner to open a new file.



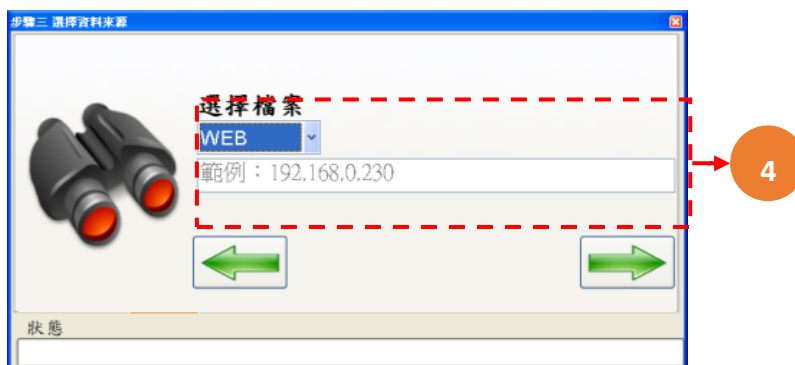
Step 2: Enter the project name and click Next Page (green arrow).



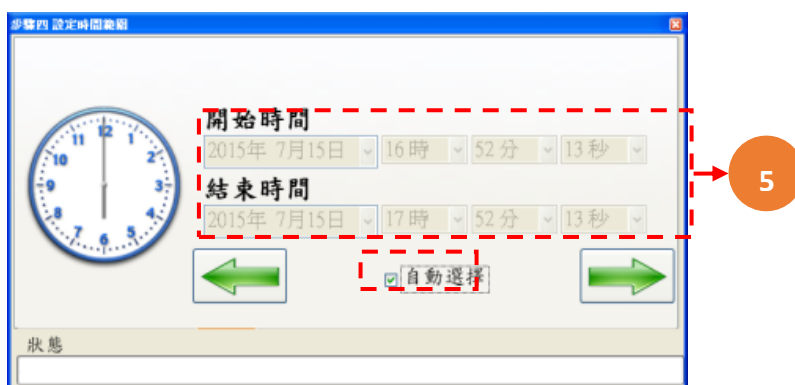
Step 3: Select the storage path and click Next when finished.



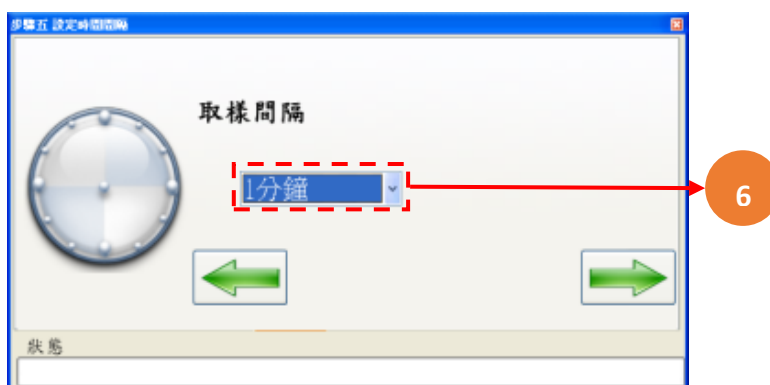
Step 4: Select the file. WEB can directly download and import the device data. Use USB to take out the flash drive on the device and specify the file data.csv to import the data.



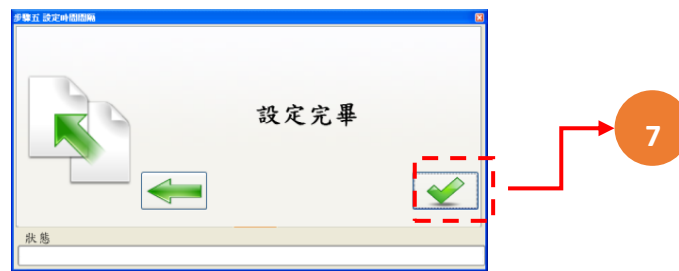
Step 5: Choose to display the data start time and end time, or choose to automatically complete and click Next.



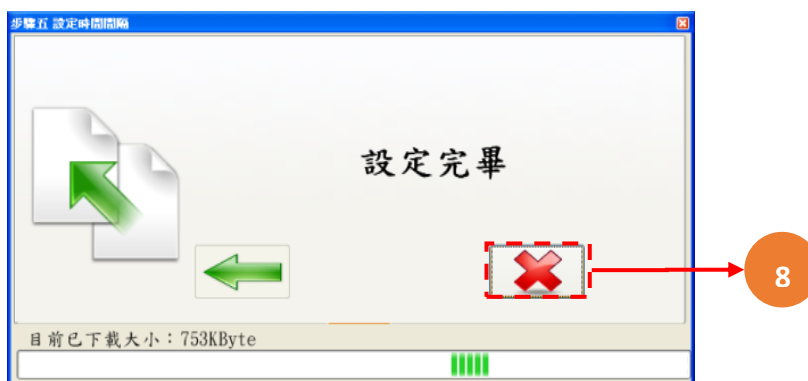
Step 6: Select the sampling interval (1 second/10 seconds/30 seconds/1 minute/10 minutes/30 minutes/one hour/customized) and click Next after completion.



Step 7: After all settings are confirmed, please click the Done button (green check mark).

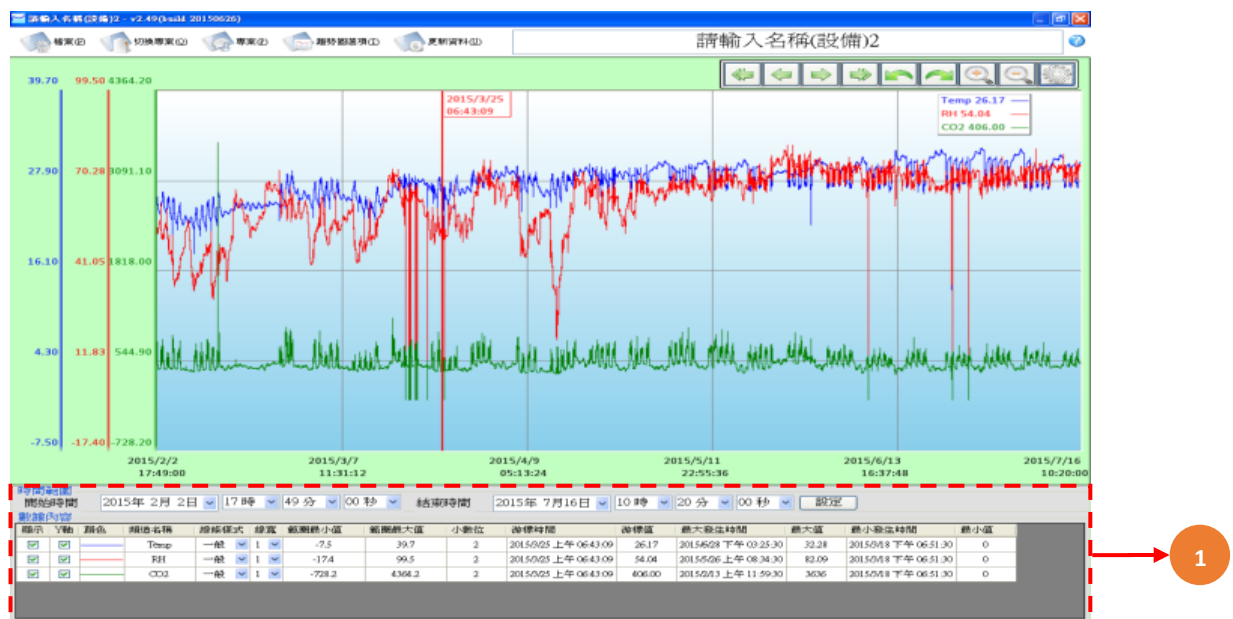


Step 8: Start downloading/importing data. If you want to cancel, please click the cancel button (red cross).



6.1.4 Trend Chart Options-Details

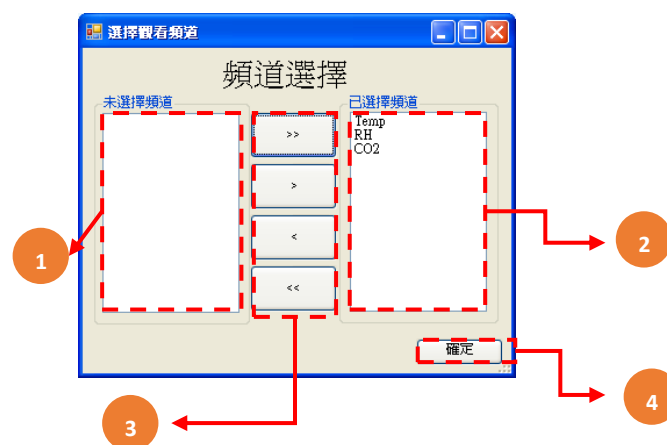
Click the trend graph option→Details



Code	Name	Function Description
1	Details column	Show details of trend chart

6.1.5 Trend Chart Options-Filter

Click the trend graph option → Filter, and click the confirmation button after selecting the channel.



Code	Name	Function Description
1	No channel selected	Hide the trend chart and do not display the channel
2	Channel selected	Trend chart showing selected channel
3	Add uncheck button	>> : Add all selections > : Single selection < : Single withdrawal << : Exit all
4	Sure	After selecting the channel, please click the confirm button.

6.1.6 Trend Chart Options-Standard Line

Click the trend graph option→standard line. Please click the confirmation button after the addition is completed.



Code	Name	Function Description
1	Checklist	Overview of the customized standard line list, which can be added/modified/removed by yourself
2	Content	Adjust and set the standard line label (name)/style/line width (1~8)/standard value/font/appearance color of the group you belong to (RH/Temp/CO2)
3	Cancel/Confirm	After adding, please click the OK button. If you want to cancel, please click the cancel button.

6.1.7 Trend Chart Options-Report output

Click the trend graph option → report output. After selecting, please click the confirmation button to archive and execute.



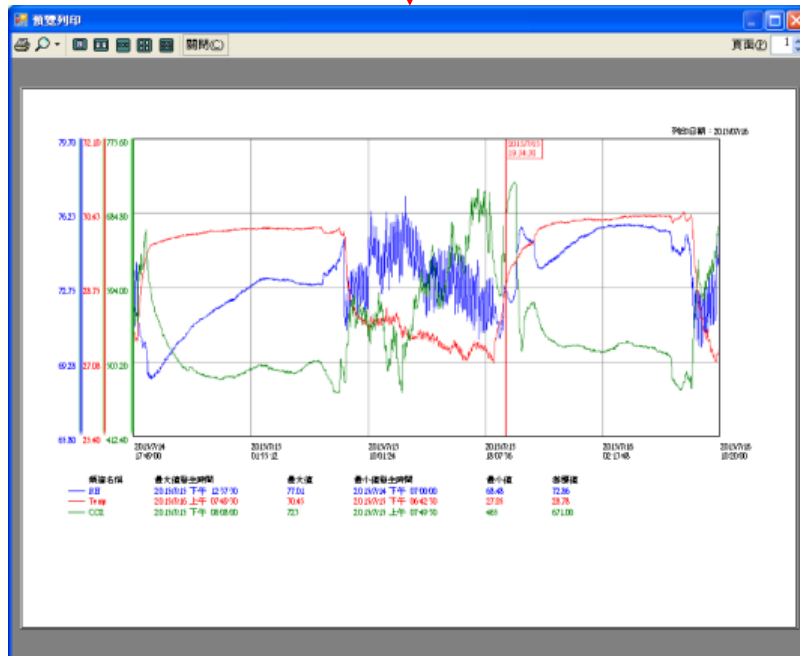
Code	Name	Function Description
1	Report settings	You can choose the start time/end time (year/month/day hour/minute/second) or change the report type (daily report/monthly report/annual report/customized report) ※Customized reports: year/month/day hour/minute/second can provide individual input and adjust the time interval (minutes).
2	State	Progress status of report generation

6.1.8 Trend Chart Options-Print

Click the trend graph option → Print, enter the file title → click the OK button → enter the print screen.



A screenshot of a 'Print' dialog box. The title bar says 'Print'. Inside, there is a red instruction: '請填入標題名稱(英數字、標點符號合計最多25個)' (Please enter the title name (English numbers, punctuation marks, total up to 25 characters)). Below this is a text input field. To the right of the input field is a button labeled '確定' (OK) which is highlighted with a red dashed border.



PART 7. CO2 Calibration method

7.1 Zero point calibration - use zero-level standard gas N2 for zero point calibration

First perform zero point calibration; inject zero-level standard gas N2 (ventilation rate = 100~150 ml/min) into the vent hole for about 2-3 minutes. At this time, the carbon dioxide measurement value should be 0ppm, and then adjust the offset (Offset). , to perform zero offset correction.

7.2 Full-scale calibration - full-scale calibration using standard carbon dioxide gas

Inject standard carbon dioxide (1500ppm, ventilation rate = 100~150ml/min) into the vent hole for about 2-3 minutes, and then adjust the gain value (Gain) for full carbon dioxide calibration.

7.3 Simple calibration mode - using outdoor background value calibration mode

Use outdoor air for calibration and leave it outdoors for at least 10 minutes until the carbon dioxide measurement value no longer changes. Outdoor carbon dioxide 400ppm is used as the background reference value, and then adjust the offset (Offset) to calibrate the carbon dioxide background value.

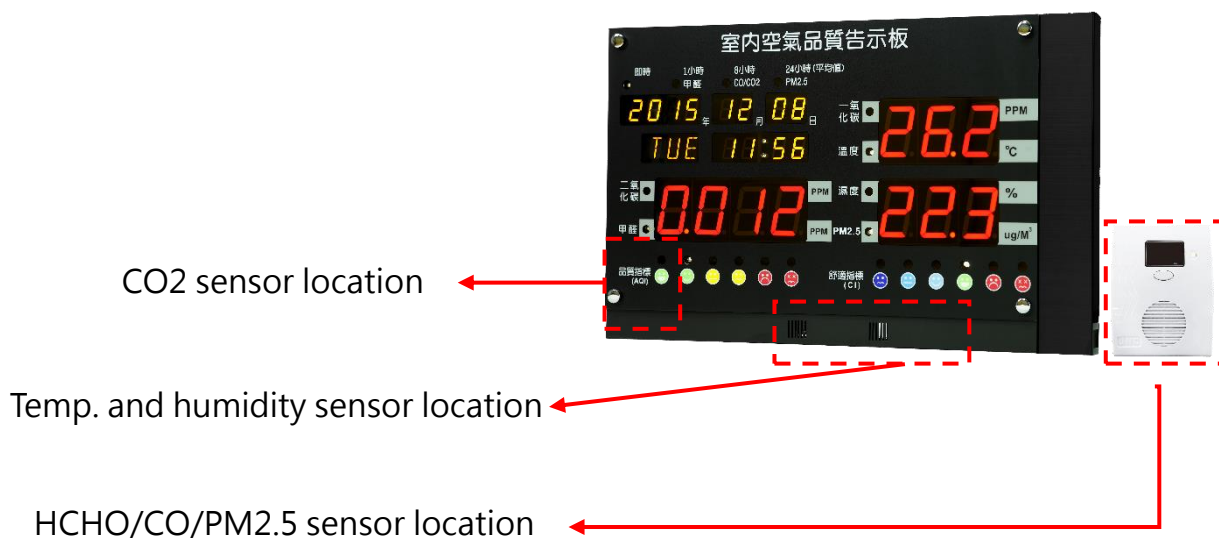
(Note: Users should not breathe into the carbon dioxide monitoring hole. The carbon dioxide exhaled by the user will affect the measurement value)

7.4 Standard parts comparison and correction - use handheld certified standard parts

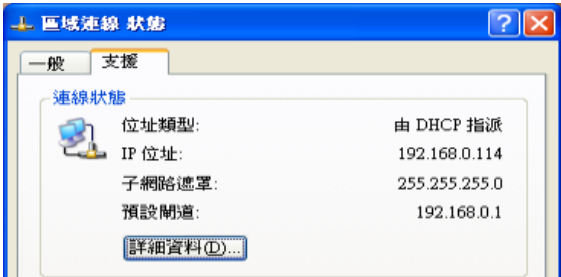
instruments for comparison and correction

Use a handheld certified standard instrument for comparison and calibration. Place the certified standard instrument and the machine in the same controlled environment at the same time until the carbon dioxide measurement values of the two no longer change. Then adjust the gain value (Gain) for carbon dioxide calibration.

※Temp. and humidity/CO2/ HCHO/CO/PM2.5 sensor location



PART 8.Trouble Clearing

No.	Problem	Action
1	Unable to connect to the network	Please check whether the RJ45 light is on and flashing, and confirm whether the network cable is normal.
2	The time and date are incorrect	You can go to the Web Service interface and reset the time and date. If the power is turned off for a while and then reconnected, the time and date are still wrong, which means the battery is dead.
3	The seven-segment display does not display properly	It is designed to be hot-swappable to facilitate future maintenance. Sometimes, poor contact may occur due to impact during transportation. You only need to turn the mirror bead by hand to open the cover and gently press the seven-segment display.
4	Forgot the set IP address	The system can be reset. Please refer to the RST key function description in item 2 of 2.4.1 Hardware IO End Description. (IP after reset: 192.168.0.230) ※System reset will return all internal parameters to factory values, please note
5	The web page is garbled	Please select your web browser encoding→Unicode(UTF-8)
6	IAQ-HUB is visible in the WiFi option, but the connection cannot be successful.	First check whether the HUB is plugged in properly, or power on the HUB again. Or re-enable search on your phone' s WiFi function.
7	Is it possible to connect the CTR230 network to the HUB socket of the existing broadband network (with WiFi) at home?	It is possible to connect to your own HUB, but the displayed WiFi name will change to the WiFi name you use at home instead of IAQ-HUB.
8	Cannot open webpage using local network	Please check whether the local network and the CTR230 IP network are in the same domain. (The default CTR230 IP domain is 192.168.0.1) Example: You can change the local network settings of the connected computer to the settings in Figure 1. Figure 1 

9	Unable to open web pages using IE	The web content uses HTML5 syntax, so some browser versions cannot support HTML5. The following are the versions currently available for computer browsers: (1) Google Chrome (2) Internet Explorer 9 (3) Mozilla Firefox 3.5 (4) Opera 10.5 (5) Safari 3.1 Please refer to the following URL: http://en.wikipedia.org/wiki/HTML5_Audio
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Part 9. Appendix

9.1 Glossary

※Glossary :

1.Delay Time:

The abnormal value will be considered abnormal after it lasts for N seconds (set number of seconds).

2.Deadband:

In an abnormal state, the abnormal state is deemed to be resolved only when the value returns to the specified area within the normal range. Example: Set Range 0~200, HI 100, DB 2. When the value exceeds 100, the high point alarm is activated. When the value drops to 98, which is 2 lower than the high point, the alarm is lifted.

9.2 Air Quality Index (AQI):

9.2.1 Default mode:

The AQI value is calculated using CO2 data according to the formula. The calculation formula is as follows:

$$S_i = \frac{P_i - P_0}{Q_i - Q_0} * (C - Q_0) + P_0$$

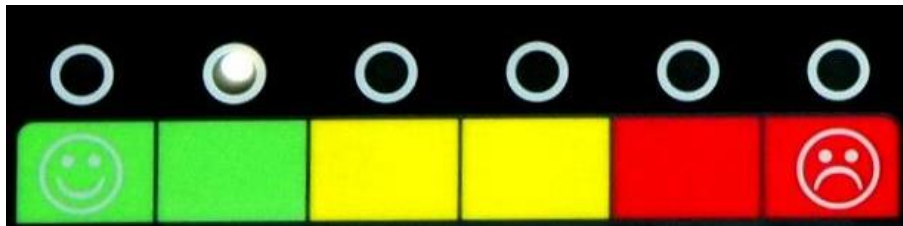
The high value of the pollutant concentration closest to C

The low value of the pollutant concentration closest to C

The corresponding score of Qi

The corresponding score of Qo

The comfort corresponding to the calculated AQI data can be roughly divided into 6 levels, as shown in Figure 1:

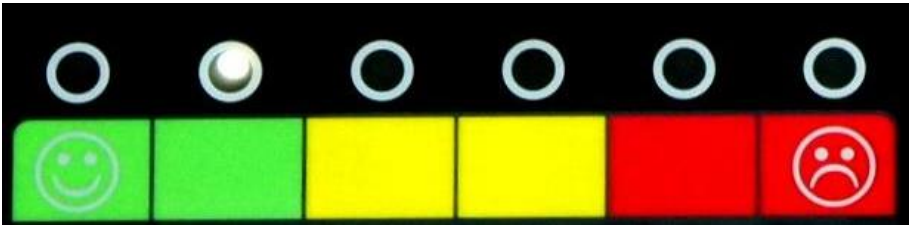


AQI	0~50	51~100	101~150	151~200	201~300	301~500
Health effects	Good	Ordinary	Unhealthy for sensitive groups	unhealthy	very unhealthy	Danger
CO2 Concentration value	350~600	1,100	3,500	5,000	10,000	10,000 above
PM2.5	0~15	16~40	41~65	66~100	101~250	251~500
HCHO	0.00~0.01	0.011~0.02	0.0021~0.06	0.061~0.10	0.10~1.00	1.01~5.00
CO	0.00~2.0	2.1~5.5	5.6~9.3	9.4~23.1	23.2~50	51~90

Figure 1 AQI diagram and corresponding data

9.2.2 Custom mode:

The CO2 value is directly used, and the corresponding status of the 6-segment set points is set by the user, as shown in Figure 2:



Paragraph 1 Set point	Paragraph 2 Set point	Paragraph 3 Set point	Paragraph 4 Set point	Paragraph 5 Set point	Paragraph 6 Set point
Good	Ordinary	Unhealthy for sensitive groups	unhealthy	very unhealthy	Danger

Figure 2 AQI custom mode icon and corresponding description

9.3 Indoor human comfort index (CI):

The comfort index CI adopted by the Central Weather Bureau also refers to the commonly referred to temperature and humidity index THI (Temperature Humidity Index). The CI value is calculated using temperature, dew point temperature, and relative humidity.

The comfort corresponding to CI can be roughly divided into 6 levels, as shown in Figure 3:



Temp. and humidity index (THI)	Below 10	11~15	16~19	20~26	27~30	31 above
Health effects	Very cold	Cold	A little chilly	Comfortable	Muggy	Prone to heatstroke

Figure 3 CI comfort diagram and corresponding instructions

9.4 MODBUS communication protocol reference table

CTR-230 Modbus communication table (Firmware V1.19)				2013/11/08
Address	HEX	Uses characters	Represent	Instructions
FUNCTION (04H)				
0	0	1	TEMP.	(Value) / 10
1	1	1	Humidity	(Value) / 10
2	2	1	CO2	(Value)
3	3	1	PM2.5	(Value) / 10
4	4	1	HCHO	(Value) / 1000
5	5	1	CO	(Value) / 10

9.5 Instructions for connecting multiple modules with the same IP advanced settings

When there is only one fixed IP but you want to connect to more than two devices, you can use the forwarding function of the communication port to achieve this.

Example description: The following examples will use the following equipment

- TOTO Link sharer (or Server) : 192.168.0.3 (fixed IP)
- CTR100 : 192.168.1.100
- CTR230 : 192.168.1.230

9.5.1 Set a fixed IP for the TOTO Link sharer



9.5.2 Confirm hardware equipment

Confirm that the hardware device CTR100 and CTR230 IP must be in the same domain and subnet mask as the sharer IP.

(The factory default IP domain of the hardware device is 192.168.0.(IP))

IP設定

更改IP項目

IP位址: 192.168.1.230

子網路遮罩: 255.255.255.0

預設閘道: 192.168.1.1

MAC位址: 02 : 1a : b6 : 00 : 02 : 55

設定

9.5.3 Set up port forwarding

Set up port forwarding

192.168.0.3:81 > 192.168.1.100

192.168.0.3:82 > 192.168.1.230

In the LAN IP section, enter the hardware device CTR100 and CTR230 IP. You can also change the IP yourself, but it must be the same as the hardware device IP (explained in step 2) .



9.5.4 Link to the corresponding device through the browser

Type <http://192.168.0.3:81> or <http://192.168.0.3:82> in the browser · it can be connected to the corresponding device .



