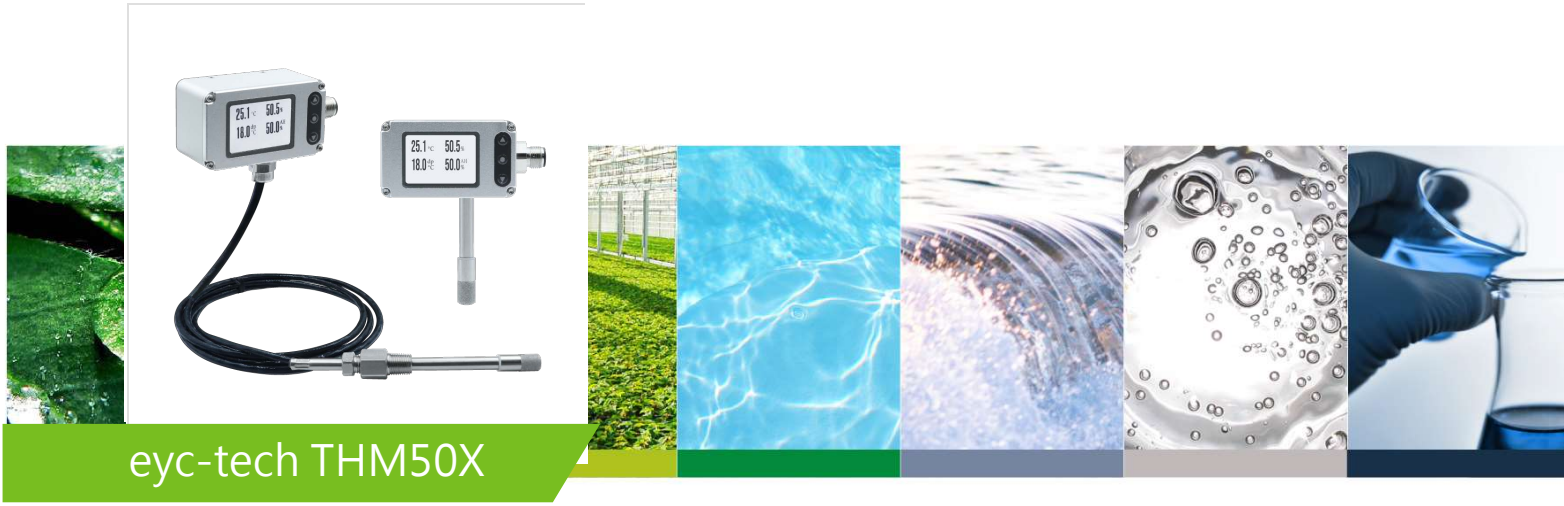
Operation Manual

eyc-tech THM50X

Temperature and humidity sensor



Contents

I. Security considerations

Please read this Specification carefully, prior to use of this, and keep the manual properly, for timely reference.

Solemn Statement：

This product can not be used for any explosion-proof area.

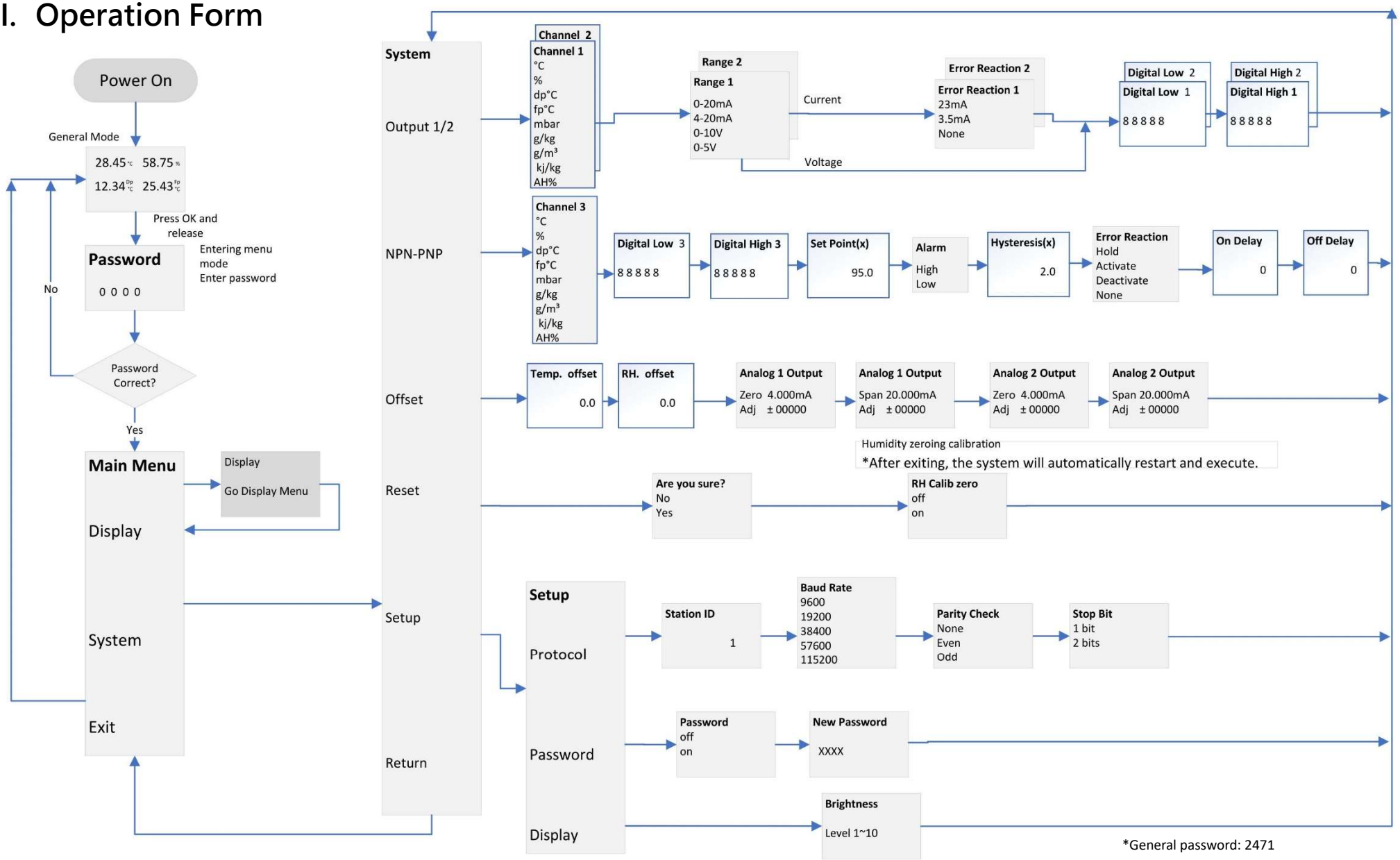
Do not use this product in a situation where human life may be affected.

eyc-tech will not bear any responsibility for the results produced by the operators！

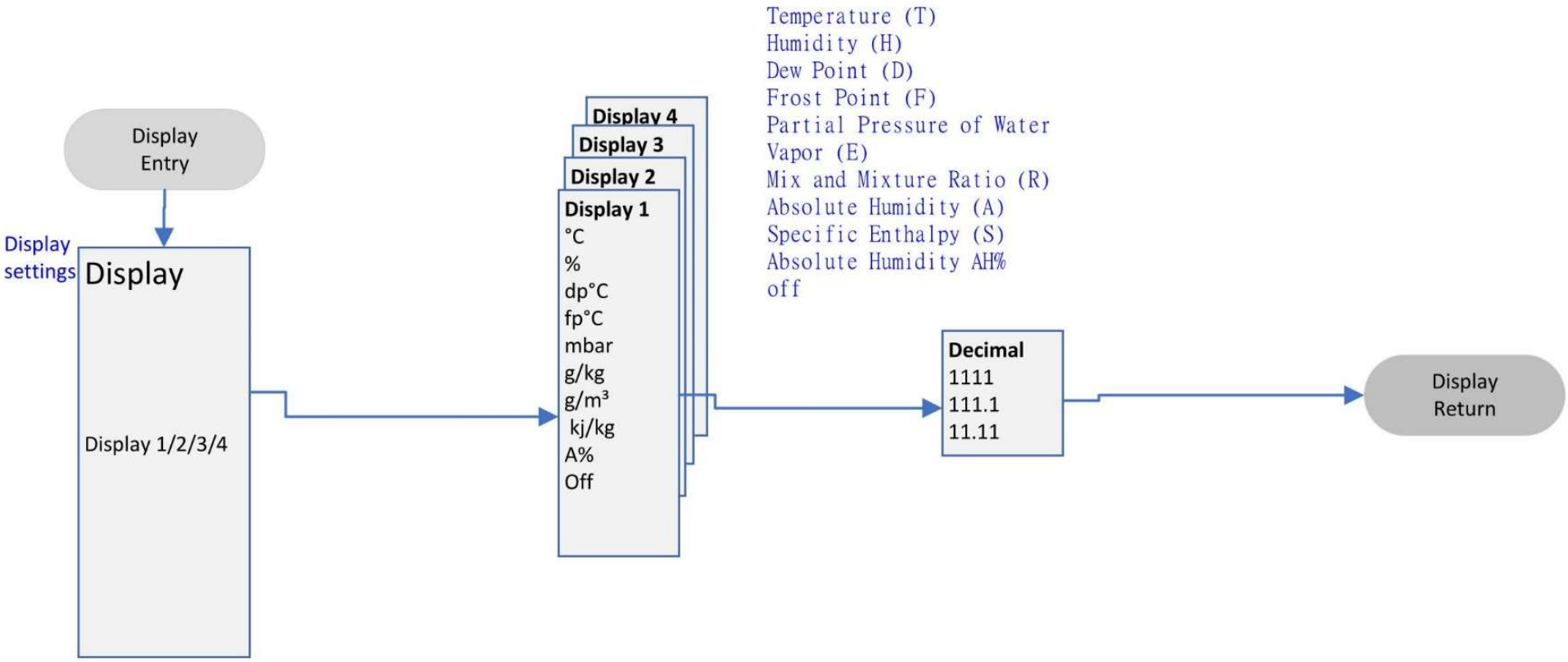
Warning!

- Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards.
- This product must be operated under the operating conditions specified in manual to prevent equipment damages.
- Please using the product under the ordinary pressure, or it will influence safe problem.
- This product must be operated under the operating condition specified in this manual to prevent equipment damages.
- This product must be operated under the normally atmospheric condition to prevent equipment damages.
- To prevent products damage, always disconnect the power supply from the product before performing any wiring and installation.
- All wiring must comply with local codes of indoor wiring and electrical installation rules.
- Please use crimp type terminal.
- To prevent personal injury, do not touch the moving part of product in operation.
- It may cause high humidity atmosphere during the product was breakdown. Please take safety strategy.

II. Operation Form



*General password: 2471


Display
Entry
Display
settings
Display
Display 1/2/3/4
Display 4
Display 3
Display 2
Display 1
°C
%
dp°C
fp°C
mbar
g/kg
g/m³
kj/kg
A%
Off
Temperature (T)
Humidity (H)
Dew Point (D)
Frost Point (F)
Partial Pressure of Water Vapor (E)
Mix and Mixture Ratio (R)
Absolute Humidity (A)
Specific Enthalpy (S)
Absolute Humidity AH%
off
Decimal
1111
111.1
11.11
Display
Return

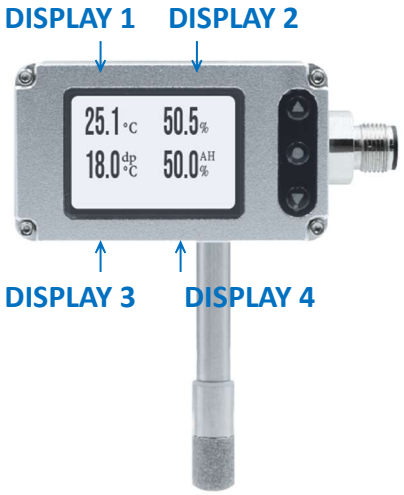
※Key Pad Operation Mode

Button Instruction	Operation Mode	
	Normal mode	Menu Mode
Press UP once	Resrved	increase number or option once
Press OK once	Go Menu Mode	submiit the selecion,go on next menu or complete the setting and then return to the nomel mode
Press DOWN once	Resrved	decrease number or option once,shift cursor if numerical menu
Hold UP	Resrved	increase number or option faster
Hold OK 5 seconds	Resrved	Return to previous menu,or leave menu mode
Hold DOWN	Resrved	decrease number or option faster

THM501

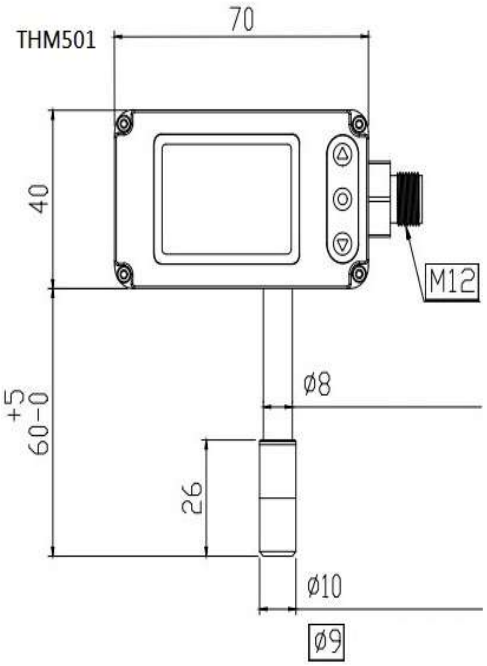
III. Appearance Description

Display allocation

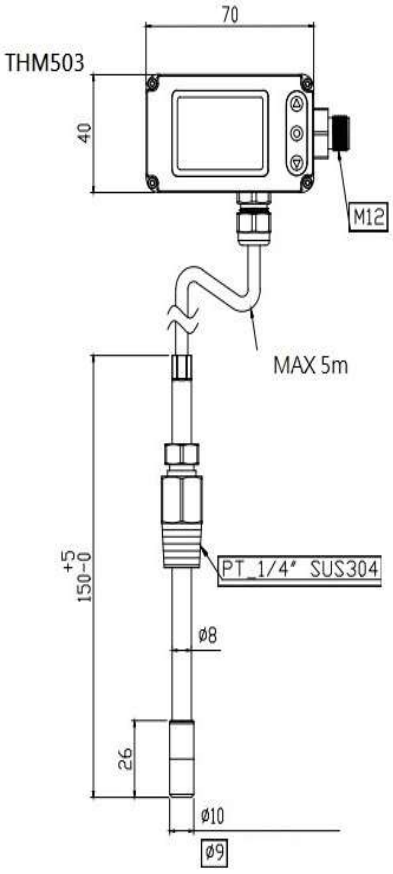


Appearance

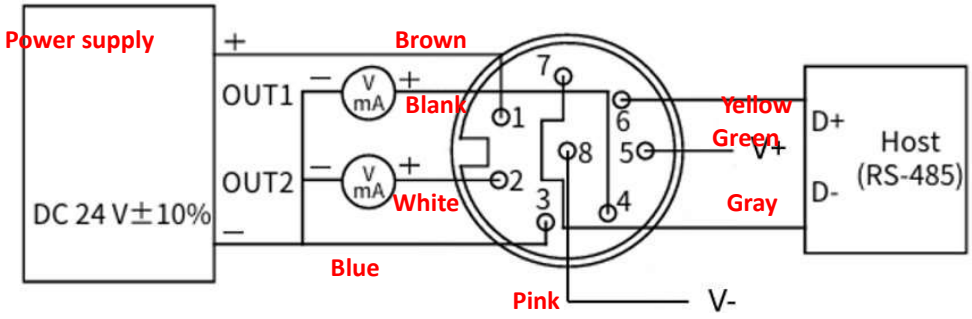
Wall-mounted



Separate type



IV. Connection Diagram



*Please make sure the product and the device which connect with RS-485 are on common ground, avoid damaged product.

V. Features

1. Multi-parameter display (°C / %RH / dp°C / AH%)

Simultaneous display of crucial engineering parameters such as temperature, relative humidity, absolute humidity, and dew point allows engineers to understand environmental conditions without additional calculations. Direct display of absolute humidity provides users with a clearer understanding of dryness levels and the risk of material moisture absorption; relative humidity offers supplementary information on temperature and humidity balance, resulting in a more comprehensive overall assessment. This synchronized display enables more accurate on-site judgments in less time.

2. Absolute Humidity Percentage (AH%)

The HM50X defines humidity as using "Absolute Humidity Percentage (AH%)" as the process control benchmark. Absolute humidity (AH, g/m³) is defined as the mass of water vapor contained in a unit volume of air, and it is directly related to temperature and pressure, unaffected by changes in saturation conditions.

The definition of AH% proposed by THM50X is as follows:

$$AH\% = \frac{AH_{env}}{AH_{sat@25°C}} \times 100\%$$

Where $AHenv$ represents the absolute humidity of the actual environment (calculated based on the measured temperature and relative humidity), and $AHsat@25°C$ represents the saturated absolute humidity value at 25°C (approximately 23.0 g/m³). This definition uses the 25°C saturation value as a unified benchmark, converting the actual water vapor content at different temperatures to the same reference scale, ensuring consistent comparability of humidity indices under various temperature conditions.

Example:

Temperature	Measured Absolute Humidity(g/m³)	Absolute Humidity Percentage (AH%)
100°C	4.6 g/m³	(4.6 ÷ 23) × 100% = 20%
100°C	1.15 g/m³	(1.15 ÷ 23) × 100% = 5% AH% = 5% (Well-drying)

3. NPN/PNP output signal

Equipped with NPN/PNP output signals, it can convert measurement status into explicit switching signals, which can be directly provided to the digital input terminals of PLCs, alarms, or process equipment. Through clear signal interpretation, the equipment can react immediately, reducing humidity deviations and process risks caused by delays, making overall environmental control more timely and reliable.

4. Filter head selection

Order Number	Name	Description	Features
4425000022	Stainless steel sintered filter head 	Material: SUS316 stainless steel powder sintering Aperture: **40μm** Outer Diameter: **10mm** Length: **25mm**	It has excellent pressure resistance, pollution resistance, and filtration properties, and is corrosion resistant. Heat Resistant:: **200°C max.**
8203104027	Metal filter head & filter screen 	Material: SUS304 stainless steel Outer Diameter: **9mm** Length: **25mm**	It has moderate pollution resistance, fast reaction speed, high temperature resistance, and good breathability. Heat Resistant: **200°C max.**

5. RH Zero Calib

The RH Zero Calibration function activates an automatic heating mechanism through system control to enhance long-term measurement stability and accuracy.
When enabled, the sensor is heated to a preset temperature to remove moisture and condensation attached to the capacitive humidity sensing element.
After the heating cycle is completed, the device automatically returns to normal measurement mode.

VI. RS-485 and Modbus

THM50X integrates a RS-485 interface for digital communication as an option feature. Based on Modbus protocol makes the general convenience on PLC, HMI and PC connection. For Modbus protocol information please download the file from website. Besides the PLC, HMI application, the user software provide the device setting and data logging function, it also can free download from website.

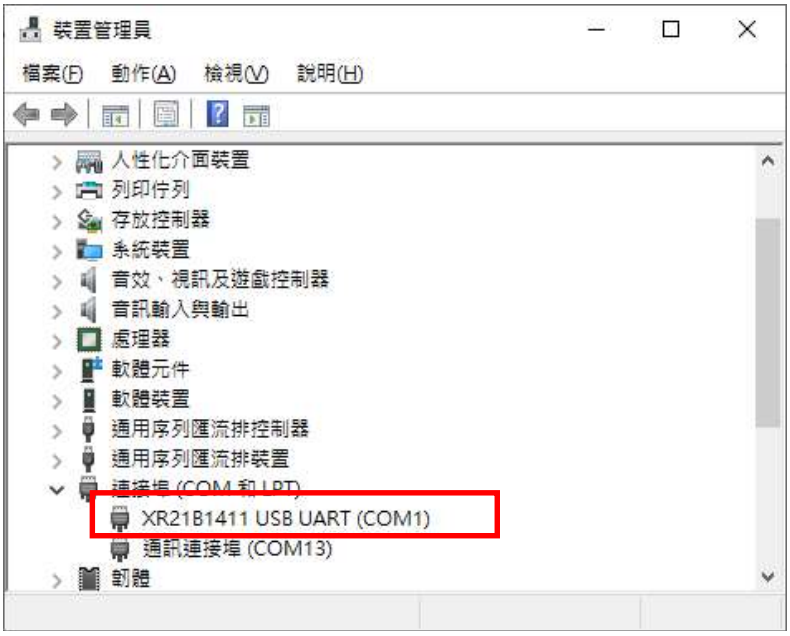
Technical Data：

(1) Max. network size：32 transmitters
(2) Communication：with COM-Port (serial interface) of PC
(3) Max. network expansion：1200m (3937ft) total length at 9600 baud
(4) Transmission rate：9600, 19200, 38400, 57600, 115200 Baud
(5) Parity：None, Even, Odd
(6) Data length：8 bit
(7) Stop bit：1 or 2 bit
(8) Factory default Station address = 1, Data format= 9600, N81

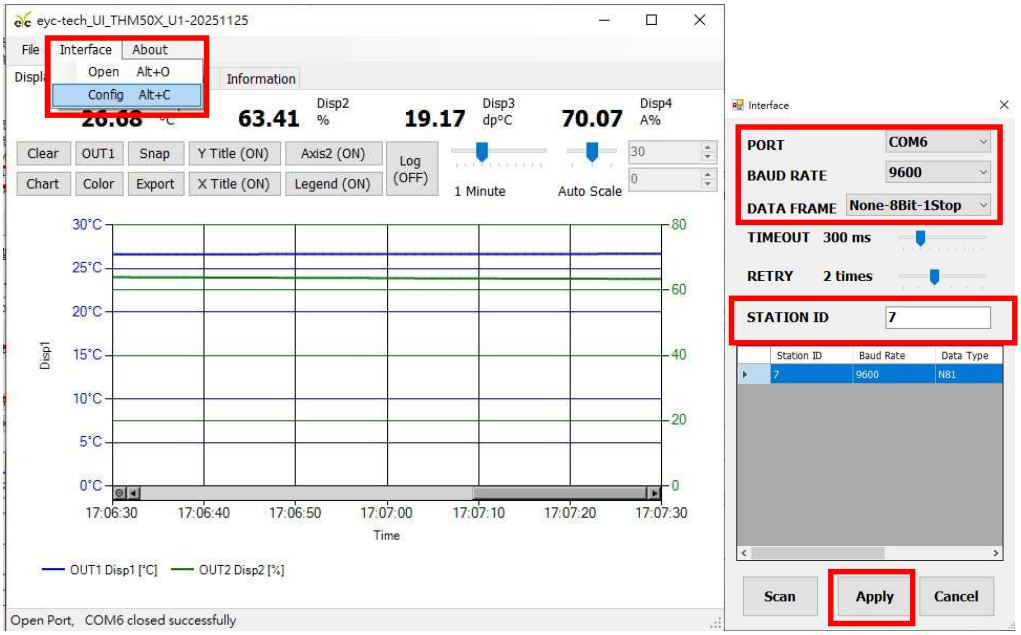
VII. Software and configuration step

User may download the configuration software on eyc-tech web site. Please decompress the application prior to execute it. Operating System requirements：above Windows 10. Hardware connection：Connect the FDM06-L to PC through USB to RS-485 or RS-232 to RS-485 converter

1. Check the COM port number from Device Manager in Computer Management. e.g. COM1 in illustration

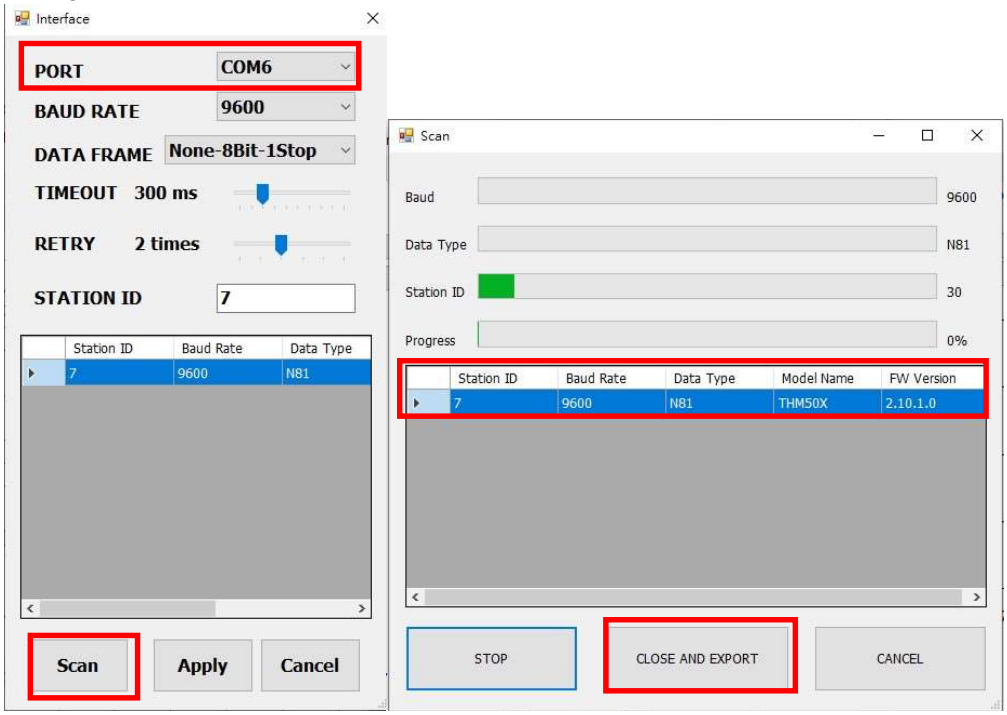


2. Open the THM50X UI, go to function " Interface " , click item " Config " and then setting COM port, BAUD rate, data format and Station ID, pressed " Apply " for connection



3. Scan RS-485 connection

Open the THM50X UI, go to function " Interface " , click item " Config " and then setting COM port, pressed " Scan " bottom for scan devices and pressed " Close and Export "



when the interested devices found.

Pick up the device that you want to connect to and then press "Apply" to go.

4. Output [Analog out1/out2] /PNP-NPN output

In the group of Analog, Output tab. The output1 and output2 related setting could be found.

(1) Quantity：Output types

(2) Analog Type：Voltage or Current

(3) Analog Range：0 ... 20 mA / 4 ... 20 mA (if output current) / 0 ... 10 V (if output voltage)

(4) Range for Display Upper

(5) Range for Display Lower

(6) Alarm Mode: Check the box if analog output pretends an alarm switch output

(7) Alarm Trigger Point: Upper

(8) Alarm Trigger Point: Lower

(9) Alarm Output Level: Upper

(10) Alarm Output Level: Lower

The PNP-NPN alarm output settings are as follows:

(11) Quantity：Output types

(12) Alarm Level：Relay activate mode, activate at increasing signal (High) or activate at decreasing signal (Low)

(13) Range for Display Upper

(14) Range for Display Lower

(15) Error Reaction Mode：None if disable, Hold if memory and hold the first alarm until reboot, Action if active when alarm assert, Reaction if inactive when alarm assert

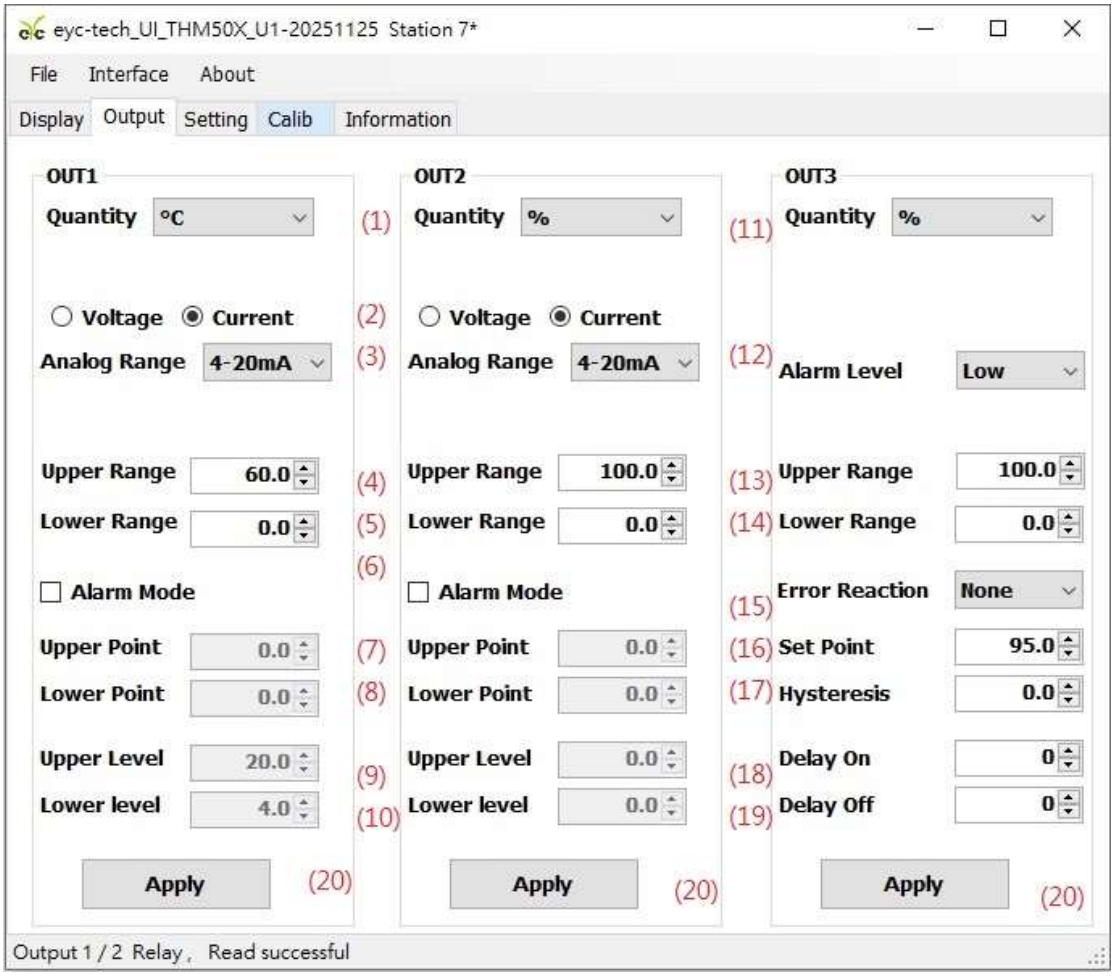
(16) Alarm Trigger Point: Set Point

(17) Alarm Trigger Point: Hysteresis

(18) Alarm delay time：Delay time unit (seconds)

(19) Alarm extension time：Extend the time unit (seconds)

(20) Apply: Writes the settings to the device. Changes made will be discarded unless this button is pressed.



5. Setting Offset adjustment and RS-485 Setup

There are 3 groups in setting tab. The description of each item as below.

※ Offset adjustment：

(1) Humidity Offset

(2) Temperature Offset

(3) Temperature first-order low-pass filter response time (T90), 0 ... 100, 100: filter off, 0: slowest response speed, stable reading.

(4) Humidity first-order low-pass filter response time (T90), 0 ... 100, 100: filter off, 0: slowest response speed, stable reading.

※ Modbus Protocol：

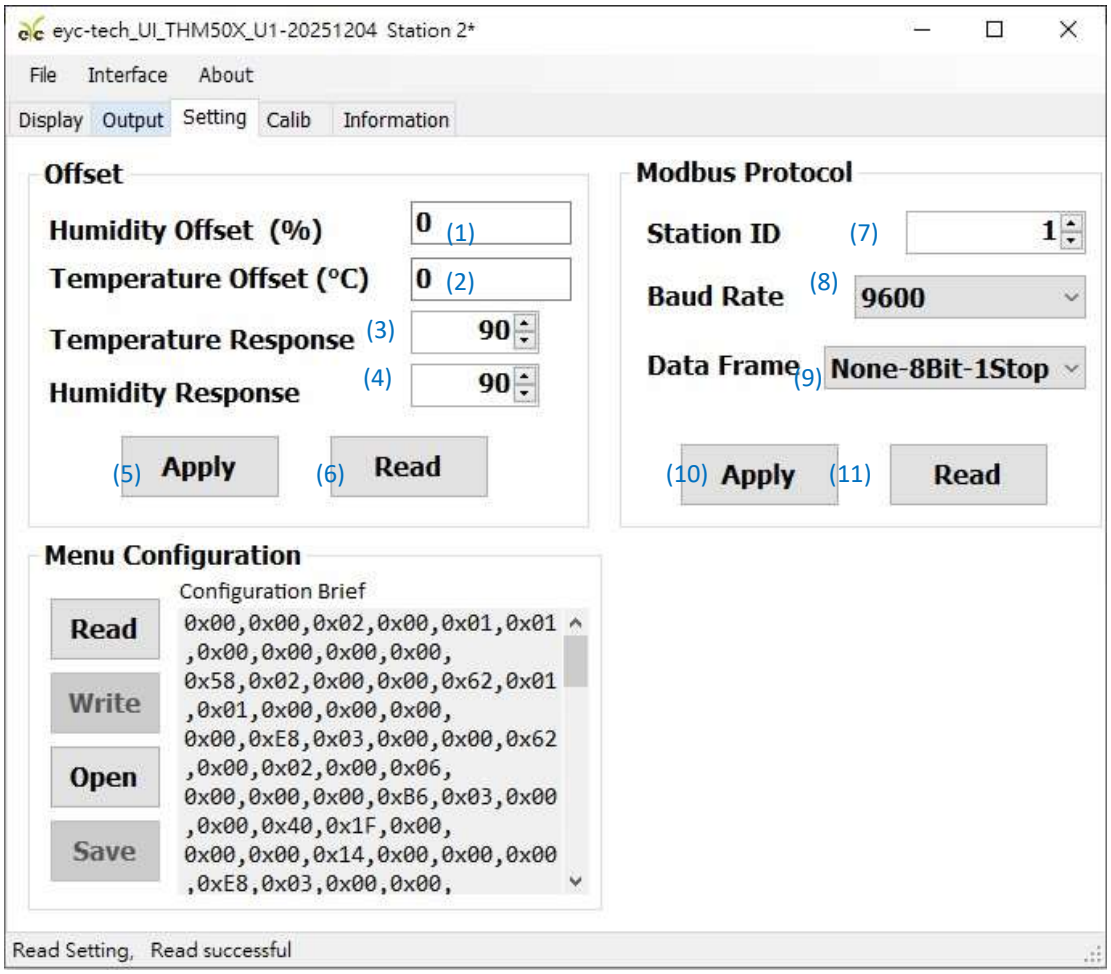
(5) Station ID

(6) Baud Rate

(7) Data Frame, the combination of parity check and stop bit

(8) Modbus Protocol settings write.

(9) Modbus Protocol settings for reading.



6. **Calib Temperature and Humidity Correction**

(1) Temperature High Point Correction

(2) Temperature Low Point Correction

(3) Temperature Offset

(4) Clear Temperature Offset

(5) Temperature Calibration Table Input ℃: Product Display Value. Output ℃: Calibration Standard Value

(6) Read Back Current Temperature Calibration Table

(7) Reset Default Temperature Calibration Table

(8) Write New Calibration Standard Value to Temperature Calibration Table

(9) Humidity High Point Correction

(10) Humidity Low Point Correction

(11) Humidity Offset

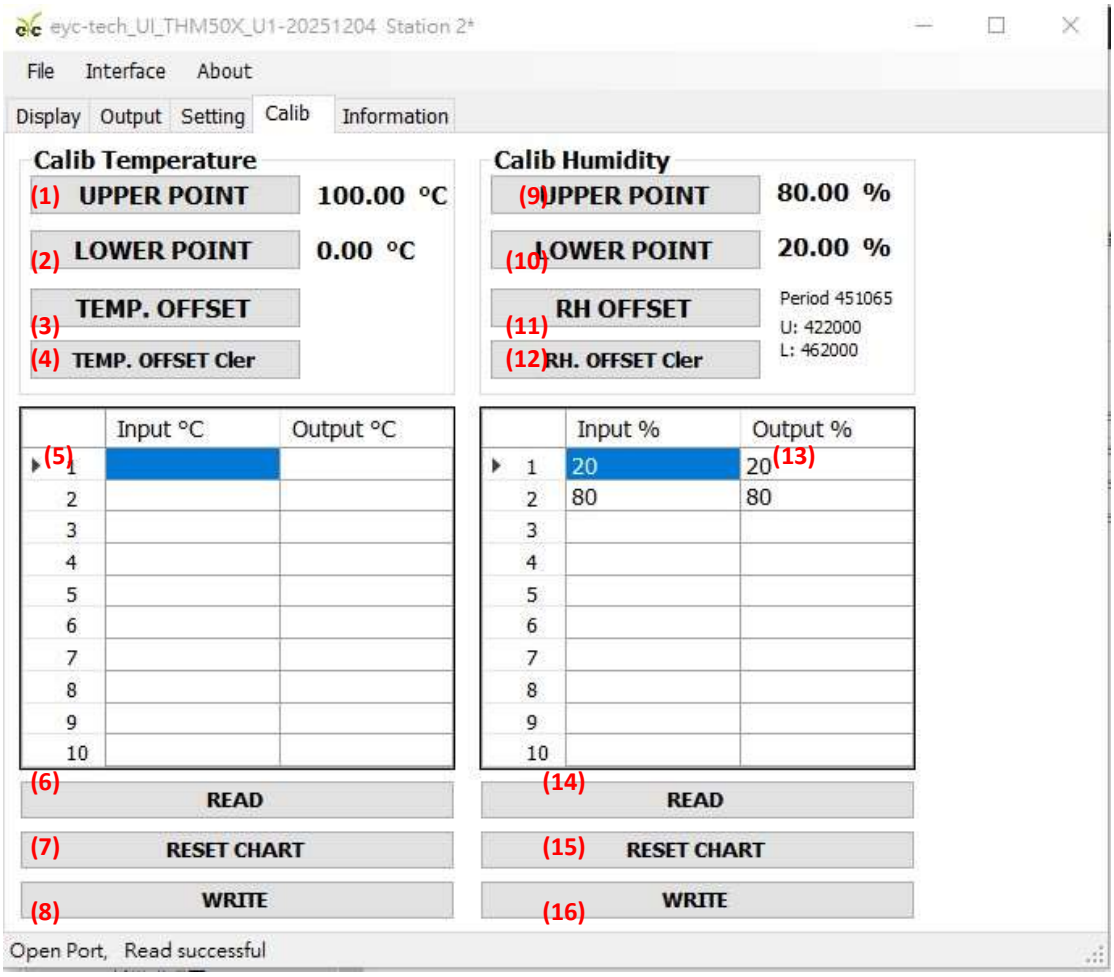
(12) Clear Humidity Offset

(13) Humidity Calibration Table Input %: Product Display Value. Output %: Calibration Standard Value

(14) Read Back Current Humidity Calibration Table

(15) Reset Default Humidity Calibration Table

(16) Write New Calibration Standard Value to Humidity Calibration Table



7. **Data display and logging**

On the Display tab, display the measurement data and log the data. The settings are as follows.

※button function description

Clear clear chart

Chart change chart drawing line style

OUT1 select the activate channel to be set color

Color set the activate channel line color

Snap Capture drawing chart screen

Export export measurement data since the last "clear chart" or ui start up

Y Title (ON) Y-axis label On/Off

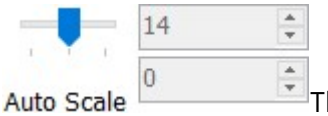
X Title (ON) X-axis label On/Off

Axis2 (ON) secondary Y-axis On/Off

Legend (ON) chart legend On/Off

Log (OFF) data log function On/Off

1 Minute The X-axis scale adjustment

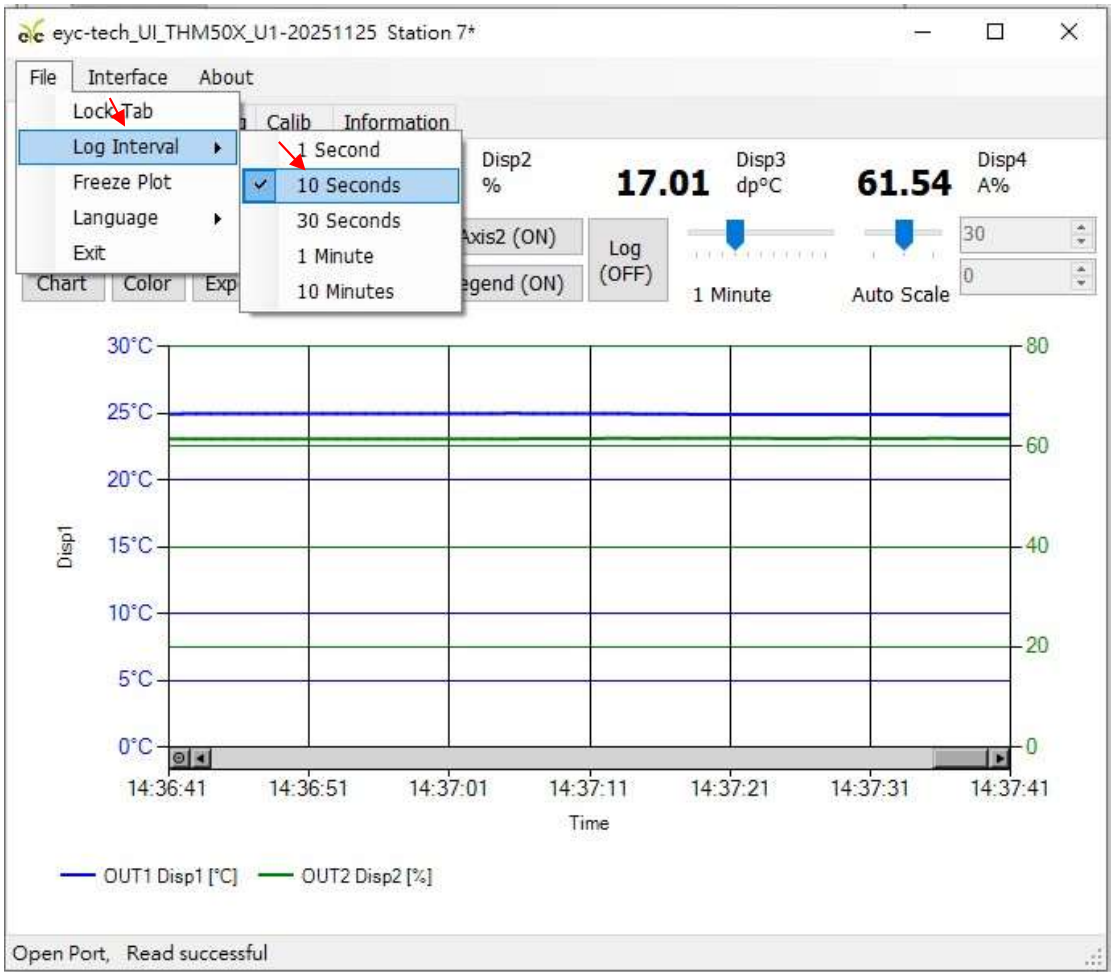


The Y-axis scale mode

※Set recording time interval

a. File > Log Interval

b. Select recording interval

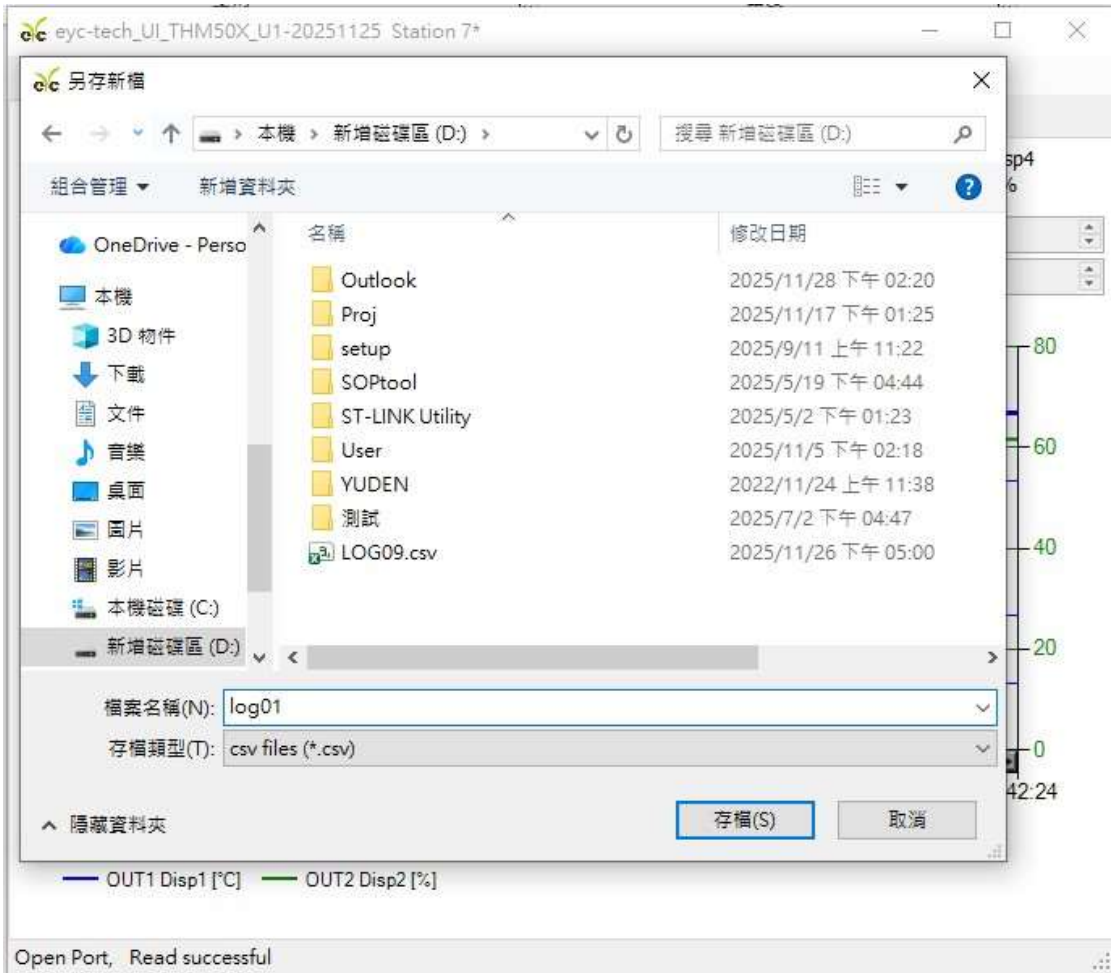


※Export/recording measurement

1. export measurement data since ui start up or the last "clear chart"

1-1. clock Display > Export

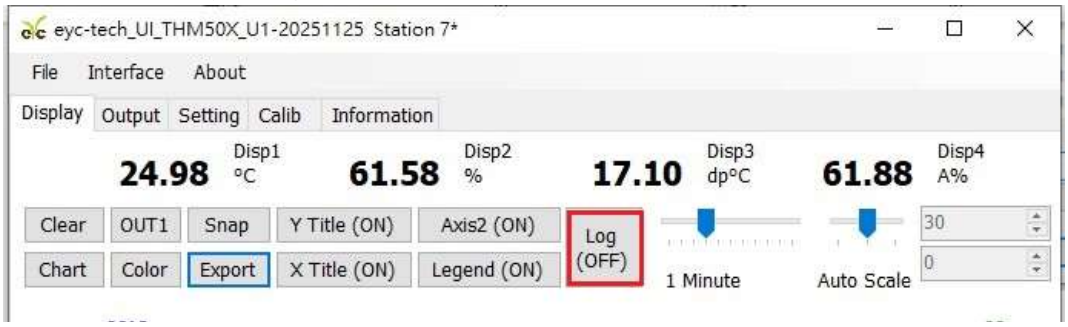
1-2. Specify the file path and file name > Save



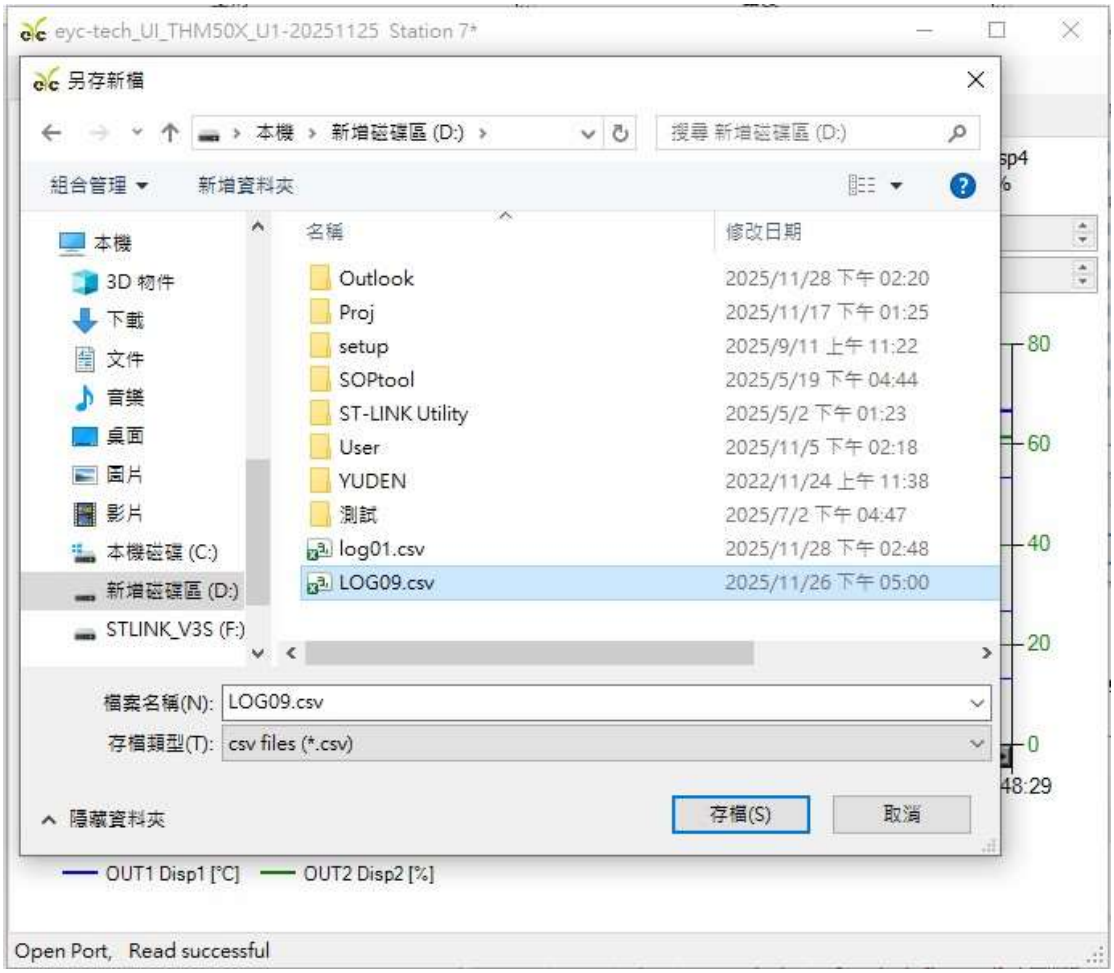
Note: If the specified file already exists, the data will be overwritten.

2. Record measurement data: record data since the Log function is turn on

2-1. Clock Display > Log(OFF)

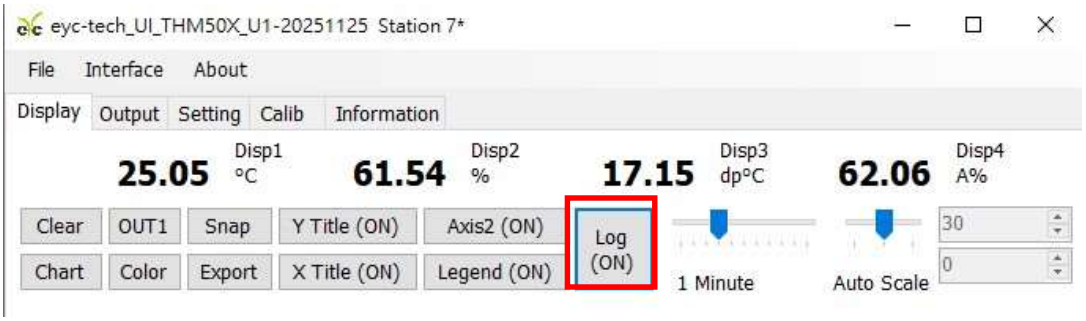


2-2. Specify the file path and file name > Save > Log(ON)



Note: If the specified file already exists, the data will be overwritten.

2-3. Finish recording measurement data: Click Log(ON) again. At this time, the button returns to displaying Log(OFF), and the recorded data file is stored in the specified file.



8. Device Information

On the Information tab, you can find device information, including the following:

(1) Device serial number

(2) Product name

(3) Firmware version

(4) Temperature range

(5) Dew point and humidity range

(6) Humidity high/low calibration point

(7) Temperature high/low calibration point

(8) Output1 analog output calibration point

(9) Output2 analog output calibration point

(10) Analog output calibration point

(11) Factory mode, should be displayed as Disabled under normal conditions

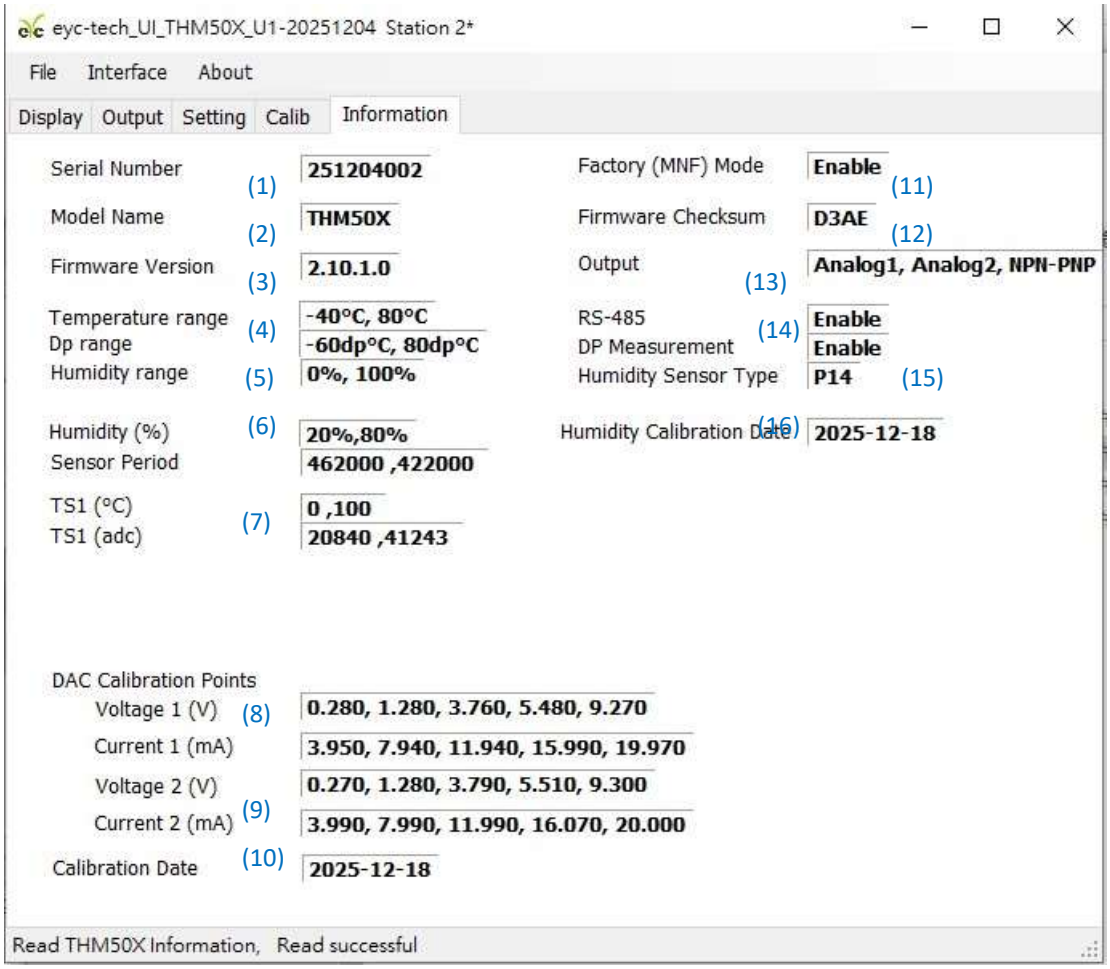
(12) Firmware check code

(13) Output optional function, standard products support analog output1, output2 and NPN-PNP

(14) RS485 support

(15) Dew point display support, humidity sensor P14

(16) Humidity calibration date



VIII. Inspection and maintenance

1. Maintenance

The temperature and humidity sensor has been inspected and correctly adjusted for accuracy at the factory, therefore no readjustment is required at the installation site. Please maintain it according to the following points:

(1) Regular Inspection

Determine the maintenance cycle based on the dust content and dirt condition in the air. Perform regular inspections to confirm accuracy and check and clean any blockages in the filter mesh.

2. Repair and Handling of Abnormal Conditions:

(1) Sensing Element Protection

Do not scratch the surface of the temperature and humidity sensor with any objects during maintenance to avoid damage.

(2) Abnormal Conditions and Their Repair and Handling

If any abnormality occurs during operation, please repair according to the table below and take necessary measures.

Problem	Cleck items	Soluations
●No output ●Unstable output	●Disconnected wiring ●Loose wiring ●Power supply voltage ●Sensor damages	●Correct the wiring. ●Tighten the terminal block or replace the wiring. ●Replace the product.
●Slow response to output ●Error in output	●Sensor body is wet/condensed ●Confirm installation location ●Confirm the condition of the bypass duct (dust, sweat, etc.) ●Installation location	●Remove the main unit from the bracket. ●Remove the sensor cover and filter. Allow the main unit to air dry in clean air. ●Refer to the installation instructions. ●Cleaning the filter. ●Replacing the filter head.

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enhance your capability with sensor technology

Air flow | Humidity | Dew point | Differential pressure | Liquid flow

Temp. | Pressure | Level | Air quality | Signal meter

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