



# Operation-Manual

FTM94 / 95 Industrial Grade High Accuracy  
Thermal Mass Flow Transmitter



eYc FTM9495

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## I. Safety Precautions

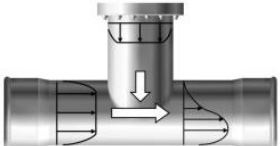
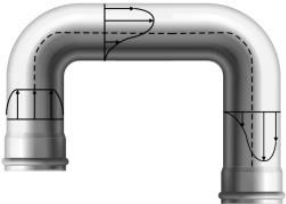
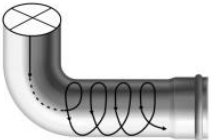
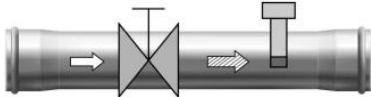
- Before using this product, the user must to read the details of this user's manual, then use this product with correct steps. This user's manual is for reference while using / Setting this product, and required to conserve properly.
- This product is improperly to use in explosion-proof area, do not use this product in dangerous situation where human health & life may be threaten & affected.
- If the user install this product in special environments as Dust-Free Room, Breed Environment for Animals, etc., please initiate a specialized product consultation to our professional sales of our company.
- If the improper & dangerous results which result from improper operator or improper environment, our company will not bear any legal responsibility.

## Warning

- Please ensure the outlook / outbox do not have any damage which result from improper transportation, or malfunction which results from lost attachments.
- In order to prevent the GM from damages. This product must be used in the proper environment which specified in this user's manual.
- Please implement the wiring operation under power-off status; otherwise it will cause electric shock, or become the root cause of machinery breakdown.
- For prevent equipment damage, disconnect the power supply from the product before performing any wiring and installation.
- This product must be operated under ruled power supplying value, and be operated under the ruled normal operation conditions which described in the user's manual ; otherwise it may cause the disasters as fire accident or be the root cause of machinery breakdown.
- This product must be operated under the operating conditions specified in manual to prevent equipment damage.
- Installation and wiring must be performed by qualified personnel in accordance with all applicable safety standards, According to applicable safety standards all wiring must comply with local codes of indoor wiring and electric installation rules.
- All wiring must comply with the rule for indoor wiring and electrical installation rules. The screw must be tight for upper cover & lower base.
- In order to prevent the interferences from frequency converter, etc., and avoid error signal to result in the product damage, please use the isolated conducting wire.
- 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.
- While discard this product, the user must to comply with the related rules for industrial domestic wastes for different country / location.

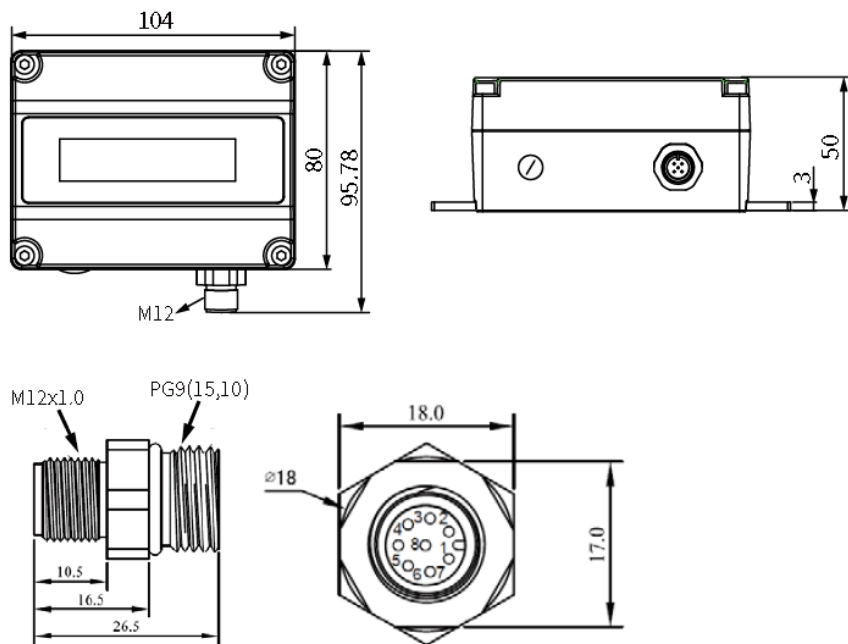
## II. Installation

The following table specifies the required straight lengths of the pipe sections depending on pipe diameter in case of different disturbances.

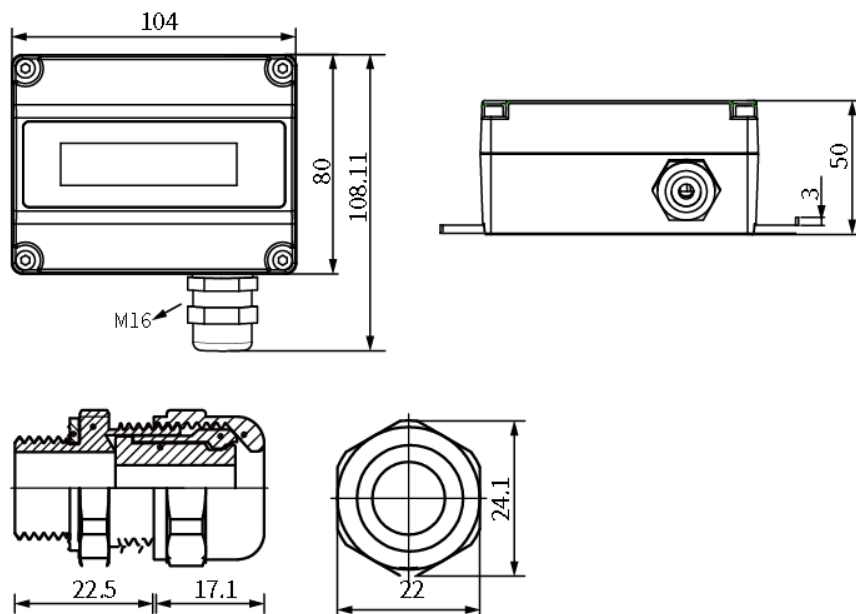
| Type                                                        | Drawing                                                                             | Upstream straight pipe | Downstream straight pipe |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------|--------------------------|
| Light bend ( $< 90^\circ$ )                                 |    | 10 x D                 | 10 x D                   |
| T-junction                                                  |    | 15 x D                 | 10 x D                   |
| Two $90^\circ$ bends in one plane                           |  | 20 x D                 | 5 x D                    |
| Two $90^\circ$ bends with 3-dimensional Change in direction |  | 35 x D                 | 10 x D                   |
| Shut-off valve                                              |  | 45 x D                 | 10 x D                   |

### III. Electrical Connector

#### 1. M type : M12-8PIN metal connector(RS-485+analog)

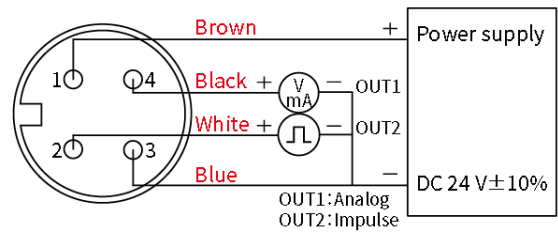
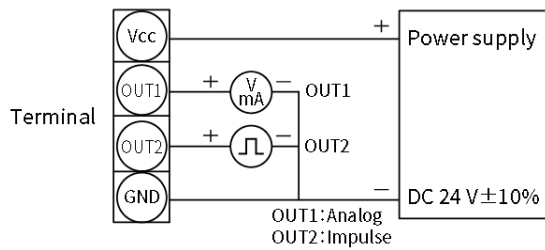


#### 2. N type : M16-8PIN metal connector(RS-485+analog)

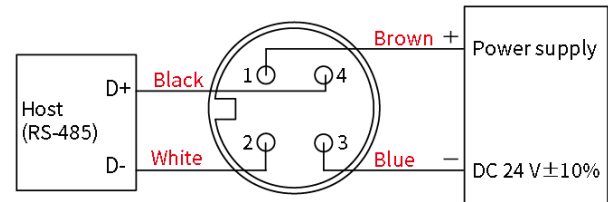
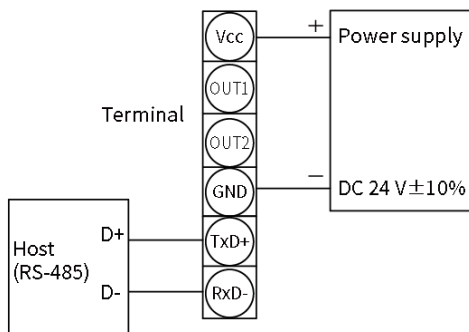


## IV. Connection Diagram

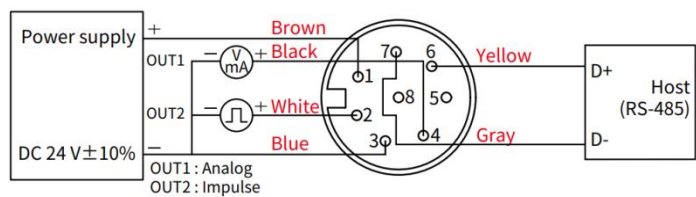
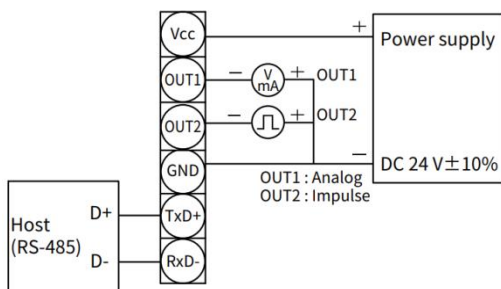
### 1. Analog & Impulse



### 2. RS-485



### 3. Analog+RS-485 & Impulse



## V. RS-485 and Modbus

FTM94 / 95 integrate 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

## VI. Software and calibration operation step

Free installation program : eYc-FTM94\_95-UI-YYYYMMDD-X.Y.Z.exe, where YYYYMMDD stand for 8

digits date code and X,Y,Z stand for version number. This menu based on eYc-FTM94\_95-UI-

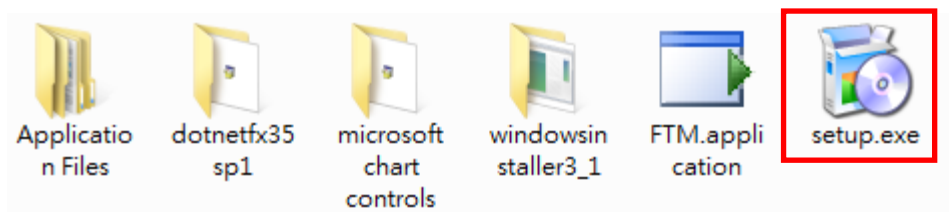
20211203-1.0.3.EXE

(※Please use installation program when free program doesn't execute)

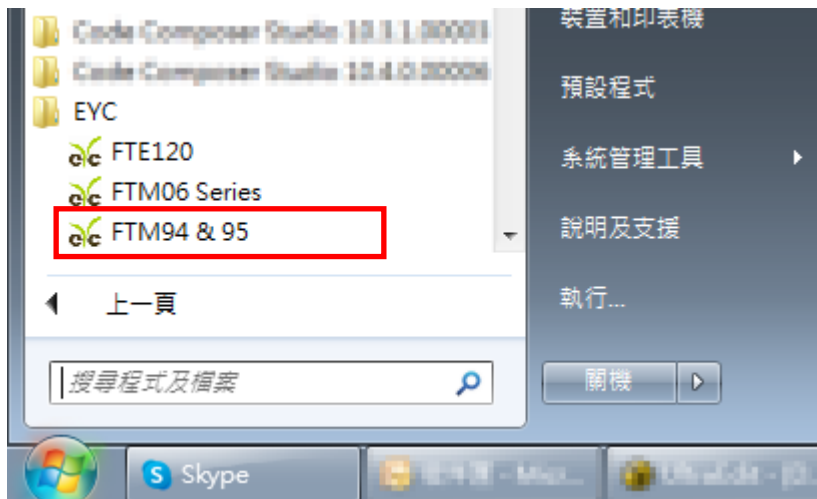
Installation program : eYc-FTM94\_95-UI-YYYYMMDD-X.Y.Z (INSTALLER).rar

a. Operating System requirements : above Windows XP SP2

b. Decompress installation program and click Setup to install



c. Navigate to program group EYC and click FTM94 & 95



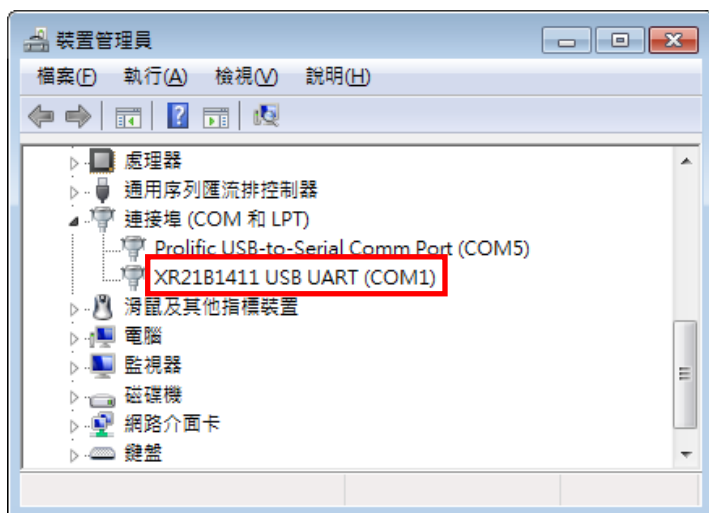
# Industrial Grade High Accuracy Thermal Mass Flow Transmitter

1. Hardware connection : Connect the FTM94 / 95 to PC through USB to RS-485 or RS-232 to RS-485

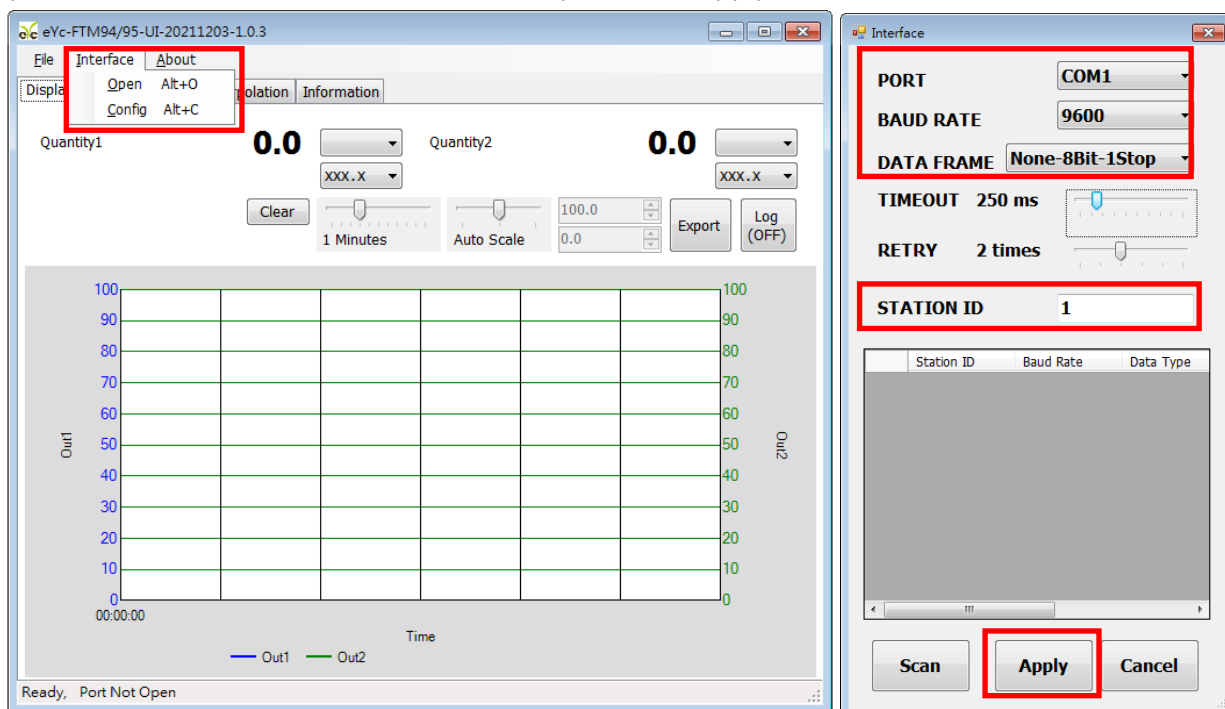
converter

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

illustration

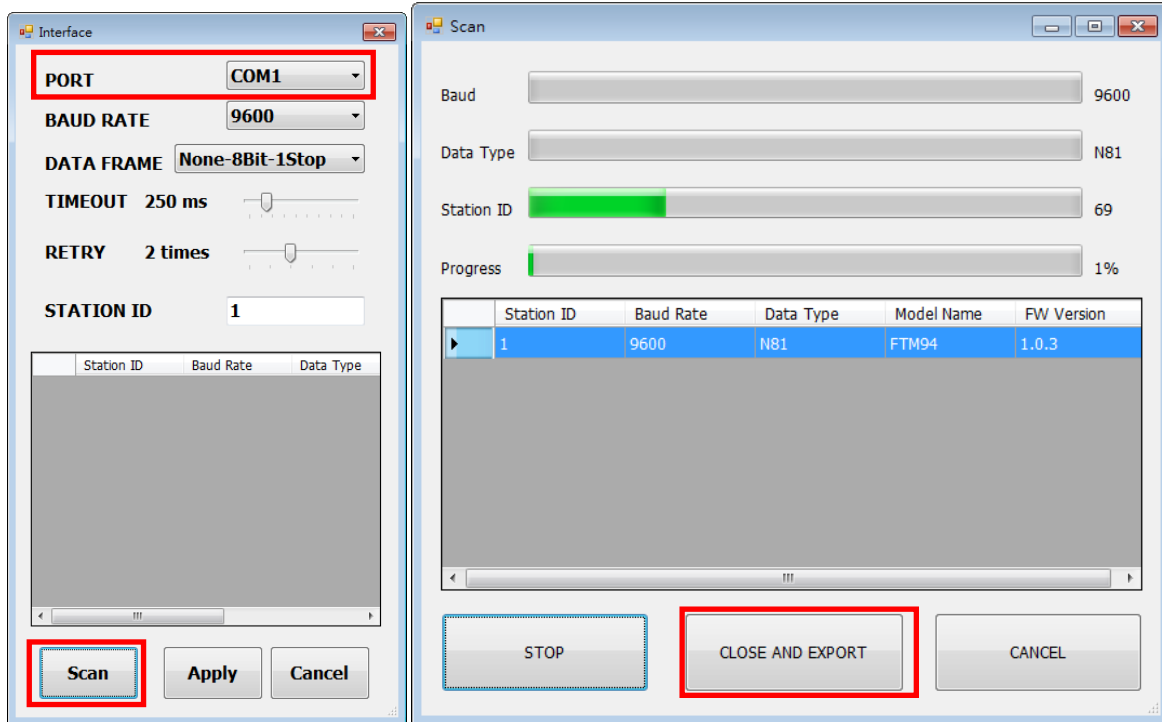


3. Open the FTM94 / 95 UI, go to function " Interface " , click item " Config " and then setting COM port, BAUD rate, data format and Station ID, pressed " Apply " for connection



#### 4. Scan RS-485 connection

Open the FTM94 / 95 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.

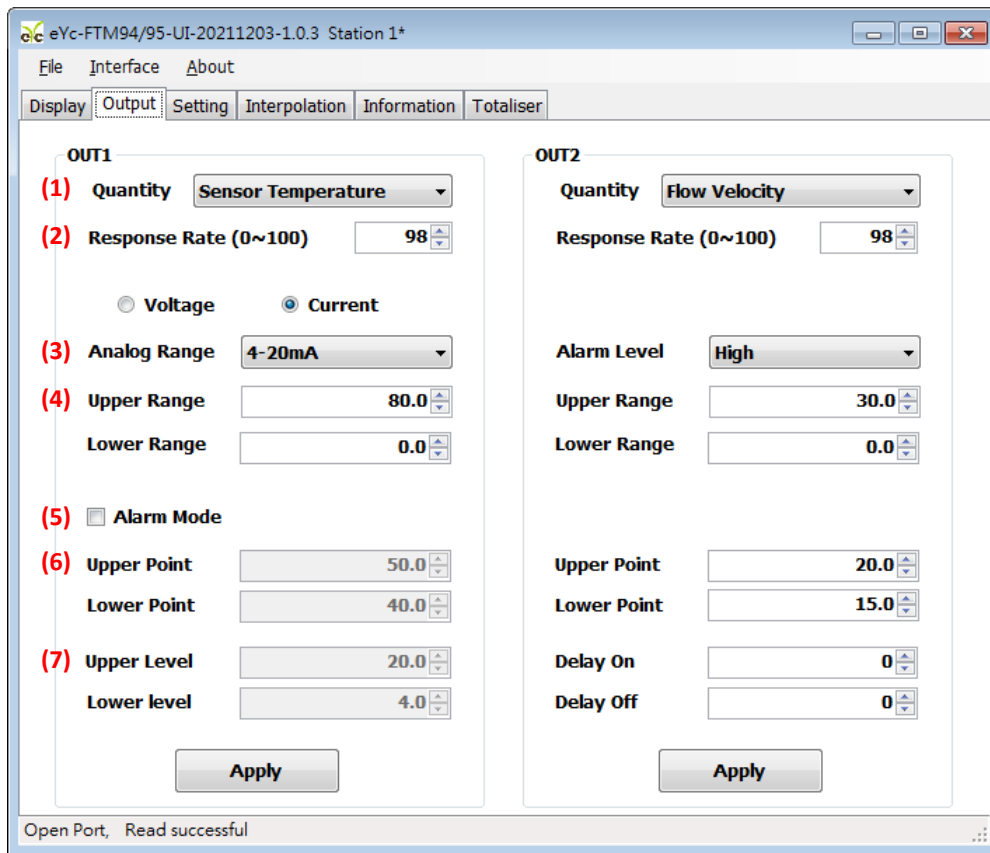


Pick up the device that you want to connect to and then press "Apply" to go.

## 5. Setting on Analog Output

In the group of OUT1, Output tab. The output1 related setting could be found.

- (1) Quantity : Flow Velocity, Flow Volume and Sensor Temperature
- (2) Response rate : 0 ... 100 , 100 : filter off , 90 : filter = 60 second , 80 : filter = 120 second, etc.
- (3) Analog type : 0 ... 20 mA / 4 ... 20 mA (if output current) / 0 ... 10 V (if output voltage)
- (4) Range for Upper and Lower
- (5) Alarm Mode: Check the box if analog output pretend a alarm switch output
- (6) Alarm Trigger Point: Upper and Lower
- (7) Alarm Output Level: Upper and Lower



The screenshot shows the 'Output' tab of the software interface. It is divided into two main sections: OUT1 and OUT2. Each section has a 'Quantity' dropdown, a 'Response Rate (0~100)' input, and an 'Analog Range' dropdown. OUT1 also has 'Upper Range' and 'Lower Range' inputs, an 'Alarm Mode' checkbox, and 'Upper Point' and 'Lower Point' inputs. OUT2 has 'Alarm Level' dropdown, 'Upper Range' and 'Lower Range' inputs, 'Upper Point' and 'Lower Point' inputs, and 'Delay On' and 'Delay Off' inputs. Both sections have an 'Apply' button at the bottom. The status bar at the bottom indicates 'Open Port, Read successful'.

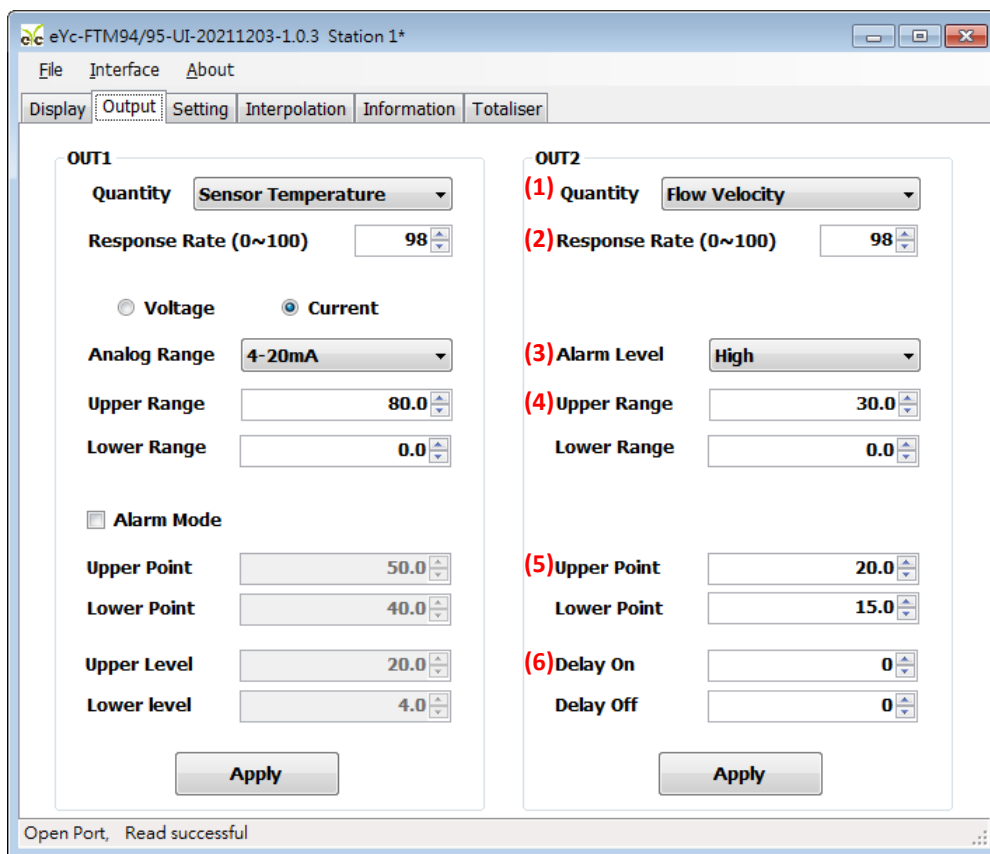
| Section | Quantity           | Response Rate (0~100) | Analog Range | Upper Range | Lower Range | Alarm Mode               | Upper Point | Lower Point | Delay On | Delay Off |
|---------|--------------------|-----------------------|--------------|-------------|-------------|--------------------------|-------------|-------------|----------|-----------|
| OUT1    | Sensor Temperature | 98                    | 4-20mA       | 80.0        | 0.0         | <input type="checkbox"/> | 50.0        | 40.0        | 20.0     | 4.0       |
| OUT2    | Flow Velocity      | 98                    |              | 30.0        | 0.0         |                          | 20.0        | 15.0        | 0        | 0         |

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### 6. Setting on PNP/PNP Output (Optional, Only Available if Function Equipped)

In the group of OUT2, Output tab. The PNP/PNP switch output related setting could be found.

- (1) Quantity : Flow Velocity, Flow Volume and Sensor Temperature
- (2) Response rate : 0 ... 100 , 100 : filter off , 90 : filter = 60 second , 80 : filter = 120 second, etc.
- (3) Alarm Mode : High Activate or Low Activate
- (4) Range for Upper and Lower
- (5) Alarm Point : Upper and Lower
- (6) Delay Time : On Delay Time and Off Delay Time (seconds)



The screenshot shows the 'Output' tab of the software interface. It is divided into two main sections: OUT1 and OUT2. OUT1 is configured for 'Sensor Temperature' with a response rate of 98, and 'Current' output with a range of 4-20mA. OUT2 is configured for 'Flow Velocity' with a response rate of 98, and 'High' alarm level. Both sections have fields for upper and lower ranges and points, and delay times. The status bar at the bottom indicates 'Open Port, Read successful'.

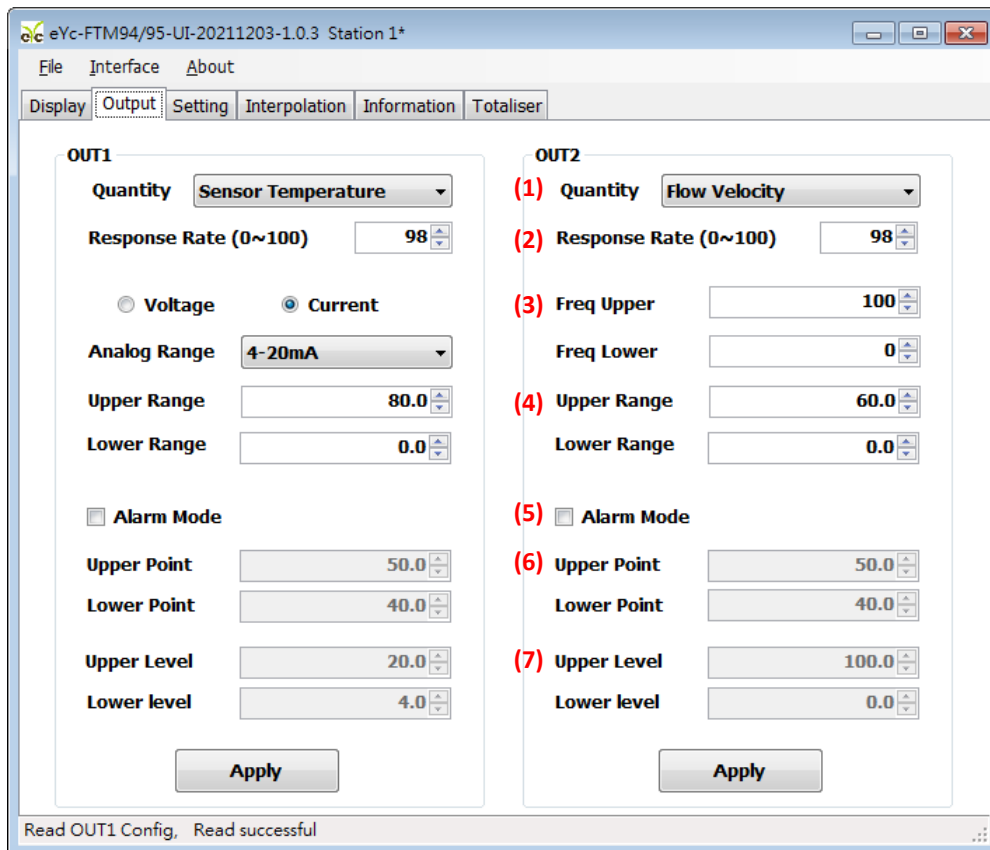
| Section | Quantity           | Response Rate (0~100) | Output Type | Analog Range | Upper Range | Lower Range | Alarm Mode               | Upper Point | Lower Point | Upper Level | Lower level | Delay On | Delay Off |
|---------|--------------------|-----------------------|-------------|--------------|-------------|-------------|--------------------------|-------------|-------------|-------------|-------------|----------|-----------|
| OUT1    | Sensor Temperature | 98                    | Current     | 4-20mA       | 80.0        | 0.0         | <input type="checkbox"/> | 50.0        | 40.0        | 20.0        | 4.0         |          |           |
| OUT2    | Flow Velocity      | 98                    |             |              | 30.0        | 0.0         |                          | 20.0        | 15.0        |             |             | 0        | 0         |

## Industrial Grade High Accuracy Thermal Mass Flow Transmitter

### 7. Setting on Frequency Output (Optional, Only Available if Function Equipped)

In the group of OUT2, Output tab. The Frequency output related setting could be found.

- (1) Quantity : Flow Velocity, Flow Volume and Sensor Temperature
- (2) Response rate : 0 ... 100 , 100 : filter off , 90 : filter = 60 second , 80 : filter = 120 second, etc.
- (3) Frequency : Upper and Lower
- (4) Measures : Upper and Lower
- (5) Alarm Mode : The output would be switch between upper and lower correspond to measures
- (6) Alarm Point : Upper and Lower
- (7) Alarm Output : Upper and Lower



The screenshot shows the 'Output' tab for two channels, OUT1 and OUT2. The 'OUT2' section is highlighted with red numbers (1) through (7) corresponding to the settings listed in the text above.

| Setting                   | OUT1 Value               | OUT2 Value               |
|---------------------------|--------------------------|--------------------------|
| (1) Quantity              | Sensor Temperature       | Flow Velocity            |
| (2) Response Rate (0~100) | 98                       | 98                       |
| (3) Freq Upper            | -                        | 100                      |
| Freq Lower                | -                        | 0                        |
| (4) Upper Range           | 80.0                     | 60.0                     |
| Lower Range               | 0.0                      | 0.0                      |
| (5) Alarm Mode            | <input type="checkbox"/> | <input type="checkbox"/> |
| (6) Upper Point           | 50.0                     | 50.0                     |
| Lower Point               | 40.0                     | 40.0                     |
| (7) Upper Level           | 20.0                     | 100.0                    |
| Lower level               | 4.0                      | 0.0                      |

Buttons: Apply (for both OUT1 and OUT2)

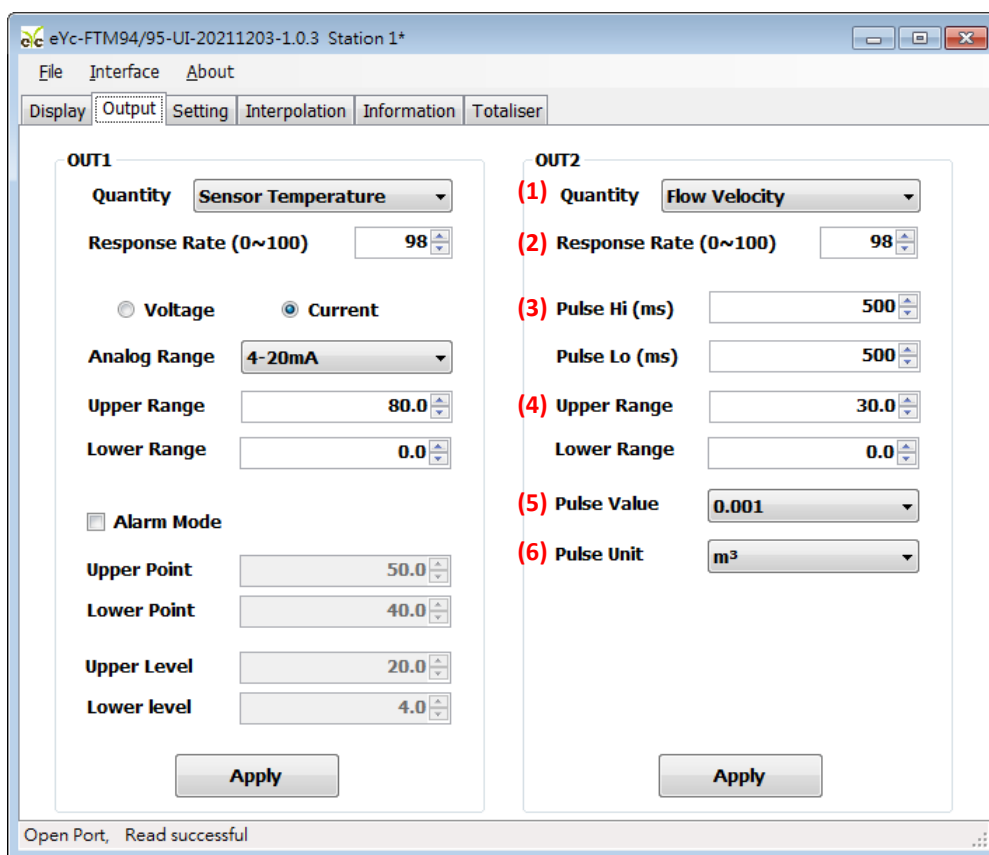
Status bar: Read OUT1 Config, Read successful

## Industrial Grade High Accuracy Thermal Mass Flow Transmitter

### 8. Setting on Impulse Output (Optional, Only Available if Function Equipped)

In the group of OUT2, Output tab. The Impulse output related setting could be found.

- (1) Quantity : Flow Velocity, Flow Volume and Sensor Temperature
- (2) Response rate : 0 ... 100 , 100 : filter off , 90 : filter = 60 second , 80 : filter = 120 second, etc.
- (3) Impulse Duration : High and Low
- (4) Measures : Upper and Lower
- (5) Impulse Value : The valence of single impulse quantity
- (6) Impulse Unit : m<sup>3</sup>, Liter, mL, mm<sup>3</sup>, ft<sup>3</sup>, inch<sup>3</sup>, gal,us (Gallon, us), gal,uk (Gallon, uk)



eYc-FTM94/95-UI-20211203-1.0.3 Station 1\*

File Interface About

Display Output Setting Interpolation Information Totaliser

**OUT1**

Quantity: Sensor Temperature

Response Rate (0~100): 98

☐ Voltage ☒ Current

Analog Range: 4-20mA

Upper Range: 80.0

Lower Range: 0.0

☐ Alarm Mode

Upper Point: 50.0

Lower Point: 40.0

Upper Level: 20.0

Lower level: 4.0

Apply

**OUT2**

(1) Quantity: Flow Velocity

(2) Response Rate (0~100): 98

(3) Pulse Hi (ms): 500

Pulse Lo (ms): 500

(4) Upper Range: 30.0

Lower Range: 0.0

(5) Pulse Value: 0.001

(6) Pulse Unit: m<sup>3</sup>

Apply

Open Port, Read successful

## 9. Setting on RS-485, Process Parameters and offset adjustment

There are 4 groups in setting tab. The description of each item as below.

※ Process Parameters :

- (1) Temperature of normal condition
- (2) Pressure of working condition
- (3) Relative Humidity of working condition
- (4) Profile factor of gas speed

※ Offset Adjustment :

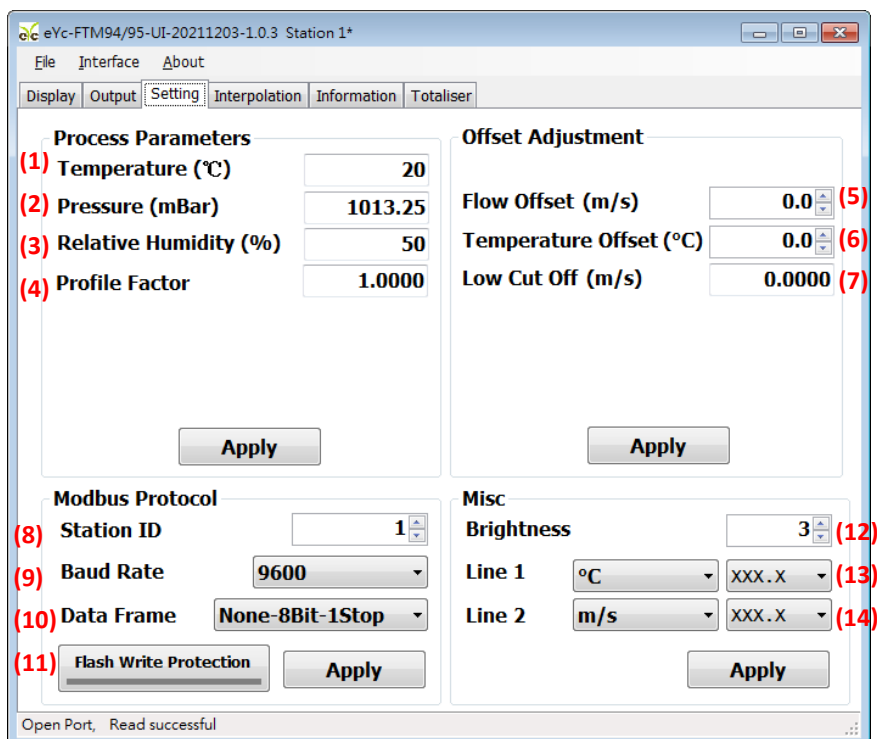
- (5) velocity offset
- (6) temperature offset
- (7) velocity cut off

※ Modbus Protocol :

- (8) station ID
- (9) Baud Rate
- (10) Data Frame
- (11) Flash memory write protect

※ Miscellaneous :

- (12) LCM brightness
- (13) LCM Line1 Display Selection
- (14) LCM Line2 Display Selection



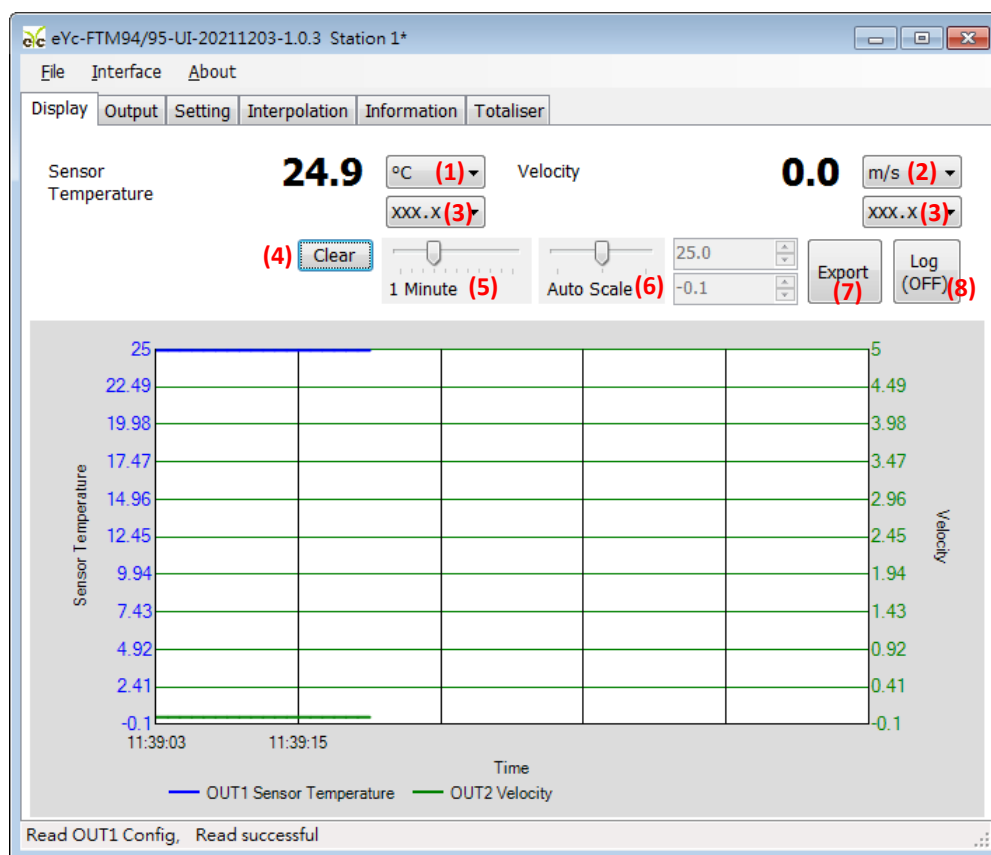
The screenshot shows the 'Setting' tab of the eYc-FTM94/95-UI-20211203-1.0.3 Station 1\* software. The interface is organized into four main sections:

- Process Parameters:** Contains four input fields: (1) Temperature (°C) set to 20, (2) Pressure (mBar) set to 1013.25, (3) Relative Humidity (%) set to 50, and (4) Profile Factor set to 1.0000. An 'Apply' button is at the bottom.
- Offset Adjustment:** Contains three input fields: (5) Flow Offset (m/s) set to 0.0, (6) Temperature Offset (°C) set to 0.0, and (7) Low Cut Off (m/s) set to 0.0000. An 'Apply' button is at the bottom.
- Modbus Protocol:** Contains four settings: (8) Station ID set to 1, (9) Baud Rate set to 9600, (10) Data Frame set to None-8Bit-1Stop, and (11) Flash Write Protection (a checkbox). An 'Apply' button is at the bottom.
- Misc:** Contains two settings: (12) Brightness set to 3, and (13) Line 1 and (14) Line 2 display selection, both set to °C and m/s respectively. An 'Apply' button is at the bottom.

The status bar at the bottom indicates 'Open Port, Read successful'.

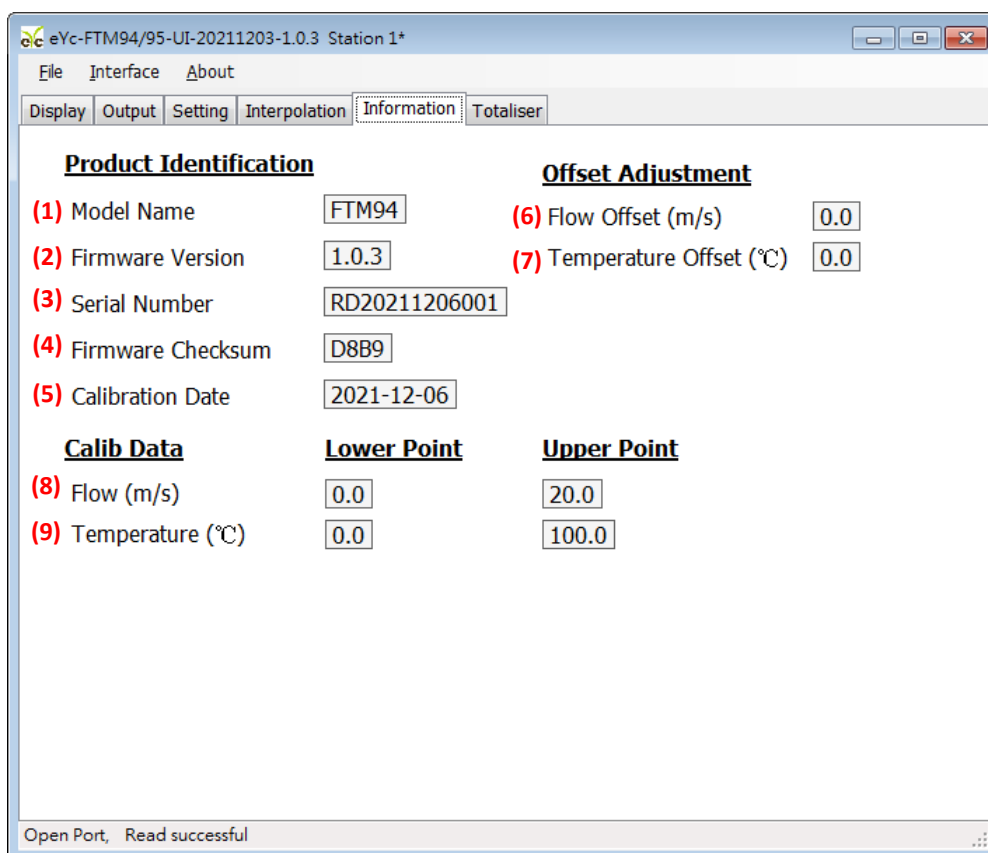
## 10.Data display and logging

- (1) Assign Temperature Unit : °C / °F
- (2) Assign Flow Velocity Unit : m/s 、ft/s 、Nm/s , Flow Volume Unit : Nm<sup>3</sup>/h, L/min, m<sup>3</sup>/min
- (3) Display Decimals
- (4) Clear Measure Plot Chart
- (5) Time scale of plot
- (6) Vertical scale of plot
- (7) Export all logging data since device is connected
- (8) Start/Stop data logging



## 11. Device Information

- (1) Model Name of Device
- (2) Firmware Version of Device
- (3) Serial Number of Device
- (4) Firmware Checksum
- (5) Calibration Date
- (6) Flow Offset
- (7) Temperature Offset
- (8) Flow Calibration Range
- (9) Temperature Calibration Points



The screenshot shows a software window titled "eYc-FTM94/95-UI-20211203-1.0.3 Station 1\*". The window has a menu bar with "File", "Interface", and "About". Below the menu bar is a tabbed interface with tabs for "Display", "Output", "Setting", "Interpolation", "Information", and "Totaliser". The "Information" tab is selected, displaying the following data:

| <u>Product Identification</u> |               | <u>Offset Adjustment</u>    |     |
|-------------------------------|---------------|-----------------------------|-----|
| (1) Model Name                | FTM94         | (6) Flow Offset (m/s)       | 0.0 |
| (2) Firmware Version          | 1.0.3         | (7) Temperature Offset (°C) | 0.0 |
| (3) Serial Number             | RD20211206001 |                             |     |
| (4) Firmware Checksum         | D8B9          |                             |     |
| (5) Calibration Date          | 2021-12-06    |                             |     |

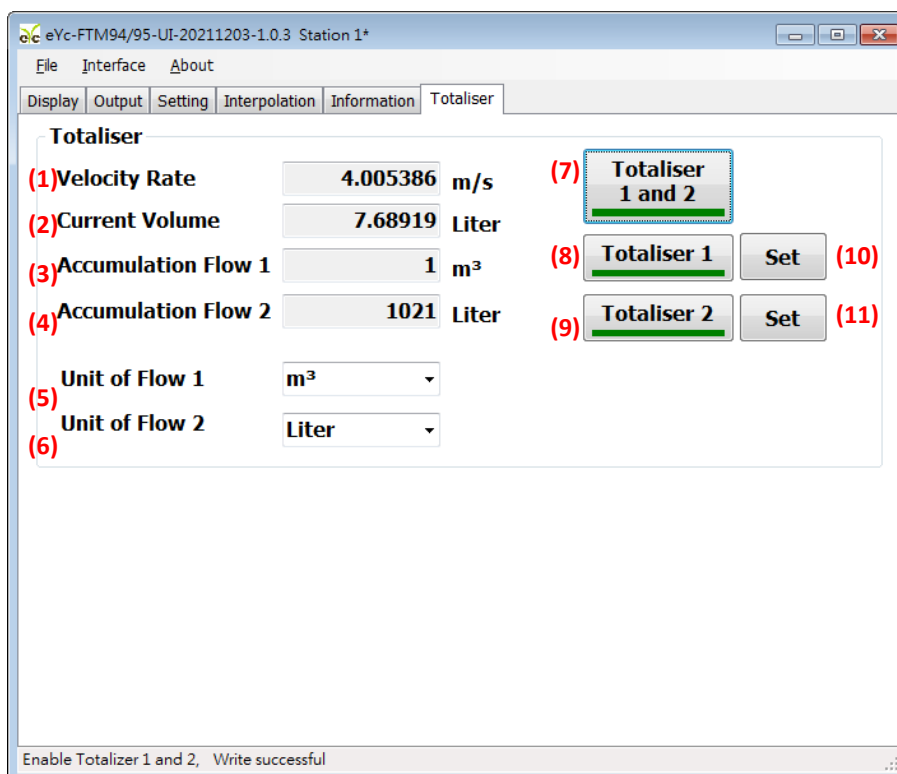
  

| <u>Calib Data</u>    | <u>Lower Point</u> | <u>Upper Point</u> |
|----------------------|--------------------|--------------------|
| (8) Flow (m/s)       | 0.0                | 20.0               |
| (9) Temperature (°C) | 0.0                | 100.0              |

At the bottom of the window, a status bar indicates "Open Port, Read successful".

## 12. Totalizer

- (1) Flow Velocity
- (2) Flow Volume Rate
- (3) Volume Accumulation Totalizer 1
- (4) Volume Accumulation Totalizer 2
- (5) unit of counter 1
- (6) unit of counter 2
- (7) Main switch of totalizer
- (8) Function switch of totalizer 1
- (9) Function switch of totalizer 2
- (10) Ser/Reset Totalizer 1
- (11) Set/Reset Totalizer 2



## VII. Inspection and maintenance

### 1. Maintenance

Since this product is inspected and calibrated for high accuracy at the factory before shipment, no calibration on the installation site is necessary when this product is installed

For inspection and maintenance follow the instructions below :

#### (a) Periodic inspection

Periodically inspect this product for its sensing accuracy, and clean the cover

Set the period between inspections based on atmospheric dust and other contaminants in the installation environment

#### (b) Sensor maintenance

Do not damage sensor surface during maintenance process

#### (c) Troubleshooting

If any problem occurs during operation, refer to the table below for appropriate solutions

### 2. Troubleshooting :

| Problem                                                                                              | Cleck items                                                                                                                                                                                                       | Soluations                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>●No output</li> <li>●Unstable output</li> </ul>               | <ul style="list-style-type: none"> <li>●Disconnected wiring</li> <li>●Loose wiring</li> <li>●Power supply voltage</li> <li>●Sensor damages</li> </ul>                                                             | <ul style="list-style-type: none"> <li>●Re-perform wiring</li> <li>●Crew on terminal tightly or replace wires</li> <li>●Replace the sensor</li> </ul>                                                                                                                                                                              |
| <ul style="list-style-type: none"> <li>●Slow response to output</li> <li>●Error in output</li> </ul> | <ul style="list-style-type: none"> <li>●Moisture / Condensation on the product</li> <li>●Check installed location</li> <li>●Check installed angle</li> <li>●Check dust and contamination on the sensor</li> </ul> | <ul style="list-style-type: none"> <li>●Remove the sensor and filter dry power-off state sensor in clean air seasoning</li> <li>●Refer to the section</li> <li>●Align measurement head with flow direction</li> <li>●Cleaning the filter</li> <li>●Changing the filter</li> <li>●Calibrate</li> <li>●Replace the sensor</li> </ul> |

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