Operation-Manual

eYc PHM33 Industry Degree Differential Pressure Transmitter

eYc PHM33

Contents

Product description

Transmitter for differential pressure measurement. Membrane technology sensor.

The main application area for the PHM33 is going to be clean-rooms, but also other applications such as control of pressure drop, energy management systems or HVAC can be considered as target markets. The PHM33 is best economic option to the market.

Product Characteristics

- Range from ±50Pa to ±500Pa
- RS-485 Communication Interface, Modbus RTU protocol.
- 4-20mA or 0-10V output
- IP65, with or without LCD display
- Square root function for air velocity measurement
- Computer fixing for linearity.
- High stability & repeatability.

Technical Data

Parameters	Differential pressure
Sensor technology	Piezoelectric Differential Pressure Module
Measuring Units	mbar, Pa, hPa, kPa, mmH2O, mmWS, inH2O, mmHg
Measuring Range	0-±500 Pa
Output Signal 3-wire	0-20mA / 4-20mA / 0-1V / 0-5V / 1-5V / 0-10V / 2-10V
Accuracy at 25℃	± 0.5 % of F.S.
Load Impedance (Current output)	＜ 500Ω
Load Impedance (Voltage output)	≧ 10KΩ
Filter	0, 5, 10, 20, 25 seconds
Auto zero	Manual with push button
Display	LCD 16*2 digits
Power Supply	8~35VDC or 12~30VAC
Electronic Protection	Overvoltage/ Reverse Protection
Certification:	CE
IP-Protection	IP 65
Connect	M12 Metal Connector
Working Temperature	0~50℃(With Display) -20~+80℃ (Without Display)
Storage Temperature	-40 ~ +80 ℃
Environment Humidity	< 97 % RH (Non-Dewing Condition)

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Industry Degree Differential Pressure Transmitter

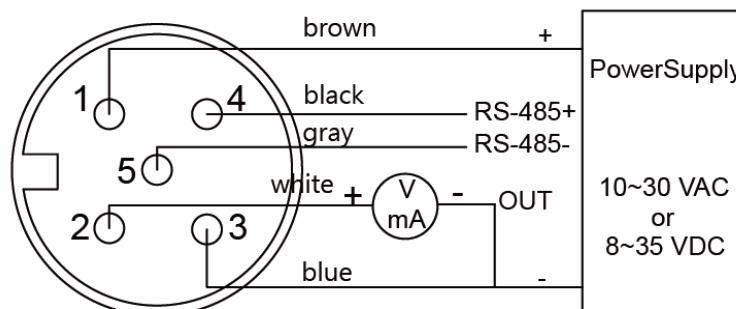● **Dimension (mm)**

※ P1/P2 : Connected to Ø6 PVC/PTFE compressed air pipe
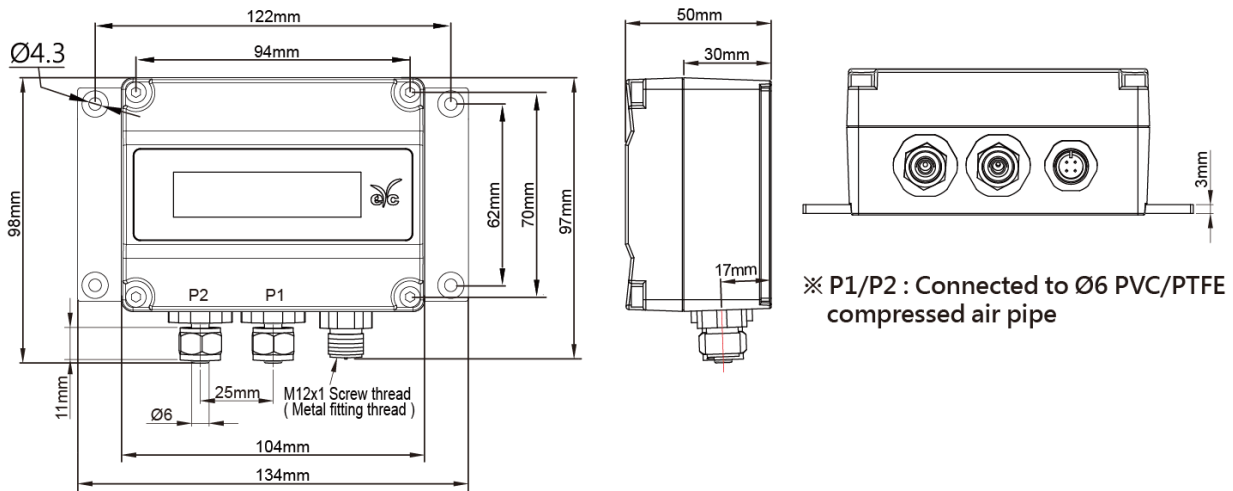
● **Connection Diagram: Analog**
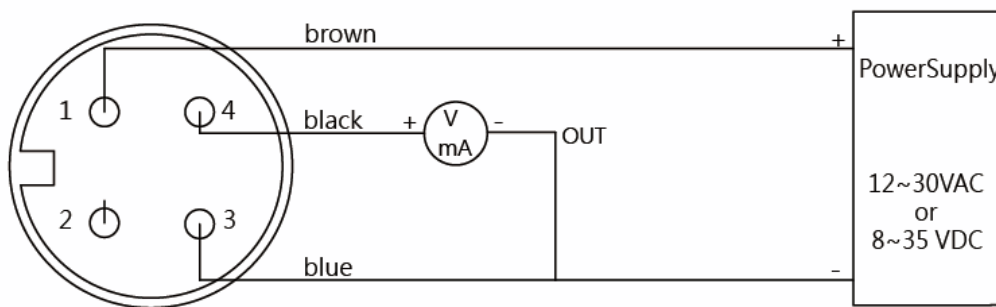
4P M12 Connector + Analogue

● **Connection Diagram: Analog+RS-485**

5P M12 Connector + RS-485

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DIP Switch

For PHM33, the setting status of DIP switch will be read by software while power on, and this reading action will not happen later on. Thus in order to read the DIP switch status again by firmware, the user must to reboot again if re-setting the DIP switch.

- **Function List**
  - Switch_1   DIP Switch Active / Deactivate :
                            Set the DIP switch as On / Off
  - Switch_2   The Type for Analog Output
  - Switch_3,4   Switch Measuring range :
                            upon ordering code (unit : Pa)
  - Switch_5,6,7   Switch physical quantity unit
  - Switch_8   Zero switch
  - Switch_9   Linear / square root output switching
  - Switch_10   Filtering On / Off
  - Switch_11,12   Switch RS-485 station no. : ID 1

Switch_1 DIP DIP Switch Active/Deactivate : Set the DIP switch as On/ Off
The function of DIP Switch_2 ~ 12 only be effective while setting the DIP switch_1 as "On".
The transmitter setting is factory default or by software if DIP switch_1 as "Off".

O: On, X: Off

DIP switch	Switch_1
Deactivate	X
Active	O

Switch_2 The Type for Analog Output
4-20mA or 0-10V for output setting

O: On, X: Off

Output	Switch_2
4-20mA	X
0-10V	O

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Switch_3,4 Switch Measuring range : upon ordering code (unit : Pa)

Three fixed values could be selected by DIP switch. Example, the number 0.5 on the table (mbar, Switch_3 and Switch_4 both Off) is represented +100% of measuring value.

One flexible measuring range support by factory default or user software setting as Switch_3 and Switch_4 both On. In this setting, the Central range setting for Switch_8 will be ignored and the measuring range is setting as factory default or user software.

O: On, X: Off

Switch	3		4		3		4		3		4		3		4	
	X		X		O		X		X		O		O		O	
Unit\Range	10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40
Pa	50	300	1000	2500	100	500	1600	5000	250	1000	2500	7500	default or software setting			
mbar	0.5	3	10	25	1	5	16	50	2.5	10	25	75	default or software setting			
hPa	0.5	3	10	25	1	5	16	50	2.5	10	25	75	default or software setting			
kPa	0.05	0.3	1	2.5	0.1	0.5	1.6	5	0.25	1	2.5	7.5	default or software setting			
mmH2O	5	30	100	250	10	50	160	500	25	100	250	750	default or software setting			
mmWS	5	30	100	250	10	50	160	500	25	100	250	750	default or software setting			
inH2O	0.2	1.2	4	10	0.4	2	6.4	20	1	4	10	30	default or software setting			
mmHg	0.375	2.25	7.5	18.75	0.75	3.75	12	37.5	1.875	7.5	18.75	56.25	default or software setting			

Switch_5,6,7 Switch physical quantity unit

Eight units is supported by transmitter: mbar, Pa, hPa, kPa, mmH2O, mmWS, inH2O and mmHg.

O: On, X: Off

Unit	Switch_5	Switch_6	Switch_7
mbar	X	X	X
Pa	O	X	X
hPa	X	O	X
kPa	O	O	X
mmH2O	X	X	O
mmWS	O	X	O
inH2O	X	O	O
mmHg	O	O	O

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Switch_8 Zero switch

According maximum measuring value setting of Switch_3, 4 and unit setting of Switch_5, 6, 7, the central range sets the Bidirectional or unidirectional of measuring.

Example: the maximum measuring value is 0.5 and the unit setting is mbar
Switch_8 Off : -0.5 / +0.5 mbar
Switch_8 On : 0 / +0.5 mbar

O: On, X: Off

Range	Switch_8
Range: -100 ~ +100%	X
Range: 0 ~ +100%	O

Note: If Switch_3, 4 both On, then Central range setting will be ignored

Switch_9 Linear / square root output switching

Root extraction is benefit for air velocity application. Measure the air velocity in the application with a reference instrument and work out the average velocity. LCD shown the √ mark on left-low side and red led of LDEP flash slowly while the square root extracted function has active.

The following formula can be used for converting a linear 4-20mA current loop signal to a square root extraction type:

$$Output_{SqRt} = 4mA + (4 \times \sqrt{(Output_{Linear} - 4mA)})$$

The formula for 0-10V to a square root extraction type:

$$Output_{SqRt} = \sqrt{10} \times \sqrt{Output_{Linear}}$$

O: On, X: Off

Status\No.	Switch_9
Linear	X
Square Root Extracted	O

Switch_10 Filtering On / Off

Analog output filter setting for 10 seconds or disable.

O: On, X: Off

Status\No.	Switch_10
Filter off	X
10 seconds	O

Switch_11, 12 Switch RS-485 station no. : ID 1-4

Station ID for Modbus RTU slave device setting.

O: On, X:Off

Station ID	Switch_11	Switch_12
1	X	X
2	O	X
3	X	O
4	O	O

Note:

While setting the DIP switch_1 as "On", some of the "Setting" & "Output" features will be disabled on user software. In other word, these features are controlled by DIP switch. Otherwise, the features on UI can be configured if set the DIP switch_1 as "Off".

Button

- **Autozero**

This button allows user to set the current pressure to "AUTOZERO", it is required to press the button for 1~2 seconds, and the pressure adjusted to "AUTOZERO" after release this button. The user will observe the red led of LEDP turn on for the noticing zero function has active.

- **Factory default**

This button allows user to restore factory default setting, it is required to press the button for 10 seconds, red led of LEDP turn to flash, the pressure offset and multiple factor will reset to 0 and 1 after release this button.
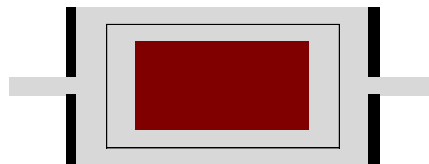
- **RS-485 and Modbus**

PHM33 integrate a RS-485 interface for digital communication as a option feature. Based on Modbus protocol makes the general convenience on PLC, HMI and PC connection. For Modbus protocol information please attached the file from website to download. 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:**
    - Max. network size: 32 transmitters
    - Communication: with COM-Port (serial interface) of PC
    - Max. network expansion: 1200m (3937ft) total length at 9600 baud
    - Transmission rate: 9600, 19200, 38400, 57600, 115200 Baud
    - Parity: None, Even, Odd
    - Data length: 8 bit
    - Stop bit: 1 or 2 bit
    - Factory default Station address = 1, Data format= 9600, N81

User Software

1. Hardware connection: Connect the PHMK33 to PC by USB to RS-485 converter.

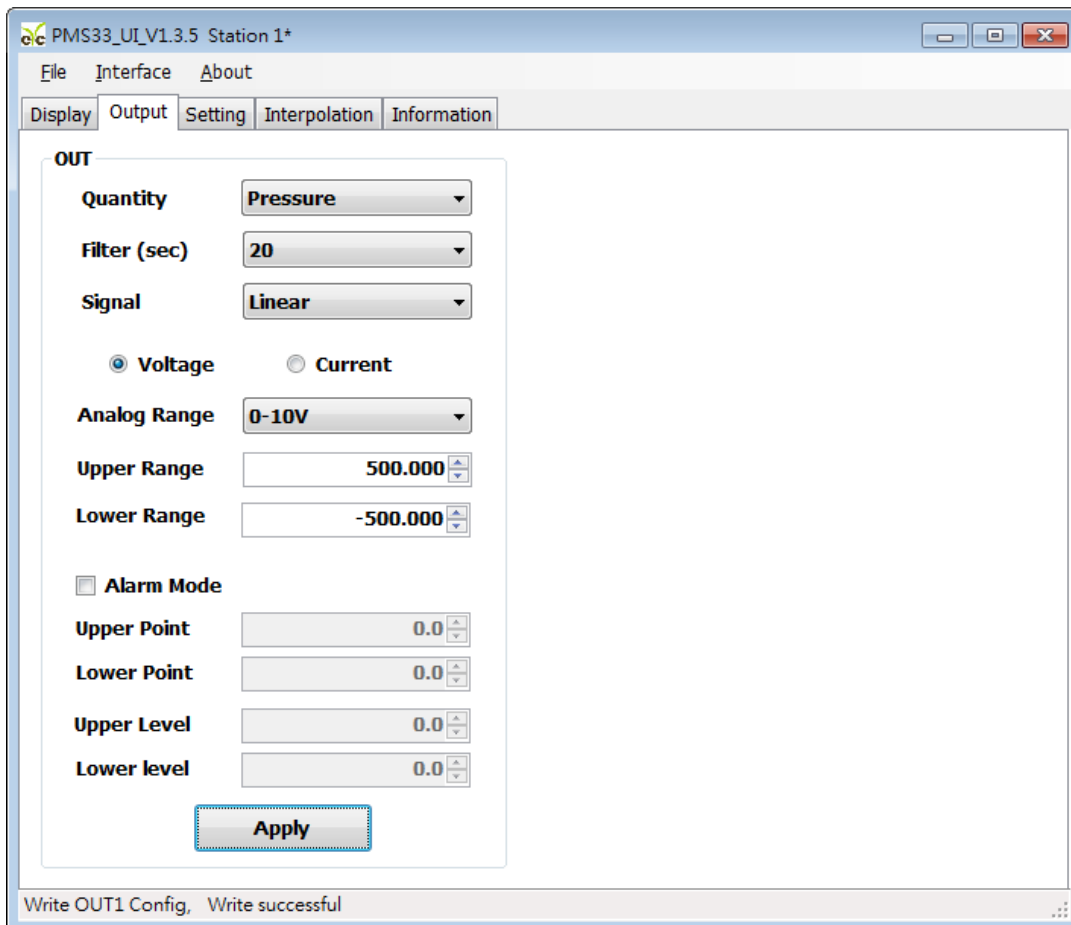2. Check the COM port number from Computer Management
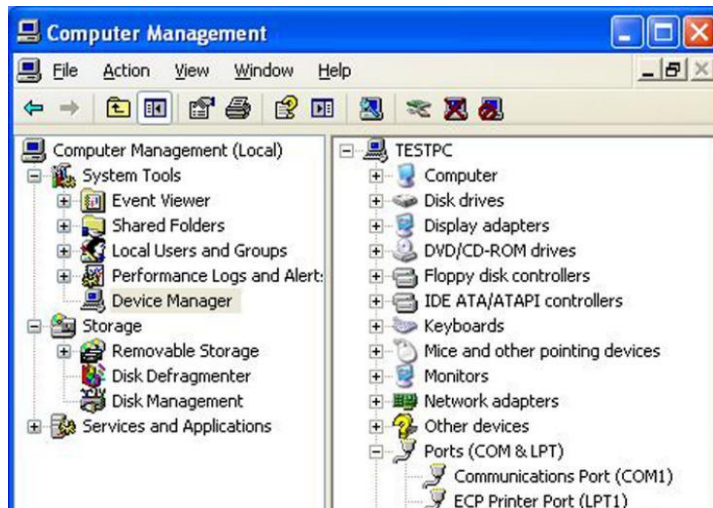
3. Open the PMS33_UI, go to function "Interface", click item "Config" and then setting COM port, BAUD rate and data format, pressed "Scan" bottom for scan devices and "Apply" for connection.
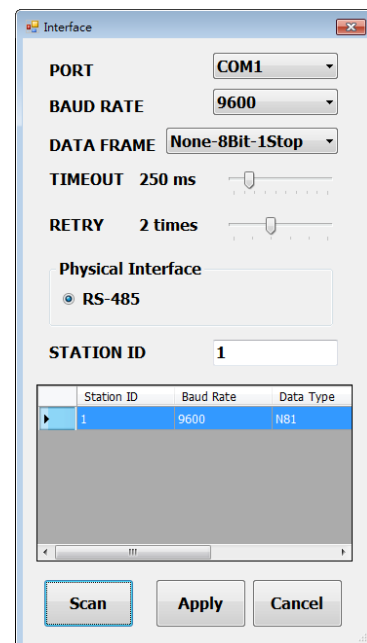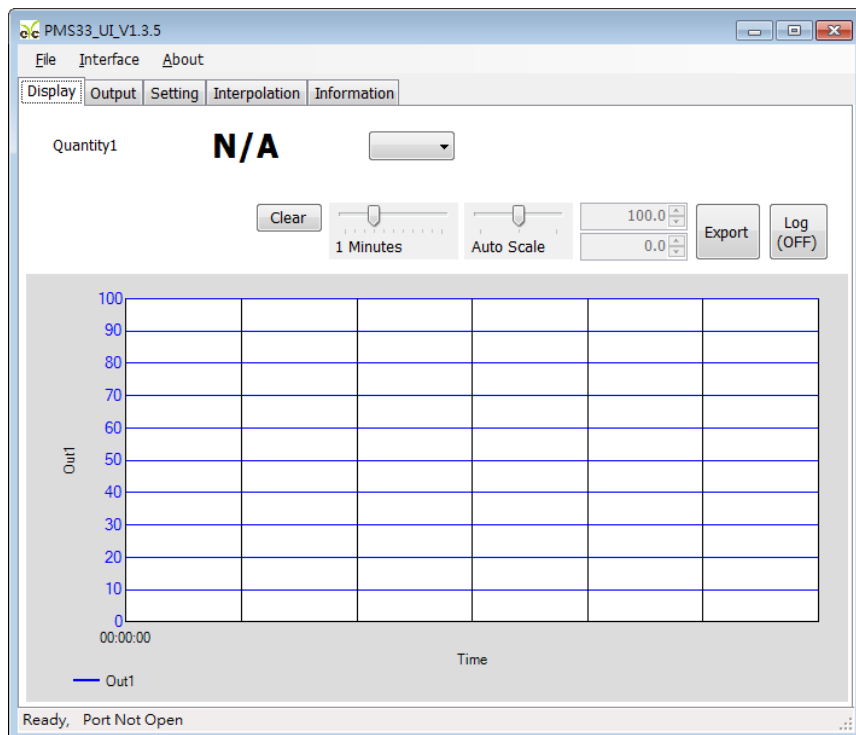
4. Setting on Analog Output
   i. Quantity: Pressure
   ii. Filter: 0, 5, 10, 20 seconds
   iii. Signal: Linear / Square root extraction
      LCD shown the √ mark on left-low side and red led of LDEP flash slowly while the square root extracted function has active.
   iv. Analog type: 0-20mA / 4-20mA / 0-1V / 0-5V / 1-5V / 0-10V / 2-10V
   v. Range for Upper and Lower

5. Setting on RS-485, offset adjustment and display

    i.   Station ID: 1~247

   ii.   Baud Rate: 9600 / 19200 / 38400 / 57600 / 115200

  iii.   Data Frame: None-8Bit-1Stop / None-8Bit-2Stop / Even-8Bit-1Stop / Even-8Bit-2Stop / Odd-8Bit-1Stop / Odd-8Bit-2Stop /

  iv.   Pressure Offset adjustment, unit available in inH2O only

   v.   Multiple on measuring value, from 0.01 to 100

  vi.   Display unit of flow velocity (A)

 vii.   Display unit of flow volumetric (B) and span programming (C)
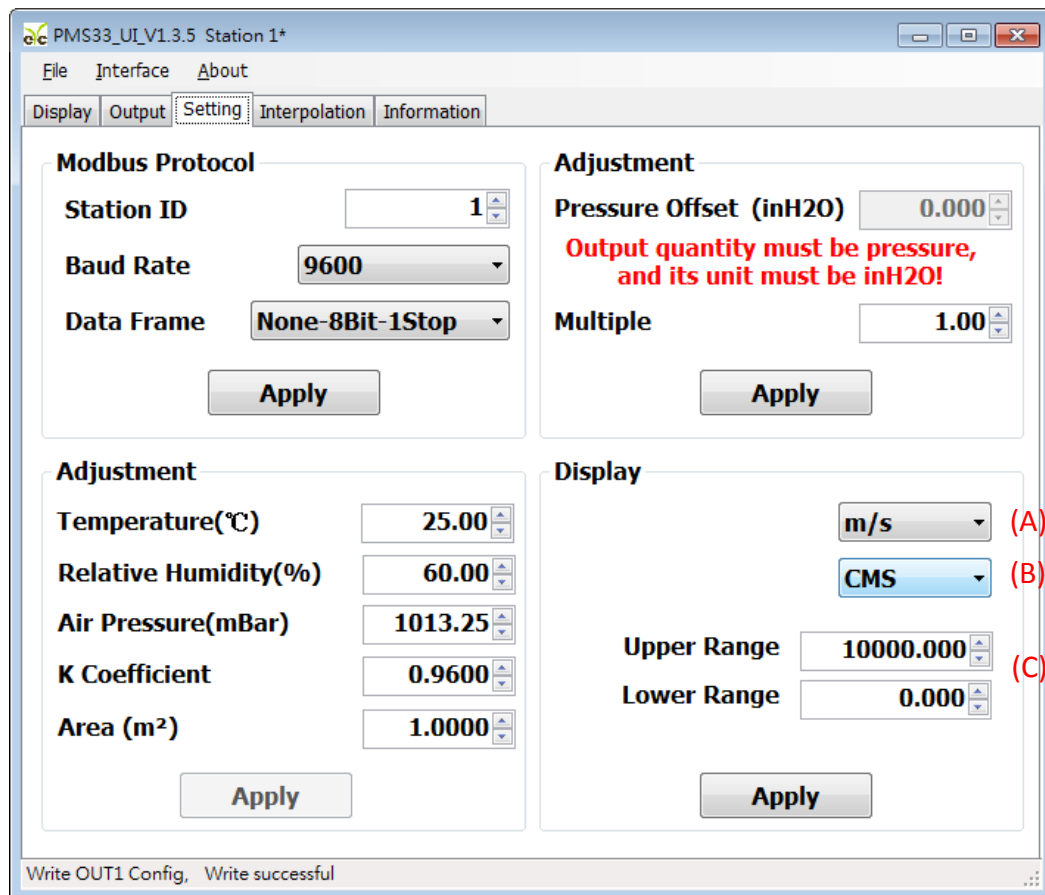
6. Unit setting, data display and data logging
    i.   Pressure unit: mbar, Pa, hPa, kPa, mmH2O, mmWS, inH2O, mmHg
    ii. Export file: *.CSV

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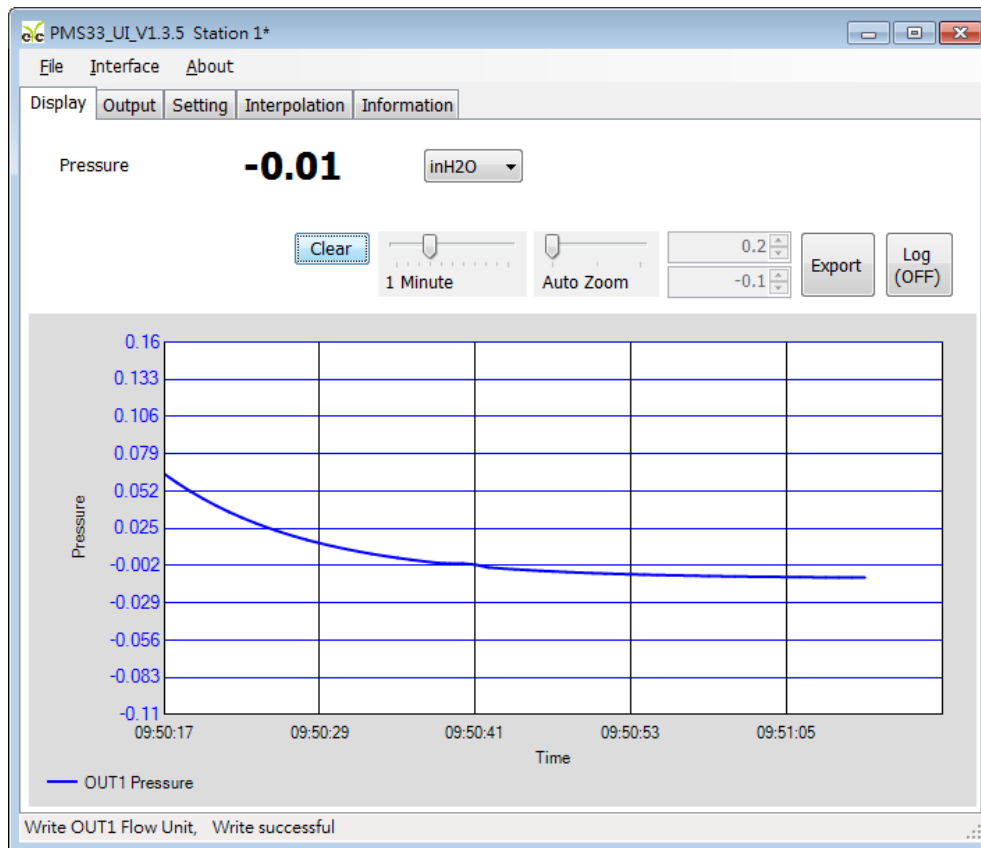
7. Transmitter information

Sustainable、Green、Professional

Temperature & Humidity / Dew point /

Air Velocity / Water Flow Measuring Specialist

Tel.: 886-2-8221-2958

Web : www.eyc-tech.com

e-mail : info@eyc-tech.com

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