Operation Manual

GS43/44

CO_2 Gas monitoring transmitter/Indoor

1. Summary

1.1 Features

1. Non-Dispersive Infrared (NDIR): For detecting the CO_2 Concentration.
2. Remote monitor by RS-485 (Modbus RTU).
3. Customized Monitoring System.
4. Providing software can be set and read the records.
5. GS43/44 UI:
   a. Set the Category of Physical Output & Measuring Range.
   b. CO_2 Concentration Detection. It provides the setting features to On/ OFF for Self-Correcting ABC Algorithm.
   c. RS-485 Port No.
   d. Different Baud Rate for data transmission.

1.2 Applicable Fields

a. The ventilation system for various building.
b. The HVAC process as Heating, Ventilation and Air Condition.
c. Monitor CO_2 concentration for house and building.

2. Security considerations

2.1. Manual Guide

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.

Solemn Statement:

1. This product is improperly to used in explosion-proof area.
2. Do not use this product in dangerous situation where human health & life may be threaten & affected.

2.2. Improper Installation Environment

In additional, 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 eYc-tech.

2.3. Illustration, Warning & Attention

If the improper & dangerous results which result from improper operator or improper environment, eYc-tech will not bear any legal responsibility

Illustration

	 This mark is to give advice & warning for the potential dangerous which result from obvious wrong/ improper operation steps. (The left mark means "Watch out for electric shock")
	In order to avoid the dangerous situation,  this mark means some special operation/ action is forbidden to implement. (The left mark means "Forbidden to Disassemble")
	In order to avoid the dangerous situation,  this mark means Specified Action/ Operation is required to implement. (The left mark means "General Instruction")

Warning

	Please implement the wiring operation under power-off status; otherwise it will cause electric shock, or become the root cause of machinery breakdown.
	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.
	Please install this product under normal pressure status. Otherwise it may cause the safety problems.

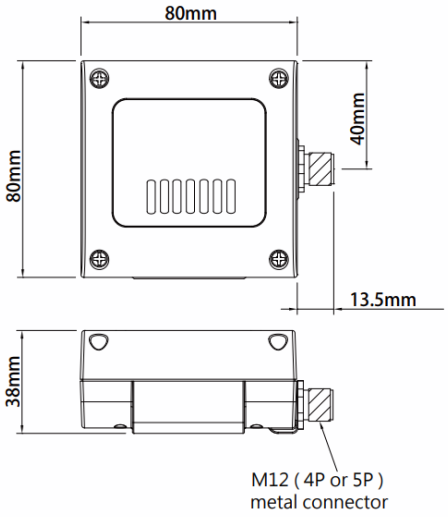
Attention

	In order to be in accordance with all applicable safety standards. The installation & wiring must be performed by qualified installer & professional instruments.
	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 GS43/44 from damages. This product must be used in the proper environment which specified in this user's manual.
	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.
	In order to prevent the product from short circuit, please install this product base on the wiring diagram on chapter 5, and please use the nonconductor material for wire end.
	In order to prevent the reduced accuracy from other interferences, do not use the two-way wireless devices within 3 meters,
	Do not disassemble this product, otherwise it may cause the malfunction.
	During the product is breakdown, please take safety strategy. Because it may cause high humidity atmosphere or the output value exceed maximum value as ruled.
	Please recycle the partial or whole parts while discard this product.
	While discard this product, the user must to comply with the related rules for industrial domestic wastes for different country/ location.

3. Housing, Dimension & Installation

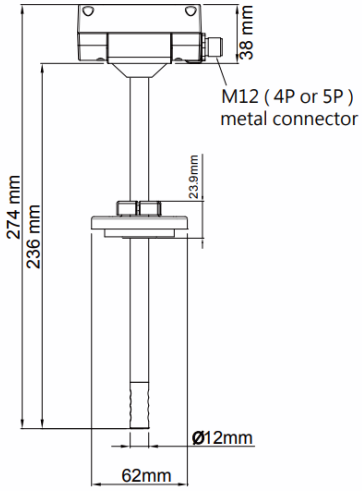
3.1 Housing & Dimension

【 GS43 (indoor) 】



M type (4P) : RS-485 or analogue
M type (5P) : RS-485 + analogue

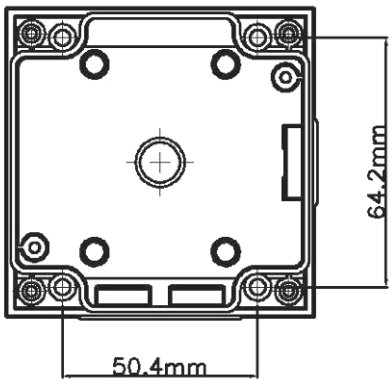
【 GS44 (duct) 】



M type (4P) : RS-485 or analogue
M type (5P) : RS-485 + analogue

3.2 Installation

Base

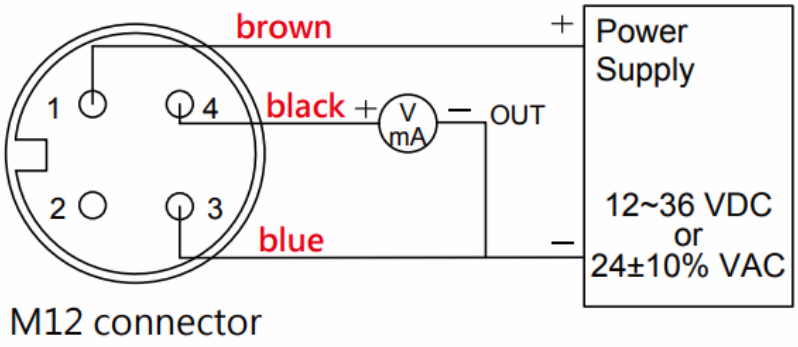


4. Hardware Feature

Power：	DC 12~36V or AC 24V ±10% (under current consumption DC 200mA or AC 210mA)
Analog output：	One programmable channel, Optional 0~1V, 0~5V, 0~10V, 1~5V, 0~20mA, 4~20mA
RS-485 output：	Baud Rate 9600, 19200, 38400, 57600, 115200 bps
	Data Frame N81, none parity, 8 bit data, 1 bit stop
	Station ID 1-247

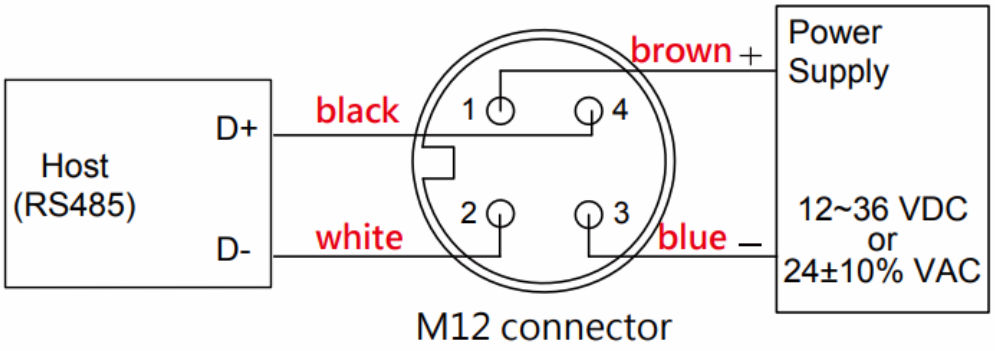
5. Signal Connection

1. Analog Output Connection Diagram



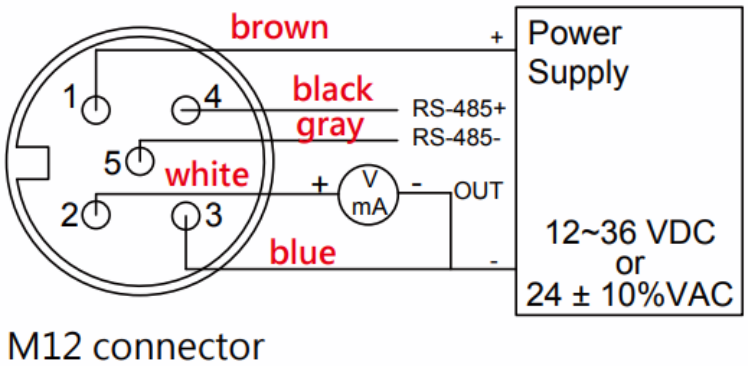
M type (4P)

2. RS-485 Serial Port Connection Diagram



M type (4P)

3. Analog Output and RS-485 Serial Port Connection Diagram



M type (5P)

6. Software Feature & Using

6.1 Software Compatibility

GS43/44 software features are compatible to Microsoft Windows System, and the PC System connects with GS43/44 via COM PORT (Serial Port)。

6.2 RS-485 Serial Communication

GS43/44 uses RS-485 Serial Port Interface to connect with monitor PC, except the software, the hardware interface is also necessary, GS43/44 provides 2 methods for hardware connection.

1. If the PC equipped with COM Port. Use Converter (RS-232 to RS-485) to connect with GS43/44.
2. In despite of the PC equipped with COM Port. Use Converter (USB to RS-485) to connect with GS43/44.

6.3 GS43/44 Setting_Analog Output

1. GS43/44 provides one output terminal as OUT1 and output CO_2 concentration measure.
2. In order to mapping to target measure span. User may set the different output voltage or electric current range independently on each terminal as 0-1V, 0-5V, 1-5V、0-10V ,2-10V, 0-20mA or 4-20mA.

6.4 GS43/44 Setting_CO2 Self-Correcting Algorithm ADC

1. NDIR is a fast, accuracy & precious technology to detect CO2 concentration. It uses two physical characteristics, to detect the concentration of specified gas,
   a. The gas absorbs the wavelength of Infrared Rays.
   b. The gas concentration and absorbed quantity is Direct Proportion.
2. The strength of Infrared Rays have attenuation phenomenon after long time, Then the accuracy & precious of measurement must be influenced. Thus the technology of CO2 Self-Correcting Algorithm provides improvement for this defection.
3. In the general environment, the CO_2 concentration usually measured as 400ppm. The environments as From Room/ Office with the condition as midnight period & nobody status, the CO_2 concentration usually measured as 400ppm. Thus GS43/44 use the average statistics values for 7 days to implement Self-Correcting feature.
4. This feature is not adaptive to use in special environment as Factory/ Plant Greenroom where the CO_2 concentration may keep on high value & keep for long period.

6.5 GS43/44 Setting_Port No. & Transmission Rate

1. RS-485 serial communication interface merged with Modbus Protocol, these 2 features co-works to construct the digital communication format.
2. Usable Port No. Range : 1~247.
3. On the same wiring, the Port No. must to be different.
4. The maximum devices quantity which connected to RS-485 interface restricted on 31 devices.
5. Three selectable Transmission Rate (Baud Rate): 9600 / 19200 / 38400 / 57600 / 115200 bps.

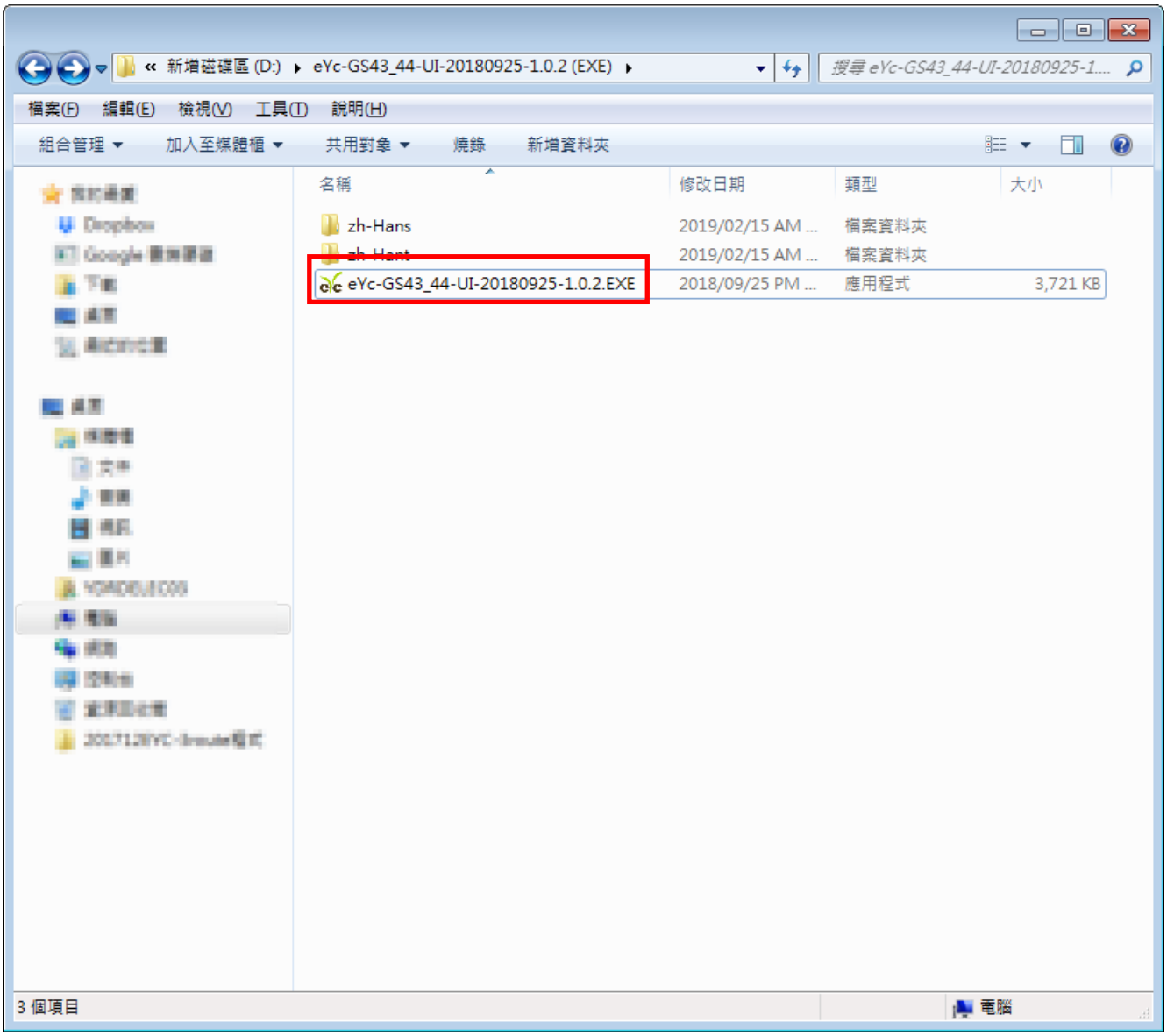
7. GS43/44 UI operation step

7.1 Execute “GS43/43 UI”

1. Free installation file：eYc-GS43_44-UI-YYYYMMDD-A.B.CEXE

   a. O.S Requirement: Windows XP or above.

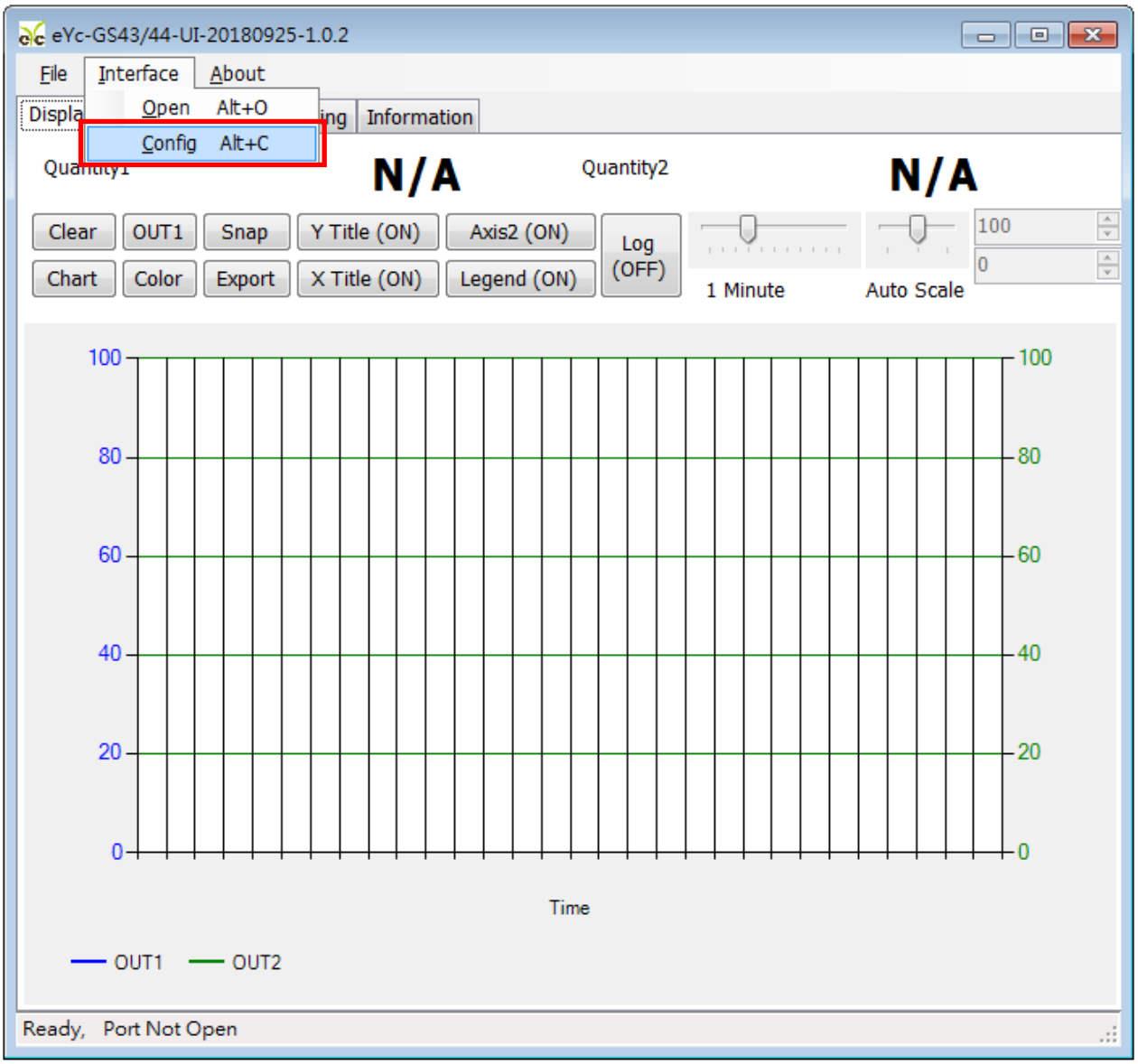
   b. Click “eYc-GS43_44-UI-YYYYMMDD-A.B.C.EXE” to open GS43/44 UI



2. Other applications required: Microsoft Office 2003 or above

7.2 Connect to PC via RS-485

1. Connect GS43/44 to PC via RS-485 cable
2. Click“Interface > Config”



3. Select the corresponding values of com port as following :

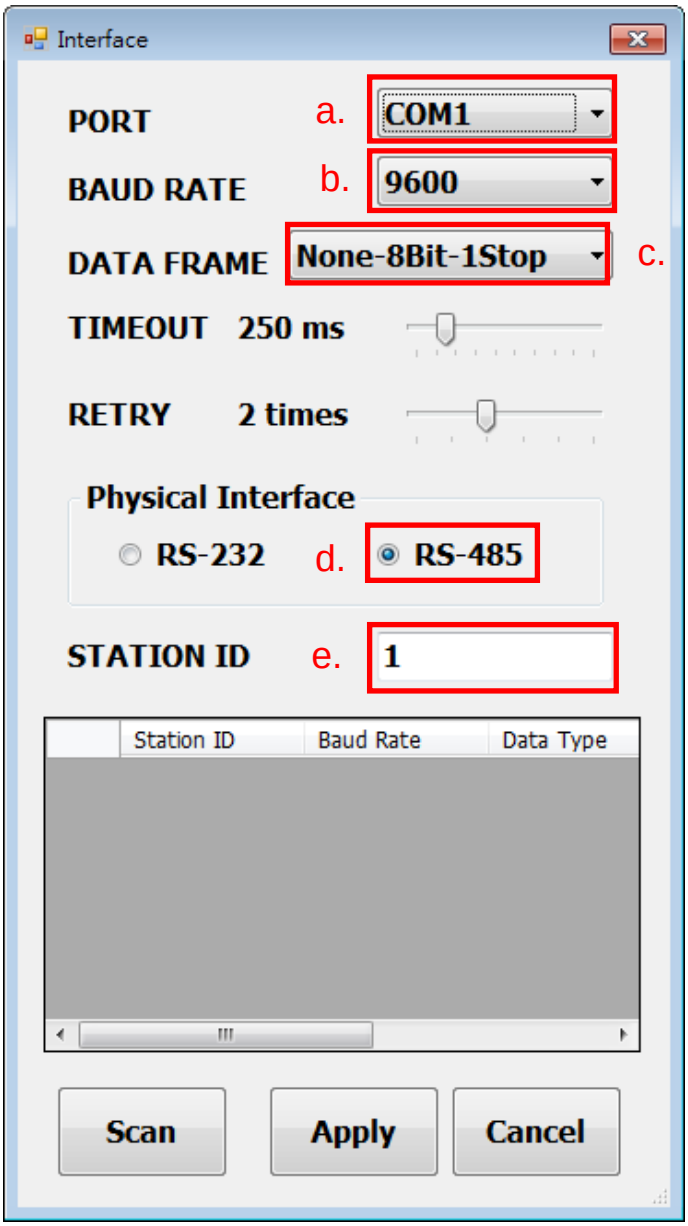
a. Port No

b. Baud Rate：9600, 19200, 38400, 57600, 115200

c. Data Frame：None-8Bit-1Stop, None-8Bit-2Stop, Even-8Bit-1Stop, Even-8Bit-2Stop, Odd-8Bit-1Stop, Odd-8Bit-2Stop,

d. Physical Interface: RS-485

e. Station ID(The factory default 1)

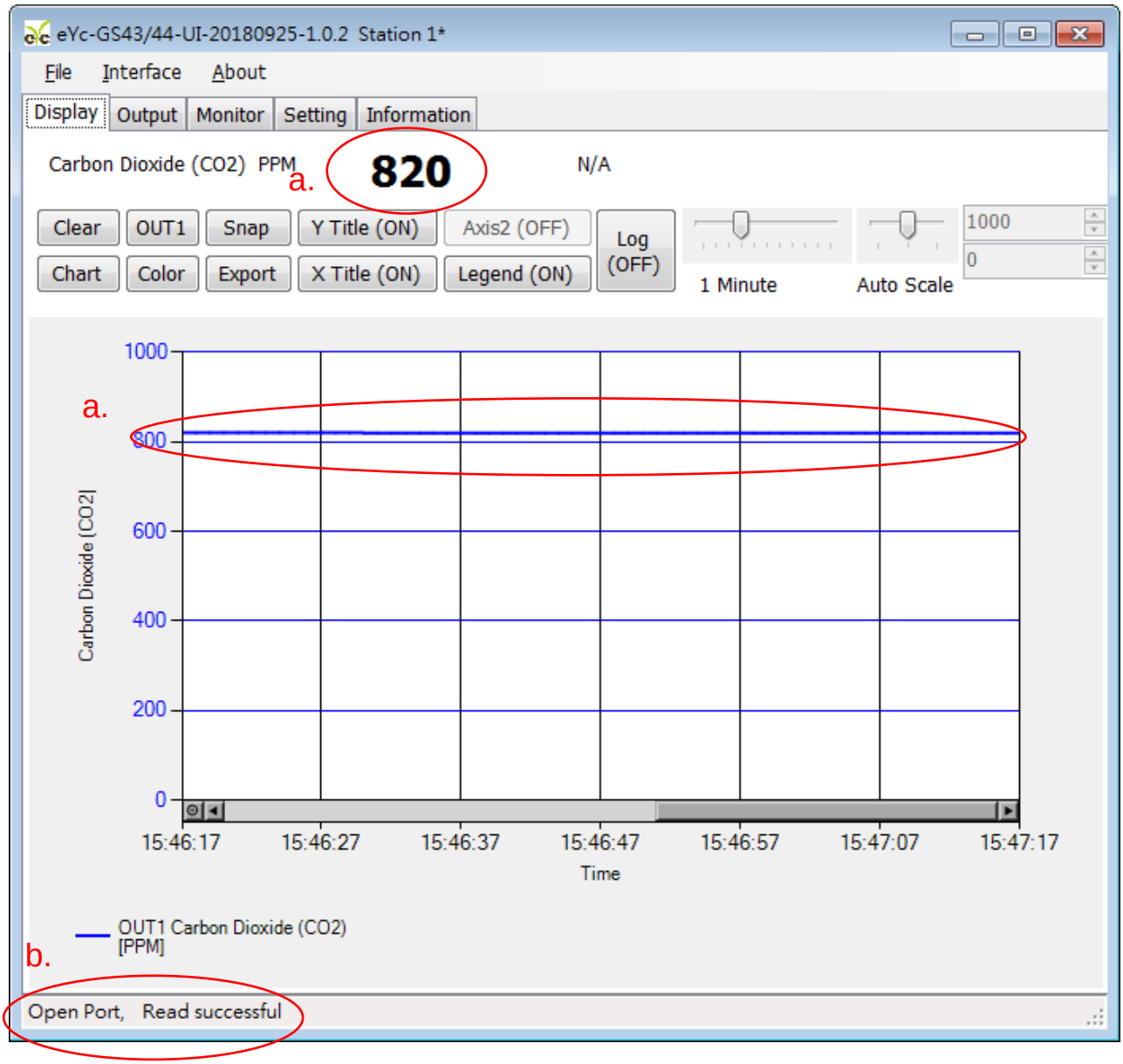


4. Click Apply accomplish the setting

5. Connect successful：

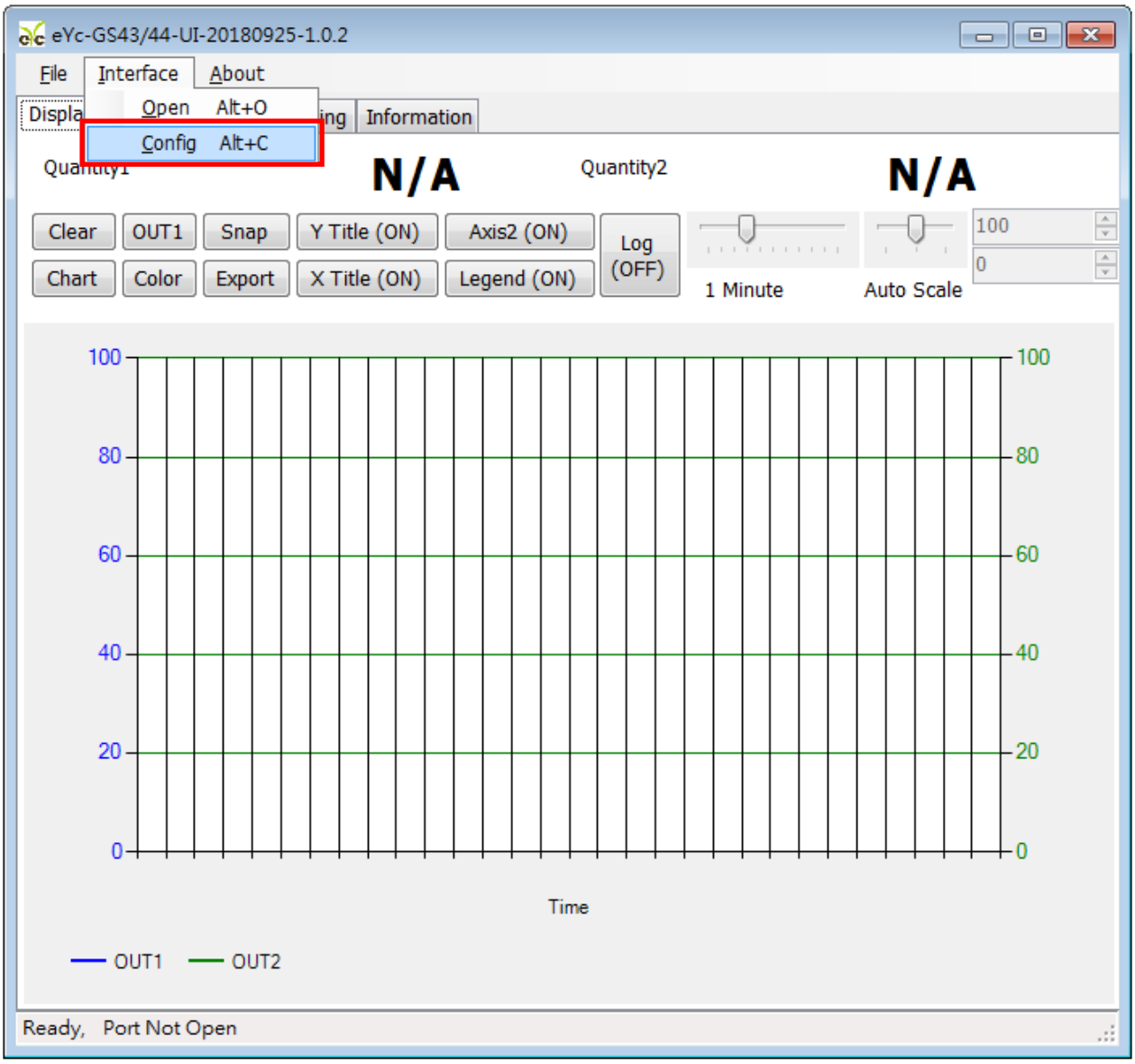
a. Shows the values of output1 as CO_2 concentration

b. Shows “Open port, Read successful” in status bar

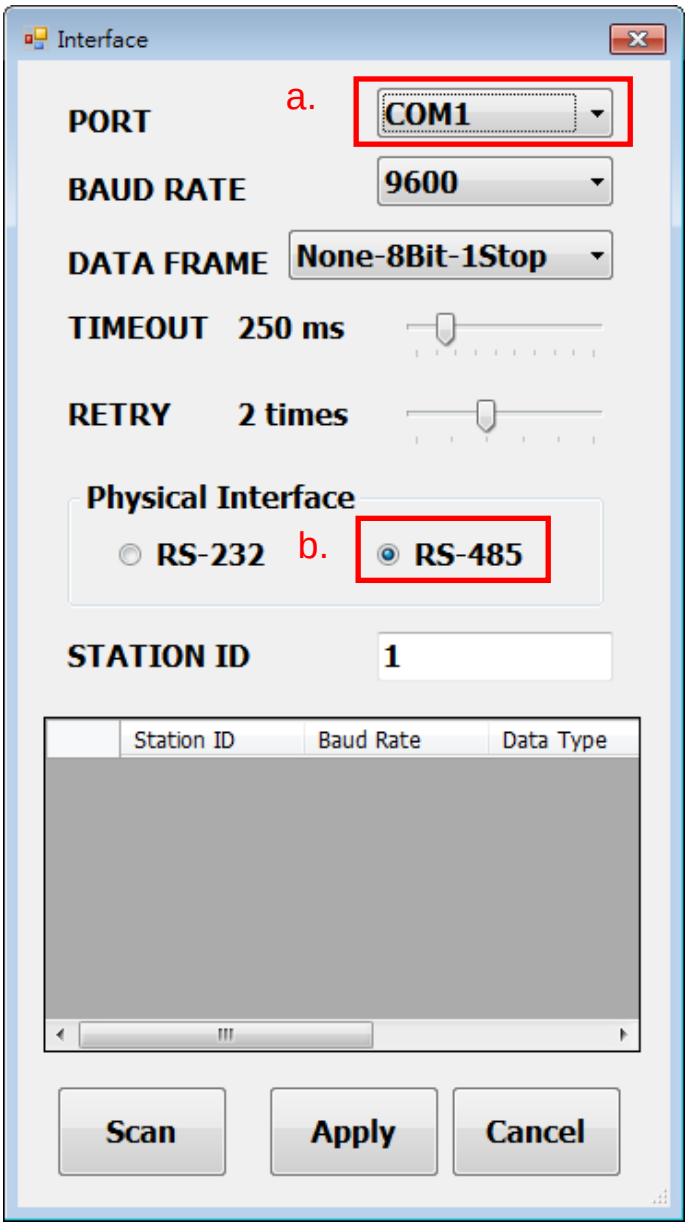


7.3 Scan RS-485 connection

1. Connect GS43/44 to PC via RS-485 cable
2. Click “Interface > Config”

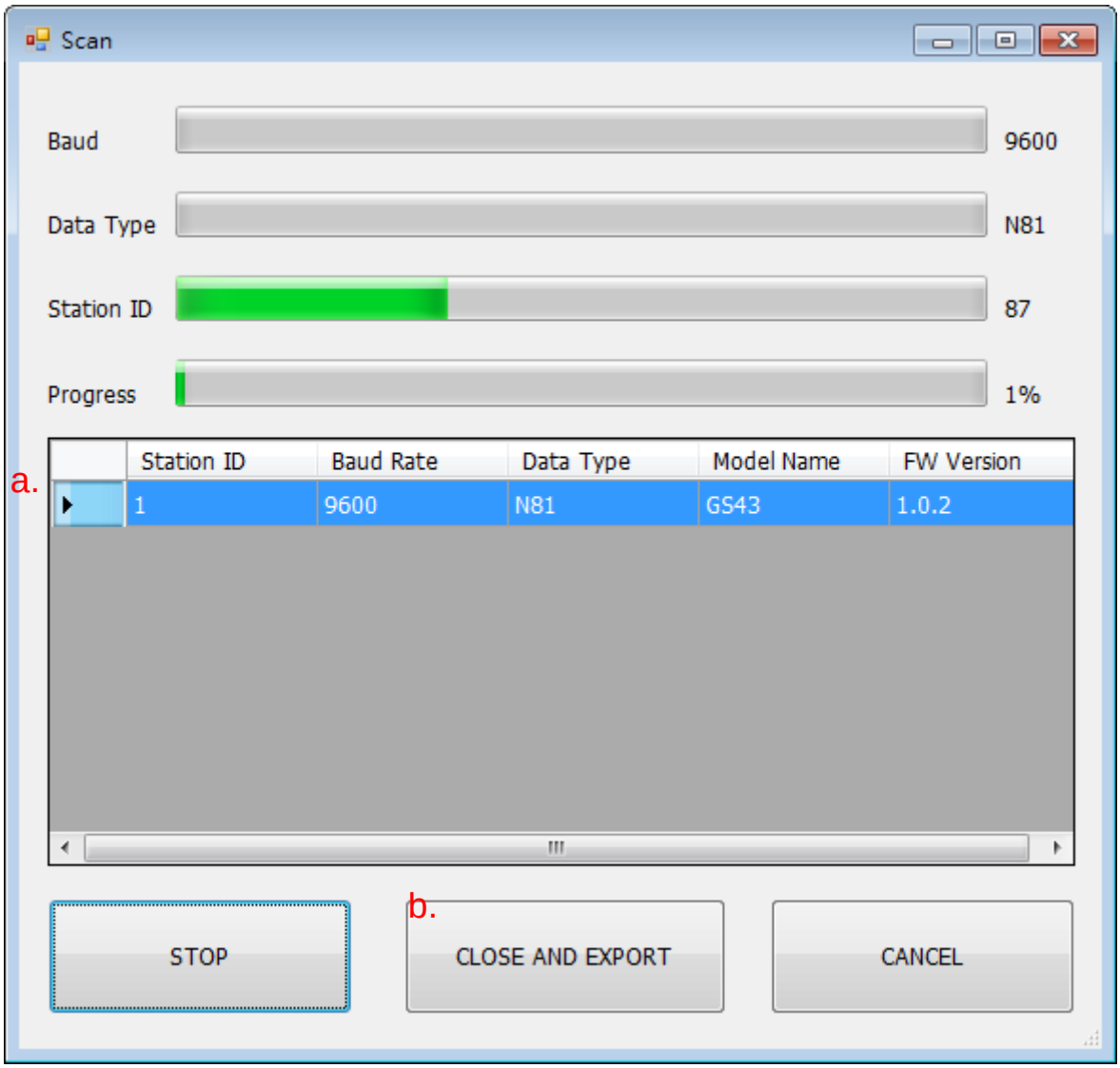


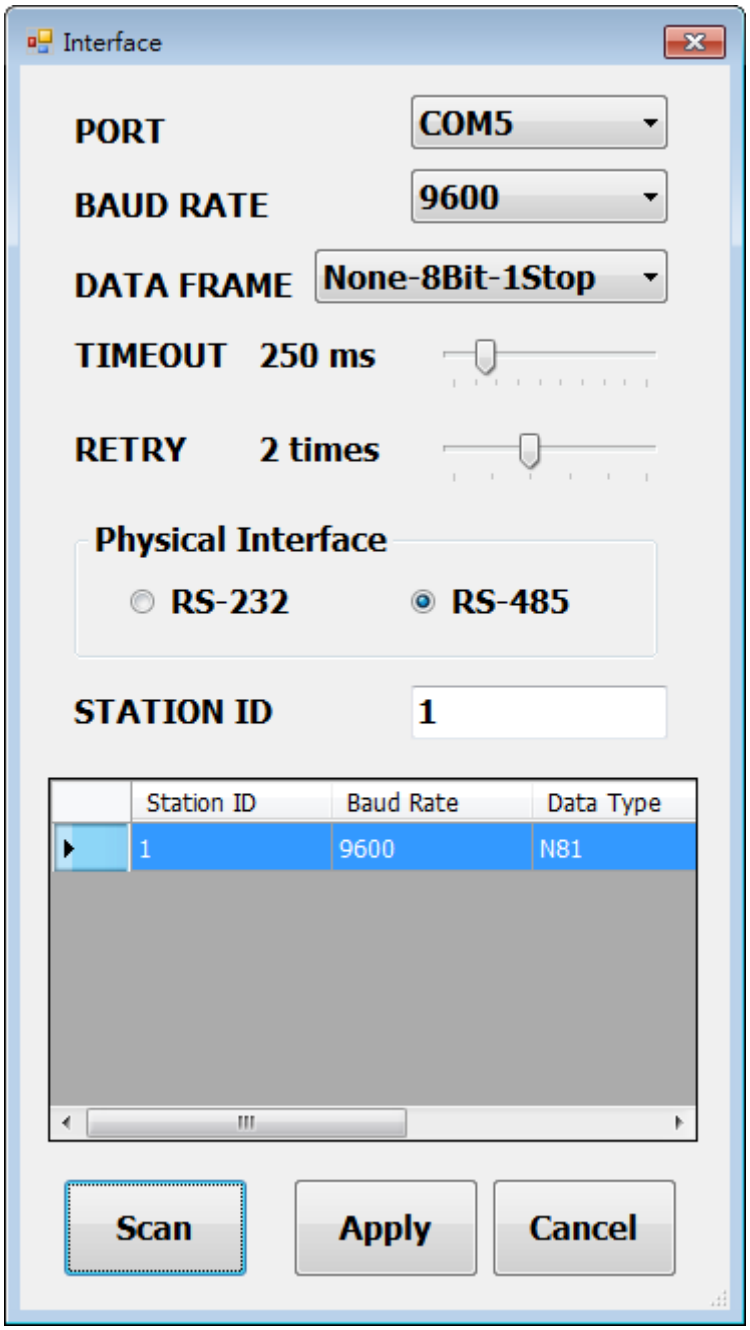
3. Select the corresponding values of com port as following
    a. Port
    b. Physical Interface: RS-485



4. Click Scan to start connection device scans

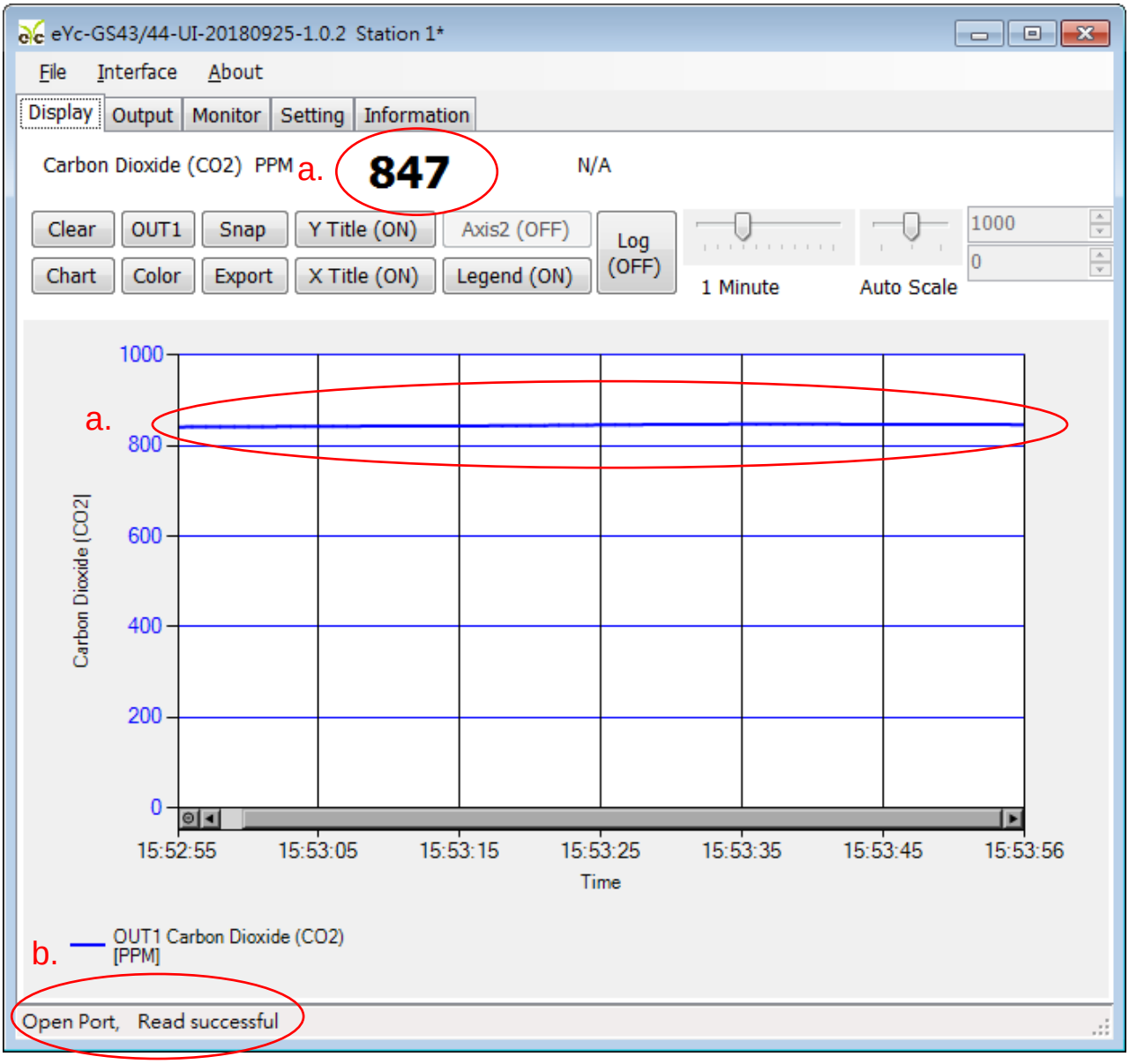
5. Scanning device and setting state
    a. Choose Station ID
    b. Click CLOSE AND EXPORT





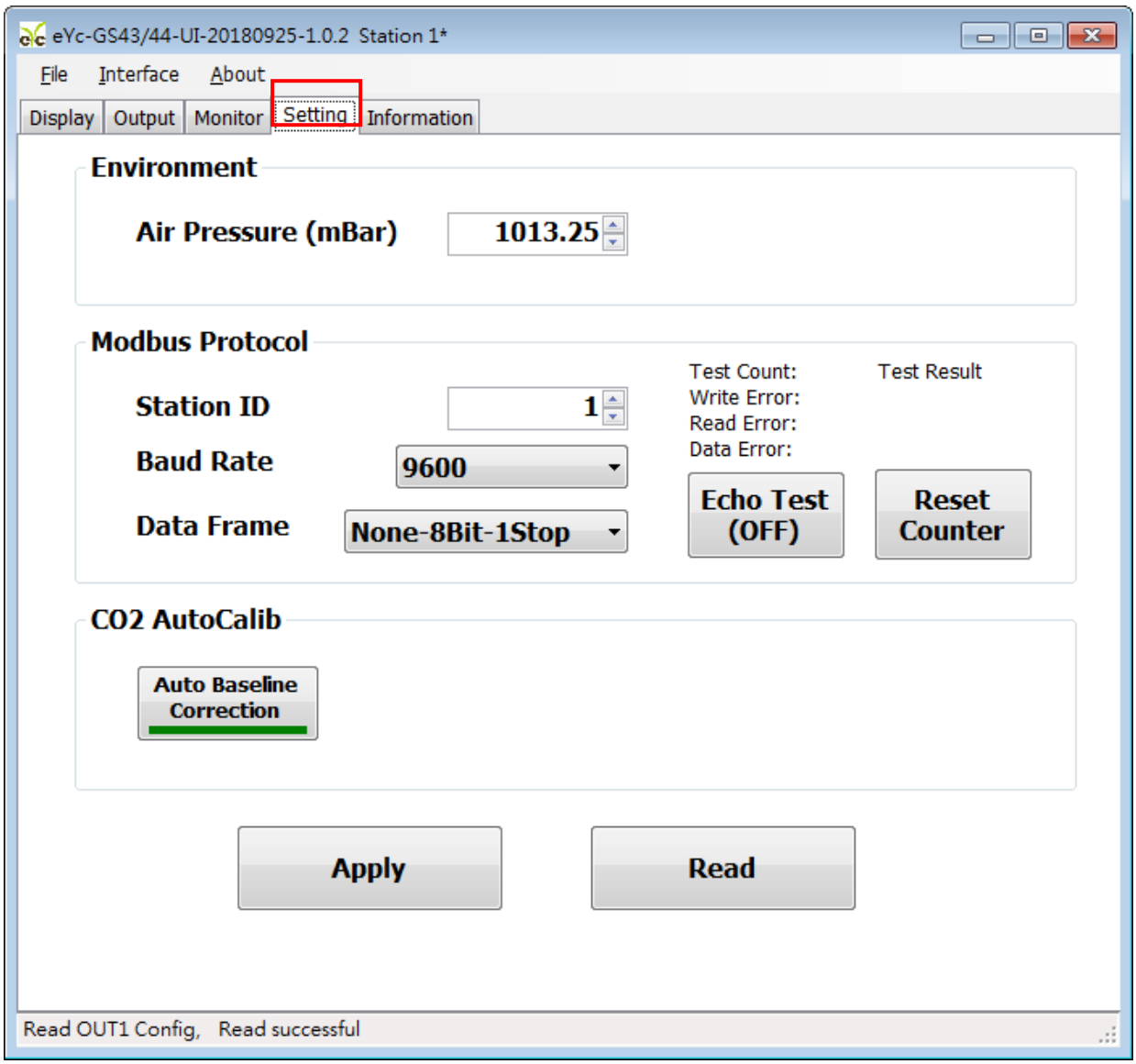
6. Click Apply accomplish the setting

7. Connect successful
    a. Shows the values of output1 ad CO_2 concentration
    b. Shows Open port, Read successful in status bar



7.4 Setting RS-485 communication format

1. RS485 connection establishment according to 7.2
2. Click on Setting

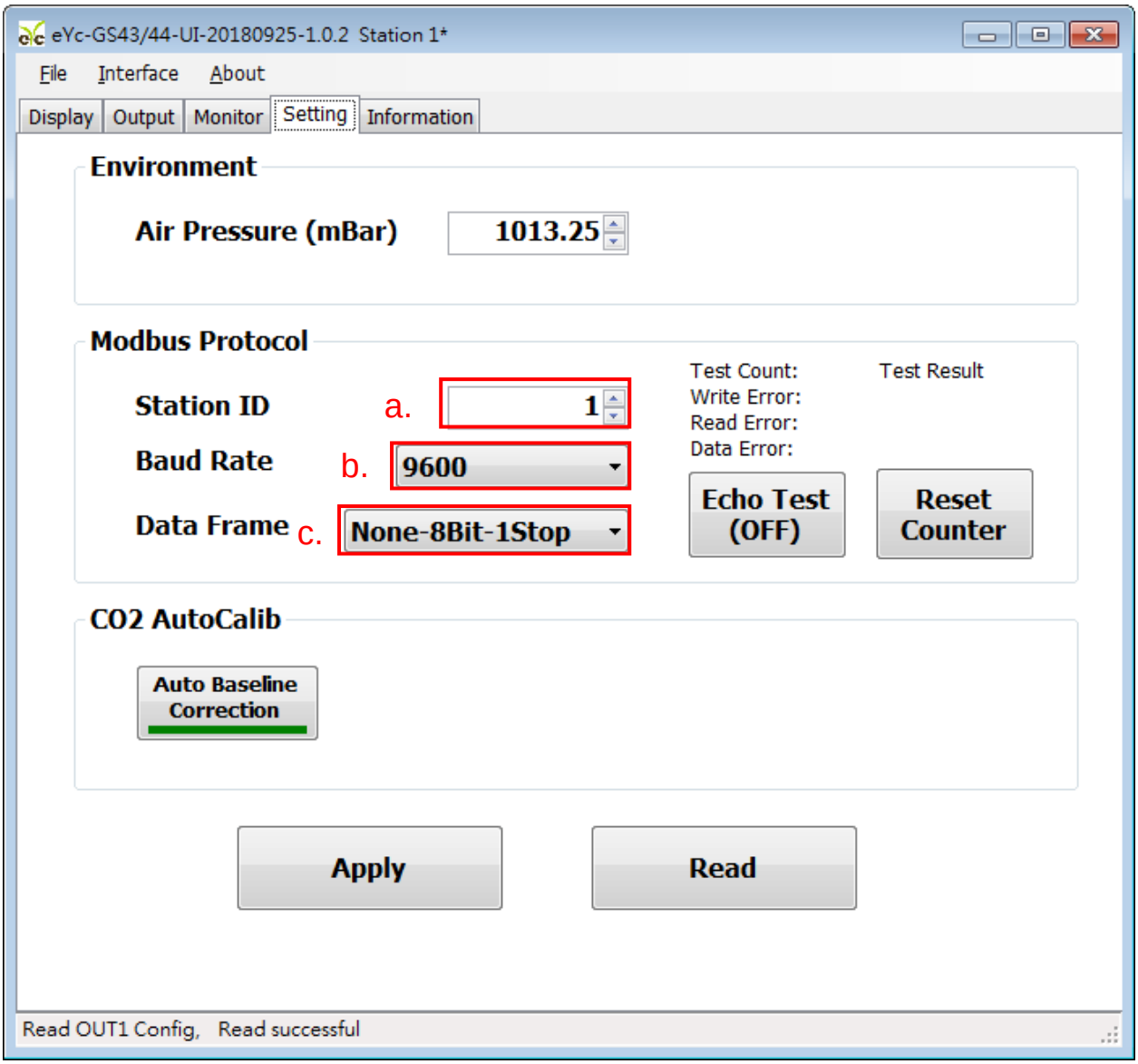


3. TO select Modbus Protocol parameter

a. Station ID：1~247

b. Baud Rate：9600, 19200, 38400, 57600, 115200

c. Data Frame：None-8Bit-1Stop, None-8Bit-2Stop, Even-8Bit-1Stop, Even-8Bit-2Stop, Odd-8Bit-1Stop, Odd-8Bit-1Stop

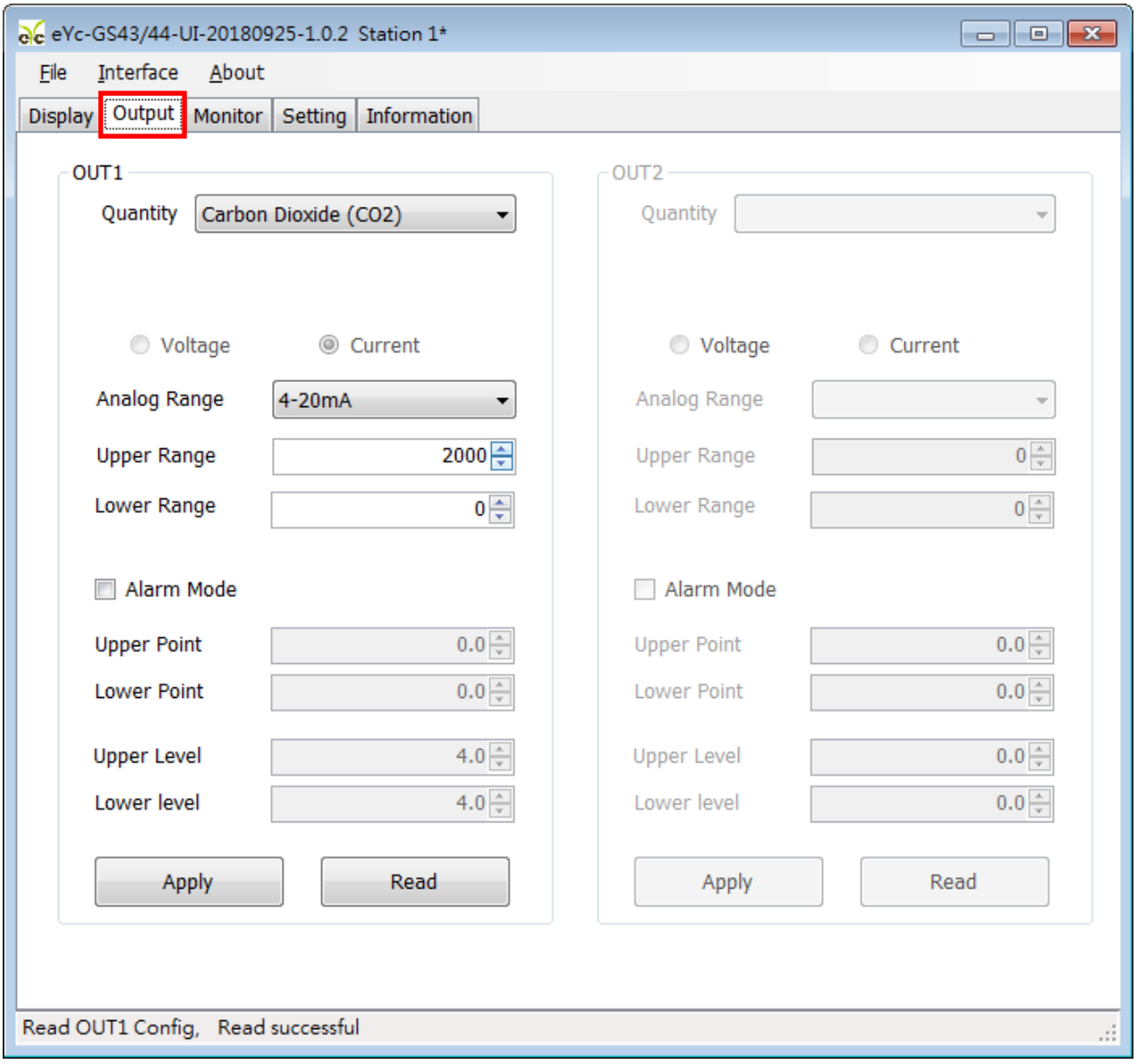


4. Click Apply accomplish the setting

5. RS485 connection establishment according to 7.2 or 7.3

7.5 Select Parameter of Output

1. Click on Output

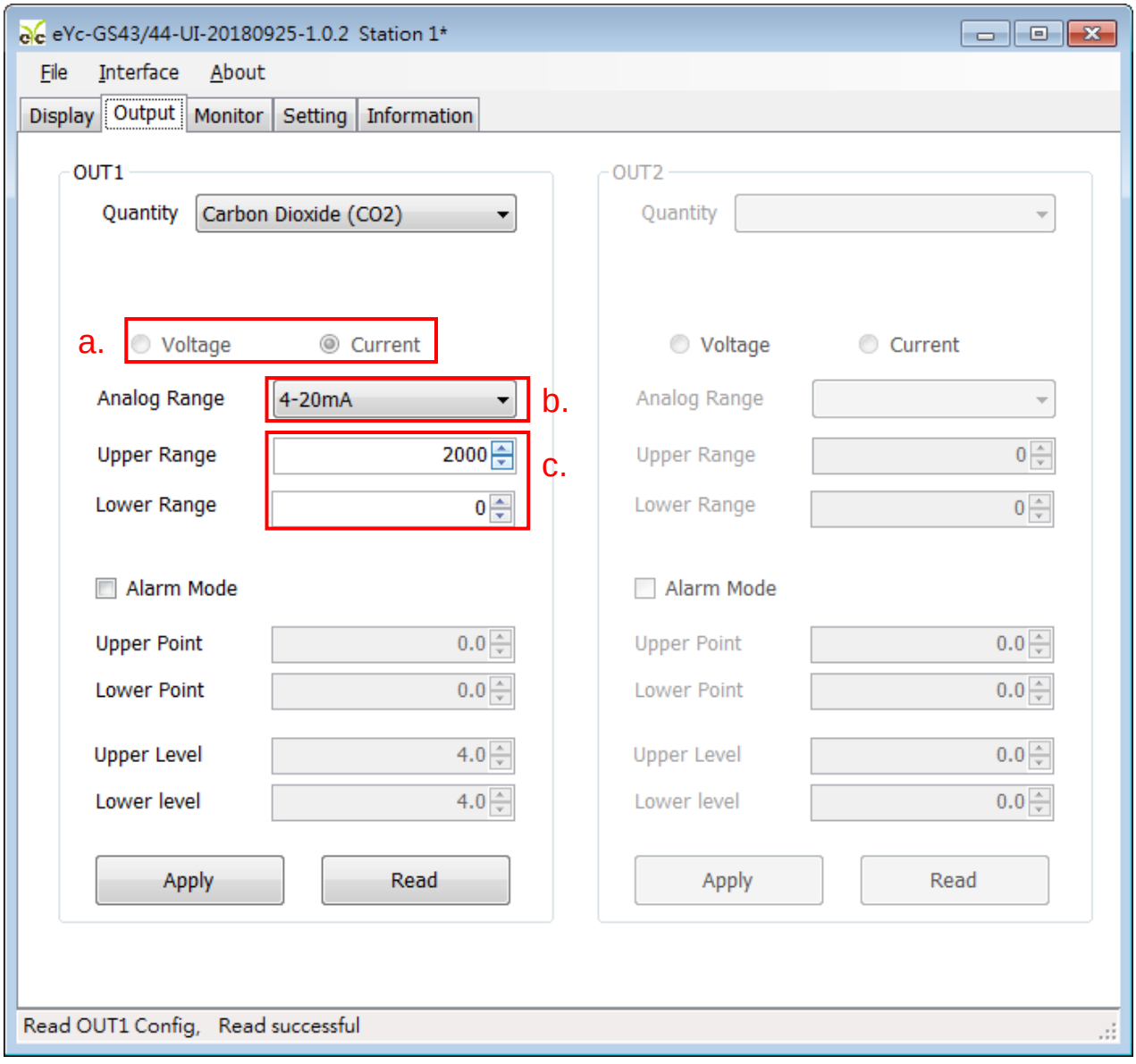


2. Select the parameters of Output1 and Output2

a. Analog output: Voltage or Current

b. Analog Range

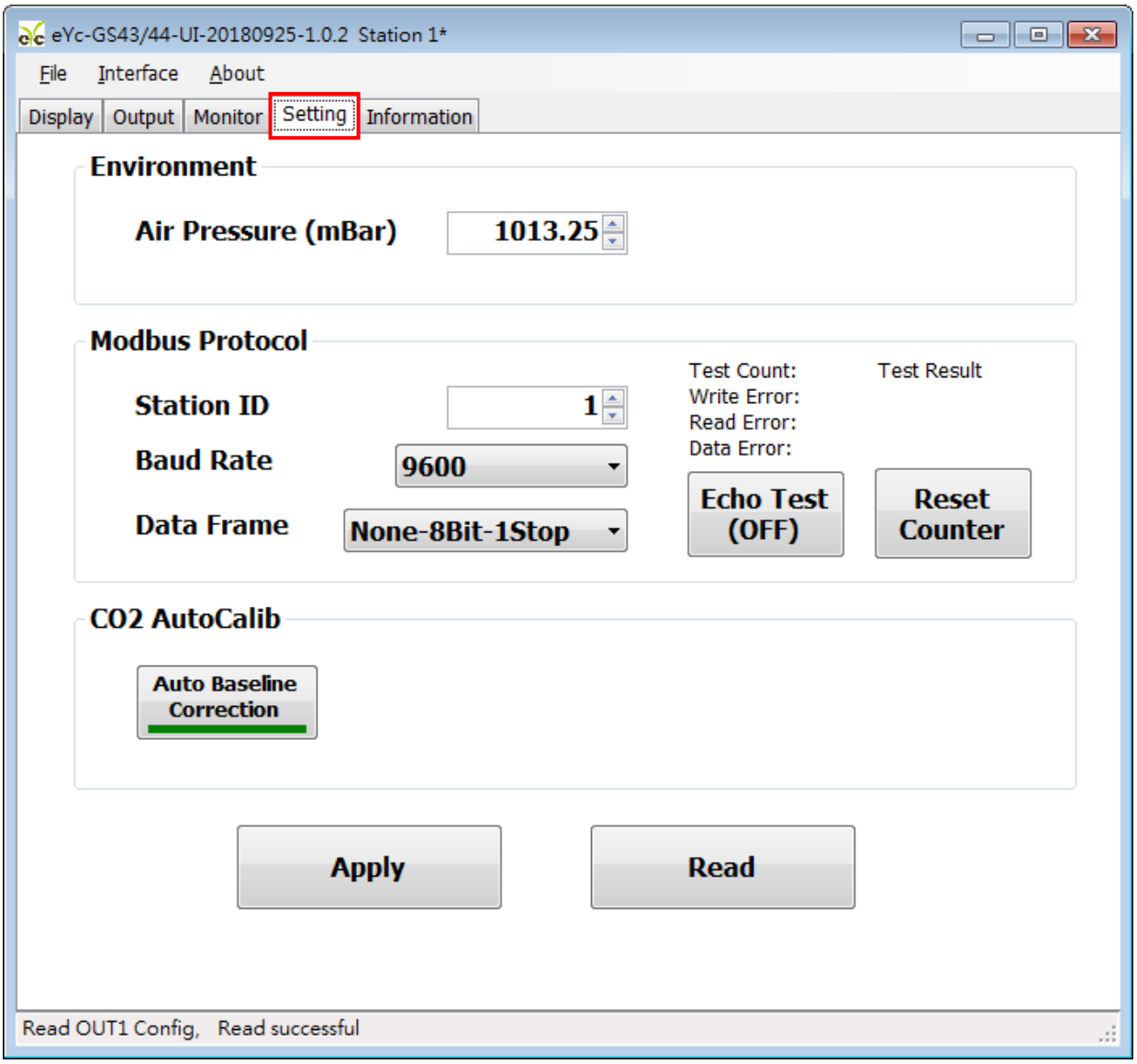
c. Upper Point and Lower Range



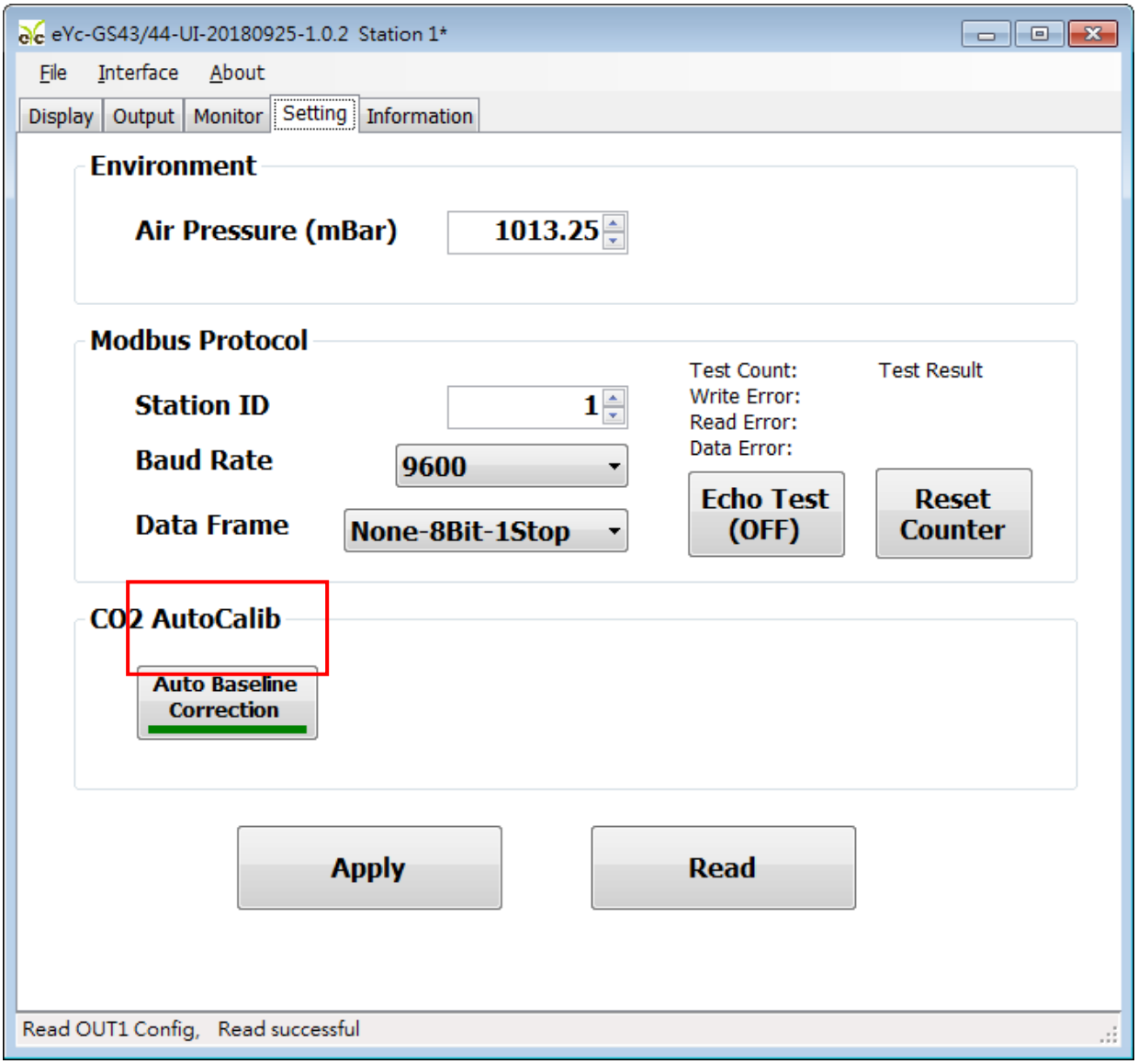
3. Click Apply accomplish the setting

7.6 CO_2 Self-Correcting ADC

1. RS485 connection establishment according to 7.2
2. Click on Setting



3. CO_2 AutoCalib > Auto Drift Calib：The default status set as OFF, this function is used for calibration of CO_2 environment, it perform the sampling method (average value of 7 days) to implement calibration.
   a. This product is suitable for indoor HAVC environment as general apartment, office building.
   b. The environment have to clean up for over 6 hours if user attempt to turn ON this function; And it is advised to turn OFF this function if the humans stay in the indoor environment for long periods.



8. Protocol

8.1 User can use GS43/44 UI to read data, and another option as ModBus Protocol is provided.

8.2 Modbus is a standard protocol in industry field, a common protocol between electrical equipments. 8.3 For getting more information, please refer to the protocol of GS43/44 product.

8.4 Wiring Rule:

1. The Port No. must be different.
2. The maximum devices which connected to RS-485 interface restricted to 32 devices.
3. Transmission Rate (Baud Rate) must be the same.

9. Factory Default Setting

9.1 Suggested Setting

Please refer to following setting details if the ordering code is not specified,

1. ID Setting : 01
2. Modbus Baud Rate : 9600
3. Analog Output : 4-20mA
4. CO_2 Range : 0-2000 PPM
5. CO_2 Self-Correcting ADC : OFF

10. Cautions

10.1 In order to prevent the internal PCB & Electric Components from damages, the user must be careful while opening the cover.

10.2 In order to avoid damage or measuring error, for anybody, do not touch or knock the High-Sensitivity Sensors.

10.3 In order to maintain accurate measuring values. Please install product at well ventilation location.

10.4 For the special environment as Chemical Factory or Plant Greenhouse, please turn OFF the CO_2 Self-Correcting ADC function if the CO2 concentration stays on long term & high concentration status.

11. Inspection and Maintenance

Maintenance & Trouble Shooting

The user is unnecessary to calibrate the product while installation. The GS43/44 product has already accomplish the inspection/ calibration before shipment. The user just to follow the steps for maintenance.

1. Periodical Inspection --- According to the contamination status & density of air dust, to implement the inspection/ maintenance periodically for sensing accuracy, and clean the filter of GS/43/44.
2. Protection for High-Sensitivity Sensor --- In order to protect the surface of sensor, any scratch/ damage is forbidden during the maintenance.
3. Trouble Shooting --- Please follow the instructions for appropriate solution,

Unusual Status	Inspection	Shooting Procedure
1. No Output 2. Output Unstable	1. Disconnected Wiring. 2. Wiring Loosen or Disconnected. 3. Confirm the voltage of power supply. 4. The damage of sensors.	1. Re-Perform the wiring 2. Crew on terminal tightly or re-place wires. 3. Replace the sensor.
1. Slow Response Output 2. Inaccuracy	1. Moisture/ Condensation on sensor. 2. Check the installed location. 3. Check the dust & Contamination of GS43/44 Housing.	1. Remove the housing. 2. Place the sensor in the Clean/ Nature Air for drying. 3. Refer to the Chapter 5 for installation. 4. Clean the filter of GS43/44.

Accurate | Professional | Stable

Temperature and Humidity / Dew Point /
Air Velocity / Flow / Pressure
Measuring Specialist