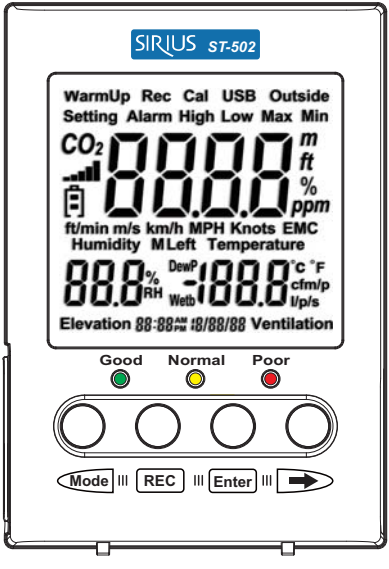
TENMARS

ST-502
Desktop Indoor Air Quality (IAQ) Monitor User's Manual



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1 Introduction

ST-502 is a desktop indoor air quality monitor that can measure carbon dioxide, relative humidity, air temperature, and ventilation rate.

2 Accessories

1 ST-502 Ammeter
1 User's Manual
1 AC100~240V
12V/1A (5.5*2.1*1.0mm) switching transformer
1 5-pin USB cable

3 Safety Precaution

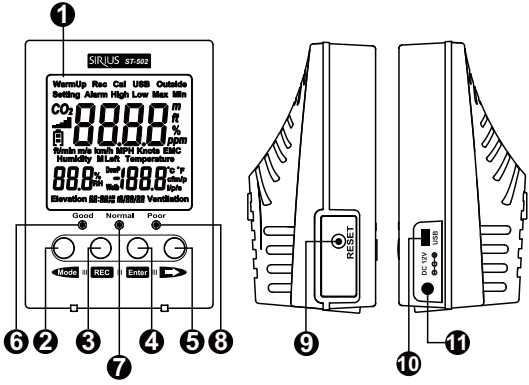
	Note! Please refer to this manual. Improper usage may damage the ammeter and its components.
	Complies with European Directive

- Do not operate in environments with flammable gas or humid environments.
- Operating altitude: 2000 meters below sea level.
- Operating environment: Indoor use; contamination level class 2.
- Cleans wide with soft cloth when dirty, such as glasses cloth. Do not clean with chemical and other solvents.
- EMC: EN61326-1:CISPR 11:Group 1, Class A

✧ **Class A** –Equipment for use in all establishments other than domestic

✧ **Group 1** –RF energy generated is needed for internal functioning

4 Meter Description



1. LCD Monitor
2. Mode/Left button
3. Datalogger button
4. Enter button
5. Right button
6. CO_2 concentration indicator; good
7. CO_2 concentration indicator; normal
8. CO_2 concentration indicator; poor
9. Setting reset button
10. USB jack
11. External power input jack

5 Operation

5.1 Applications

- Building air conditioning system (HVAC) monitoring.
- Indoor air quality monitoring.

5.2 CO_2 Concentration and Guidelines

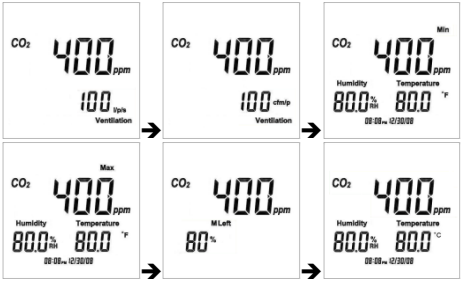
- As indicated according to ASHRAE standard 62.1-2013 Appendix B Summery of Selected Air Quality Guidelines, carbon dioxide may cause risks to body health when the under very high concentrations (for example greater than 5,000PPM).

- NIOSH recommendations:

250-350ppm – Concentration of normal outdoor environment
600ppm – Minimum requirement for good air quality.
600-1000ppm – CO2 concentration slightly high
1000ppm – Insufficient ventilation
These standards are guideline references only; if the CO2 content exceeds 1,000ppm, it does not necessarily mean that the building is dangerous and needs to be evacuated. This standard is used as a guideline to help increase the level of comfort to a maximum.

5.3 Checking Measurement Modes

- Press the Mode button to view the following screens in this order:



L/P/S ventilation➔CFM/P ventilation ➔minimum value➔maximum value➔save effective percentage➔℃.

5.4 Record Function

- Press the REC button until “REC” appears on the LCD (2 seconds) to enter the automatic recording function. The currently measured value, setting function and USB connection can be displayed during the recording process. Press the “REC” button again until “REC” on the LCD disappears (2 seconds) to exit the automatic recording function.

5.5 Reset Settings

- Before powering on, press and hold the “RESET” button and then turn on the power to restore all settings to the factory default values.

5.6 Function Setting

- Press and hold Mode + Enter buttons simultaneously for 2 seconds to enter the function setting mode;
  use the Mode or ➡ buttons to select the content to set and then press Enter to enter and set that item.
- Press and hold Mode + Enter buttons simultaneously for 2 seconds to exit the function setting mode.

Step 1. 12/24 hour mode

- Press the Enter button to enter this item setting operation.
- Press the ➡ button or Mode button to select between 12/24.
- Press the Enter button to exit this item setting operation.

Step 2. Clock setting

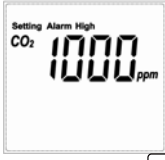
- Press the Enter button to enter this item setting operation.

- The hour digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the minute digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the month digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the year digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button again to start setting from the first digit again.
- Press the Enter button to exit this item setting operation.

Step 3. Alarm switch

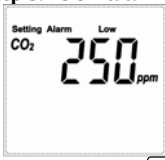
- Press the Enter button to enter this item setting operation.
- Press the → or Mode button to select on/off.
- Press the Enter button to exit this item setting operation.

Step 4. CO2 alarm maximum value



- Press the Enter button to enter this setting item operation.
- The first digit will start flashing at this time; press the ➡ button to increase and press the Mode button to decrease.
- Press the REC button and the second digit will start flashing; press the ➡ button to increase and press the Mode button to decrease.
- Press the REC button and the third digit will start flashing; press the ➡ button to increase and press the Mode button to decrease.
- Press the REC button and the fourth digit will start flashing; press the ➡ button to increase and press the Mode button to decrease.
- Press the REC button again to start setting from the first digit again.
- Press the Enter button to exit this item setting operation.

Step 5. CO2 alarm minimum value



- Press the Enter button to enter this setting item operation.
- The first digit will start flashing at this time; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the second digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the third digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the fourth digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button again to start setting from the first digit again.
- Press the Enter button to exit this item setting operation.

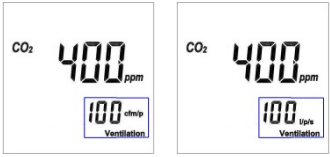
Step 6. Outdoor CO2

- Press the Enter button to enter this setting item operation.
- The first digit will start flashing at this time; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the second digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the third digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button and the fourth digit will start flashing; press the → button to increase and press the Mode button to decrease.
- Press the REC button again to start setting from the first digit again.
- Press the Enter button to exit this item setting operation.

Step 7. ABC Auto-correct function

- Press the Enter button to enter this item setting operation.
- Press the → or Mode button to select on/off.
- Press the Enter button to exit this item setting operation.
- Once the ABC function is turned on, it uses 400ppm as the standard and will have adjusted approximately 30ppm over an accumulated time of 180 hours; therefore it is recommended to place it at a well-ventilated place once the function is enabled.

5.7 Ventilation Formula



- CFM/P(inch/minute/person)
- CFM/P = 10600/(Cs-Co)
- Cs = CO_2 read value, Co = CO_2 outdoor read value.
- L/P/S(liter/second/person)
- L/P/S=(CFM/P)*28.32/60

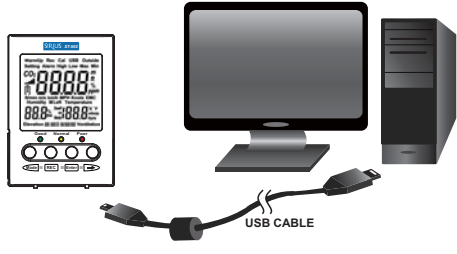
6 Software Installation

Supported operating systems:
XP/Windosw7/Windows 8.1/Windows10

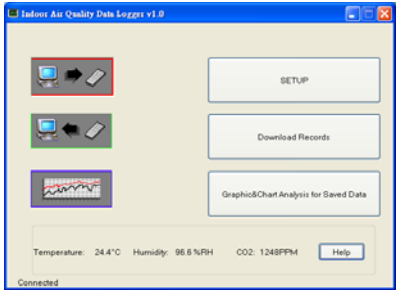
- First place the CD included with this meter into the CD/DVD ROM of the PC to install the desktop program:

- Once the desktop program installation is complete, remove the CD from the CD/DVD ROM drive.

- Connect this meter to the PC using the USB cable included, as shown in the figure below:



- Execute the PC desktop software program: double-click the left mouse button on the desktop program (Indoor Air Quality Data Logger.exe) to execute the desktop program.



7 General Specifications

- **Read value display:** Triple-display LCD monitor
- **Display unit:** ℃/℉, PPM, %RH
- Maximum value/Minimum value
- Alarm function
- Memory can store a maximum of 17,000 data entries.
- **Record time interval:**
  5 seconds/10 seconds/1 minute/5 minutes /10 minutes/30 minutes/1 hour/2 hours
- **Operating power consumption:** 2.4W
- **Operating temperature and humidity:** 0℃ to 50°C (32-122°F), relative humidity 5-95% RH (non-condensing)
- **Storage temperature and humidity:** -10℃ to 60℃(14-140℉) , relative humidity under 70%
- **Weight:** Approximately 190 grams
- **Dimensions:** 89 x 62 x 128 mm (L x W x H)

8 Electrical Specifications

Accurate ambient temperature range: 18℃ (64℉) ~ 28℃ (82℉)

- Carbon dioxide

Sensor Type	Non-Dispersive InfraRed (NDIR)
Measurement Range	0 to 9999ppm
Accuracy	±5% read value or ±75ppm.(0-2000ppm)
Resolution	±1ppm
Response Time	Reaches 90% in approximately 2 minutes

- Temperature

Sensor Type	Thermistor
Measurement Range	0°C~50°C / 32°F~122°F
Accuracy	±1.0°C/±1.8°F
Resolution	0.1°C/0.1°F
Response Time	Approximately 1 second

- Relative Humidity

Sensor Type	Capacitive
Measurement Range	5-95%
Accuracy	±3.0%RH(20~80%); ±5.0%RH(<20%,>80%)
Resolution	0.1%
Response Time	Approximately 4 seconds

9 Maintenance

1. Please read the user's manual carefully to check whether there are any operating errors.
2. Do not place the ammeter in locations that has high temperature, humidity or that are exposed to direct sunlight.

10 Cleaning

Please turn off the power first before cleaning; use a soft and dry cloth to wipe it clean. Do not wipe it with wet cloth, liquids or water etc.

11 End of Life Disposal

Note: This symbol indicates that the ammeter and accessories must be separated and processed properly.

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