User Manual R1.0
Santacary Technology Co., Ltd.
Indoor Air Quality Monitor SA80

Santacary

INTRODUCTION

Congratulations on your purchase of this Santacary SA80 Indoor Air Quality Monitor. Santacary SA80 is a high precise instrument mainly used to continuously monitor the carbon dioxide (CO2) concentration, particulate matter PM2.5, PM10, the temperature and the relative humidity in ambient air.

High level CO2 in ambient air may cause fatigue, loss of concentration, and illnesses such as Sick Building Syndrome. Fine particles PM2.5 refers to fine particulate matter in ambient air aerodynamic equivalent diameter less than or equal to 2.5 micron particles. It was suspended for a long time in the air. The higher the fine particulate concentration and the carbon dioxide concentration in the air, the worse the air quality is. Studies suggest that long term exposure to fine particulate matter may be associated with increased rates of chronic bronchitis, reduced lung function and increased mortality from lung cancer and heart disease. The Indoor Air Quality Monitor SA80 converts the concentration of CO2, PM2.5 in the air into visual data, and evaluates the air quality comprehensively.

SA80 can be widely used in the houses, office, school, meeting room, restaurants, hospitals, mining facilities, metal refineries, commercial and public buildings, agriculture greenhouse, and other places where confined spaces for personal health and personal comfort is important. Santacary SA80 is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

Please read this manual carefully before use. This user manual will provide you with all the necessary information for the correct use of your SA80 Air Quality Monitor.

Health Disclaimer

While the SA80 can detect levels of airborne particulates it cannot determine the health impact for any given individual. Respiratory ailments and allergic symptoms are caused by a variety of factors. The SA80 is not meant to be used in the treatment or mitigation of any medical condition. Please consult your physician

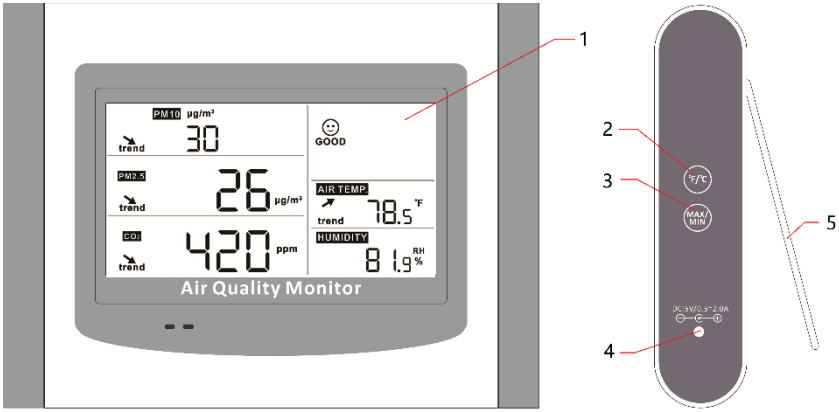
UNIT DESCRIPTION

Features

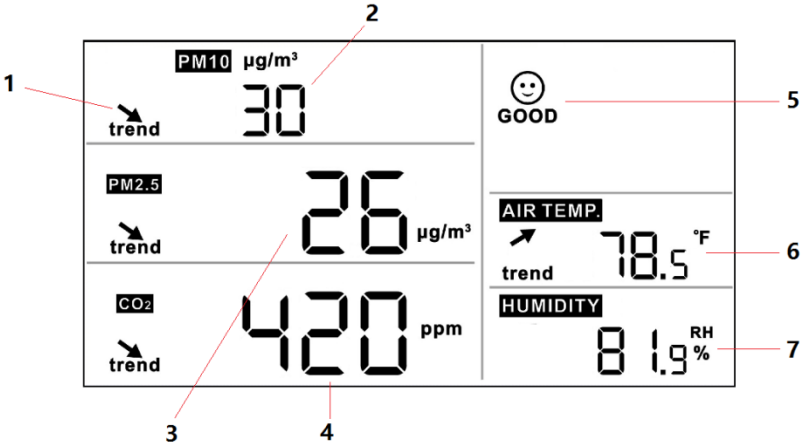
- Monitors CO2, particulate matter PM2.5 and PM10, RH, and Air Temperature
- Stable and accurate NDIR sensor for CO2 detection
- Detect atmospheric PM2.5 with laser scattering theory
- Particulate measurement range: 0.3 ~ 2.5 μm
- Easy-to-understand icons indicate air quality status
- Minimum and Maximum Readings
- Large LCD display with Backlight
- Support on desktop with back bracket
- Includes DC5V Power Adapter

Device

1. LCD display
2. Fahrenheit and Celsius switching button
3. MAX/MIN button
4. Power supply jack (DC 5V)
5. Bracket



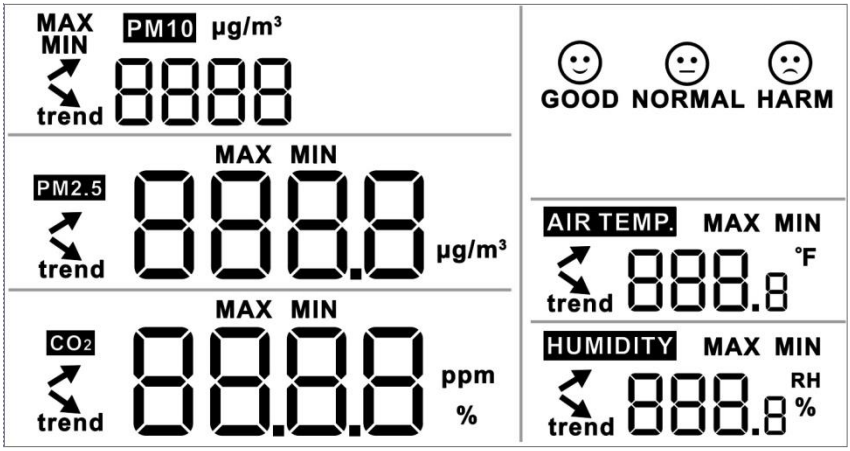
LCD Display



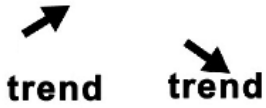
1. Trend Change Arrows (Up or Down)
2. PM10
3. PM2.5
4. CO2 concentration in ppm or x.xx% (>9,999 ppm)
5. Air Quality Indicator Icon
6. Air Temperature

7. % Relative Humidity

Display with All Elements Shown in below figure.



Trend Icons



The trend icon indicates that the reading is on the rise. The trend icon indicates that the reading is declining.

Air Quality Icons

There are faces icons showing the current air quality. They indicate Good, Normal, and Harm air quality respectively. See Table 1 for the criteria of judgment.

Table 1

Air Quality	Faces Icons	CO2 (ppm)	PM2.5 (μg/m3)	PM10 (μg/m3)
Good	GOOD	<800	<12	<50
Normal	NORMAL	800~1200	12~35	50~150
Harm	HARM	>1200	>35	>150

In one line, all 3 criteria need to be met at the same time. For example, for **Good** air quality GOOD: CO2<800 ppm, and PM2.5 <12 μg/m3, and PM10 <50 μg/m3.

Installation

Install the SA80 at a location and height in the room where you want to test the air quality. Be aware that particulate concentrations and CO2 concentration can vary dramatically from one location to another within the same house.

Materials Supplied

1. Monitor
2. DC 5V 0.5~2A Adapter
3. Operation manual

THEORY OF OPERATION

Theory of CO2 Measurement: SA80 uses Dual Beam Non-dispersive infrared (NDIR) principle to detect the existence of CO2 in the air.

Automatic Background Calibration (ABC) is disabled.
Theory of PM2.5 and PM10 Measurement: SA80 uses a laser scattering theory to obtain the number of particles in the equivalent particle size and volume units of different size through the algorithms based on MIE theory.

OPERATION

Power On

The monitor is powered by an adaptor (5VDC/0.5~2A output).
Plug in the adaptor and the monitor turns on automatically with a short beep. The monitor will warm up briefly and the reading will be displayed. Levels are updated every 2 seconds.
The display will shows the CO2 (ppm or %), PM2.5 concentration reading (PM2.5 g/m3), PM10 concentration reading (PM2.5 g/m3), Temperature reading (°C or °F), Humidity reading (%RH).
In the condition of operating environment change, it takes 2 minutes to respond for CO2 sensor, 10 sec for PM2.5/PM10 sensor and 30 minutes for RH.
For the most accurate measurement, do not place the monitor close to any source of CO2.

Note:
Failure to use the correct power configuration will damage the monitor.

Note:
Do not hold the monitor close to faces in case that exhalation affects CO2 levels.

Note:
Air Sampling Port: Always ensures that the monitor air sampling inlet and outlet port are not blocked and open to the atmosphere.

Button Operation

1. Fahrenheit and Celsius switching Button

Press Fahrenheit and Celsius switching button to select two temperature units (℃ and ℉).

2. Minimum and Maximum Readings

The monitor automatically records minimum and maximum CO2 levels. To view the minimum and maximum readings while in Normal Display:

1) Press MAX/MIN button to display the maximum reading.
   The **MAX** symbol is displayed.
2) Press MAX/MIN button again to display the minimum reading.
   The **MIN** symbol is displayed.
3) Press MAX/MIN button to return to Normal Display.

To reset the minimum and maximum readings:

1) With the minimum or maximum reading displayed, press MAX/MIN button for 2 seconds.
2) “Clr” will display and the monitor will return to Normal Display.

Note:

When LCD backlight is off, press any button to turn on the backlight before operation.

LCD backlight will turn off automatically after 60 seconds of button inactivity.

Ambient Calibration (400ppm) for CO2

This monitor can implement CO2 ambient calibration when needed (such as annually). Place the monitor in the window ventilation and charged, then press **Fahrenheit and Celsius switching button** for 5 seconds until "**CAL**" appears. The monitor enters the CO2 ambient calibration (400ppm).

SPECIFICATIONS

PM2.5 Specification:

Measurement range of particles	0.3 to 2.5 µm
Particle count efficiency	50% @ 0.3 µm; 98% @ ≥0.5 µm;
Measurement range	0 to 1000 µg/m3
Resolution	1.0 µg/m3
Consistency of mass concentration of particles	±10 µg/m3 @ 0~100 µg/m3; ±10% @ 100~500 µg/m3
Temperature Range	-10 to 50°C (14 to 122°F)
Humidity Range	0 to 90%RH
Response Time	≤10 Seconds

CO2 Specification:

Measurement Range	0~10,000ppm(1%Vol) display
Display Resolution	1ppm / 0.01%
Accuracy	±40ppm or ±3% of reading
Repeatability	±20ppm @ 400ppm
Temperature Dependence	Typ. ±0.3% of reading per °C or ±4ppm per °C, whichever is greater, referenced to 25 °C
Pressure Dependence	0.13% of reading per mmHg
Response Time	About 2 min for 90% of step change
Warm-up Time	<5 seconds at 22°C
Measurement Interval	2 seconds

Temperature Specification:

Temperature Range	-10.0~60.0°C (14~140°F) display
Display Resolution	0.1°C (0.1°F)
Display Options	°C/°F switchable
Accuracy	±0.5°C (±0.9°F)
Response Time	5~30 seconds (device must equilibrate with environment)

RH Specification:

Measurement Range	0.0~99.9%RH
Display Resolution	1%RH
Accuracy	±4.5%RH
Response Time	<8 seconds for 63% of step change

General Specification:

Operating	0°C~50°C (32°F~122°F), <95% RH non-condensing
Storage	-10°C~60°C (14°F~140°F), <99% RH non-condensing
Power Supply	5.0VDC 1.0A
Dimensions	235x165x40mm (9.2x6.5x1.6")
Weight	568 grams (20.04 oz.)

Out of range of operating conditions will impact the accurate of CO2 and PM2.5/PM10 measurement.

MAINTENANCE

Cleaning and Storage

The front panel and case can be cleaned with a mild solution of detergent and water. Apply sparingly with a soft cloth and allow drying completely

before using. Do not use aromatic hydrocarbons or chlorinated solvents for cleaning.

Troubleshooting

1. Can't power on

Check whether the adaptor is well plugged.

2. Slow response

Check whether the air flow channels on the rear were blocked.

Take care not to drop the unit; this could cause malfunctions which require service.

WARRANTY

The SA80 is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation and does not cover misuse, abuse, alteration, neglect, improper maintenance.

Proof of purchase is required for warranty. Warranty is void if the monitor has been opened.

CO2 LEVELS AND GUIDELINES

NIOSH recommendations

250-350 ppm: normal outdoor ambient concentrations

600 ppm: minimal air quality complaints

600-1000 ppm: less clearly interpreted

1000 ppm: indicates inadequate ventilation; complaints such as headaches, fatigue, and eye/throat irritation will be more widespread. 1000 ppm should be used as an upper limit for indoor levels.

ASHRAE Standard 62-1989: 1000ppm

CO2 concentration in occupied building should not exceed 1000ppm.

Building bulletin 101 (BB101): 1500ppm

UK standards for schools say that CO2 at averaged over the whole day (i.e. 9am to 3.30pm) should not exceed 1500ppm.

OSHA: 5000ppm

Time weighted average over five 8-hour work days should not exceed 5000ppm. Germany, Japan, Australia, UK: 5000ppm. 8 hours weighted average in occupational exposure limit is 5000ppm.

PM2.5 POLLUTION REGULATION

		WHO				European Union	USA		Canada
		IT-1	IT-2	IT-3	AQG		United States	California	
PM2.5 $\mu g/m^3$	Yearly average	35	25	15	10	25	12	12	-
	Daily average (24-hour)	75	50	37.5	25	-	35	-	30

CONTACT US

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