# Preface:

The concept of a high-quality life not only means material satisfaction, health and environmental protection has been embodied our modern life with new connotation. Therefore, paying attention to the environmental air quality status gradually becoming an indispensable part for our life quality improving. The newly decorated living rooms, offices, school rooms and kindergartens and other places for people to live, work and study, where the harmful gas problems such as HCHO (formaldehyde gas), TVOC organic volatile substances , $C_6H_6$ (Benzene substances) etc. have not been solved.

The problem of PM2.5 (dust particles) and PM10 (dust particles) air pollution degree in people's living environment, and $CO_2$ (carbon dioxide) problems of the physical comfortableness of the living environment are focuses of people's attention to the environmental air quality. Therefore, various testing schemes of Air quality detector series products have been designed according to the demand of different groups of people.

They would be good assistants for you to govern, improve and control the environment and maintain the healthy life.

**I Product Description**

The series of Air quality detector are manufactured according to the standard of Q31/0120000311C003-2018 and adopting to the independently sampled high-quality sensors, which can be used to detect the HCHO, $CO_2$, PM10, PM2.5, TVOC, $C_6H_6$, temperature and humidity (refer model table for tested mediums) in the environmental air; 24 hours uninterruptedly record and analyze the environmental air

quality status; provide real-time and phased data and analyze the air quality changing condition and tendency within a period time or an interval through the PC software; The alarm mediums can be set according to the needs of different users; Could select the indoor air quality standard GB18883-2002 or the indoor environmental pollution standard GB50325-2010 two standards with tricolor prompts. The information storage volume of 5,000 groups (1 group/m) indicates the concept of big instrument data.

**II Scope and Application Sites**

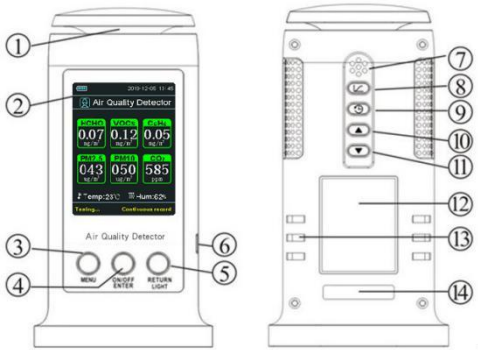
The applicable scope of this detector includes:

Inspection in daily life, working quality evaluation of the professional air control companies, air pollution analysis of decoration companies, air quality control and data analysis of offices, school buildings, kindergartens and hotels, efficiency analysis of air purification equipment and air purification materials. For fixed placement or hand-held use.

The applicable sites of this detector includes:

Living Rooms, Offices, School buildings, Kindergartens, Hospitals, Hotels and outdoor places (the longest period for use is 4 hours).

## III Panel Schematic Diagram

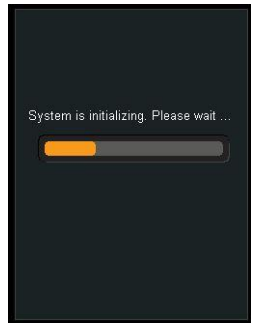



## Detector

| | | | |
|---|---|---|---|
| 1 | Tricolor LED state indication light | 8 | Graphic trend view |
| 2 | TFT real color display screen | 9 | History record inquiry |
| 3 | MENU | 10 | Up |
| 4 | ON/OFF+ENTER | 11 | Down |
| 5 | RETURN/LIGHT | 12 | Notice for use |
| 6 | USB charge / Data transmission port | 13 | Exhaust hole of sensor |
| 7 | Acquisition window of temperature and humidity sensor | 14 | Serial number |

# IV Operation Description

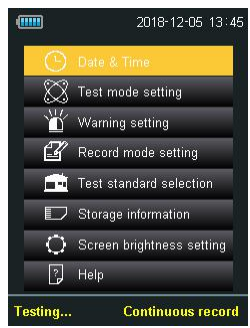
**4.1 Power on / off**




4.1.1 Press the “ON/OFF” key for two seconds, the screen will appear with words “the system is initializing, please wait...”

4.1.2 Under the normal test mode, press the “ON/OFF” key for two seconds and then the air quality detector will be powered off.

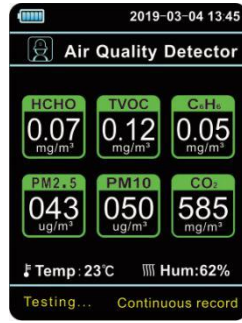
**4.2 Menu setting**




4.2.1 Press the “MENU” on the panel for one time and then it will appear as on the diagram:

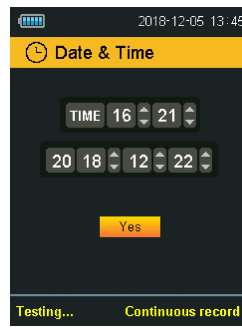
Select the item you need to set up and press the “ENTER” key to enter the setting items and switch the needed item to set up through“ ▲ ”or“ ▼ ” keys (please refer detailed page behind for the specific setting up of each item).

4.2.2 When the selected item has been set up, press the “RETURN / LIGHT” key once to exit the menu. Press the “RETURN / LIGHT” key again, then the detector will return back to the real-time data collection display page, and the detector entered set up state.




**4.3 Time setting**

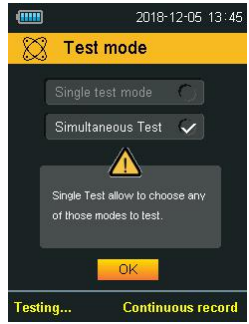
4.3.1 In time setting, date / time can be selected through “▲” or “▼” key and press “ENTER” key to enter the hour-minute-year-month-day setting, press “ENTER” key again to shift the setting item. When one of the items is blinking, choose the date and time you need to set by “▲” or “▼” key.




4.3.2 After the setting has been finished, press the “RETURN/LIGHT” key once to exit the date and time setting. Press the “RETURN/LIGHT” key once again, the detector will return back to the real-time display page of data collection and automatically store the data that has been set.

### 4.4 Test mode selection

4.4.1 In menu setting, press“ ▲ ” or “ ▼ ” key to select the item of “test mode selection” and press the “ENTER key to enter “single item testing” / “simultaneous testing” setting, press “▲” or “▼” to adjust the item;




4.4.2 After the setting has been finished, press the “RETURN/LIGHT” key once to exit test mode selection setting. Press the “RETURN/LIGHT” key once again, the detector will return back to the real-time data collection display page and automatically store the data that has been set;

4.4.3 After selecting “single item testing” in “test mode selection” item and the data has been saved and exited, the data of single-item testing will appear on the display interface (As shown in the figure); Press “▲” or “▼” key to adjust the required testing items. Under this function, three-color LED display state on top of the detector is synchronized with the page state.

( -A ) HCHO⇔TVOC⇔$C_6H_6$ ⇔Temp⇔Humidity

( -B ) HCHO⇔TVOC⇔$C_6H_6$⇔PM2.5⇔PM10⇔Temp⇔Humidity

( -C ) PM2.5⇔PM10⇔$CO_2$⇔TVOC⇔Temp⇔Humidity

( -D )
HCHO⇔TVOC⇔$C_6H_6$⇔PM2.5⇔PM10⇔$CO_2$⇔Temp⇔Humidity

**4.5 Warning setting**

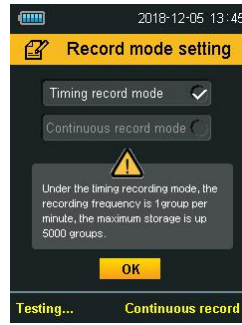
4.5.1 Press “▲” or “▼” key to select “alarm setting” and press the “ENTER” key to enter the alarm setting. Through “▲” or “▼” key to adjust the alarm setting according to you need; or shut down the alarm function.


4.5.2 After setting has been finished, press the “RETURN/LIGHT” key once to exit the alarm setting. Press the “RETURN/LIGHT” key once again, the detector will return back to the real-time data collection display page and automatically store the data that has been set;

4.5.3 The alarm item selection is different due to the different product functions. The picture on the page is only for reference.

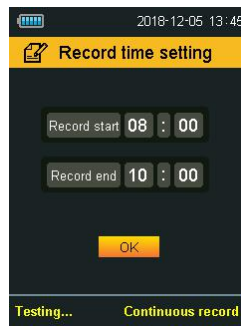
### 4.6 Record mode setting

4.6.1 In menu setting, press “ ▲ ” or “ ▼ ” key to select the “record mode setting” item and press the “ENTER” key to enter the “fixed-time record mode” or “continuous record mode” setting. Press “▲” or “▼” key to adjust the required record mode setting items.




(Kindly reminder: under the fixed-time record mode, the information recording frequency of the detector is 1 group per minute, and the maximum information recording are 5,000 groups!)

4.6.2 After the record mode has been selected, press the “ENTER” key to enter the “record time setting”. Press the “ENTER” key to switch and adjust the required “start of record” and “end of record” time setting. When one of the items is blinking, press “▲” or “▼” key can adjust the required hour and minute setting;

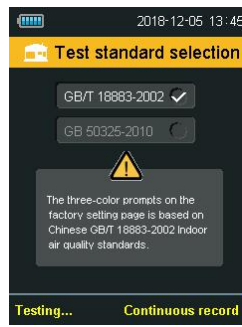


4.6.3 After the setting has been finished, press the “RETURN/LIGHT” key once to exit the “record time setting” item. Press the “RETURN/LIGHT” key once again, the detector will automatically store the data that has been set;

4.6.4 The download address of the detector manual and PC software is: http://www.ecofive.com.cn/Technical_list.aspx?id=6263,data or figure analysis printing can be conducted by connecting a PC.

**4.7 Test standard selection**

4.7.1 In menu setting, press “ ▲ ” or “ ▼ ” key to find item “test standard selection” then press the “ENTER” key to enter the “GB/T18883-2002” or “GB50325-2010” setting. Press “ ▲ ” or “ ▼ ”key could adjust the required test standard selection setting.




**(**Kindly remainder: The three-color prompts of the factory default setting is according to the GB/T18883-2002 Indoor air quality standard).

4.7.2 After the setting has been finished, press the “RETURN/LIGHT” key once to exit the “test standard selection” item and the detector will automatically store the data that has been set.

### 4.8 Storage capacity information


4.8.1 In menu setting, press the "▲" or "▼" key to enter the "storage capacity information" item and press the "ENTER key to enter the storage capacity indication cursor;

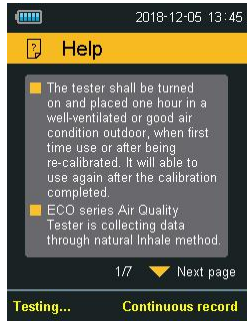
4.8.2 After the setting has been finished, press the "RETURN/LIGHT" key once to exit the "storage capacity information" item. Then press the "RETURN/LIGHT" key once again, the detector will return back to the real-time data collection display page;

### 4.9 Screen brightness setting


4.9.1 In menu setting, press "▲" or "▼" key to select "screen brightness setting" item and press the "ENTER" key to enter the backlight brightness setting, then press "▲" key to increase the screen brightness or press "▼" key to decrease the screen brightness.

4.9.2 After the setting has been finished, press the "RETURN/LIGHT" key to exit the "screen brightness setting" item. Press the "RETURN/LIGHT" key once again , the detector will return back to the real-time data collection display page;

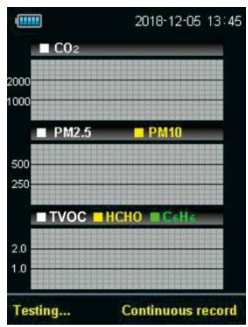
**4.10 Usage help**




4.10.1 In menu setting, press “ ▲ ” or “ ▼ ” key select the “usage help” item and press the “ENTER” key to enter and check the usage help.

4.10.2 After the setting has been finished, press the “RETURN/LIGHT” key to exit the “usage help” item. Press the “RETURN/LIGHT” key once again , the detector will return back to the real-time data collection page and automatically store the data that has been set;

**4.11 Real-time graphic view and analysis**




4.11.1 When the detector has entered the data display status, touch the “ ” button to enter the real-time image trend interface (as shown in the figure).

4.11.2 Press the panel to trigger the “ENTER” key to start or pause the test state.

4.11.3 After the view or analysis has been finished, press the “RETURN/LIGHT” key to exit “real-time graphic view and analysis” item and return to the data display interface.

**4.12 Data history records**

4.12.1 After the detector has entered the testing mode, touch the button " " to enter the history records (as shown in the figure).


4.12.2 Select the historical data record item by pressing the " " or " " key, then press the "ENTER" key to confirm the record check.

4.12.3 After record check has been finished, press the "RETURN/LIGHT" key to exit the "History records" item. Press the "RETURN/LIGHT" key once again, the detector will return back to the real-time data collection display page and enter setting accomplished state, then return back to the data display interface.

**4.13 Display light switch**

4.13.1 When the detector entered the normal testing state, the display device will enter the real-time data collection display interface. Press "RETURN/LIGHT", the display will be shut down. Press any key the display device will restore the display state.

4.13.2 When the display light turned off, the detector will continue in working state.

**V Technical Indicators**

Figure I:

| Items | Measuring range | Resolution ratio | Accuracy |
|---|---|---|---|
| HCHO ( formaldehyde ) | 0 mg/m³ ~ 3.00mg/m³ | 0.01 mg/m³ | ±( 5% or 0.02 ) |
| TVOC ( organic volatile substances ) | 0 mg/m³ ~ 5.00 mg/m³ | 0.01 mg/m³ | ±20% |
| $C_6H_6$ ( Benzene ) | 0 mg/m³ ~ 3.00 mg/m³ | 0.01 mg/m³ | ± ( 10% or 0.03 ) |
| PM2.5 ( dust particles ) | 0 ug/m³ ~ 999ug/m³ | 1ug/m³ | ±10% |
| PM10 ( dust particles ) | 0 ug/m³ ~ 999 ug/m³ | 1ug/m³ | ±10% |
| $CO_2$ ( carbon dioxide ) | 0 ppm ~ 3000ppm | 1 ppm | ±5% |
| Temperature ℃ | 10℃ ~ 45℃ | 1℃ | ±1.5℃ |
| Humidity %RH | 10%RH ~ 90%RH | 1 %RH | ±5% |

Alarm and indication light chart II:

| Items | Excellent (green) | Slight pollution (yellow) | Heavy pollution (red) | Implementation standard |
|---|---|---|---|---|
| HCHO (formaldehyde) | ≤0.10mg/m³ | >0.10mg/m³ ≤0.30mg/m³ | >0.30mg/m³ | GB18883-2002 |
| | ≤0.08mg/m³ | >0.08mg/m³ ≤0.30mg/m³ | >0.30mg/m³ | GB50325-2010 |
| TVOC (organic volatile substances) | ≤0.60mg/m³ | >0.60mg/m³ ≤3.00mg/m³ | >3.00mg/m³ | GB18883-2002 |
| | ≤0.50mg/m³ | >0.50mg/m³ ≤3.00mg/m³ | >3.00mg/m³ | GB50325-2010 |
| $C_6H_6$ (Benzene) | ≤0.11mg/m³ | >0.11mg/m³ ≤2.40mg/m³ | >2.40mg/m³ | GB18883-2002 |
| | ≤0.09mg/m³ | >0.09mg/m³ ≤2.40mg/m³ | >2.40mg/m³ | GB50325-2010 |
| PM2.5 (dust particles) | ≤75ug/m³ | >75ug/m³ ≤150ug/m³ | >150ug/m³ | GB3095-2012 |

| | | | | |
|---|---|---|---|---|
| PM10 ( dust particles ) | ≤150ug/m³ | > 150ug/m³ ≤250ug/m³ | > 250ug/m³ | GB18883-2002 |
| $CO_2$ ( carbon dioxide ) | ≤700ppm | > 700ppm ≤1500ppm | > 1500ppm | GB18883-2002 Reference to health statistics |

**Note: 1. The factory default setting is according standard GB18883-2002 for HCHO, TVOC, $C_6H_6$, PM10, $CO_2$, odor items which can be switched by the menu setting, please see more detail in 4.7 section of the test standard options.**

**2. When the detector under simultaneous testing mode, the display state of the top tricolor light is refer to the first function in the model comparison table in Article VIII**;

## VI Information on Use

### 6.1 Notice for use

6.1.1: When the detector is used first time or has been re-calibrated. It shall be turned on and placed one hour in a well-ventilated or good outdoor air condition, so that It will able to use again after the calibration completed.

6.1.2: The air quality detector collects mediums by adopting the method of natural aspiration. It is recommended that the detector shall be placed at a height between 80cm to 120cm and used in an environment with good surrounding air circulation and no interfering gas sources. The detector is not applicable in high gas concentration and heavy pollution environments. The optimum ambient temperature for use is between 20℃±5℃ and the relative humidity is 45% ~ 70%.

6.1.3: The air quality detector adopts AC 110V-220V converted into DC 5V, 18650 (with protection board). It may have strong electrical signal input between charger and the connection point of external AC power. Please be careful! Minors shall use the detector under supervision of an adult! Please disconnect the AC power supply under the state of standby mobile use!

6.1.4: The designed service life of the HCHO electrochemical sensor of the air quality detector is three years from the day of regular service (the usage environment shall be in and below lightly pollution). When the sampling response remains unchanged, should returned to manufacturer to get sensor replaced with payment. However, the manufacturer only charges the sensor cost.

6.1.5: The tricolor - green, yellow and red indicating light of the detector respectively indicate the medium of the indoor air quality , indoor environment quality is in excellent state, light pollution and heavy pollution. It is set in accordance with GB18883-2002/GB50325-2010 standard (switchable), Q31/0120000311C003-2017 standard and AQI class state setting.

6.1.6: The data discreteness of the detector will increase when it being used in a heavily polluted environment and the accuracy will be affected. The test data then is only for reference. The detector shall be moved to an environment with clean air for self-calibration again.

6.1.7: When the machine is in normal operation, please avoid contacting with high concentration of alcohol, perfume, odor substances, or hydrogen sulfide, carbon monoxide, sulfur dioxide, hydrogen, smog and other gases. Otherwise, it will lead to measurement error or damage to the sensor.

(Please do not directly measure the cigarette smoke or other high-concentration gases, or the detector will be damaged).

**6.2 Usage and operations:**

6.2.1: As shown in the figure, when the environmental air is excellent, the interface display is green; when the environmental air quality is in light pollution, the interface display is yellow; and when the environmental air quality is in heavy pollution, the interface display is red and should open window on for ventilation or turn on purification equipment at this time. (HOCO reference view, other items will be varied according to your settings).


2018-12-05 13:45
Air Quality Detector
HCHO
0.06 mg/m³
Good
Temp:23℃ Hum:56%
Testing...
Continuous record


2018-12-05 13:45
Air Quality Detector
HCHO
0.10 mg/m³
Mild pollution
Temp:23℃ Hum:56%
Testing...
Continuous record


2018-12-05 13:45
Air Quality Detector
HCHO
0.35 mg/m³
Heavy pollution
Temp:23℃ Hum:56%
Testing...
Continuous record

**VII Product Specifications**

| | |
|---|---|
| Display mode: | TFT true-color display screen |
| Sampling rate: | one group/minute |
| Power supply mode: | USB DC 5V |
| Usage environment: | temperature range: 0～50℃ |
| Humidity range: | 0～90%RH |
| Pressure condition: | standard atmospheric pressure |
| Physical dimension: | 146*80*68 mm |

**VIII Model Comparison Table**

| Model / Function | A | B | C | D |
|---|---|---|---|---|
| HCHO (formaldehyde) | ● | ● | | ● |
| TVOC (organic volatile substances) | ● | ● | ● | ● |
| $C_6H_6$ (Benzene) | ● | ● | | ● |
| PM2.5 (dust particles) | | ● | ● | ● |
| PM10 (dust particles) | | ● | ● | ● |
| $CO_2$ (Carbon Dioxide) | | | ● | ● |
| Temperature ℃ | ● | ● | ● | ● |
| Humidity %RH | ● | ● | ● | ● |
| Weight (with battery) | 207g | 249g | 255g | 260g |

**IX Accessories**

8.1 One 5V/1A USB charger

8.2 One 2-meter-long USB four-core data wire

8.3 One copy of the instruction manual and PC software CD

8.4 One copy of the product qualification certificate / warranty card

8.5 18650 rechargeable battery 2500mA/h DC 3.7V (with protection board)