

Thank you for choosing our product! Before using the product, please read this user manual carefully and keep it in a safe place for future reference.

# Portable multi-parameter gas detector user manual



Product Compliance Standards: AQ6207-2007, MT703-2008, MT704-2008, MT563-1996, GB3836.1-2010, GB3836.2-2010, GB3836.4-2010

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**Catalog**

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## Introduction:

1. During maintenance, do not arbitrarily change the electrical parameters, specifications and models of the intrinsically safe circuit and components related to the intrinsically safe circuit!
2. The product can only be connected with the product specified in the instruction manual; underground charging and battery disassembly are strictly prohibited!
3. Do not use chargers and batteries other than those specified in the instructions!
4. The detector should be maintained and used by a special person. The user manual should be read completely for the first time!
5. Adjust the zero point and precision of the measuring instrument within the specified time limit.

If there is no deviation, it can be used again!

6. Regular maintenance of the detector is required; for coal dust and humid environment, the explosion-proof filter or white three-proof filter should be checked frequently. When a large amount of dust accumulates, the explosion-proof filter or white three-proof filter should be cleaned in time for the next use!

## I. GENERAL INFORMATION

### 1.1 Scope of Application and Use

The portable multi-parameter gas analyzer is designed for continuous monitoring of toxic, harmful, and explosive gases in environments such as metal mines, coal mines, metallurgical smelting, petrochemical plants, municipal fire safety, emergency rescue operations, tunnel construction, and gas and power facilities. When gas concentrations exceed safety thresholds, it automatically triggers multiple alarm systems including audible alerts, visual indicators, vibration alerts, and light bar displays. The device is portable for field personnel, management staff, professionals, mobile teams, and coal mine ventilation specialists, while also supporting fixed installations in these environments. Featuring explosion-proof design with both intrinsically safe and flameproof certifications, the instrument delivers user-friendly operation, convenient portability, and high-precision performance.

### 1.2 Working Principle

The detector uses thermal catalysis, infrared or laser measurement principle for methane;

infrared measurement principle for carbon dioxide; electrochemistry for carbon monoxide (CO), oxygen (O<sub>2</sub>), hydrogen sulfide (H<sub>2</sub>S) and other gas with the same measurement principle.

### 1.3 Measurement Principle

The detector converts airborne gases into corresponding electrical signals. After amplification and filtering, the microcontroller processes these signals to display the gas concentration in digital form. When concentrations of toxic or harmful gases exceed preset alarm thresholds, or oxygen levels drop below specified limits, the alarm circuit triggers audible alerts to indicate concentration exceedances.

## II. Technical Indicators

### 2.1 Technical Specifications

- 1) Detection method: natural diffusion (portable)
- 2) Alarm mode: sound, light alarm, vibration, light bar and other alarms
- 3) Alarm sound intensity: the sound intensity at a distance of 1 meter from the sound source axis is greater than 75dB
- 4) Alarm light visibility: greater than 20m (in darkness)
- 5) Continuous working time:  $\geq 12$  hours
- 6) Sensor life: catalytic combustion type:  $\geq 1$  year; electrochemical type:  $\geq 2$  years; infrared type:  $\geq 3$  years

### 2.2 Power Supply and Charging

- a) Battery parameters: ① The battery pack is composed of a mine lithium manganese oxide battery and a battery protection board connected in series and cast into one body; ② The open circuit voltage of the battery is less than or equal to 4.2V; the maximum output current is less than or equal to 1.6A;
- b) The detector battery is a non- "memory" battery.
- c) The detector shall have power voltage display, under-voltage prompt and automatic shutdown function.
- d) When the detector is charged, there should be charging indication, charging completion shutdown and indication function.

### III. Main Technical Parameters

| Gas & Chem.<br>Formula    | Measuring Range                           | Intrinsic Error                                                                                           | Resolution<br>Ratio | Response<br>Time | Alarm<br>Point | Alarm<br>error |
|---------------------------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------|------------------|----------------|----------------|
| Cat. CH <sub>4</sub>      | 0.00~4.00%                                | 0.00-1.00%      ±0.10<br>1.00-3.00%    ±10%FS<br>3.00-4.00 %     ±0.30                                    | 0.01                | ≅ 20s            | 1.00           | ±0.05%         |
| NDIR. CH <sub>4</sub>     | 0.00~5.00%<br>0.00~10.00%<br>0.00~100.00% | 0.00-1.00%      ±0.06%<br>1.00-100.00%    ±6%FS                                                           | 0.01                | ≅ 30s            | 1.00           | ±0.05%         |
| O <sub>2</sub>            | 0.0~25.0%                                 | 0.0-5.0            ±0.5<br>5.0-25.0          ±3%FS                                                        | 0.1                 | ≅ 35s            | 18.0           | ±0.3%          |
| CO                        | 0~1000ppm                                 | 0-20                ±2<br>20-100             ±4<br>100-500    ±5% of reading<br>500-1000   ±6% of reading | 1                   | ≅ 45s            | 24             | ±1             |
| CO -High<br>concentration | 0~10000ppm                                | 0-1000             ±10<br>1000-10000      ±5%FS                                                           | 1                   | ≅ 45s            | 200            | ±1             |
| H <sub>2</sub> S          | 0.0~100.0ppm                              | 0-49                ±3<br>50-100             ±10%FS                                                       | 0.1                 | ≅ 45s            | 10.0           | ±3             |
| NDIR.CO <sub>2</sub>      | 0.00~5.00%                                | 0.00-1.00          ±0.10<br>1.00-3.00          ±10%FS<br>3.00-5.00          ±0.30                         | 0.01                | ≅ 30s            | 1.00           | ±0.05%         |
| LEL                       | 0~100%                                    | 0-100                ±5                                                                                   | 1                   | ≅ 20s            | 25             | ±2%            |
| SO <sub>2</sub>           | 0.0~100.0ppm                              | 0-49                ±3<br>50-100             ±10%FS                                                       | 0.1                 | ≅ 45s            | 10.0           | ±3             |
| NO                        | 0~250 ppm                                 | 0-250    ±5% of reading                                                                                   | 1                   | ≅ 45s            | 10             | ±1             |
| NO <sub>2</sub>           | 0.0~100.0ppm                              | 0.0-100.0    ±10%FS                                                                                       | 0.1                 | ≅ 45s            | 10.0           | ±2             |
| CL <sub>2</sub>           | 0.0~100.0ppm                              | 0.0-100.0    ±10%FS                                                                                       | 0.1                 | ≅ 45s            | 5.0            | ±2             |
| H <sub>2</sub>            | 0~1000ppm                                 | 0-500    ±5% of reading<br>500-1000   ±6% of reading                                                      | 1                   | ≅ 60s            | 10             | ±1             |
| NH <sub>3</sub>           | 0~200ppm                                  | 0-100                ±4<br>100-200             ±10%FS                                                     | 0.1                 | ≅ 45s            | 10             | ±1             |

## IV. Use and Calibration

### 4.1 Detector Charging

**Warning: The charger must be charged in a safe place outside the well. The charger must be turned off!**

The battery symbol on the upper right of the measuring instrument shows the sufficient power of the battery. Three or four square "■" indicates the sufficient power. When the alarm low voltage alarm battery box logo flashes and a square "■" appears, the battery power is insufficient and needs to be charged.

When charging, please place the detector in a safe place on the well;

Turn off the detector;

Plug the USB plug of the small end of the data charging cable into the charging seat of the tester, and plug the USB plug of the large end into the USB port of the charger's power plug;

Plug the charger power plug into the AC power supply, AC power supply requirements are AC220V 50Hz;

At this time, the indicator light of the detector turns red, indicating the charging status;

**When the indicator light of the detector is off, it indicates that it has been fully charged. The whole charging process takes about 5-6 hours.**

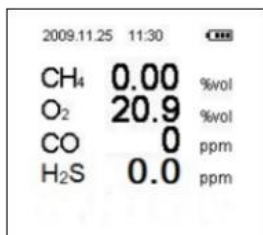
**4.2 Operation Instructions**  
**(Example below)**

#### 4.2.1 Start Up

| *Alarm Point* |           |
|---------------|-----------|
| CH4           | 1.00 %VOL |
| O2            | 18.0 %VOL |
| CO            | 24.0 PPM  |
| CO2           | 1.00 %VOL |

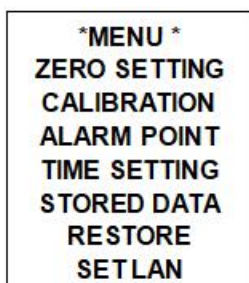
The analyzer operates through a menu-based interface. To enhance usability, we will provide graphical and textual instructions. When the device is powered off, press the "Right-Click" button to activate it. This process triggers alarm sounds, flashing lights, and self-check procedures while displaying a startup indicator. After 2 seconds, the system automatically enters the alarm point interface for the measured gas, as shown in the diagram. This interface remains active for approximately 3 seconds.

### 4.2.2 Main Interface



After the interface display completes, the detector automatically enters the main interface. The following image shows the main interface: This is the standard detection interface capable of measuring concentrations of 2-5 types of gases, with real-time battery voltage, time, and date displays. When a gas alarm occurs, in addition to audio-visual vibration alerts, the alarm gas value turns red. Long-press the "Right" button to enter the shutdown interface; long-press the "Left" button to access the function interface.

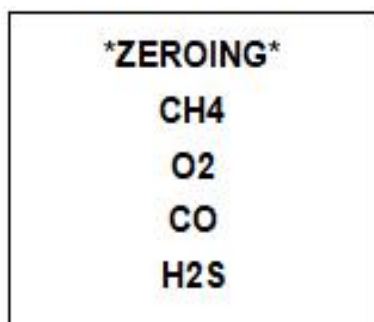
### 4.2.3 Function Interface Operation



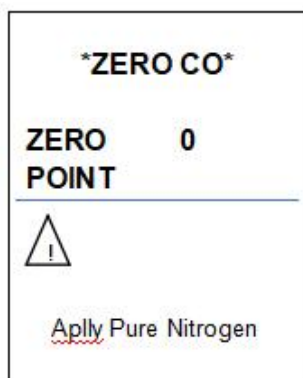
This interface serves as a feature selection panel where you can choose relevant functions and access corresponding interfaces. The arrow indicates the selected item with color changes. To adjust options, short-press the left mouse button to move to the next option, long-press the right mouse button to enter the function details, or short-press the right mouse button to return to the main interface.

### 4.2.4 Zero Calibration Operation and Related Interfaces

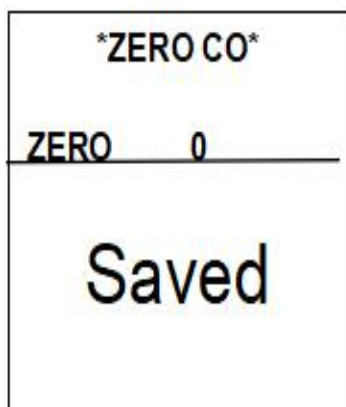
This interface serves as a multi-parameter gas zero adjustment selection panel. Here, you can select corresponding gas zeroing functions and access their respective interfaces. The arrow points to the selected item with color changes. Short-press the "Left Key" to adjust function options; long-press the "Right Key" to enter specific functions; short-press the "Right Key" to return to the function selection interface.



1). Zero Adjustment Interface: This interface serves as the gas zero adjustment selection panel. Here, you can select corresponding gas zero functions and access their respective interfaces. The arrow indicates the selected item with color changes. Short-press the "Left Arrow" key to adjust gas options; long-press the "Right Arrow" key to enter the selected gas zero interface; short-press the "Right Arrow" key to return to the function selection interface.



2). Initial Zero Point Display: This interface serves as the gas zero adjustment panel where calibration operations are performed. The "CO Zero Adjustment" indicator identifies this panel, with the adjacent numerical display showing the zero point value. The bottom section specifies environmental requirements for zero calibration. Long-pressing the left button saves the zero point settings, while short-pressing the right button returns to the gas zero adjustment selection interface.

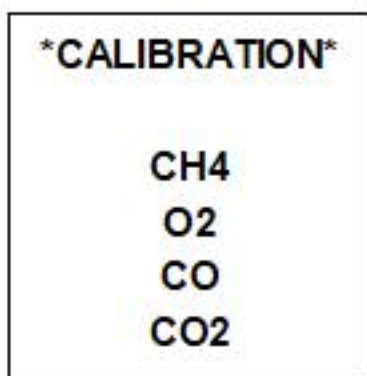


3). Save interface: This interface is the zero adjustment and save interface. Left-click "long press" to save the zero point, and the prompt indicates that the zero point has been adjusted. Then return to the gas zero adjustment selection interface.

Special note: Except for oxygen and carbon dioxide gas, which should be introduced with pure nitrogen gas before zero adjustment operation and then operated after the value is stable;

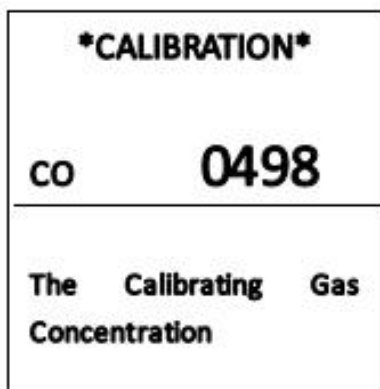
the zero adjustment interface and operation method of other corresponding gases are the same as above.

#### 4.2.5 Calibration Operation and Related Interface



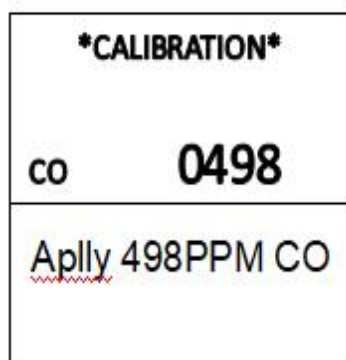
A. Calibration Interface: This is the gas calibration selection interface where you can choose specific calibration functions and access corresponding gas calibration interfaces. The arrow highlights the selected item with color changes. Short-press the "Left" key to adjust calibration options for different gases; long-press the "Right" key to enter the selected gas's calibration mode; short-press the "Right" key to

return to the function selection interface. When calibrating a gas, first complete its zero adjustment operation.



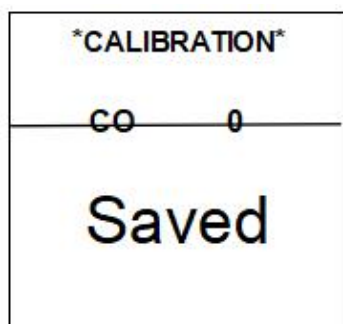
B. Standard Gas Configuration Interface: This interface allows setting gas calibration values, where "0498" denotes the concentration of the standard gas. To adjust the calibration value, hold down the left mouse button to select a number (0-9) using the numeric keypad. Long-press the left mouse button to enter the gas calibration interface, while short-pressing the right mouse button returns to the standard

gas selection interface.



C. Ventilation Interface: This calibration interface allows users to introduce the previously set standard gas concentration. The bottom panel displays the gas concentration (e.g., "498ppm"). The real-time value (marked with a "0") updates as the gas is introduced. Once the reading stabilizes, long-press the left button to save the calibration value, and

short-press the right button to return to the gas calibration selection interface.



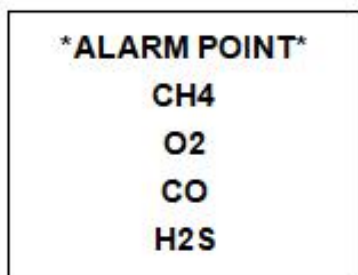
D. Calibration storage interface: When the displayed value is stable, long press the "left key" to save the calibration value, and there will be a prompt interface for calibration completion. Short press the "right key" to return to the gas calibration selection interface.

#### Calibration Notes:

1. The standard gas used for calibration must be the standard gas produced by the production unit certified by the national metrology department.
2. Calibration: Use the manufacturer's dedicated calibration hood with alarm instrument.

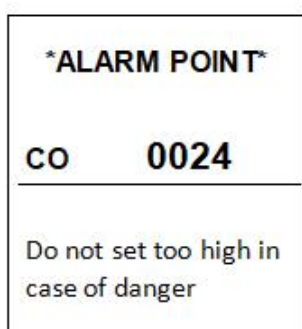
The standard gas flow settings are 200ml/min for NH<sub>3</sub>, 500ml/min for NO<sub>2</sub>. Allow the gas flow to stabilize for 30 seconds before placing the calibration hood on the sensor's front end and securing it tightly. 3. The recommended calibration (adjustment) cycle for the detector is once a month.

#### 4.2.6 Alarm Point Setting and Operation



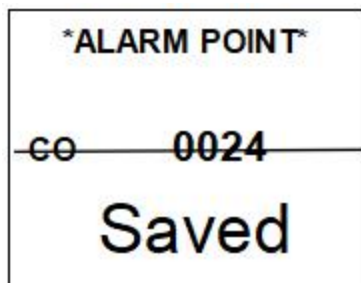
A. Alarm Point Selection Interface: This interface enables configuration of gas alarm points. Users can select relevant alarm point settings and access corresponding configuration interfaces. The highlighted arrow indicates the selected item with color changes. Left-click to adjust function options; hold

down right-click to enter specific functions; short-press right-click to return to the configuration interface.



B. Alarm Point Configuration Interface: This interface allows you to set alarm thresholds suitable for your instrumentation environment. To select numbers, long-press the left mouse button to incrementally adjust values from 0 to 9. Long-press the right mouse button to save your settings and proceed to the completed configuration page. Short-press the right mouse button to return to

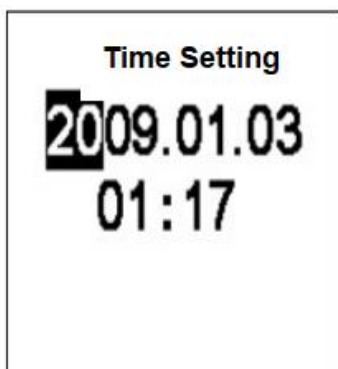
the initial configuration interface.



C. Alarm point storage interface: This interface is the alarm setting completion prompt interface, indicating that the alarm point setting is completed, and returns to the alarm point setting selection interface.

D. The setting method of alarm points for other gases is similar to this. Please refer to it.

#### 4.2.7 Time Setting Operation and Interface



Select "Time/Date Settings" in the interface to access the time configuration panel. The upper row displays date, while the lower row shows time. Adjust the time using left/right buttons: Long-press the left button to select two-digit dates (with first two digits ranging 20-99 and last two digits 00-99), short-press to adjust hour/minute settings (00-23 for hours, 00-59 for minutes). After completing your settings, long-press the right button to

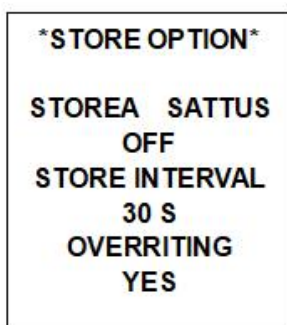
save the date/time and return to the main interface. Short-press the right button to cancel without saving.

#### 4.2.8 Data Storage Operation and Related Interface

A. This interface is the data storage selection interface. Here you can select the



corresponding data storage functions. The arrow points to the selected item and changes color. Short press "left key" to adjust the options. Long press "right key" to enter the function items, short press "right key" to return to the function selection interface.



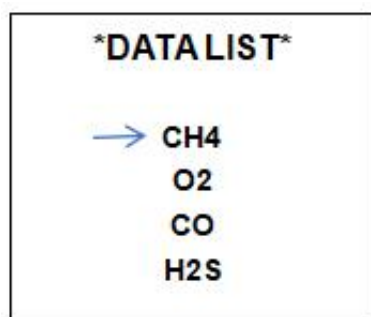
B. This interface serves as the storage configuration panel, where users can enable/disable automatic storage and set time intervals for each session, with selected options changing color. Long-press the left button to select debugging settings, while short-pressing it modifies option content. When the storage status is

"Off", the color changes; short-pressing left toggles between "On" and "Off". Long-pressing left navigates to the storage interval setting (colored "30") where short-pressing left adjusts the default interval (30 seconds) to 15,30,45,1 minute, 2 minutes, 3 minutes, 4 minutes, 5 minutes, 6 minutes, 7 minutes, 8 minutes, 9 minutes, 10 minutes, 20 minutes, 30 minutes, 40 minutes, 50

minutes, or 60 minutes. Adjustments are made in increments of one unit from small to large, with intervals exceeding 60 minutes reset to 15 seconds. Long-pressing left activates storage overwrite (enable), while short-pressing left deactivates it. When the storage status is "On", long-pressing right saves current settings and redirects to the storage prompt interface, while short-pressing right returns to the data storage selection panel.



C. This interface serves as a storage prompt screen displaying existing data entries. The number "3 5 " indicates that 3 5 data entries have been stored, which updates dynamically based on accumulated data volume. The system also shows an 8-hour storage duration, calculated according to the preset interval and current data count. Below appears a "Delete Existing Data" prompt, allowing deletion of the 3 5 entries. Click "Yes" to delete, and "No" to retain. The left-click option corresponds to "Yes", while the right-click option indicates "No".

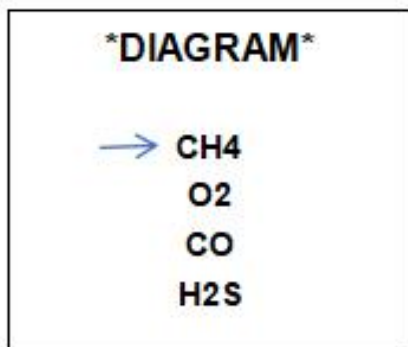


D. This interface is a data viewing interface, which contains data options of the gas under test. The arrow points to the selected item and changes color. "Left-click" adjusts function options; long press "right-click" to enter the function list to view data; short press "right-click" to return to the function selection interface.

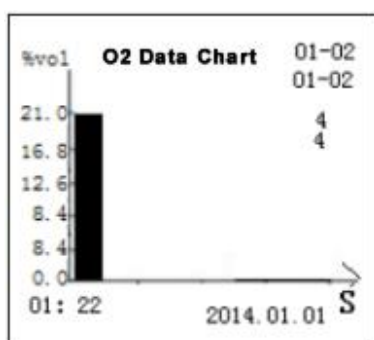
| CO Data    |       | 001-002 |
|------------|-------|---------|
|            |       | ppm     |
| 2014.01.01 | 00:31 | 0       |
| 2014.01.01 | 00:31 | 0       |
| 2014.01.01 | 00:32 | 0       |
| 2014.01.01 | 00:32 | 0       |
| 2014.01.01 | 00:33 | 0       |
| 2014.01.01 | 00:33 | 0       |

E. This interface serves as both a data display panel and a storage data viewing interface. In the upper-right corner of this interface, the "001-002" display indicates that 001 represents the current page and 002 denotes the total number of stored pages. When displaying data, each row contains date, time, and concentration values, forming a set of data.

Each page stores six sets of data. Shortly pressing the "left arrow" key navigates to the next page, while short-pressing the "right arrow" key returns to the storage data viewing interface.



F. This interface is a graphical display selection interface. Short press the "left key" to adjust the options, and the arrow will point to the selected item and change color. Long press the "right key" to enter the options to view the data graphics, and short press the "right key" to return to the data.



G. This interface serves as a data visualization platform displaying gas composition changes over continuous time intervals, with "volume percentage (%)". The first row's "01-02" indicates two data pages for the day, with the current page being the first. The second row's "01-02" denotes two data days, with the current day being the first. Below the coordinate system, a date-time display shows the current day. Short-pressing the left mouse button enables page navigation within the same day (time conversion), while holding down the left mouse button adjusts the displayed date. Holding down the right mouse button changes the concentration scale display size, whereas short-pressing the right mouse button returns to the graphic display selection interface.

H. Data for other gases show similar operations, please refer to the operation.

**Note: After the data storage of the detector is opened, the data can only be stored when you return to the concentration display interface.**

#### 4.2.9 Shutdown Operation and Interface



This interface is the shutdown interface. Long press the "right key" on the main interface, and the alarm instrument displays this interface. Short press the "left key" to select "Yes" to shut down, and short press the "right key" to select "No" to return to the normal detection interface.

## V. Data Communication Function

The measurement device features wired data communication capabilities. By connecting the alarm instrument to a computer via a USB serial port cable (Note: Connect the USB cable with the small end to the alarm instrument and the large end to the computer, differing from standard data cables), it enables real-time data transmission between the alarm instrument and host computer. (Note: Select appropriate serial port drivers for cable connections.) Key functions include dynamic real-time data transmission, static data transfer, data list management, curve plotting, time-period-specific curve analysis, statistical calculation of maximum/minimum values, data list processing, and curve chart printing.

## VI. Usage Notes

6.1 Please read the instructions carefully before use;

6.2 The detector shall be maintained and used by a special person, and the operation and adjustment shall be strictly in accordance with the instructions. It is strictly prohibited to disassemble the detector at will;

6.3 The detector should be placed in the leather case during carrying and use to prevent violent collision and keep the detector clean;

6.4 Research on the environment in which the detector is used or stored includes organic silicon, adhesives and other chemical substances to avoid poisoning of carrier components;

6.5 Battery components belong to explosion-proof parts, and it is strictly prohibited to change their specifications and parameters during maintenance and replacement. The accessories of the measuring instrument manufacturer should be used for maintenance and replacement by professionals;

6.6 The detector should be calibrated regularly, usually once a month;

6.7 It is strictly prohibited to disassemble the machine underground for inspection and maintenance, and the original model, specification and parameters of circuit components shall not be changed during maintenance.;

6.8 Low voltage prompt: When the battery voltage is lower than 3.4V, the buzzer will give

an alarm prompt;

6.9 Shutdown protection: When the voltage is lower than 3.2V, the detector will shut down automatically.

6.10 The detector shall be charged every three months during storage to activate the battery pack and maintain the characteristics of the sensor and battery pack.

6.11 USB port data communication must be carried out in a safe place.

## VII. Common Faults and Maintenance of Alarm Instrument

| Hitch                                               | Cause                                                                                | Measure                                                                             |
|-----------------------------------------------------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Test not Accuracy                                   | 1. The alarm instrument has not been calibrated for a long time<br>2. Sensor Failure | Calibrate the alarm<br>Replace the sensor                                           |
| No Alarm                                            | 1. The alarm point is not set correctly<br>2. Circuit fault                          | Reset the alarm point<br>Send it back to the manufacturer for maintenance           |
| No reaction of measured gas                         | 1. Sensor failure<br>2. Circuit fault                                                | Replace the sensor<br>Send it back to the manufacturer for maintenance              |
| Booting is not possible                             | 1. Insufficient battery voltage                                                      | Charge                                                                              |
| Can't charge it.                                    | 1. Charger failure<br>2. Alarm instrument fault                                      | Change the charger for charging<br>Send it back to the manufacturer for maintenance |
| Insufficient operating time of the alarm instrument | 1. Alarm instrument fault                                                            | Send it back to the manufacturer for maintenance                                    |
| Non-zero in clean air                               | 1. Zero point drift                                                                  | Calibration (in clean air or pure nitrogen)                                         |
| Short sound and light alarm                         | 1. Low battery voltage                                                               | Check the battery voltage and charge                                                |

## VIII. Transportation and Storage

9.1 The detector may be transported by various means including land transportation and water transportation. During transportation, it is necessary to prevent violent collision, heavy pressure, rain and mixed with corrosive goods.

9.2 The detector shall be stored in a dry, clean, ventilated warehouse free from corrosive gas,

water and liquid invasion, with relative humidity not greater than 90% and temperature between (-10°C~40°C).

## IX. Packing List

| Name            | Unit                   | Quantity |
|-----------------|------------------------|----------|
| Gas detector    | Short for Taizhou      | 1        |
| Instructions    | Stem or root of plants | 1        |
| Calibration cap | Individual             | 1        |
| Charger         | Individual             | 1        |
| USB cable       | Root                   | 1        |
| Certificate     | Fix                    | 1        |

## X. Warranty Commitment

The warranty period of this product is 12 months, calculated from the date of shipment. During this period, the company will be responsible for free maintenance if the product is damaged due to non-human causes.