

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.

Gas Detection Alarm Instrument 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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Introduction:

1. Do not arbitrarily alter the electrical parameters, specifications, and models of the intrinsically safe circuits and components related to them during maintenance!
2. The product can only be used in conjunction with products specified in the manual; charging underground and disassembling the battery are strictly prohibited!
3. Chargers and batteries not specified in the manual are strictly prohibited for use!
4. The alarm device should be maintained and used by a designated person, and the instruction manual should be read in full before initial use!
5. Adjust the zero point and accuracy of the alarm device within the specified time limits; if there is no deviation, it can continue to be used!
6. Regularly maintain the alarm device; for those used in environments with high coal dust and humidity, frequently check the explosion-proof filter or white filter for dust accumulation. When dust accumulates significantly, clean the explosion-proof filter or white filter promptly to ensure its readiness for the next use!

I、 Overview

1.1 Scope of Application and Purpose

Portable gas detection alarm devices are suitable for continuous monitoring of the concentration of toxic and harmful gases, as well as explosive gases in environments such as metal mines, coal mines, metallurgical smelting, petrochemical, municipal fire fighting, emergency rescue, tunnel operations, and gas and electric power industries. When the gas concentration exceeds the limit, the device can automatically issue sound, light, vibration, and light bar alarms. It can be carried by relevant staff, managers, professionals, mobile workers, and coal mine ventilation and prevention personnel, and can also be used for fixed installation in the aforementioned locations. The instrument's explosion-proof type is intrinsically safe and flame-proof for mining use, characterized by simple operation, convenient carrying, and high precision.

1.2 Principle of Operation

The alarm device uses thermal catalytic, infrared, or laser measurement principles for methane; infrared measurement principles for carbon dioxide; and electrochemical measurement principles for carbon monoxide (CO), oxygen (O₂), hydrogen sulfide (H₂S), and gases with equivalent measurement principles.

1.3 Measurement Principle

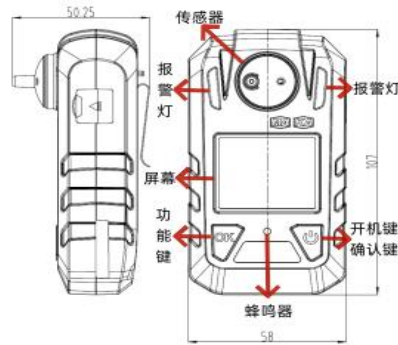
The alarm device converts the gases present in the air into corresponding electrical signals. These electrical signals are amplified, filtered, and processed by a microcontroller, which then displays the concentration of the gases in the air in digital form. When the concentration of toxic and harmful gases exceeds the set alarm point, or the oxygen concentration falls below the set alarm value, the alarm circuit issues an audible alarm signal to indicate that the concentration limit has been exceeded.

II. Technical Features

2.1 General Technical Specifications

- 1) Detection Method: Natural diffusion type (portable)
- 2) Alarm Method: Multiple alarms including sound, light, vibration, and light bar
- 3) Alarm Sound Intensity: Sound intensity greater than 75 dB at a distance of 1 meter from the sound source
- 4) Alarm Light Visibility: Greater than 20 meters (in darkness)
- 5) Continuous Operating Time: ≥ 12 hours
- 6) Sensor Lifespan: Catalytic combustion type ≥ 1 year; Electrochemical type ≥ 2 years; Infrared type ≥ 3 years

2.2 Outer Dimensions (Schematic Diagram)



107mm×58mm×30mm (about 150g)

2.3 Power Supply and Charging

A) Battery Parameters: ① The battery pack is composed of a mine-use manganese acid lithium battery and a battery protection board connected in series and encapsulated as one unit; ② Open-circuit voltage of the battery: $\leq 4.2V$; Maximum output current: $\leq 1.6A$;

B) The alarm device's battery uses a "memory effect"-free battery.

C) The alarm device should have functions for power voltage display, under-voltage indication, and automatic shutdown due to under-voltage.

D) When the alarm device is being charged, it should have charging indication, charging completion cut-off, and indication functions.

III、 Main Technical Parameters

Gas Name and Chemical Formula	Measurement Range	Basic Error	Resolution	Response Time	Alarm Point	Alarm Error
CH ₄ (catalyze)	0.00~4.00%	0.00-1.00% ± 0.10 1.00-3.00% value $\pm 10\%$ 3.00-4.00 % ± 0.30	0.01	$\leq 20s$	1.00	$\pm 0.05\%$
CH ₄ (infrared)	0.00~5.00% 0.00~10.00% 0.00~100.00%	0.00-1.00% $\pm 0.06\%$ 1.00-100.00% value $\pm 6\%$	0.01	$\leq 30s$	1.00	$\pm 0.05\%$
O ₂	0.0~25.0%	0.0-5.0 value ± 0.5 5.0-25.0 $\pm 3\%FS$	0.1	$\leq 35s$	18.0	$\pm 0.3\%$

CO	0~1000ppm	0-20 ± 2 20-100 ± 4 100-500 value $\pm 5\%$ 500-1000 $\pm 6\%$	1	$\leq 45s$	24	± 1
H2S	0.0~100.0ppm	0-49 ± 3 50-100 value $\pm 10\%$	0.1	$\leq 45s$	10.0	± 3
CO2	0.00~5.00%	0.00-1.00 ± 0.10 1.00-3.00 value $\pm 10\%$	0.01	$\leq 30s$	1.00	$\pm 0.05\%$
LEL	0~100%	0-100 value ± 5	1	$\leq 20s$	25	$\pm 2\%$
SO2	0.0~100.0ppm	0-49 ± 3 50-100 value	0.1	$\leq 45s$	10.0	± 3
NO	0~250 ppm	0-250 value $\pm 5\%$	1	$\leq 45s$	10	± 1
NO2	0.0~100.0ppm	0.0-100.0 value $\pm 10\%$	0.1	$\leq 45s$	10.0	± 2
CL2	0.0~100.0ppm	0.0-100.0 value $\pm 10\%$	0.1	$\leq 45s$	5.0	± 2
H2	0~1000ppm	0-500 value $\pm 5\%$ 500-1000 $\pm 6\%$	1	$\leq 60s$	10	± 1
NH3	0~200ppm	0-100 value ± 4 100-200 $\pm 10\%$	0.1	$\leq 45s$	10	± 1

IV、 Use and Calibration

4.1 Charging the Alarm Device

Warning: Charging of the alarm device must be carried out in a safe place above ground, and the device must be switched off during charging!

The battery symbol on the upper right side of the alarm device indicates the level of battery charge. Three to four squares "■" indicate a full charge. When the alarm device gives a low-voltage warning and the battery square symbol flashes with only one square "■" visible, it means the battery charge is low and needs to be recharged.

To charge, please place the alarm device in a safe location above ground;

Switch off the alarm device;

Insert the small end USB plug of the data charging cable into the charging port of the alarm device, and the large end USB plug into the USB port of the charger;

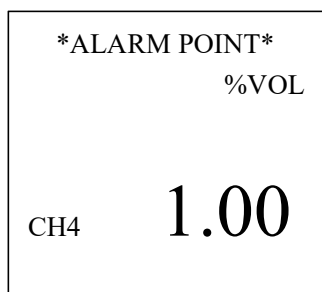
Insert the charger's power plug into the AC power source, which should be AC220V 50Hz;

At this point, the alarm device's indicator light turns red, indicating that it is charging;

When the indicator light goes out, it means the device is fully charged. The entire charging process takes approximately 5 to 6 hours.

4.2 Operating Instructions (Example Below)

4.2.1 Power On



The alarm device operates through a menu-driven mode. For easier operation, the following will introduce it with a combination of graphics and text. To power on the alarm device, press and hold the "Right" button when it is off. It will perform a self-check of the alarm sound, light,

and vibration, then display the alarm point for the measured gas, as shown in the right middle diagram, followed by displaying the basic information of the device, including the measurement range of the gas, the current battery voltage, and the firmware version. Each interface is displayed for about 3 seconds. Here is the English translation:

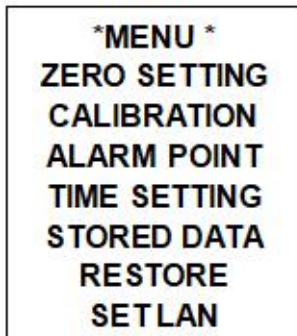
The alarm meter adopts a menu-based operation mode. To facilitate operation, the following will be introduced with a combination of graphics and text. To power on the alarm meter, long press the "Right" button in the off state. The meter will perform a self-check for alarm sound, light, and vibration, then display the alarm point for the gas being measured, as shown in the diagram on the right, followed by displaying the basic information of the meter, including the measurement range of the gas, the current battery voltage, and the firmware version. Each interface is displayed for approximately 3 seconds.

4.2.2 Main Interface



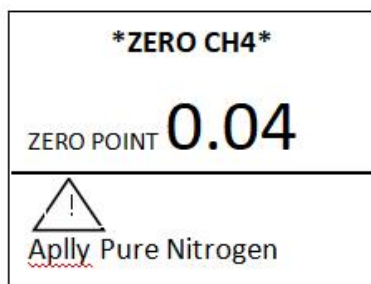
After the aforementioned interfaces have been displayed, the alarm meter automatically transitions to the main interface. The diagram on the right illustrates the main interface display of the CH4 alarm meter: This interface serves as the normal detection main interface, capable of showing the concentration of the detected gas, as well as the battery charge, time, and date. When the gas concentration exceeds the threshold and triggers an alarm, in addition to the auditory, visual, and vibration alerts, the displayed gas concentration value turns red.

4.2.3 Function Interface Operation



Press and hold the "Left" button to enter the function interface. This interface is the function selection interface, where you can choose related functions and enter the corresponding function interfaces. The arrow indicates the selected item, which will change color. Press the "Left" button briefly to adjust the function options, and the arrow will point to the next option; press and hold the "Right" button to enter the function item; press the "Right" button briefly to return to the main interface.

4.2.4 Zero Calibration Operation and Related Interfaces



This interface is the single-gas zero calibration selection interface, where you can choose the corresponding gas zero calibration function and enter the corresponding gas zero calibration interface. The arrow indicates the selected item, which will change color; press and hold the "Right" button to enter the function item; press the "Right" button briefly to return to the function selection interface.

Here, perform the gas zero calibration work. This interface displays "CH4 Zero Calibration" to indicate that this is the CH4 zero calibration interface, with the adjacent value showing the current gas measurement concentration. "Press and hold"

the left button to save the zero point and a prompt message "Zero point has been saved" will pop up. The zero point must be sufficiently small; otherwise, the alarm meter will judge it as an abnormal state and will not save it. Press the "Right" button briefly to return to the function interface.

Special attention: Before zero calibration operations for oxygen and carbon dioxide, pure nitrogen gas should be introduced until the value stabilizes before proceeding with the operation; other corresponding gas zero calibration interfaces and operation methods are the same as above.

4.2.5 Calibration Operation and Related Interfaces

CALIBRATION		
CH4	1.00	
The Calibrating Gas Concentration		

A. Standard Gas Setting Interface: Before calibrating the alarm meter, it is necessary to zero the gas. When calibrating, first enter the gas calibration value setting interface. The "1.00%" displayed on the screen is the concentration of the standard gas used. You can change the calibration value using the left button; press and hold the left button to select the digit, and press the left button briefly to change the numbers from 0 to 9. Press and hold the "Right" button to enter the gas calibration interface, and press the "Right" button briefly to return to the function interface.

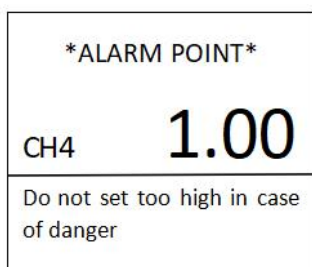
B. Gas Calibration Interface: This interface is for gas calibration. After entering this interface, you can introduce the standard gas with the concentration you set earlier. The interface has a prompt at the bottom indicating the concentration of the gas to be introduced, such as "1.00%". The real-time value will change as the gas is introduced. When this displayed value stabilizes, press and hold the "Left" button to save the calibration value, and a "Calibration Complete" prompt message will pop up. Press the "Right" button briefly to return to the function interface.

D. Calibration Storage Interface: After the displayed value stabilizes, press and hold the "Left" button to save the calibration value, and a calibration completion prompt interface will appear. Press the "Right" button briefly to return to the gas calibration selection interface.

Calibration Notes:

1. The standard gas used for calibration must be produced by manufacturers recognized by the national metrology department.
2. Please use the special alarm meter calibration hood provided by the manufacturer for calibration. The conventional gas flow rate is usually set to 200ml/min, the NH₃ gas flow rate is set to 500ml/min, and the NO₂ gas flow rate is set to 400ml/min. Allow the gas to flow for half a minute to stabilize the flow rate, then place the detector calibration hood at the front end of the sensor and secure the calibration hood.
3. It is recommended that the calibration (standardization) cycle for the detection alarm meter be once a month.

4.2.6 Alarm Point Setting and Operation



A. Alarm Point Selection Interface: This interface is for setting the gas alarm points. Please set the alarm points according to the needs of the monitored location. Press and hold the "Left" button to move the cursor between the alarm digits. Press the "Left" button briefly to change the numerical values of the high and low alarms between 0 and 9. Press and hold the "Right" button to save the set alarm points and alarm modes, and a "Alarm Point Setting Complete" prompt message will pop up. Press the "Right" button briefly to return to the function interface.

B. The alarm point setting method for other gases is similar, please refer to this for guidance.

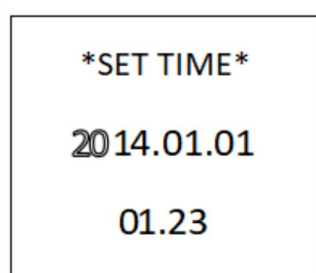
4.2.7 Data Storage, Record Browsing, and Related Interfaces

In addition to real-time gas concentration detection, the alarm meter can also record concentration values at set intervals for subsequent inquiry and analysis. Therefore, the alarm meter provides a browsing function for recorded data,

specifically in two methods: data tables and data curves. As shown in the data record interface below, the highlighted item is the selected option. Press the "Left" button briefly to adjust the function options, press and hold the "Right" button to enter the corresponding function to view the data, and press the "Right" button briefly to return to the function selection interface.

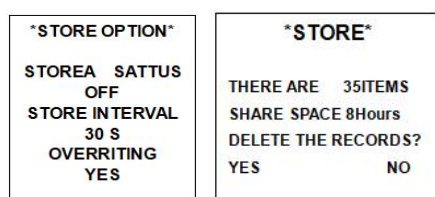


4.2.8 Time Setting



In the time setting interface, set the year, month, day, hour, and minute separately. The year is set in four digits, with the thousands and hundreds place set from 20 to 99, and the tens and ones place set from 00 to 99. The month is set between 01 and 12, the day is set between 01 and 31, the hour is set between 00 and 23, and the minute is set between 00 and 59. The inversely displayed digit is the current setting item. Press and hold the "Left" button to adjust the current setting item, and press the "Left" button briefly to change the value of the current setting item. Press and hold the "Right" button to save the set time and return to the setting interface. Press the "Right" button briefly to directly return to the setting interface. Additionally, the time can also be set by connecting to a computer and using communication software.

4.2.9 Storage Settings



Storage settings include whether to store data (i.e., storage status), the storage time interval, and whether to overwrite when the storage is full (i.e., storage overwrite), with the current setting item being inversely

displayed. Press and hold the "Left" button to select the setting item, and press the "Left" button briefly to change the option content. For example, when the storage status is selected, the word "Off" is inversely displayed, and pressing the "Left" button briefly toggles between "On" and "Off". Press and hold the "Left" button to jump to the storage time interval of "30", and press the "Left" button briefly to adjust the time. The minimum time is 15 seconds in the storage prompt interface, with each adjustment not exceeding 15 seconds for less than 1 minute, not exceeding 1 minute for less than 10 minutes, and not exceeding 10 minutes for less than one hour. Press and hold the "Left" button to jump to storage overwrite "Yes"; if you do not want to overwrite previous data when storage is full, press the "Left" button briefly to switch to "No". When the storage status is "On", press and hold the "Right" button to save the current setting status and jump to the storage prompt interface. Press the "Right" button briefly to return to the settings interface.

The storage prompt interface displays storage-related data. It shows that there are 10 pieces of data already stored, indicating that 10 data points have been saved, and this number will change based on the amount of stored data. It also indicates that you can still store data for 24 hours, which is calculated based on the set storage time interval and will change according to the set storage time interval and the number of already stored data points. Below, there is a prompt asking "Do you want to delete existing data?" This prompt asks whether you want to delete the original 10 data points. If you press "Yes", the data will be deleted; if you press "No", the data will not be deleted. "Yes" represents the "Left" button, and "No" represents the "Right" button.

Note: After the data storage of the alarm meter is turned on, data can only be stored when returning to the monitoring main interface.

4.2.10 Power Off Operation and Interface



The diagram on the right shows the power off interface. In the main interface, press and hold the "Right" button, and the alarm meter will display this interface. Press the "Left" button briefly to select "Yes" to power off, or press the "Right" button briefly to

select "No" and return to the normal detection interface.

V、 Data Communication Function

The alarm instrument is equipped with wired data communication transmission function. By connecting the alarm instrument to the computer through a USB serial port data cable (Note: The small end of the USB data cable should be connected to the alarm instrument and the large end to the computer, which is different from the common data cable usage), the online data communication function between the alarm instrument and the upper computer data transmission system can be realized. (Note: The connection of the serial port cable requires the selection of an appropriate serial port driver.) It mainly includes dynamic real-time data transmission, static data transmission, data list, curve drawing, curve analysis within a fixed time period, and can also perform statistics on maximum and minimum values, as well as print the data list and curve graph.

VI、 Precautions for Use

6.1 The alarm meter should be maintained and used by a designated person, and operated and adjusted strictly according to the manual. Unauthorized disassembly of the alarm meter is prohibited..2 When carrying or using the alarm meter, it should be placed in a leather case to prevent severe impacts and to maintain the cleanliness of the alarm meter.

6.3 The environment where the alarm meter is used or stored should be free of organic silicon, adhesives, and other chemical substances to avoid poisoning the carrier elements.

6.4 The battery assembly is an explosion-proof component. Its specifications and parameters must not be altered during maintenance or replacement. Accessories from the alarm meter manufacturer should be used, and replacement should be done by professional personnel.

6.5 The alarm meter should be calibrated regularly, generally once a month.

6.6 Disassembly and repair underground are strictly prohibited, and the model, specifications, and parameters of the original circuit components must not be changed

during maintenance.

6.7 Low Voltage Alert: When the battery voltage drops below 3.4V, the buzzer emits an alarm signal.

6.8 Shutdown protection: When the voltage drops below 3.2V, the alarm meter will shut down automatically.

6.9 When the alarm meter is in storage, it should be charged every three months to activate the battery pack and maintain the characteristics of the sensor and battery pack.

6.10 USB data communication must be carried out in a safe location.

VII、 Common Faults and Repairs of the Alarm Meter

Fault	Cause	Measures
Testing Inaccuracy	1.The alarm meter has not been calibrated for a long time. 2.The sensor has aged and failed.	1.Calibrate the alarm meter. 2.Replace the sensor.
No Alarm	1. Incorrect alarm point setting. 2. Circuit malfunction.	1. Reset the alarm points. 2. Return to the manufacturer for repair.
No response to the measured gas.	Sensor Fault 2. Circuit Malfunction	1.Replace Sensor 2.Return to Manufacturer for Repair
Unable to Power On	1. Insufficient Battery Voltage	Recharge
Not Charging	1. Charger Malfunction 2. Alarm Meter Fault	1. Replace the Charger and Attempt to Charge 2. Return to Manufacturer for Repair
Insufficient Working Time	Alarm detector Malfunction	Return to Manufacturer for Repair
Zero point is not zero in clean air	Zero point drift	Zero calibration operation (in clean air or pure nitrogen)
Brief Audible and Visual Alarm	Low Battery Voltage	Check the battery voltage and recharge.

VIII、Transportation and Storage

8.1 The alarm meter can be transported by various means, including land and water transport. During transportation, it is necessary to prevent violent impacts, heavy pressure, rain exposure, and mixing with corrosive goods.

8.2 The alarm meter should be stored in a dry, clean, well-ventilated warehouse, free from corrosive gases, without dripping or liquid intrusion, with a relative humidity not exceeding 90%, and at a temperature range of (-10℃ to 40℃).

IX、Packing List

Name	Unit	Quantity
Gas Detector	Piece	1
Manual	Unit	1
Calibration Cap	Each	1
Charger	Each	1
Charging Cable	Stick	1
Certificate of Conformity	Sheet	1

X、Warranty Commitment

This product is warranted for 12 months from the date of shipment. During this period, if it is damaged due to non-human factors, our company will be responsible for free repair.

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