

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.

Pump-type 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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Preamble: This manual is the instruction manual for the pump suction type combustible gas, oxygen, carbon monoxide and hydrogen sulfide detection alarm (hereinafter referred to as the detection alarm). Please read this manual in detail before using this instrument.

1. Uses

The pump suction type combustible gas, oxygen, carbon monoxide, and hydrogen sulfide detector is suitable for various working environments in petrochemicals, metallurgy, chemical industry, and pipeline measurement. It can measure and alarm on the concentration of combustible gas (LEL), oxygen (O₂), carbon monoxide (CO), and hydrogen sulfide (H₂S) gases. The instrument detects gas concentrations at the site and can trigger audio-visual alarms. Equipped with an integrated suction pump, it meets the requirements for gas measurement in special settings, featuring simple operation, compact size, easy portability, and high precision.

Explosion-proof form of the instrument: intrinsically safe and flameproof

Explosion-proof mark: Ex dib II BT4 Gb

The instrument shall be able to adapt to the following environmental conditions:

Environmental temperature: -10°C~+40°C

Relative humidity: ≤ 98% (+25°C)

Wind speed: less than 8m/s

Atmospheric pressure: 80~116kPa

Warning: When the operating environment of the instrument exceeds the above conditions, the error of the instrument may increase. When the instrument is used for a long time in the environment below -10°C, the LCD may be damaged!

2. Measurement principle

The instrument uses thermal catalysis for combustible gas (LEL) measurement and electrochemical principles for oxygen (O₂), carbon monoxide (CO), and hydrogen sulfide (H₂S). The alarm converts the combustible gas, oxygen, carbon monoxide, and hydrogen sulfide in the air into corresponding electrical signals through respective sensors. These signals are amplified and filtered, then processed by a microcontroller. In digital form, they can detect in real-time the concentrations of combustible gas, oxygen, carbon monoxide, and hydrogen sulfide in the ambient air. When the concentrations of toxic gases such as

combustible gas, carbon monoxide, and hydrogen sulfide exceed the set alarm points or when the oxygen concentration falls below the set alarm value, the alarm circuit emits an alarm signal to indicate that the concentration has exceeded the limit.

3. Technical indicators

Principle of determination: catalytic combustion principle, electrochemical principle, infrared principle.

Chemical Name	measuring range	intrinsic error	resolution ratio	response time	Alert point	Alarm error
CH ₄	0.00-4.00% CH ₄	0.00-1.00 ±0.10 1.00-3.00 True value ± 10% 3.00-4.00 ±0.30	0.01	≦ 20s	1.00	±0.05%CH ₄
O ₂	0.0-25.0% O ₂	0.0-5.0 ±0.5 5.0-25.0 ±3%FS	0.1	≦ 35s	18.0	±0.3%O ₂
CO	0-1000ppm CO	0-20 ±2 20-100 ±4 100-500 true value ±5% 500-1000 true value ±6%	1	≦ 45s	24	±1ppm
H ₂ S	0.0-100.0ppm H ₂ S	0-49 ±3 50-100 true value ± 10%	0.1	≦ 45s	10.0	±3ppm
CO ₂	0.00-5.00% CO ₂	0.00-1.00 ±0.10 1.00-3.00 True value ± 10% 3.00-5.00 ±0.30	0.01	≦ 60s	1.00	±0.05%CO ₂
LEL	0-100% LEL	0-20 ±2%LEL 20-75 True value ± 10% 75-100 ±6%LEL	1	≦ 20s	25	±2%LEL
SO ₂	0.0-100.0ppm SO ₂	0-49 ±3 50-100 true value ± 10%	0.1	≦ 45s	10.0	±3ppm
NO	0-250ppm NO	0-250 True value ±5%	1	≦ 45s	10	±1ppm
NO ₂	0.0-100.0ppm NO ₂	0.0-100.0 True value ± 10%	0.1	≦ 40s	10.0	±2ppm

CL2	0.0-100.0ppm CL2	0.0-100.0 True value $\pm$ 10%	0.1	$\leq$ 40s	5.0	$\pm$ 2ppm
H2	0-1000ppm H2	0-500 true value $\pm$ 5% 500-1000 true value $\pm$ 6%	1	$\leq$ 60s	10	$\pm$ 1ppm
NH3	0-200ppm NH3	0-100 true value $\pm$ 10%	1	$\leq$ 45s	10	$\pm$ 1ppm
HCHO	0.00-5.00ppm	0.00-5.00 True value $\pm$ 5%	0.01	$\leq$ 40s	0.5	$\pm$ 0.05ppm

ambient condition		Intrinsic parameters	
working temperature	-10℃~ 40℃	Battery specifications	One rechargeable battery
relative humidity	≤95%RH (+25℃)	Maximum open circuit voltage	U0: 4.2V
storage temperature	-40℃ ~ +60℃	rated voltage	3.7V
atmospheric pressure	80~ 116kPa	working current	Electrochemical ≧23mA catalytic element ≧103mA
wind speed	0~ 8m/s	Alarm current	Electrochemical ≧53mA catalytic element ≧136mA
levels of protection	IP65	charging interval	5~7 hours
Alarm sound level intensity	>80dB		
Alert mode	Sound, light alarm, vibration alarm, light bar indication		
Continuous working hours	> 10 hours		
Sensor life	Catalytic combustion type		> 1 year
	Electrochemical type		> 2 years
	Infrared type		> 3 years
outline dimension	192mm×66mm×35mm		
Shell material	The shell is made of two-color injection molding, the inner layer is transparent ABS engineering plastic, the outer layer is TPU rubber material		
weight	About 300g		
Battery specifications	Intrinsically safe power supply of the instrument: one lithium manganate battery, specification: rechargeable battery is sealed with epoxy resin as a whole to form the intrinsically safe battery assembly.		
Alarm light visibility	Not less than 20m (in darkness)		

4. Instrument structure diagram:



5. Use and calibration

5.1 Charge the detection alarm instrument

Warning: The charging of the detection alarm must be carried out in a safe place outside the well, and the device must be turned off when charging!

The battery symbol in the upper right corner of the detection alarm indicates the battery's charge status. A green color signifies a full charge. When the detection alarm triggers a low voltage warning and the battery box icon flashes red, it indicates insufficient battery power and requires charging. To charge, place the detection alarm in a safe location; turn off the detection alarm; insert the small end USB connector of the data charging cable into the charging port of the detection alarm, and insert the large end USB connector into the USB port of the charger's power plug; plug the charger's power plug into an AC power source, which should be AC220V 50Hz. At this point, the indicator light on the detection alarm turns red, indicating the charging status;

When the detection alarm indicator light is off, it indicates that it is full. The whole charging process takes about 5~6 hours.

5.2 Operation instructions

5.2.1 Start up

The detection alarm instrument operates in a menu mode. For easier operation, the following will be explained through text. When the detection alarm instrument is turned off, press the "right button" to turn it on. It will then sound an alarm, light up, and perform self-checks, while displaying a startup indicator. After 2 seconds, it automatically enters the startup alarm

point interface, which shows the alarm points of the measured gas. This interface remains active for about 3 seconds.

5.2.2 Main interface

After the machine is turned on, the detection alarm instrument automatically enters the main interface and displays the time and date. When a certain gas is detected, in addition to the sound, light and vibration prompts, the value of the detected gas turns red. Long press the "right key" to enter the shutdown interface; long press the "left key" to enter the function interface.

5.2.3 Function interface operation

Long press the "left button" function to select the interface, where you can select the relevant functions and enter the relevant function interface. The arrow points to the selected item. Short press the "left button" to adjust the function options and point to the next option; long press the "right button" to enter the function item; short press the "right button" to return to the main interface.

5.2.4 Zero adjustment operation

The function table selects the instrument gas zeroing interface, where you can perform gas zeroing operations. This interface has "methane, carbon monoxide zeroing" to indicate that this is the O zeroing interface. The value next to it is the zero point value, and at the bottom of the interface are the environmental requirements for zeroing. Long press the "left button" to save the zero point, and a prompt interface will appear. Short press the "right button" to return to the gas zeroing selection interface.

Note: The zero adjustment of oxygen and carbon dioxide gas should be carried out by introducing pure nitrogen.

5.2.5 Calibration operation

A. Standard Gas Setting Interface: The interface for setting the methane gas calibration value, where "1.00" represents the concentration of the standard gas used. You can change the calibration value by pressing the left button; long-pressing the left button allows you to select numbers from 0 to 9. Long-pressing the right button takes you to the gas calibration interface, while short-pressing the right button returns you to the gas calibration selection

interface.

B. Ventilation Interface: In the function table, select instrument gas calibration as the ventilation calibration interface. After entering this interface, introduce the standard gas set at the concentration from the previous step. At the bottom of the interface, there is a prompt indicating the concentration of the introduced gas, such as "1.00%CH₄". The real-time value will change after the gas is introduced. Once this display stabilizes, long press the "left button" to save the calibration value and display the prompt interface. Short press the "right button" to return to the gas calibration selection interface.

Calibration Note:

A. The standard gas used for calibration must be the standard gas produced by the production unit recognized by the national metrology department, and its concentration should be 1/2 of the maximum range of the measured gas standard gas sample; do not use the gas with low concentration relative to the range for calibration;

b. Calibration Please use the manufacturer's special detection alarm calibration cover, the flow setting is usually 200ml/min, let the gas flow rate stabilize for half a minute, cover the sensor front end of the detection alarm with the calibration hood, and tighten the fixing knob of the calibration hood.

C. It is recommended that the calibration (calibration) period of the detection alarm instrument is 1 month.

d. The detection alarm must be calibrated separately for each channel, and the mixed gas cannot be used for simultaneous calibration.

5.2.6 Alarm point setting and operation

A. Alarm Point Setting Interface: This is the alarm point setting interface. Please set the alarm values suitable for the location where the alarm instrument will be used according to your needs. Long press the "left button" to select numbers; short press the "left button" to change numbers from 0 to 9. Long press the "right button" to save the set alarm points, and you will see the completed alarm point setting interface. Short press the "right button" to return to the alarm point setting selection interface.

5.2.7 Time setting operation and interface

Select "Time and date Settings" in the function interface, and the alarm detector will enter the time setting interface,

The upper is the date, and the lower is the time. You can adjust the time using left and right buttons. Long press the "left button" to select positions; each selection covers two digits. Short press the "left button" to change the numbers: the first two digits of the year range from 20 to 99, the last two digits from 00 to 99, the month from 01 to 12, the day from 01 to 31, the hour from 00 to 23, and the minute from 00 to 59. After setting, long press the "right button" to save the selected time and date, returning to the function interface. Short press the "right button" to return to the function interface without saving.

5.2.8 Data storage operations

A. Select "Data Storage" in the function interface. In this interface, you can select the corresponding data storage function. The arrow points to the selected item and changes color. Short press "Left key" to adjust the option. Long press "Right key" to enter the function item, and short press "Right key" to return to the function selection interface.

B. In the storage settings interface, you can turn on and off automatic storage, set the time interval for each storage, and change the color of selected items. Long press the "left arrow" to select debug options, and short press the "left arrow" to change the option content. If the selected storage status is "off," it will change color; short press the "left arrow" to switch between on and off. Long press the "left arrow" to go to the storage interval of "30" and change its color; short press the "left arrow" to adjust the storage interval, with default settings being 30 seconds. Available intervals include 15 seconds, 30 seconds, 45 seconds, 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, and 60 minutes. Each adjustment increases by one level from the smallest to the largest; if it exceeds 60 minutes, it resets to 15 seconds. Long press the "left arrow" to go to the storage overwrite option; if you do not want to overwrite previous stored data, short press the "left arrow" to go back to the storage selection interface. Short press the "right arrow" to return to the data storage selection interface.

C. This interface is the storage prompt interface. If you press "Yes", all stored data will

be deleted,

Do not delete if "No". "Yes" represents left click, and "No" represents right click.

D. This interface is for displaying data and viewing stored data. In the "001-002" display at the top right corner of this interface, 001 on the left indicates that it is the first page, and 002 on the right indicates that there are a total of 2 pages stored. When displaying data, each row consists of date, time, and concentration value, forming one set of data. Each page stores 13 sets of data. Short-press the "left button" to flip to the next page, and short-press the "right button" to return to the interface for viewing stored data.

E. This interface is a data graph display interface, where you can view changes of various gases over continuous time. "VOL%" represents the unit. The first row in the lower right corner, "01-01," indicates that there is one page of data for that day, and the current page is the first one; the second row, "01-01," indicates that there are 1 days of data in total, and the current date is the 1st day's data. Below the coordinates, the time and date are displayed. Short pressing the "left button" allows you to flip pages (time conversion) within the same day, while long pressing the "left button" changes the displayed date. Long pressing the "right button" adjusts the size of the concentration display on the graph, and short pressing the "right button" returns to the graph display selection interface.

Note: After the data storage of the detection alarm is opened, the data can only be stored when returning to the concentration display interface.

5.2.9 Shutdown operation

In the normal detection interface, long press the "right key", the detection alarm instrument displays the words "whether to shut down", short press the "left key" to select "yes" to shut down, short press the "right key" to select "no" to return to the normal detection interface.

6. Precautions for use

6.1 Please read the instructions carefully before use;

6.2 The detection alarm instrument shall be maintained and used by special personnel, and shall be operated and adjusted in strict accordance with the instructions. It is strictly

prohibited to disassemble the detection alarm instrument at will;

6.3 The detection alarm should be placed in the leather case when carrying and using to prevent violent collision, and pay attention to keeping the detection alarm clean;

6.4 Research on the environment in which the detection alarm instrument is used or stored includes organic silicon, adhesives and other chemical substances, Avoid carrier element poisoning;

6.5 Battery components are explosion-proof parts. When maintaining and replacing them, it is strictly prohibited to change their specifications and parameters. Parts of the manufacturer of detection alarm should be used for maintenance and replacement by professionals;

6.6 The detection alarm instrument should be calibrated regularly, usually once a month;

6.7 It is strictly prohibited to disassemble, inspect and maintain the machine underground. During maintenance, the original circuit parts shall not be changed number, specification and parameter;

6.8 Under-voltage prompt: when the battery voltage is lower than 3.4V, the buzzer will sound an alarm;

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

6.10 When the detection alarm is stored, it should be charged every three months to activate the battery pack and maintain the characteristics of the sensor and battery pack.

When charging the alarm, please use the special charger provided by the manufacturer. Charging must be carried out in a safe place;

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

7. Common faults and maintenance of alarm instrument

hitch	cause	measure
The test was not accurate	1. The alarm instrument long time not been calibrated 2. Sensor aging and failure	Calibrate the alarm instrument Replace the sensor

Don't call the police	1. The alarm point is not set correctly 2. Circuit fault	Reset the alarm point Send back to the manufacturer for maintenance
The measured gas has no reaction	1. Sensor failure 2. Circuit fault	Replace the sensor Send back to the manufacturer for maintenance
The machine cannot be started	1. Battery voltage is insufficient	charge
No charging	1. Charger failure 2. Alarm instrument fault	Replace the charger for charging Send back to the manufacturer for maintenance
The alarm instrument does not work for a short time	1. Alarm instrument fault	Send back to the manufacturer for maintenance
The zero point is not zero in clean air	1. The zero point drifts	Zero adjustment operation (In clean air or pure nitrogen)
Short sound and light prompt alarm	1. Battery voltage is low	Check battery voltage and charge

9. Transportation and storage

9.1 The detection alarm instrument can be transported by various means including land transportation and water transportation. During transportation, it should be prevented from violent collision, heavy pressure, rain and mixed with corrosive goods.

9.2 The detection alarm instrument shall be stored in a dry, clean, ventilated warehouse without corrosive gas, no dripping water and liquid invasion, the relative humidity of air is not greater than 95%, and the temperature is (-40~60) °C.

10. Packing list

name	quantity
Gas detector	1
instructions	1
Calibrate the cap	1
charger	1
USB cable	1
certificate	1

11. Warranty Commitment

The warranty period of this product is 12 months from the date of delivery. During this period, the company will be responsible for free repair if the damage is not caused by human error.

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