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BH-4M
Portable Multi-gas Detector

Operation Manual

BOSEAN

1.Brief Introduction

BH-4M portable gas detector (hereinafter referred to as the detector) is an intelligent multi-parameter detector designed with advanced integrated circuit technology, standard design technology and proprietary digital-analog hybrid communication technology.

The detector adopts natural diffusion or pump suction sampling method for gas sampling, and the sensitive element adopts high-quality gas sensor for gas detection. It has good sensitivity and excellent repeatability. It is easy to use and maintain, which greatly meets the safety detection of industrial sites. For the requirements of high reliability of the equipment, the shell is made of high-precision engineering plastics and non-slip rubber, with high strength and good hand feeling. It can be widely used in petroleum, chemical, environmental protection, smelting, refining, biochemical medicine, agriculture,science and technology, universities and other industries and fields.

The detector can detect 1-4 gas combinations according to customer needs.Using integrated modules,it integrates electrochemistry,catalysis,semiconductor,thermal conductivity, optics and other detection principles to provide users with reliable, accurate and safe gas detection solutions.

2.Instrument features

2.1 Features

* The new GUI design scheme is adopted, the interface display is more comprehensive, and the operation is more user-friendly.
* Natural diffusion or pumping gas detection methods can be selected, and 1 to 4 gas types can be detected at the same time.
* Using miniature vacuum sampling pump, stable flow, long life and low noise.
* It adopts a 2.0-inch high-definition color screen with a wide viewing angle of 120 degrees.
* The three-button operation is simple and intuitive.
* Support a variety of extended functions to meet users' different product applications.

2.2 Functions

* Sound, light, vibration and display four alarm modes.
* It supports switching between real-time gas concentration data display and real-time curve display mode.
* It supports multi-point calibration, up to 5 points calibration.
* Multiple data storage methods, alarm storage, manual storage.
* Support Chinese and English switching, other languages can be customized.
* Large-capacity (2500mAh) rechargeable lithium battery, which can last longer.
* The USB interface adopts Type-C interface, and there is no fear of plugging in front and back.
* Support TWA, STEL alarm function.

3. Technical Data

Target Gas	Range	Low alarm	High alarm	Resolution
EX	0-100 %LEL	20%LEL	50%LEL	1%LEL
H_2S	0-100 ppm	10ppm	35ppm	1ppm
CO	0-1000 ppm	50ppm	150ppm	1ppm
O_2	0-30 %vol	19.5%vol	23.5%vol	0.1%vol

★ Other gases needed, please contact supplier

Response time: Pump suction type T90<30s, natural diffusion type T90<60s

Detecting gas: Support 1~4 kinds of gas detection

Accuracy: ≤ ±5% F.S.

Indication: 2.0 inch color display, resolution 320*240

Alarm methods: Acousto-optic vibrating display quadruple alarm, TWA/STEL alarm

Data communication: Support USB to connect to the upper computer of the computer to view data

System language: Support Chinese and English switching; other languages can be customized

Working environment: Temperature -10 ~50 ; humidity<95%RH (no condensation)

Power Source: DC3.7V (Lithium battery capacity 2500mAh)

Charging way: Type-C charging interface, 5V/1A standard charger

Standby time: ≥8h

Charging time: <5h

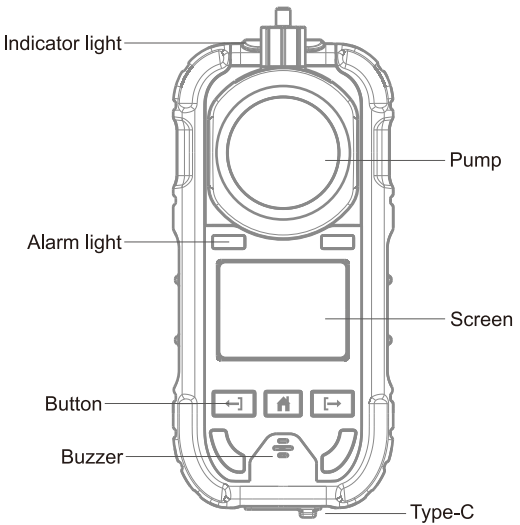
Gas Sensor Life: 2 years

Weight: 372.5g(include pump)

Dimensions: Pump suction type 160*69*75mm; natural diffusion type 150*69*55mm

4. Structure

4.1 Structure function comparison table



4.2 Detector structure

It is mainly composed of shell, circuit board, battery, display screen, sensor, charger and other components.

4.3 Sensor working principle

Electrochemical and catalytic combustion.

5.Function and operation

5.1 Power-on self-test and warm-up

When the detector is turned off, press and hold the middle button for 3 seconds, the display of the detector displays the welcome interface (as shown in Figure 1), and then the instrument performs the system initialization operation, and then performs the system self-check and pre-check (sound, light, vibration, channel, etc.) heat. When the preheating is completed, enter the main detection interface of the detector (Figure 2).

Figure 1

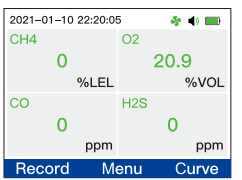


Figure 2

5.2 Turn off

In the main menu interface of the detector, press and hold the middle button for 3 seconds and then release the button to enter the shutdown operation interface (Figure 3), click the left "Yes" to confirm the shutdown, and click the right button "No" to cancel the shutdown. Press and hold the middle button for 5 seconds to shut down directly.

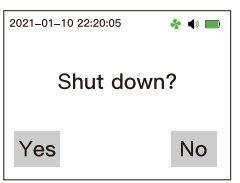
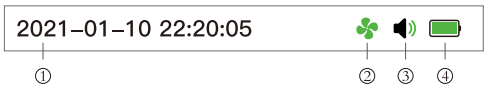


Figure 3

5.3.1 Main interface function description



1.Display the current date and time.

2.Pump status indication. When the pump is normally turned on, the icon rotates and the color changes to green; when the air pump is normally closed, the icon does not rotate, and the color changes to gray.

3.Buzzer status indication. When the gas concentration detection is in the normal state, the icon is green; when the gas concentration detection is in the low or high alarm state, after pressing "Mute", the icon turns red.

4.Battery level indicator. The battery level is divided into six bars. When there are two bars remaining, the icon turns yellow and the screen prompts that the battery level is low. When there is one bar of power remaining, the icon turns red and the screen prompts that the battery power is low. When the power is exhausted, it will automatically shut down.

5.3.2 Main interface display description

The detector shows the real-time concentration of the relevant gas in the environment as shown in Figure 4 under the normal detection state.

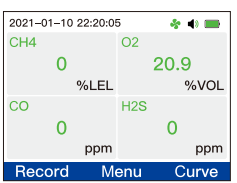


Figure 4

When the gas concentration detected by the detector is lower than the set alarm value (Note: when the oxygen concentration is higher than the low alarm value and lower than the high alarm value), the detection status bar only displays the concentrationValue, no abnormal display.

When the gas concentration detected by the detector is higher than the set low alarm value (Note: when the oxygen concentration is lower than the set low alarm value), the detector is in the low alarm state, the gas concentration value display color changes to red, and the status bar displays "L", and the buzzer beeps at 0.5s intervals, the alarm lights on both sides of the screen flash synchronously, and the vibrator vibrates. If the screen is in the off state, the screen lights up at the same time.

When the detector detects that the gas concentration is higher than the set high alarm value, the detector is in the high alarm state, the gas concentration value display color changes to red, the detection status bar displays "H", and the buzzer emits "di" at an interval of 0.25s. The beep sounds, the alarm lights on both sides of the screen flash simultaneously, and the vibrator vibrates.

When the detector detects that the gas concentration is higher than the sensor range, the detector is in the over-limit state, the gas concentration value is displayed as red "HHHH", the detection status bar displays "OV", and the buzzer interval 0.25s sends out a "di" beep, the alarm lights on both sides of the screen flash simultaneously, and the vibrator vibrates.

When the detector detects the gas concentration for 8 hours, when the calculated TWA value exceeds the set value, the gas concentration value display color changes to red, and the detection status bar displays "T".

When the detector detects the gas concentration for 15 minutes, when the calculated STEL value exceeds the set value, the gas concentration value display color changes to red, and the detection status bar displays "S".

Note: When the alarm mute function is turned on, if a new alarm state occurs, the buzzer will resume ringing.

When the gas concentration detected by the detector returns to the lower limit alarm value, the gas concentration value color will change to green, and the alarm signal will be automatically released at the same time.

When multiple alarm states are detected in the same gas channel, only the highest priority alarm will be issued.

The police priority is as follows:

Normal < Low alarm < High alarm< TWA <STEL <Out of limit

5.3.3 The main interface button function description

Click the left button in the main interface to enter the "Record" interface (Figure 5). Right-click to select the gas to be viewed, and after clicking the middle button, the gas alarm record operation can be viewed on the interface (Figure 6). Single-click the right button to turn the "next page" page, click the left button to turn the "previous page" page, click the middle button to return to the Figure 5 interface, and click the left button to return to the main interface.

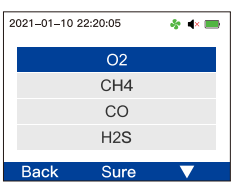


Figure 5

Right-click in the main interface to enter the "curve display" interface (Figure 7). In this interface, you can view the real-time detection curve of a certain gas channel within 10s. Click the left or right button to switch the channel display, and click the middle button to return to the main interface.

Click the middle button in the main interface to enter the "Main Menu" interface (Figure 8). Click the left and right buttons to select the function icon. Click the middle button to enter the corresponding function interface.

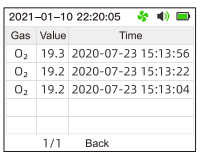


Figure 6

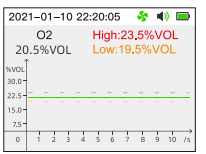


Figure 7

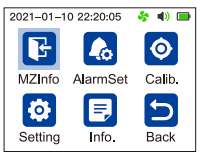


Figure 8

5.4 Navigation bar function description

The navigation bar is displayed in three grids, corresponding to three buttons respectively, and the corresponding functions can be realized by operating the buttons.

ICON	Usage
Back	Return to the previous interface or status bar.
Sure	To confirm the data or function, enter the next interface or status bar.
Open	The start operation of the setting object.
Close	The finish operation of the setting object.
▼	Down shift function.

▲	UP shift function.
>>	Right shift function.
Cali	Perform calibration settings.
Mute	Occurs when alarming, and the buzzer alarm sound is turned off after clicking.
Cancel	Cancel the setting object.
Record	After pressing, enter the view record operation interface.
Curve	After pressing, enter the curve display operation interface.

5.5 Main menu interface description

As shown in Figure 8, click the left and right buttons to select the function icon. Click the middle button to enter the corresponding function interface.

ICON	Description	Usage
	Channel setting	It's used to set the parameters of related channel gases and view the setting informationof each channel.
	Alarm setting	Set alarm value to each channel.
	Calibration	Perform calibration operations such as calibration and zero adjustment on the relevant channel gas.
	System setting	Set time, language, backlight, air pump and other system parameters.
	Device Information	Used to view the factory default parameter information of the instrument, etc.
	Back	Back to main manu.

5.6.1 Channel information

In the main menu interface of the detector (Figure 8), select the channel information icon to enter the channel information interface (Figure 9). The left column of the figure is the gas option, and the right is the channel information display area. Follow the navigation bar prompts to set the operation (Figure 10, 11).

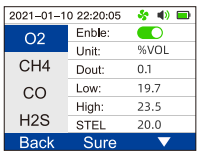


Figure 9

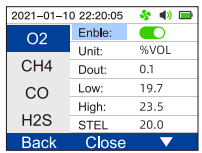


Figure 10

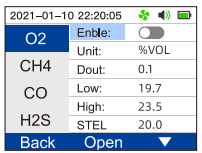


Figure 11

5.6.2 Alarm setting

In the main menu interface of the detector, select the alarm setting icon and click the middle button to enter the alarm setting interface (Figure 12). The left side of the figure shows the gas options, and the right side shows the alarm settings. Follow the instructions in the navigation bar to set the operation.

There will be a corresponding prompt on the screen when the save succeeds or fails (Figure 13).

Note: The low value must be less than the high value.

Figure 12

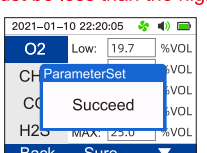


Figure 13

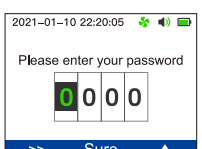


Figure 14

5.6.3 Calibration setting.

Warning: It is strictly forbidden for non-professionals to perform this calibration and other operations.

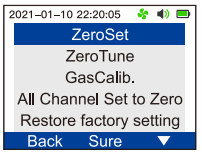


Figure 15

Select the “calibration settings” icon in the main menu interface of the detector, click the middle button to enter the password input interface (Figure 14), follow the navigation bar prompts to set the operation, and enter “1111” to enter the customer calibration interface (Figure 15).

The customer calibration interface includes five functional options: zero calibration, zero drift, concentration calibration, one-key zero calibration, and factory reset (Figure 15).

Zero point calibration: Calibrate the gas zero point. The user zero point interface (as shown in Figure 16) will continue to pass in gas suitable for zero point calibration for a certain period of time. After the value is stable, click the middle button to confirm and save. There will be a corresponding prompt on the screen when the save succeeds or fails (Figure 17).

Zero drift: After the sensor is used for a long time, the zero point is offset, and the display is not zero in the clean air, and it can be returned to zero through the zero point translation (Figure 18).

Concentration calibration: enter the corresponding concentration gas, and perform concentration calibration on the gas.

One-key zeroing: zeroing all the gases in use in the detector.

Factory reset: restore all configuration information of the sensor module before leaving the factory.

Note: A series of operations such as zero point calibration have been carried out before the detector leaves the factory, and the user can directly use it normally. If the user does not operate without the manufacturer's guidance, all the consequences shall be borne by himself.

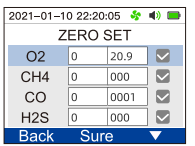


Figure 16

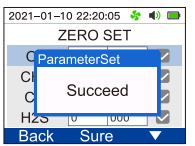


Figure 17

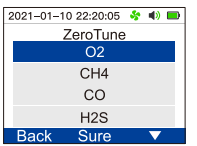


Figure 18

5.6.4 System setting

Select the system setting in the main menu of the detector, and click the middle button to enter the system setting interface (Figure 19). The setting options include: time setting, backlight setting, language setting, pump setting.

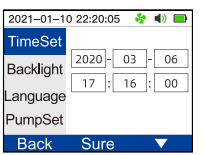


Figure 19

Time setting: Follow the navigation bar prompts to set the system time (Figure 19).

Backlight setting: Set the brightness of the instrument's backlight, there are three levels in total, and you can also set the backlight delay time (Figure 20).

Language setting: Set the system display language (Figure 21).

Pump settings: set the pump switch (as shown in Figure 22), in the main interface state, press the left and right keys at the same time, the air pump can be directly turned on or off.

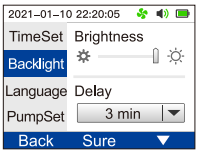


Figure 20

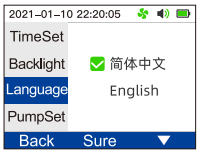


Figure 21

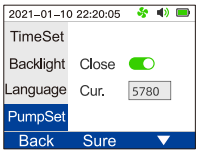


Figure 22

5.6.5 Device information

Select the system information icon in the main menu interface of the detector, and click the middle button to enter the system information view interface (Figure 23). Click the middle button to return to the previous menu.

Figure 23

6. Charging function description

When the interface prompts "The voltage is too low! Please charge!" or the detector cannot be turned on normally due to undervoltage, please charge in time; when the detector is off, connect the charger plug to the charging jack of the detector, and then Plug the charger's AC plug into the AC220V AC power supply, the detector will automatically turn on and display the charging status (Figure 24). After the charging is completed, the interface will display "Charging Complete" (Figure 25). Turn on the detector for normal use.

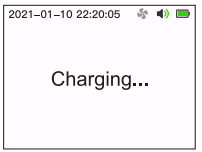


Figure 24

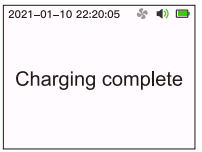


Figure 25

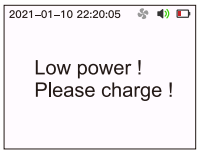


Figure 26

Undervoltage

When the battery is insufficient, the interface prompts "The voltage is too low! Please charge!" every 1 minute (Figure 26).

Undervoltage shutdown

When the battery power is lower than the normal working voltage, the instrument enters an automatic shutdown countdown, and the instrument shuts down after the countdown ends (Figure 27).

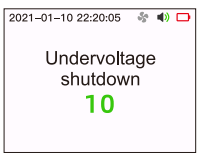


Figure 27

Note: Please try not to charge the tester when it is turned on, so as not to affect the charging speed; please do not charge the tester at the test site, so as to avoid unplugging and plugging the charger.Sparks cause fire or explosion.

7. Possible fault and corresponding solution

Possible fault	Possible reason	Corresponding solution
The detectorcan't be turned on	Too low battery	Please charge it in time.
	The detector dies	Please contact the manufacturer of dealer
	Fault of electric circuit	Please contact the manufacturer of dealer
No response to the gas	Warm up is not finished	Wait till warm up is finished
	Fault of electric circuit	Please contact the manufacturer of dealer
Inaccurate indication	Sensor is overdue	Please contact the manufacturer or dealer to replace the gas senor
	Uncalibrated for long time	Please calibrate it in time
Fault indication of time	Battery voltage is used up	Please charge it and reset time
	Strong electromagnetism disturb	Please reset time
Zero calibration is unavailable	Too much zero drift of gas sensor	Please calibrate or replace the gas sensor
Minus gas level displayed	Gas sensor drift	Calibrate zero point
Sensor fault indication	Sensor fault	Please contact the manufacturer or dealer to replace the gas senor

8. Accessories and others

220V charger and cable	1pcs
Small screwdriver	1pcs
Soft tube	1pcs
User manual and Certificate of conformity	1pcs
Natural diffusion plastic board	1pcs

9.Precautions for use

a. Prevent the instrument from falling from a height or subject to strenuous exercise

b. In a high-concentration gas environment, the detector may cannot be used normally.

c. Please strictly follow the operation and use specifications in the manual, otherwise it may cause inaccurate test results or damage the instrument.

d. This product must not be stored or used in an environment containing corrosive gases (such as high concentration of chlorine, etc.), nor in other harsh environments, including excessively high or low temperatures, high humidity, strong electromagnetic fields, etc. Use or store this machine.

e. If there is dirt on the surface of the instrument after long-term use, please wipe it gently with a clean soft cloth dipped in water. It is forbidden to wipe the surface of the instrument with corrosive solvents and hard objects, otherwise it may cause scratches or damage to the instrument surface.

f. In order to ensure the detection accuracy of the instrument, the instrument should be calibrated regularly, and the calibration period should not exceed one year.

g. The battery pack cannot be disassembled or replaced in an explosive gas environment, nor can the battery be charged; in an explosive gas environment, peripheral plug-in instruments that have not been certified for explosion-proof cannot be used, and sensors cannot be replaced.

h. When the surface of the filter element at the gas sampling hole is seriously polluted, please replace the filter element in time to ensure the sensitivity and accuracy of the gas detection.

10. Sotre

The detector should be stored in a ventilated room with an ambient temperature of -10℃~50℃ and a relative humidity of not more than 85%, and the air must not contain harmful gases or impurities that may corrode the detector.

Appendix I Table1

Model	Range	L-alarm	H-alarm
CH4	0-100%LEL	20%LEL	50%LEL
C3H8	0-100%LEL	20%LEL	50%LEL
H2	0-100%LEL	20%LEL	50%LEL
H2	0-1000ppm	35ppm	250 ppm
H2S	0-100ppm	10ppm	15ppm
H2S	0-100ppm	10ppm	20ppm
CO	0-1000ppm	35ppm	200ppm
CO	0-1000ppm	30ppm	60ppm
C2H4O	0-20ppm	10ppm	15ppm
C2H4	0-100%LEL	20%LEL	50%LEL
C2H4	0-20ppm	5ppm	10ppm
O2	0-30%vol	19.5%vol	23.5%vol
C2H5OH	0-100%LEL	20%LEL	50%LEL
NH3	0-100ppm	25ppm	50ppm
CL2	0-20ppm	5ppm	10ppm
O3	0-20ppm	5ppm	10ppm
O3	0-10ppm	2ppm	5ppm
SO2	0-20ppm	2ppm	5ppm
SO2	0-100ppm	2ppm	5ppm
PH3	0-20ppm	0.3ppm	5ppm
PH3	0-5ppm	0.3ppm	2ppm
CO2	0-5000ppm	1000ppm	2000ppm
CO2	0-50000ppm	1000ppm	2000ppm
NO	0-250ppm	20ppm	50ppm
NO2	0-20ppm	5ppm	10ppm
HCN	0-500ppm	10ppm	20ppm
HCN	0-50ppm	10ppm	20ppm
HCL	0-50ppm	10ppm	20ppm
CH2O	0-10ppm	2ppm	5ppm
VOC	0-100ppm	20ppm	50ppm
C6H6	0-100ppm	20ppm	50ppm

Appendix II Installation mode of Pump

1.Unscrew the screw above the back clamp.

2.Remove the front natural diffusion card.

3.Align the pump with the bayonet on the machine and insert it.

4.Tighten the connecting screws above the back clip.