BH-4S

Portable Multi-gas Detector
User Manual

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supereyes.ru СУПЕРАЙС

Bosean Electronic Technology Co.,Ltd

ISO9001-2008

Brief Introduction

BH-4S portable multi-gas detector could detect combustible gas, O2 and other two types toxic gases continuously and simultaneously. It is widely used in the area where explosion-proof is required or toxic gas leaks, like underground channels or mining industry, so as to protect the workers' life and avoid damage on the relevant equipments.

1. Main features

* Natural diffusion sampling method and high-sensitivity sensor, with high sensitivity and repeatability.
* 32-bit built-in MCU, high reliability and self-adaptation ability.
* Full functions, easy operation.
* CSTN colorful LCD, more intuitionistic, abundant and clear indication.
* Compact design, easy carrying.
* High strength engineering plastics and compound anti-slippery rubber; high strength, water-proof, dust-proof and explosion-proof.

2. Structure & Function

2.1 Appearance

Fig. A

No.	Name	No.	Name
1	Alarm light	4	Buzzer
2	Button	5	Sensors
3	LCD screen		

2.2 Detector structure: the main shell, circuit boards, batteries, display, sensors, chargers of the components.

2.3 Principle: Electrochemical and Catalytic sensor.

3. Technical Data

Target Gas	Range	Low alarm	High alarm	Resolution
LEL	0～100%LEL	20%LEL	50%LEL	1%LEL
H_2S	0～100ppm	10ppm	35ppm	1ppm
CO	0～999ppm	50ppm	150ppm	1ppm
O_2	0～30%vol	19.5%vol	23.5%vol	0.1%vol
Other gases needed, please contact supplier				

Gas sampling method: Natural diffusion

Detecting gas: Combustible gas, H2S, CO, O2

Accuracy: ≤±5% F.S.
Response Time: ≤30s
Indication: LCD displays real-time and system status; LED, audio and vibration alert for gas leakage, fault and low voltage.
Working environment: -20℃～50℃, ＜95%RH (no dew)
Power Source: DC3.7V Li-on battery, 2000mAh
Charging time: 6h~8h
Working time: ≥ 8h continuously (without alarming)
Gas Sensor Life: 2 years
Explosion-proof grade: Ex ib IIB T3 Gb
Protection Grade: IP65
Weight: Appr. 400g (with battery)
Dimensions: 130mm×67mm×30mm(L × W × H)

4. Operation & Function

4.1 Turn on

Press the button for 3s and then release it. After the buzzer gives short sound once, the detector is turned on. After 10 seconds, it enters detecting status. At this time, it displays the concentration of O2, H2S, CO and Combustible gas in the environment as figure 1.

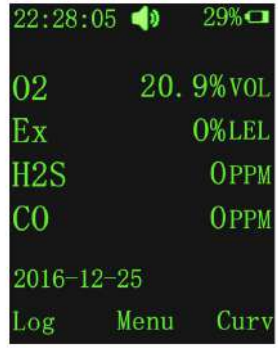


Fig.1

4.2 Turn off

Under power on status, press ⏻ button for more than 3s, With the buzzer issued a "beep" sound, the LCD screen prompts the user to shut down the interface shown in Figure 2, the user through the ▲ ▼ keys to select whether to shut down, if you choose to shut down, the screen no longer display any information, the detector into the shutdown state.

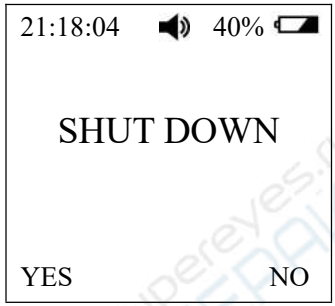


Fig. 2

4.3 Button function

Detector in the normal detection state as shown in Figure 3:

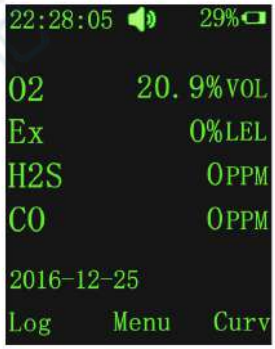


Fig. 3

Press any key to open the back light (user can set back light time)
Press "⏻" key to enter the menu;
Press "▲" key to enter the alarm record;
press "▲ ▼" key to select the alarm log to view the alarm record details.
Press "▼" key to enter the gas concentration curve display interface;
press "▲ ▼" key to view the different gas type concentration value curve.

4.3.1 When the detector detects the gas concentration is lower than the pre-set low alarm value (Note: when the concentration of oxygen is higher than the low alarm value and lower than the high alarm value), the detector is in the normal state, No alarm at this state.
4.3.2 When the detected gas concentration is higher than the preset low alarm value and less than the high alarm value (Note: when the oxygen concentration is lower than the low alarm value), the detector is in a low alarm state, the buzzer sends out every 1s "beep, beep" alarm sound, the red light flashes synchronously, and the gas concentration value on the screen changes the color to yellow, the back light and the vibrator are also open, indicate low alarm; press "⏻" key to mute, but still shows the alarm information. Until the new alarm is triggered, the buzzer is resumed and the alarm light, the vibrator are restored. When the detector detects the gas concentration value below the low alarm value, the gas concentration value color turns green, the alarm signal will be released automatically. Alarming state shown in Figure 4.

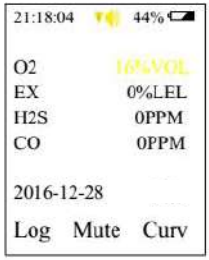


Fig. 4

4.3.3 When the detected gas concentration is higher than the pre-set high alarm value, the detector is in the high alarm state, then the buzzer sends every 1s "Di Di Di Di, ... Di Di Di Di" And the red indicator light flashes synchronously, the change of the gas concentration value is displayed on the screen. The color becomes red, the back light and the vibrator are also on, indicate high alarm; press "⏻" key to mute, but still Display alarm information. Until the new alarm is triggered, the buzzer is resumed and the alarm light, the vibrator are restored. When the detector detects the gas concentration value below the low alarm value, the gas concentration value color turns green, the alarm signal will be automatically released. the alarm signal will be released automatically. Alarming state shown in Figure 5.

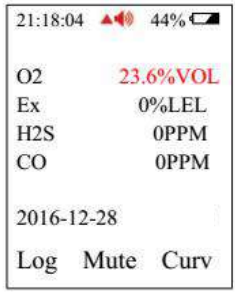


Fig 5.

4.3.4 When the detected gas concentration is higher than the test range, the buzzer sounds "beep, beep", the LCD screen is on, the vibrator is on, and the screen Display the maximum range of gas, indicating over range. Press the "⏻" key to release the alarm.

4. 3.5 Normal monitoring interface under the first line shows the time, alarm signs ⚠(it occurs when there is alarm, yellow color with low alarm, red color with high alarm), the buzzer instructions (normal 🔊, mute 🔇), battery percentage, battery power, date and temperature,

Note: The alarm sound above can be manually cleared by pressing the "⏻" key. After clearing, the alarm information is still displayed normally. If the alarm is triggered again, the corresponding alarm sound information can be issued again.

4.4 Use and set functions

The detector has a total of alarm record function, gas concentration curve display, gas parameters setting, calibration, zero calibration, language settings, information viewing, back light settings, time settings and other functions. Press the "⏻" button to enter the function selection, in the function selection interface to move the cursor to “return” words, continue to press "⏻" to return to the normal monitoring interface as shown in Figure 6.

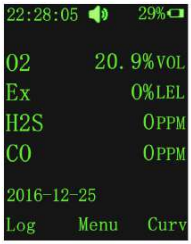


Fig. 6

4.4.1 Alarm record and alarm curve

a. Alarm record function:

Detector in the normal detection of the main interface, press ▲ to enter the alarm recording interface, the record includes the alarm sensor name, alarm type, alarm value, alarm time. As shown in Figure 7: This feature can view the gas alarm history, easy checking.

As shown in the following table:

Sensor	Type	Value	No.	Remark
O2	↑(H)	30	1/4(Current/Total)	
Ex	↑(H)	80	2/4(Current/Total)	
H2S	↑(H)	58	3/4(Current/Total)	
CO	↓(L)	127	4/4(Current/Total)	
2016-06-16 12:15:35			Alarm time	

The alarm log value is the maximum alarm value in the alarm interval (O2 is the lowest). The maximum number of record groups is 500.

b. Curve display function:

The detector in the normal detection of the main interface, press the ▼ to enter the curve display interface, this time through the ▲ ▼ button to view each channel sensor gas concentration curve. Each channel sensor has a curve display.

Oxygen as an example:

<table>
<tr><td rowspan="4">

Fig.7</td><td>Description</td></tr>
<tr><td></td></tr>
<tr><td>The abscissa X axis is the time, the current record within 9s of the curve</td></tr>
<tr><td>The vertical axis Y is the sensor value, data of the sensor can be seen from the Y axis</td></tr>
<tr><td colspan="2">Note: the axis and the data is green, the data curve is blue, the low alarm line is yellow, high alarm line is red.</td></tr>
</table>

4.4.2 Detector menu settings

In the normal detection mode, press "⏻" key to enter the menu, then press ▲ ▼ key to select the setting of gas parameters, calibration, calibration zero, language settings, information view, back light settings, time setting function. These function menus can be displayed cyclically and can be selected by cursor movement.

The menu function is as follows:

	Description	Operation
	Return	Press ▲ ▼ key to move the cursor to the return function, press "⏻" to return to the main interface.
	Setting	Four sensor parameters can be set, including the gas type, unit selection, high alarm and low alarm, range settings.
	Calibration	Can be calibrated for the sensors
	Zero	Zero calibration

	Language	Choose language
	Information	Soft version and date of manufacture
	Back light	Setting the time of back light
	Time set	Set the date and the time

4.4.3 Parameter setting of the detector

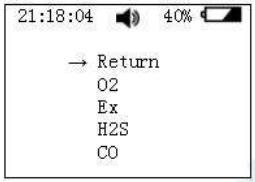
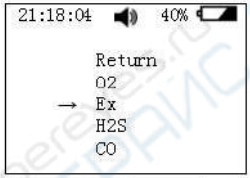
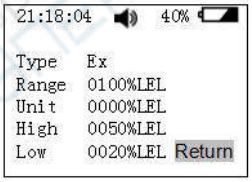
Display	Description
   Fig.8 Fig.9	1. Move the cursor to set and press " ⏻ " to enter set interface, input four passwords, as shown in Figure 8, the user can press " ⏻ " to move the cursor, input the password by ▲ ▼ key, sensor parameters as shown in Figure 9.
  Fig.10 Fig.11	2. Gas parameters setting Parameter settings include gas type, unit select, high alarm and low alarm, range settings. As an example with Ex, as shown in Figure 10, use the ▲▼key to select the gas type (Ex),press the ⏻ to enter Ex gas parameter settings, As shown in Figure 11, use the▲▼key to modify the parameter, after done, press the return. If no special requirements, alarm value parameters should not be modified.

Fig. 12

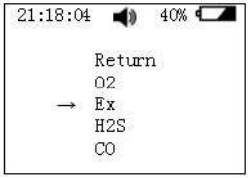


Fig. 13

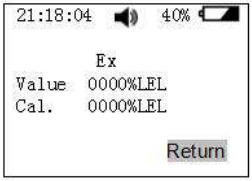


Fig. 14

3. Zero Calibration

In the menu function interface, select the Zero, press" ⏻ " key to enter the password interface shown in Figure 12, input the correct password, the same need to select the zero gas type, still with Ex as an example shown in Figure 13, Press the " ⏻ " key to move the cursor, use the ▲ ▼ key to modify the zero parameter value, as shown in Figure 14, modify the cursor to move to the last press the ▼ key to return to the previous menu.

Warning: 1. zero calibration, please ensure make it in the clean air, otherwise will affect the accuracy of gas detector.

2. the detector have been made calibration with standard gas in factory, the user should not operate this.

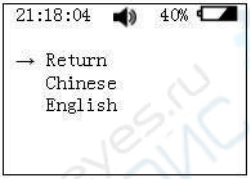


Fig.15

4. Language

In the menu function interface, select the language, press the " ⏻ " key, you can see the interface shown in Figure 15, through the ▲ ▼ key to move the cursor to select language.

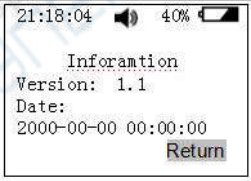
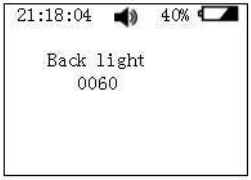


Fig.16

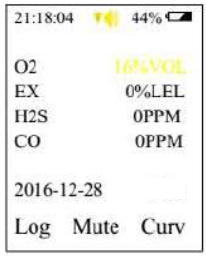
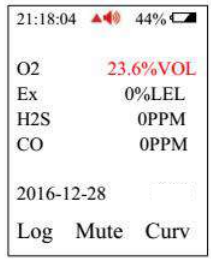
5. Information

In the menu function interface, select the information, press the " ⏻ " key, you can see the product information shown in Figure 16, including software version, factory date.

 Fig.17	6. Back light In the menu function interface, select the light, enter the back light settings interface as shown in Figure 17, press the " ⏻ " key to move the cursor, use the ▲ ▼ key to set the seconds, the maximum can be set to 60S.
 Fig. 18	7. Time set In the menu function interface, select the time, enter it as shown in the figure 18, press the " ⏻ " key to move the cursor, use the ▲ ▼ key to set the current system time, press the ▼ key return to the main menu.

4.4.4. Alarm information

The following table shows the details of each alarm:

Alarm type	Display
Low alarm: Slowly tweak the alarm tone The alarm indication is yellow The red alarm light flashes vibrating	
High alarm: Abnormal harsh tone of the drop alarm sound The alarm indication is red The red alarm light flashes vibrating	

4.5. Charging

Please charge the detector when it shows low battery or the detector can't be turned on due to low battery. Before charging, please turn off the detector. After you connect the charger correctly between the detector and AC power source, the detector will be turned on automatically. When the battery mark on the screen is full and doesn't change any more, it means the charging is completed. Please pull off the charger.

Warning: During charging status, the detector can't detect the gas leakage. Please do not try to charge it at testing places to avoid fire or explosion. Please do not charge it when the detector is working to avoid potential damage.

Note: Make sure full charge for at least once within 3 months since production date.

5. Possible fault and corresponding solution

Possible fault	Possible reason	Corresponding solution
The detector can'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

6. Notices

6.1 Falling down from high places or strong shake is prohibited.

6.2 The detector may not work properly at interferential high-concentration gas.

6.3 To avoid incorrect result or possible damage to the detector, please operate and handle the detector in accordance with the manual.

6.4 The detector should be not stored or used neither under the circumstance with caustic gas (such as Cl_2), nor under the other rugged circumstances, including excessive high or low temperature, high humidity, electromagnetic field and strong

sunshine.

6.5 If there is dust on the surface of the detector after a long-term use, please clean it lightly with clean soft cloth. The surface may be scraped or destroyed with caustic solvent or hard things.

6.6 To assure the testing accuracy, the detector should be calibrated periodically. And the calibration period should be less than one year.

6.7 Please put the used Lithium batteries to the appointed places or send to our company. Don't discard them into the dustbin at random.

7. Standard accessories:

Suit case packaging	1pc
Charger	1pc
Calibration cap	1pc
Communications cable	1pc
User manual	1pc

Henan Bosean Electronic Technology Co.,Ltd.
No.228,West 4th Ring,National High-Tech zone,Zhengzhou,China
Tel: +86 371 86533226
Fax: +86 371 86533226
E-mail: sales03@bosean.com
Website: www.bosean.com