# BH-4S

# Portable Multi-gas Detector User Manual

Ver: BSA20150424001

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.

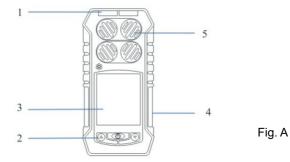


#### 1. Main features

- \* 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



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 <sub>2</sub> S	0~100ppm	10ppm	35ppm	1ppm
CO	0~999ppm	50ppm	150ppm	1ppm
O <sub>2</sub>	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:  $-20\,^{\circ}\mathrm{C} \sim 50\,^{\circ}\mathrm{C}$ , <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:  $130 \text{mm} \times 67 \text{mm} \times 30 \text{mm} (L \times W \times H)$ 

## 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.

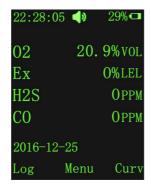


Fig.1

#### 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.

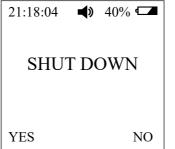


Fig. 2

#### 4.3 Button function

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

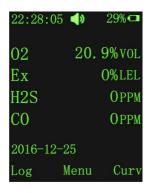


Fig. 3

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.

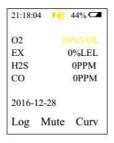


Fig. 4

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.

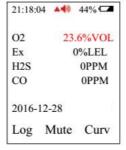


Fig 5.

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- 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

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#### 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	Туре	Value	No.	Remark
02	<b>1</b> (H)	30	1/4(Current/Total)	
Ex	<b>1</b> (H)	80	2/4(Current/Total)	
H2S	<b>↑</b> (H)	58	3/4(Current/Total)	
СО	<b>↓</b> (L)	127	4/4(Current/Total)	
2016-06-16 12:15:35		Alarm time		

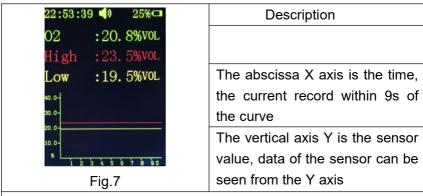
The alarm log value is the maximum alarm value in the alarm interval (O2 is the lowest). The maximum number of record groups is 500.

# b. Curve display function:

The detector in the normal detection of the main interface, press  $% \left( 1\right) =\left( 1\right) \left( 1\right) \left$ 

- the lacktriangledown 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:



Note: the axis and the data is green, the data curve is blue, the low alarm line is yellow, high alarm line is red.

# 4.4.2 Detector menu settings

In the normal detection mode, press "

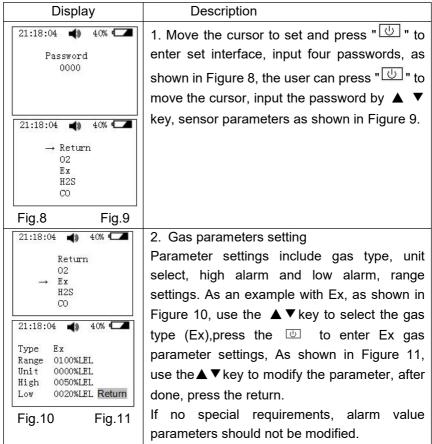
" key to enter the menu, then press ▲ ▼ key to select the setting of gas parameters, calibration, calibration zero, language settings, information view, back light settings, time setting function. These function menus can be displayed cyclically and can be selected by cursor movement.

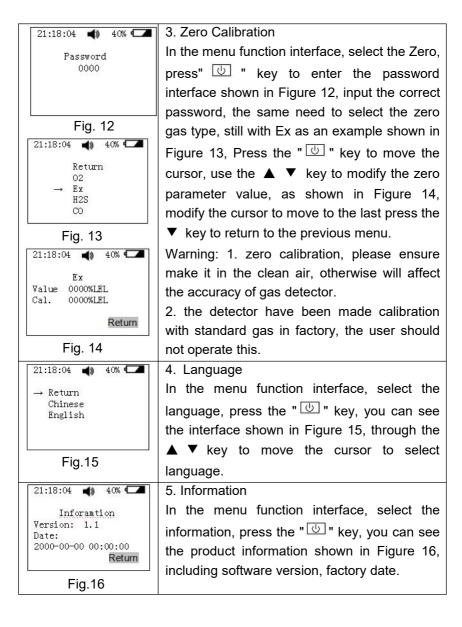
The menu function is as follows:

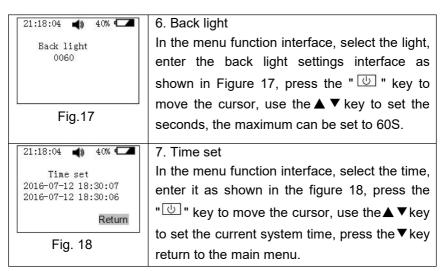
	Description	Operation
•	Return	Press ▲ ▼ key to move the cursor to the return function, press " to return to the main interface.
<b>Q</b>	Setting	Four sensor parameters can be set, including the gas type, unit selection, high alarm and low alarm, range settings.
×	Calibration	Can be calibrated for the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

<b>2</b>	Language	Choose language
0	Information	Soft version and date of manufacture
•	Back light	Setting the time of back light
(1) (24h)	Time set	Set the date and the time

# 4.4.3 Parameter setting of the detector







#### 4.4.4. Alarm information

The following table shows the details of each alarm:

Alarm type	Display
Low alarm:	21:18:04 14%
Slowly tweak the alarm tone The alarm indication is yellow The red alarm light flashes vibrating	O2
High alarm: Abnormal harsh tone of the drop alarm sound The alarm indication is red The red alarm light flashes vibrating	21:18:04 ▲ 44% ← O2 23.6% VOL Ex 0% LEL H2S 0PPM CO 0PPM 2016-12-28 Log Mute Curv

# 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	Too low battery	Please charge it in time.
can't be turned	The detector dies	Please contact the
on		manufacturer of dealer
	Fault of electric	Please contact the
	circuit	manufacturer of dealer
No response to	Warm up is not	Wait till warm up is
the gas	finished	finished
	Fault of electric	Please contact the
	circuit	manufacturer of dealer

Inaccurate	Sensor is overdue	Please contact the
indication		manufacturer or dealer to
marcation		replace the gas senor
		-
	Uncalibrated for long	Please calibrate it in time
	time	
Fault indication	Battery voltage is	Please charge it and reset
of time	used up	time
	Strong	Please reset time
	electromagnetism	
	disturb	
Zero calibration	Too much zero drift	Please calibrate or
is unavailable	of gas sensor	replace the gas sensor
Minus gas level	Gas sensor drift	Calibrate zero point
displayed		
Sensor fault	Sensor fault	Please contact the
indication		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<sub>2</sub>), 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

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