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# **BH-4A**

## **Portable Multi-gas Detector**

Operation Manual



## 1. Brief Introduction



BH-4A portable multi-gas detector could detect combustible gas, O<sub>2</sub> 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.

### 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.
- \* Large 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



### 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
EX	(0-100)%LEL	20%LEL	50%LEL	1%LEL
H <sub>2</sub> S	(0-100)ppm	10ppm	35ppm	1ppm
CO	(0-1000)ppm	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, H <sub>2</sub> S, CO, O <sub>2</sub>
Accuracy	≤±5%FS
Response Time	T <sub>90</sub> <30s
Indication	LCD displays real-time and system status; LED, audio and vibration alert for gas leakage, fault and low voltage.
Working environment	-20°C~50°C, <95%RH (no dew)
Power Source	DC3.7V Li-on battery, 1800mAh
Explosion-proof grade	Exib IIB T3 Gb
Charging time	6h-8h
Working time	≥ 8h continuously (without alarming)
Gas Sensor Life	2 years
Dimensions	130*67*30mm
Weight	400g

### 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 O<sub>2</sub>, H<sub>2</sub>S, CO and Combustible gas in the environment as figure 1.

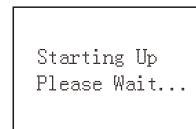


Fig. 1

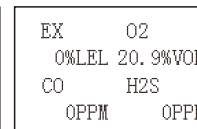



Fig. 2

#### 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.

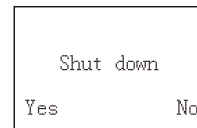


Fig. 3

### 4.3 Button function

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

EX	O2
0%LEL 20.9%VOL	
CO	H2S
PPM	PPM

Fig. 4

Press any key to open the back light (user can set back light time)  
 Press "⏻" key to enter the menu;  
 Press "▲" key to enter battery interface; Press again to return normal detection state;

**【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.

**【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.

**【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】** Under normal detecting interface, press "▲" key will appear the power, date and time display, when the power is reduced to under voltage state 20% of the electricity, will occur in different states of sound, light, vibration tips, every minute prompted once, continuous prompt 15 minutes, if not charging, the detector will be shut down automatically. press "▲" key again or 2 seconds, the detector will resume to normal detection state, as shown figure 4 and 5:

EX	O2
0%LEL 20.9%VOL	
CO	H2S
PPM	PPM

Fig. 5

DATE: 17.8.15
TIME: 09:38
BATT:3.8V 57%
VERSION:V1.2

Fig. 6

**【4.3.6】** If the use of the sensor exceeds the specified number of years, the display will continue to alarm "full range alarm", said the failure, the results may not be accurate at this time, for reference only. In there is not carbon monoxide leakage, carbon monoxide continued to show 1000 full range alarm, indicating that the sensor has failed or damaged.

**Note:** The above alarming sound can be muted by ▼ key, but still display alarm information. Until the new alarm is triggered, the buzzer is resumed and the alarm light, the vibrator are restored.

4.4 Use and set functions

The detector has a total of zero set, zero calibration, calibration, high alarm set, low alarm set, time set, ESC, turn off functions. Press the "⏻" button to enter the function selection, in the function selection interface to move the cursor, press "⏻" to enter it.

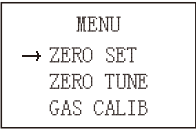


Fig. 7



Fig. 8



Fig. 9

4.4.1 Zero setting

Press "⏻" to enter the zero setting, press the "▲" key and the "▼" key to select the different gas types. Press "▲" key to cancel the return menu interface, press "▼" key to save. After the success of the program, the normal detection interface of the "combustible gas" value will become 0.

**WARNING:** This operation must ensure that it is operated in clean air or pure nitrogen (note that oxygen must be stored at high concentrations of pure nitrogen), otherwise it will affect the accuracy of the instrument and cause the instrument to not work properly.

4.4.2 Zero tune

The operation is only carried out before the factory. It is forbidden for anyone other than the manufacturer's technical staff to operate.

4.4.3 Gas calibration (Professionals to do this only)

Press the "⏻" key to display the input password interface. Press "▲" key to move the cursor to select, press "▼" key to indicate "\*" to indicate the value of the increase. Enter "1111" to enter the gas calibration interface. For gas type selection, take the gas as an example. Press "▲" key to move the cursor to select, press "▼" key to indicate "\*" to indicate the value of the increase. Set the calibration value, the standard cylinder concentration value is set to the calibration value. Press the "⏻" key to enter the ventilation interface, as shown in the figure shows the true value, this time the instrument screw on the black standard hood, open the standard cylinder into the standard gas, observe the value slowly rise, 2 minutes after the numerical stability, press "▼" key Save, save successfully, calibration steps to complete. If you accidentally enter the interface, press the "▲" key to cancel the exit interface directly. Recommended flow control at 500ml / min.

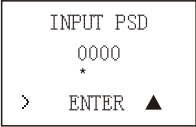


Fig. 10



Fig. 11

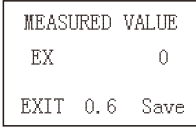


Fig. 12

**Note:** the factory has been carried out before the gas calibration, the user does not need their own calibration, all the consequences of their own commitment. If you want to calibrate, please strictly follow the steps, the first zero set (oxygen must be in high purity nitrogen) and then gas calibration.

#### 4.4.4 Alarm record

Press the "⏻" key to enter the alarm record, it displays four different gas alarm situation. The first column shows the gas type, the second column shows the number of high alarms, and the third column shows the number of low alarms. Turn off does not affect the alarm record. Press "▲" "▼" key to return to the menu interface, press "⏻" key to clear the alarm record. "Yes" All alarms are reset to zero, "no" returns to the menu interface.

EX	000 010
O2	001 020
CO	000 000
H2S	000 000

Fig. 13

Clear Record?	
Yes	No

Fig. 14

#### 4.4.5 Low alarm set

Press the "⏻" key to enter the low alarm set. Press the "▲" "▼" to select the gas type,value adjustment to the Ex as an example. As shown in the figure, the combustible gas factory defaults low 20. "▲" Key for bit selection, "▼" key to modify the corresponding bit value, "⏻" key to save the set alarm point. If you do not need to set, press the "⏻" key to save and return menu interface.

Warning: This parameter has been set according to the relevant standards, if no other special requirements, the alarm value parameters do not have to set.

LOW ALARM	
EX	
▲	SAVE ▼

Fig. 15

LOW ALARM	
0020	
*	
>	SAVE ▼

Fig. 16

#### 4.4.6 High alarm set

The parameter set is similar as low alarm set method, please refer to the low alarm.

Warning: This parameter has been set according to the relevant standards, if no other special requirements, the alarm value parameters do not have to set.

#### 4.4.7 Time set

As shown in the figure, the time set interface, "▲" key for bit selection,"▼"key to modify the corresponding bit value," key to save.To save the settings year, month, date, hour, minute, set the minutes after the prompt "is saving please wait"

Indicates that the save was successful. Time is 24 hours.

EDIT YEAR	
2020	
*	
>	SAVE ▼

Fig. 17

#### 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. Standard accessories

Gas detector	1pc	User manual	1pc
Calibration cap	1pc	Suit case packaging	1pc
Charger	1pc	Warranty card	1pc

#### 6. 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 sensor
	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 electromagnetic 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 sensor

## 7. Notices

1. Falling down from high places or strong shake is prohibited.
2. The detector may not work properly at interferential high-concentration gas.
3. To avoid incorrect result or possible damage to the detector, please operate and handle the detector in accordance with the manual.
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.
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. To assure the testing accuracy, the detector should be calibrated periodically. And the calibration period should be less than one year.
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.

**Affix. Table1**

Model	Range	L-alarm	H-alarm
CH <sub>4</sub>	0-100%LEL	20%LEL	50%LEL
C <sub>3</sub> H <sub>8</sub>	0-100%LEL	20%LEL	50%LEL
H <sub>2</sub>	0-100%LEL	20%LEL	50%LEL
H <sub>2</sub>	0-1000ppm	35ppm	250 ppm
H <sub>2</sub> S	0-100ppm	10ppm	15ppm
H <sub>2</sub> S	0-100ppm	10ppm	20ppm
CO	0-1000ppm	35ppm	200ppm
CO	0-1000ppm	30ppm	60ppm
C <sub>2</sub> H <sub>4</sub> O	0-20ppm	10ppm	15ppm
C <sub>2</sub> H <sub>4</sub>	0-100%LEL	20%LEL	50%LEL
C <sub>2</sub> H <sub>4</sub>	0-20ppm	5ppm	10ppm
O <sub>2</sub>	0-30%vol	19.5%vol	23.5%vol
C <sub>2</sub> H <sub>5</sub> OH	0-100%LEL	20%LEL	50%LEL
NH <sub>3</sub>	0-100ppm	25ppm	50ppm
Cl <sub>2</sub>	0-20ppm	5ppm	10ppm
O <sub>3</sub>	0-20ppm	5ppm	10ppm
O <sub>3</sub>	0-10ppm	2ppm	5ppm
SO <sub>2</sub>	0-20ppm	2ppm	5ppm
SO <sub>2</sub>	0-100ppm	2ppm	5ppm
PH <sub>3</sub>	0-20ppm	0.3ppm	5ppm
PH <sub>3</sub>	0-5ppm	0.3ppm	2ppm
CO <sub>2</sub>	0-5000ppm	1000ppm	2000ppm
CO <sub>2</sub>	0-50000ppm	1000ppm	2000ppm
NO	0-250ppm	20ppm	50ppm
NO <sub>2</sub>	0-20ppm	5ppm	10ppm
HCN	0-500ppm	10ppm	20ppm
HCN	0-50ppm	10ppm	20ppm
HCL	0-50ppm	10ppm	20ppm
CH <sub>2</sub> O	0-10ppm	2ppm	5ppm
VOC	0-100ppm	20ppm	50ppm
C <sub>6</sub> H <sub>6</sub>	0-100ppm	20ppm	50ppm