AQUA GAS

BH-90A

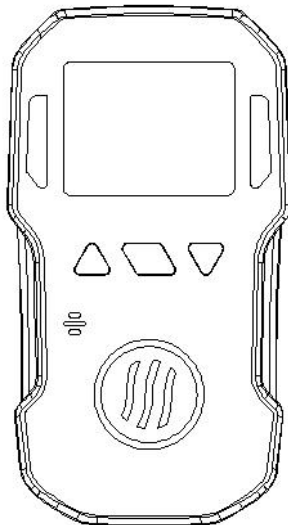## PORTABLE SINGLE GAS DETECTOR

User Manual

Ver: BSA20150424005

To avoid personal safety injury, Instrument damage and potentially dangerous accident; do not use the product before reading this manual.

1. Description

BH-90a portable single gas detector can make continuous detection to combustible and toxic gases. It is suitable for combustible and toxic gas leakage detection in underground pipe or mines, keeps the workers safe, and prevents the facilities from being destroyed.

The detector, adopting excellent-quality sensor, makes detection in the way of natural diffusion. It has good sensitivity and reproducibility. The detector adopts embedded MCU controller, easy to operate.

The shell adopts special high strength material and anti-smooth rubber, with the characters of waterproof and dust-proof.

2. Main features

2.1 Features

- Advanced MCU control with low power consumption;
- Adjustable low and high alarm level;
- Adjustable calibrating level;
- High concentration protection for combustible gas;
- Self-test for the combustible gas sensor;
- Low battery indication;
- Self-adjustment function
- Visual and audible alarm with vibration;
- Advanced self-examination and self-renovation function;
- Password management to avoid wrong operation;
- Explosive proof housing.

2.2 Specifications

Range: See attached table 1.

Gas Detected: combustible gas (CH4,C3H8,H2) and toxic gas, oxygen, Other rare toxic gas like ammonia, NO, PH3, NH3, NO2, HCN, SO2 etc also available. Can bespecified by the Customer in advance.

Alarm set points: see attached table 1.

Accuracy: ≤±5% F.S.

Response time: T<30s

Indication: LCD indicates the time and state

Indication of alarm, fault and low voltage with LED, sound, vibration

Operating Environment:

Operating temperature: -40℃～70℃ (for combustible gas)

Operating temperature: -10℃～55℃ (for toxic gas)

Humidity: <95%RH non-condensing

Operating voltage: DC3.7V Li battery 1500mAh

Working time: < 8h continuously

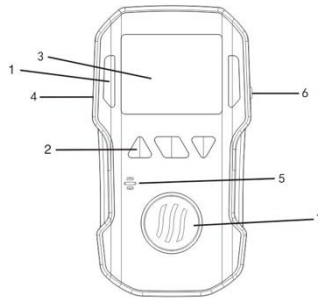**Charging time**: 4h～6h

Sensor life: 2 years

Protection category: IP65

Weight: about 130g (including battery but without accessories)

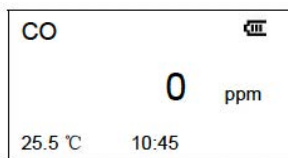**Dimension:** 109mm×60mm×30mm

3. Structure & Function

3.1 Appearance

No.	Name	No.	Name
1	Alarm light	5	Buzzer
2	Button	6	USB charging connection
3	LCD screen	6	Sensor
4	Back clip		

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

3.3 Principle: Electrochemical and Catalytic sensor.

4. Operation & Function

4.1 Display Elements

CO	Gas type	10:45	Time
	Full Voltage	ppm	Concentration value
25.5ºC	Temperature		

4.2 Push buttons

Push button	Description
	• To active the detector, press and hold it for 5 seconds • Press it to cancel the operation • To deactivate the detector, press and hold it for 5 seconds • Press it to set up the parameters
▼ ▲	• Can check parameters, alarm record, low alarm, high alarm, zero calibration, calibration, time set

4.3 Turn on

Press the button 🔘 for 5s and then release it. The interface shows "Starting", "LED Testing", and then vibrates with "Motor Testing", then beep and flashes with "Sound and Alarm Testing", shows low alarm value, high alarm value, detecting range, it enters in to detecting status.

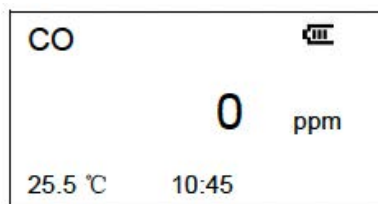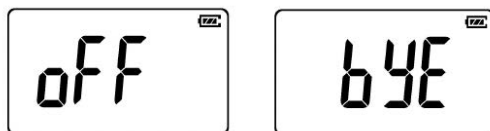At this time, it displays the concentration of gas in the environment as figure 1.

Fig. 1

4.4 Turn off

To deactivate the detector, press ⌨ key, then it displays the following information.

At this time, the buzzer gives beep sound. After 3 seconds, when it displays the following figure on the screen, loosen the ⌨ key. The detector is turned off.

Attentions: When the detector is not detecting status, press continuously till it returns to the detection mode.

4.5 Menu operating instructions

The user menu contains the following options:

Zero calibration, calibration, time set, alarm record, low alarm settings, high alarm settings, unit set.

In the detection state, press ⌨ key, the screen displays the following screen, directly into user menu as shown in figure 2:
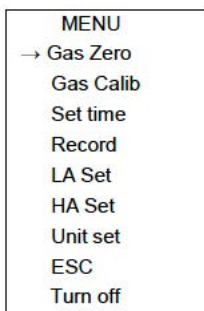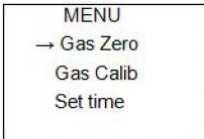
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MENU
→ Gas Zero
  Gas Calib
  Set time
  Record
  LA Set
  HA Set
  Unit set
  ESC
  Turn off
```
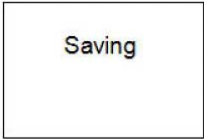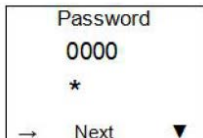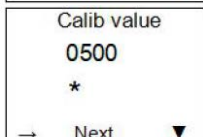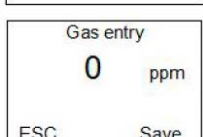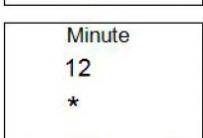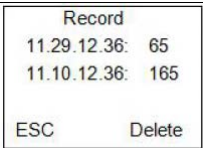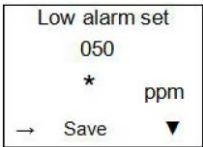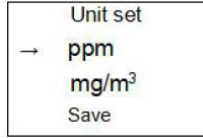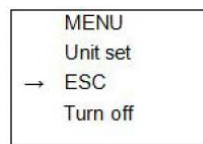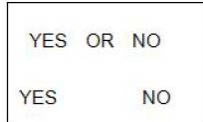
Fig. 2

Parameter setting of the detector

Display	Description

MENU
→ Gas Zero
  Gas Calib
  Set time
Fig. 3
 	
Gas Zero
2 ppm
ESC   Save
Fig. 4
 	
Gas Zero
0 ppm
ESC   Save
Fig. 5
 	
Saving
Fig. 6
	1. Zero function setting
	Press the button 🔲 in the menu interface, the interface shown as Figure 4: press 🔲 key to enter into the zero setting page as Figure 3: press the button ▲ for zero drift, as shown in Figure 4: the instrument directly into the menu settings page, press the button 🔲 to save the drift value, interface as shown in Figure 5: the instrument directly into the menu screen, press the button again, the instrument enters the normal detection interface.
	Warning: this operation is to ensure that the operation is carried out in clean air, otherwise the concentration of the reaction gas in the environment will affect the accuracy of the portable gas detector.

MENU Gas Zero → Gas Calib Set time	Fig. 7	**2. Calibration settings function** Press the button 🔳 in the menu interface, move the cursor with ▼ key, the interface shown as Figure 7: press 🔳 enter in to the calibration setting page as Figure 8: press ▲ to choose number, press ▼ to adjust the number, input password 8888 and press the button 🔳 into calibration interface. Input the standard calibration gas value in the calibration interface as Figure 9, for example, CO, its 500ppm on the gas cylinder, input 500, and press "Next" into gas entry interface as Figure 10. Please inject standard calibration gas, once the value is stable after 2 minutes, press "SAVE" calibration is done. The rate of flow 500ml/min is recommended.
Password 0000 * → Next ▼	Fig. 8	
Calib value 0500 * → Next ▼	Fig. 9	
Gas entry 0 ppm ESC Save	Fig. 10	
Year 2020 * → Next ▼	Fig. 11	**3. Time setting** Press the button 🔳 in the menu interface, move the cursor with ▼ key, choose the set time, the year interface shown as Figure 11: press → to move the *, press ▲ to adjust number, press Next to confirm. After set year, press next, you can set month, date, hour, minute, Press "SAVE" to complete the time set.
Month 04 * → Next ▼	Fig. 12	
Minute 12 * → Save ▼	Fig. 13	

Record 11.29.12.36: 65 11.10.12.36: 165 ESC Delete Deleting	Fig. 14 Fig. 15	**4. Alarm Record** Enter alarm record interface, display date and max alarm value, it saves the max alarm value every 3 minutes as shown Figure 14, "11.29.12.36" means 29th November 12:36, "65" display the max alarm value within 3 minutes. Press "ESC" return to main interface, Press ▼ to delete the record as shown Figure 15.
Low alarm set 050 ★ ppm → Save ▼	Fig. 16	**5. Low alarm setting** Enter LA set" menu, use ▲ to adjust the cursor, use ▼ to adjust the value, choose the right value and press "SAVE". then it will return the normal detecting interface show as Figure 16. If no special requirement, please do not revised alarm value.
		6. High alarm setting The setting is same as low alarm setting. Note: High alarm value never lower than low alarm value. If no special requirement, please do not revised alarm value.
Unit set → ppm mg/m³ Save	Fig. 17	**7. Unit set** Enter "Unit set" function show as Figure 17, choose the suitable unit and save it. Note, this function can be used on the PPM unit gas.
MENU Unit set → ESC Turn off	Fig. 18	**8. ESC** Under the menu function interface, choose ESC, press ▥ to return normal detecting interface.
YES OR NO YES NO	Fig. 19	**9. Turn off** Under the menu function interface, choose "Turn off", press ▲ to turn off, press ▼ to return normal detecting interface.

4.6 Alarm information

The following table shows the details of each alarm:

Alarm type
Low alarm: Short slow alarm tone; The alarm indication is yellow; The red alarm light flashes; Device vibrates.
High alarm: Abnormal harsh alarm tone; The alarm indication is red; The red alarm light flashes; Device vibrates.
Low battery alarm: When the device is in low battery, it will give slow short alarm every minute to remind user

4.7 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 to avoid any potential damage. When the battery mark on the screen is full and doesn't change any more, it means the charging is completed, you can 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 1 months If do not use it for a long time.

5. Possible fault and corresponding solution

Possible fault	Possible reason	Corresponding solution
No response to alarm	Wrong alarm point	Please reset the alarm point
	Fault of electric circuit	Please contact the manufacturer
No response to gas detected	Zero drift	Calibrate zero point
	Fault of electric circuit	Please contact the manufacturer
Inaccurate indication	Sensor is overdue	Please contact the manufacturer to replace the gas sensor
	Uncalibrated for long time	Please calibrate it in time
Insufficient working hours	Fault of charger	Please change charger
	Fault of the device	Please contact the manufacturer
Cannot charge electricity	Fault of charger	Please change charger
	Fault of the device	Please contact the manufacturer

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 randomly.

7. Standard accessories:

Gas detector	1 pc
Calibration cap	1pc
Charger	1pc
Suitcase packaging	1pc
Warranty card	1pc
Quality card	1pc

Declaration

To keep continued product improvement, AquaGas Pty Ltd reserves the right to change design features without prior notice.

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AFFIX. TABLE 1

Model	Range	L-alarm	H-alarm
BH-90A-CH4	0-100%LEL	20%LEL	50%LEL
BH-90A-C3H8	0-100%LEL	20%LEL	50%LEL
BH-90A-H2	0-100%LEL	20%LEL	50%LEL
BH-90A-H2	0-1000ppm	35ppm	250ppm
BH-90A-H2S	0-100ppm	10ppm	15ppm
BH-90A-H2S	0-100ppm	10ppm	20ppm
BH-90A-CO	0-1000ppm	35ppm	200ppm
BH-90A-CO	0-1000ppm	30ppm	60ppm
BH-90A-C2H4O	0-20ppm	10ppm	15ppm
BH-90A-C2H4	0-100%LEL	20%LEL	50%LEL
BH-90A-C2H4	0-20ppm	5ppm	10ppm
BH-90A-O2	0-30%vol	19.5%vol	23.5%vol
BH-90A-C2H5OH	0-100%LEL	20%LEL	50%LEL
BH-90A-NH3	0-100ppm	25ppm	50ppm
BH-90A-CL2	0-20ppm	5ppm	10ppm
BH-90A-O3	0-20ppm	5ppm	10ppm
BH-90A-O3	0-10ppm	2ppm	5ppm
BH-90A-O3	0-50ppm	5ppm	10ppm
BH-90A-SO2	0-20ppm	2ppm	5ppm
BH-90A-SO2	0-100ppm	2ppm	5ppm
BH-90A-PH3	0-20ppm	0.3ppm	5ppm
BH-90A-PH3	0-5ppm	0.3ppm	2ppm
BH-90A-CO2	0-5000ppm	1000ppm	2000ppm
BH-90A-CO2	0-50000ppm	1000ppm	2000ppm
BH-90A-NO	0-250ppm	20ppm	50ppm
BH-90A-NO2	0-20ppm	5ppm	10ppm
BH-90A-HCN	0-500ppm	10ppm	20ppm
BH-90A-HCN	0-50ppm	10ppm	20ppm
BH-90A-HCL	0-50ppm	10ppm	20ppm
BH-90A-CH2O	0-10ppm	2ppm	5ppm
BH-90A-VOC	0-100ppm	20ppm	50ppm
BH-90A-VOC	0-1000ppm	50ppm	200ppm
BH-90A-C6H6	0-100ppm	20ppm	50ppm