AQUA GAS

K-40

PORTABLE MULTI-GAS DETECTOR

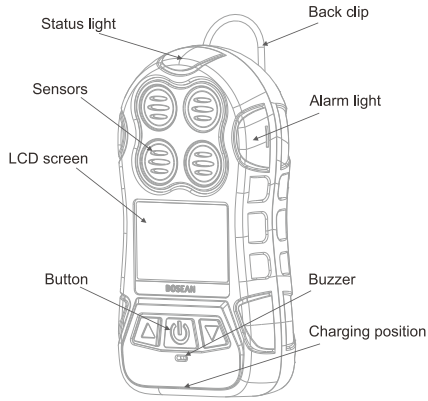
User Manual

1. Brief Introduction

K-40 portable multi-gas detector could detect combustible gas, 02 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, to protect the workers' life and avoid damage on the relevant equipment. The shell is made of high-strength engineering plastics and composite anti-skid rubber. Waterproof, 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_2S	0～100ppm	10ppm	35ppm	1ppm
CO	0～1000ppm	50ppm	150ppm	1ppm
O_2	0～30%vol	19.5%vol	23.5%vol	0.1%vol
Other gases needed, please contact supplier				

Accuracy:	≤±5% F.S.
Response Time:	T9o<60s
Indication:	LCD displays real-time and system status; LED, audio and vibration alert for gas leakage.
Working environment:	-1050 95%RH (no dew)
Power Source:	DC3.7V Li-on battery, 1800mAh
Protection Grade:	IP66
Explosion-proof grade:	Ex ib IIB T3 Gb
Charging time:	<6h
Working time:	≥ 8h continuously (without alarming)
Gas Sensor Life:	2 years (Depends on the specific usage environment)
Dimensions:	130mm×72mm×32mm (L × W × H)
Weight:	Appr. 300g

4. Operation & Function

4.1 Display interface function description

The main interface display includes gas ty pe, value, unit, status indication, date, time, alarm sound mark, battery, as shown in Figure 1.

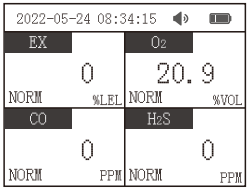


Fig. 1

4.2 Turn on

Press the button for 3s and then release it. After the buzzer gives short sound once, the detector is turned on. The detector displays welcome to use, sound, light and vibration are self-checked at the same time, as shown in Figure 2. After self-checking, it enters gas type, low alarm value, high alarm value, range parameters display interface, as shown in Figure 3. After 30 seconds as shown in Figure 4, it enters detecting status. At this time, it displays the concentration of 02, H2S, CO and Combustible gas in the environment. The status indicator flashes once every 9S to display the detector is in the normal detecting status.

Fig. 2

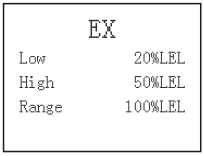


Fig. 3

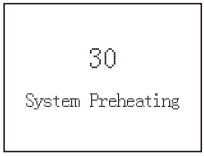


Fig. 4

4.3 Operation

In the main detecting interface (Figure 1), press the left button to enter the self-check state, as shown in Figure 5. Self-check including alarm lights, buzzers, and vibrations, as shown in Figure 6. After the self-test is completed, it will return to the main detecting interface automatically.

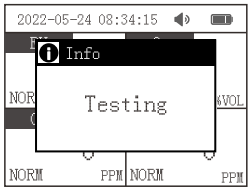


Fig. 5

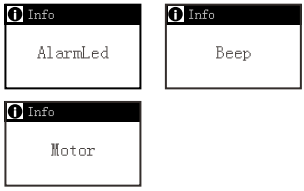


Fig. 6

The backlight display can be turned off automatically, and the off time can be set. After that, press any key to turn on the LCD backlight. Press the key again to do other operations.

The backlight off time is 10 seconds.

In the alarm state, press the right button to turn off the alarm sound, and press it again to turn on the sound; after the alarm is removed, the alarm sound will be turned off automatically.

In the main detecting interface (Fig.1), press the middle button to enter the "Menu" function, the left button to scroll up, the right button to scroll down, as shown in Figure 7. Press the middle button again to enter the relative function.

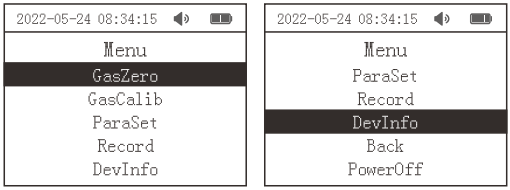


Fig. 7

4.4 Use and set functions

4.4.1 Gas zero

Select "Gas Zero" in the menu, then press the middle button to enter the gas zero setting menu, first select the gas type, as shown in Figure 8, press the left button to return to the previous menu, Press the right button to select the gas type, and then press the middle button to enter the Gas Zero submenu.

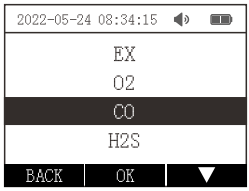


Fig 8.

Note: Taking carbon monoxide as an example, other gas setting methods are similar and will not be repeated here.

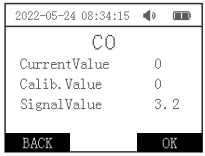


Fig. 9

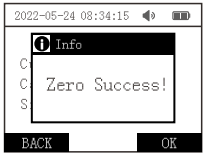


Fig. 10

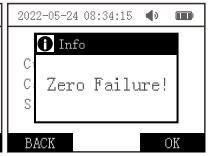


Fig. 11

Make gas zero calibration, the interface display: current value, calibration value, signal value, the current value is the gas concentration value in the current environment, and the calibration value is the zero-point value that needs to be calibrated, the signal value is the processed signal value of the current environment air value, as shown in Figure 9. Press the left button to cancel, and return to the previous menu, press the right button to confirm, save the gas concentration value at zero point, when the current gas value is within the specified range, it will display the zero-calibration success, as shown in Figure 1 O; otherwise, it will display the calibration Zero failures, as shown in Figure 11.

4.4.2 Gas calibration

Select the "Gas Calibration" in the menu, then press the middle key to enter it, input the password (default password: 1111), then left click to select the password cell, right-click to select the password number, as shown in Figure 12 and 13.

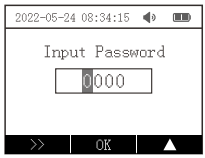


Fig. 12

Fig. 13

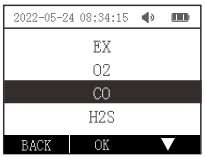


Fig. 14

After input the correct password, select the gas type, as shown in Figure 14. Press the left button to return to the previous menu, press the right button to select the gas type, press the middle button to enter the next menu, make the calibration to the selected gas, as shown in Figure 15.

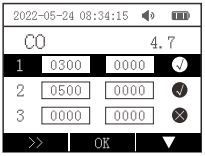


Fig. 15

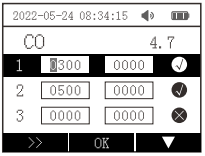


Fig. 16

As shown in Figure 15, right-click to select the calibration point, the calibration point values are arranged in ascending order. *Note: the value of the first calibration point should be less than the value of the second calibration point, and the value of the second calibration point should be less than the value of the third calibration point.* When make a single point calibration, only the first calibration point, no need to make the rest of the calibration points. Press the middle button, as shown in Figure 16, press the left button to select, press the right button to increase the value, press the middle button to confirm. After inputting the calibration

point value, press the enter key, the detector will calibrate itself,
It displays that the calibration is successful or failed, as shown in Figure 17 and 18.

Fig. 17

Fig. 18

4.4.3 Parameter settings

Parameter settings include channel parameters, restore factory settings, alarm parameters, device parameters, and return to a total of 5 items. As shown in Figure 19.

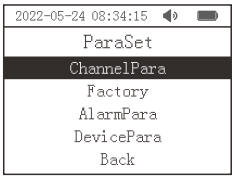


Fig 19

Note: The parameters of the sub-parameter items have been set when the device leaves the factory, please do not operate arbitrarily.

[Channel parameters]

Pass the password to enter the channel parameter setting options, select the relative setting options, as shown in Figure 20, the units include umol/mol, %VOL, %LEL, PPM, mg/m', %, 10-6, PPB, ug/m' , this item has been set in the factory, please do not change it arbitrarily, if necessary, please contact the factory. Press the middle button to enter the relative channel to view the unit, as shown in Figure 21.

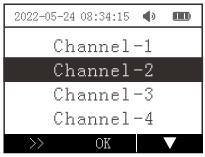


Fig. 20

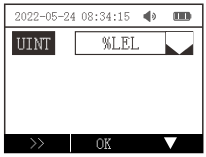


Fig. 21

[Restore factory settings]

Restore all configuration information of the sensor module before shipment.

Note: A series of operations such as zero calibration have been performed before the detector leaves the factory, the user can use directly. If the user does not operate under the guidance of the factory, all the consequences should be borne by themselves.

[Alarm parameter settings]

Enter the alarm parameter setting option, select the gas option, as shown in Figure 22. High alarm value, low alarm value, high concentration protection value, STEL value, TWA value, etc. can be set in the gas channel. Taking carbon monoxide as an example, part of toxic and harmful gases can be made TWA, STEL alarm value settings, if necessary, contact us in advance, as shown in Figure 23.

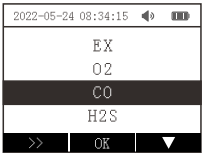


Fig. 22

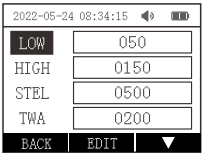


Fig. 23

[Device parameter settings]

Enter the device parameter setting options, the device parameters include backlight setting, language setting, time setting, etc., press the middle button to set, as shown in Figure 24.

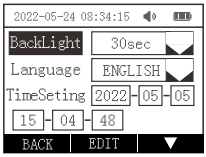


Fig 24

4.4.4 Record

Select the "Record" item in the menu. The "Alarm Record" item includes: delete record, read record, left-click to return, right-click to select up and down, middle key to confirm, as shown in Figure 25. Check to read record option, press the middle button to enter it, as shown in Figure 26. Left click to go back, right click select the gas type, press the middle button to confirm, press the middle button to enter the alarm record, left-click.right-click to select the alarm record page, and middle-click to return.

Fig. 25

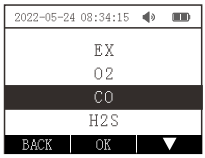


Fig. 26

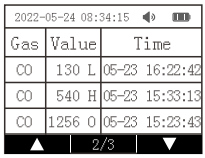


Fig. 27

On the read record viewing interface, you can view the alarm value, alarm status, and alarm time of the relative gas channel. L is low alarm; H is high alarm; 0 is overrange; P is High concentration protection, the value "2/3" represents the current page/total number of pages, as shown in Figure 27.

4.4.5 Device information

Select the "Device Information" in the menu, enter the device information menu, left-click to return, right-click to select, select sub-item, and press the middle button to confirm, as shown in Figure 28. The "Device Information" includes three items: battery information, Factory version and calibration information; battery information includes the battery information value produced by the internal algorithm of the device, which has nothing to do with battery usage, which is convenient for factory quality inspection and use; Factory information includes soft, Part version number and product number, as shown in Figure 30, press any key to return to the previous menu.

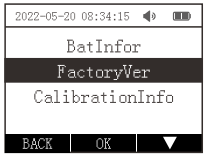


Fig. 28

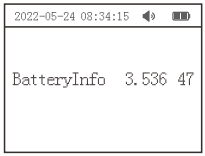


Fig. 29

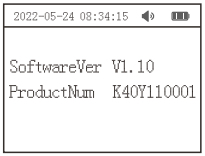


Fig. 30

Enter the calibration information item, select the gas type, press the middle key again to enter, and then the left-click returns to the previous menu, right-click to select the gas type, as shown in Figure 31. The four lines respectively represent the gas zero and three calibration points in gas calibration, the first column represents the calibration point set value, the second column is the relative internal value of the device, and the third column is the date of calibration, as shown in Figure 32.

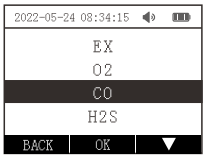


Fig. 31

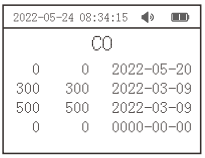


Fig. 32

4.4.6 Back

Select and press the middle button to exit the menu and return to the main interface.

4.4.7 Power off

Select and press the middle button to display whether to shut down, right click to cancel shutdown and return to the main interface, left click to shut down the device, as shown in Figure 33.

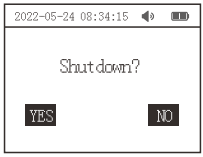


Fig 33

4.4.8 Shortcut key description

In the main detecting interface, if the backlight is not on, press any key to tum on it. In the main detecting interface and backlight is on, press the left button to make sound, light, and vibration self-check.

In the alarm state, press the right button to tum off the alarm sound, and the horn symbol on the interface will display disabled. If the alarm state changes, for example, from a low alarm to a high alarm, the alarm sound will be turned on automatically. When the main interface is on and the backlight is on, long press the middle button for more than 3 seconds, it will display whether to shut down (same as Figure 17). Press the middle button for a long time to shut down automatically.

4.5 Description of alarm function

[Low alarm]
The status indicator turns red, the detector gives a slow beeping sound, and the red alarm light flashes slowly and vibrates at the same time.

[High alarm]
The status indicator turns red, the detector gives a rapid beeping alarm sound, and the red alarm light flashes rapidly and vibrates at the same time.

[Over-limit alarm]
The status indicator turns red and displays "OL", the detector gives a rapid beeping sound, and the red alarm light flashes rapidly and vibrates at the same time. *(The high alarm is displayed in the same way).*

4.6 Description of charging function

Please charge it in time when it indicates that the battery is low or the gas detector cannot be turned on normally due to pressure. When the gas detector is turned off, plug the AC connector of the charger into the 220V AC power supply, and then connect one end of the charging cable to the charging plug and the other end to the socket of the gas detector, the gas detector will be turned on and display charging state automatically.

4.6.1 Charging

When the detector is charging, the battery progress bar is scrolling circularly, as shown in Figure 34.
The charging is completed, as shown in Figure 35.

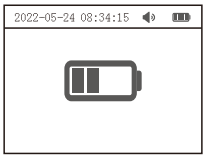


Fig. 34

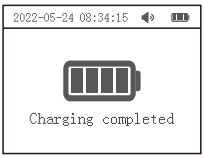


Fig. 35

4.6.2 Low battery

When the power is low, there will be an alarm sound indicate and the interface will display the indicate "please charge", as shown in Figure 36. Please charge in a safe area in time, otherwise the detector will shut down automatically, as shown in Figure 37.

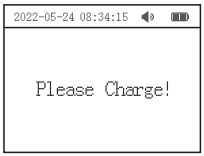


Fig. 36

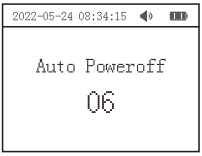


Fig. 37

Warning: The detector cannot detect gas when it is powered off and charged. Please do not charge the detector at the testing environment, so as not to cause fire or explosion due to sparks generated by plugging and unplugging the charger; please do not charge the detector with the power on, so as not to affect the charging speed.

5. Storage

The detector should be stored in a general environment where the ambient temperature is -20-55 °c and the relative humidity is not more than 85%.

Indoors, and the air must not contain harmful gas or impurities that have a corrosive effect on the detector.

6. Standard accessories

Suitcase packaging	1pc
Gas detector	1pc
Calibration cap	1pc
Charger	1pc
User manual	1pc
Communications cable	1pc
Certificate and Warranty Card	1 pc

7. Notices

7.1 Falling down from high places or strong shake is prohibited.
7.2 The detector may not work properly at interferential high-concentration gas.
7.3 To avoid incorrect result or possible damage to the detector, please operate and handle the detector in accordance with the manual.
7.4 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.
7.5 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.
7.6 To assure the testing accuracy, the detector should be calibrated periodically. And the calibration period should be less than one year.
7.7 Please put the used Lithium batteries to the appointed places or send to our company. Don't discard them into the dustbin at random.

8. 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 sensor

APPENDIX I

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	250ppm
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

Note: For other gases and ranges, please contact AquaGas..

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