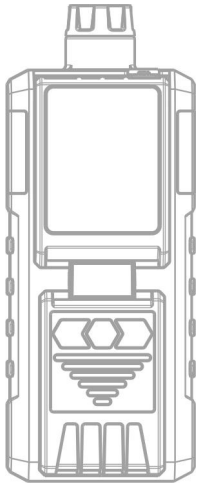
K-600

Portable Multi-gas Detector with Built-in Pump

User Manual



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Bosean Electronic Technology Co.,Ltd

ISO9001-2008

Brief Introduction

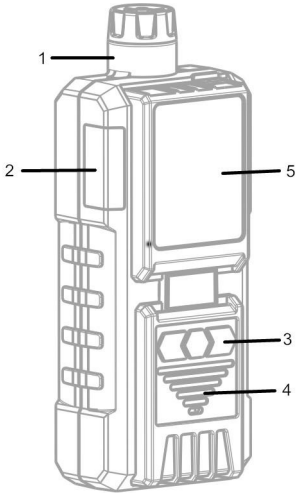
K-600 portable multi-gas detector with built-in pump is a new intelligent gas detector, which adopts an advanced integrated circuit, with standard intelligent level design technology, and proprietary digital analog hybrid communication technology. The detector is of excellent sensitivity and repeatability, which makes it very easy to use and maintain. Thus greatly meets the safety requirements of industrial sites with high reliability. The detector is made of high-strength engineering plastics, compound non-slip rubber, which is of high strength and good hand feeling. what's more, the detector is water-proof, dust-proof and explosion-proof.
It is widely used in petroleum, chemical, environmental, metallurgy, refining, gas transmission and distribution, biochemical medicine, agricultural and other industries.

1. Main features

* Gas pump 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.
*1200pcs data records, can be contacted with computer via software. Can print the data records, can store data records, can make the data analysis.
*Gas curve display.

2. Structure & Function

2.1 Appearance



1	Built-in pump gas inlet
2	LED
3	Button
4	Buzzer
5	LCD screen

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

2.3 Principle: Electrochemical or Catalytic or PID's or infrared sensor or VOC's 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				

Gas sampling method: Gas pump sampling
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, pump working state.
Working environment: -20℃～50℃, ＜95%RH (no dew)
Power Source: DC3.7V Li-on battery, 3200mAh
Charging time: 6h~8h
Working time: ≥ 8h continuously (without alarming)
Gas Sensor Life: 2 years
Explosion-proof grade: Ex ib IIB T4 Gb
Protection Grade: IP65
Weight: Appr. 400g (with battery)
Dimensions: 130mm×67mm×30mm(L × W × H)

4. Operation & Function

4.1 Turn on self check and preheating process

Press the button for 4s and then release it. the LCD screen of the detector is turned on and the welcome interface is displayed. The detector automatically performs self-test of the sound, light and vibration alarm signals, displays the system information and performs the preheating countdown. The above information can be used to confirm the integrity of the detector performance.

4.1.1 After the detector is warmed up and enters the power-on state, the normal detection state of the detector is shown in Figure 1. (The display mode varies according to the position of the sensor, and the gas in the figure represents methane.)

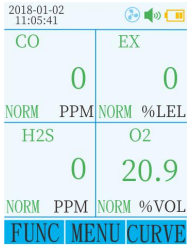


Fig.1

4.2 Turn off

Under the detector is in the normal detection state, press button, the LCD screen will prompt the user to shut down the interface as shown in Figure 2. The user selects whether to shut down through button. If select sure, the screen no longer displays any information, and the detector enters Off state.

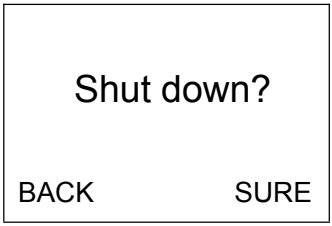


Fig. 2

4.3 Button function

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

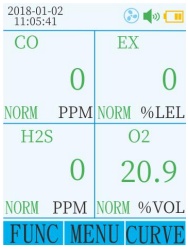


Fig. 3

Press any key to turn on the backlight (user can set the backlight time)

Press to enter the function menu;

Press the button to turn the gas sampling pump on or off.

Press to enter the gas concentration curve display interface; meanwhile press to view the concentration curve of different gases.

4.3.1when gas detector detects the gas less than the low alarm (Mark: for oxygen, between the low alarm and high alarm value), g as detector is under normal detecting state, no alarm at this time.
4.3.2 When the detected gas concentration is higher than low alarm value and lower 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 emits an alarm sound of "beep,beep..." every 0.5s, and the red alarm light flashes synchronously. At the same time, the gas concentration value on the screen turns yellow and the backlight and vibrator are also turned on remind of low alarm; press button to cancel the audible alarm, but still display alarm information. The buzzer will resume ringing until the new alarm is triggered, and the alarm light and vibrator will resume operation. When the gas concentration value detected by the detector returns below the low limit alarm value, the gas concentration value turns green and the alarm signal is automatically released. When the alarm is detected, the detector is shown in Figure 4.

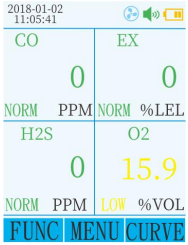
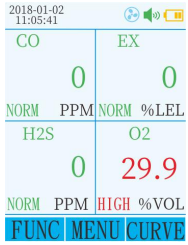


Fig.4

4.3.3 When the detected gas concentration is higher than the set high alarm value, the detector is in the high alarm state, at this

time the buzzer emits “beep,beep,... every 0.25s” . the red indicator light flashes synchronously, and the color of the gas concentration value changes to red on the screen. The backlight and the vibrator also open at the same time, indicating the high alarm; long press the button to release the audible alarm. but there is still an alarm message. The buzzer will resume ringing until the new alarm is triggered, and the alarm light and vibrator will resume operation. When the gas concentration value detected by the detector returns below the low alarm value, the gas concentration value turns green and the alarm signal is automatically released. When the alarming, the detector is shown in Figure 5.

Fig 5



4.3.4 When the detected gas concentration is higher than the test range, the buzzer of the detector will beep normally, the LCD screen will be on constantly, the vibrator will be normally open, and “HHHH” will be displayed on the screen, indicating over-range. at that time, you can press the button to release the audible alarm.

4.3.5 Display time, gas sampling pump flag , buzzer indication (signal when no mute is , when mute is), the corresponding concentration information display of different gas

types, battery power, current date.

Note: The above alarm sounds can be manually cleared by pressing the key. After clearing, the alarm information is still displayed normally; if the detector triggers the alarm again, the corresponding alarm sound information can be sent again.

4.4 Use and set functions

The detector has a total of alarm record viewing function, gas concentration curve display, setting gas parameters, calibration, zero calibration, language setting, information viewing, time setting, etc. in the normal detection interface, press button to enter the function menu, as shown in Figure 6. Then press button to enter the function selection. When the cursor moves to the return type on the function selection interface, continue to return to the normal monitoring interface.

Fig.6

Note: The following menus and function keys exit to return to the monitoring interface. This operation is no longer repeated.

4.4.1 Alarm Record Gas curve display

1. Alarm record function:

Press the button in the normal detection main interface to enter the function menu, select the , press button to enter the

alarm record interface, the record content includes the type of alarm sensor, enter the corresponding sensor to display the alarm value, alarm time, as shown in Figure 7: This function can view the gas alarm history.

Fig.7

The maximum alarm record is up to 1200 groups.

2. Curve display function:

Press ▶ in the normal detection main interface to enter the curve display interface.

Then press ● button to view the gas concentration curve of each channel sensor. Each channel sensor has a curved display. As shown in Figure 9:

Oxygen as an example:

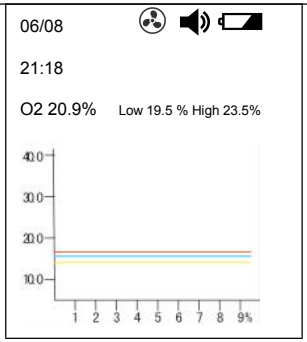


Fig.8

Description
The abscissa X axis is the time, the current record within 10s of the curve
The vertical axis Y is the sensor value, data of the sensor can be seen from the Y axis

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 to enter the menu, then press select the shut down,setting,alarm point, alarm record calibration zero, calibration, time setting and system reset. These function menus can be displayed cyclically and can be selected by cursor movement.

The menu function is as follows:

	Description	Setting content
	Main interface	Press to move the cursor to the return function, press to return to the main interface. (The cursor moves and selects the entry according to the above method, and will not be described later)
	Shut down	Press to move the cursor to the return function, press to enter the shutdown selection interface.
	System Settings	Enter the system settings interface to set the detector channel, delete alarm records, view system information, language settings, backlight settings, and air pump settings.
	Alarm point	Set the low and high value
	Alarm record	Alarm record information of the corresponding channel gas
	Gas Zero	Enter the zero calibration interface to zero the four sensors.

	Gas Calibration	Enter the calibration interface to calibrate the four sensors.
	Date time	Set the current date and time setting
	System reset	Enter the password "1111" for factory reset

The menu function is as follows:

fig. 9

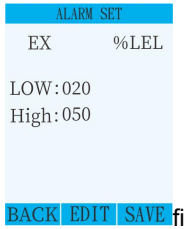
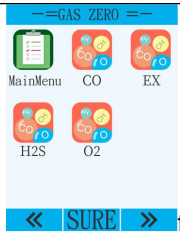
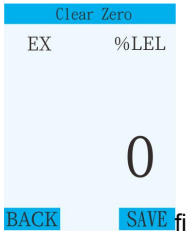


fig10

Alarm Settings

Select alarm settings under the menu interface, press the button like this choose the gas you need to detect. Take the natural gas for example, as the picture 10 shows,press the button to edit, after finishing it,press the to save it.

 fig11  fig12	Zero calibration and calibration Select Zero calibration under the menu interface, press the button ,Take the natural gas for example, as the picture 11 shows,press the button to edit, after finishing it, press the to save it.press the button return to the upper level menu. Attention:1. Zero calibration should be carried out in clean air, otherwise the degree of gas concentration in the environment will affect the accuracy of the portable pumping gas detector. 2. The detector is calibrated passing the standard gas before leaving factory, and users should not operate this item.
 fig13	The Date Select The Date under the menu interface，enter the time setting interface, as the picture 19 shows , press the button to move the cursor, press the to set the system time, after the modification is completed, the cursor moves to the last press of the , return to the main menu.

4.4.3 the system setting of the detector

Display screen parameters	Detail Features

<table>
<tr>
<td> 

fig14
 

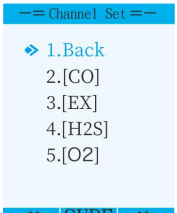
fig15</td>
<td>1. Press the button enter the feature menu, moves the cursor to system settings by pressing , as the picture 8 shows. Enter system settings by pressing , as the picture 14 shows</td>
</tr>
<tr>
<td> 

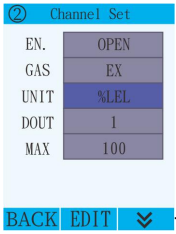
fig16
 

fig17</td>
<td>2. Channel settings include channel switch, gas type, unit selection, accuracy, and range settings. We take the natural gas for example, as the picture 10 shows,moves the cursor to select gas type (natural gas) by pressing .While the cursor moves to natural gas, you can enter the natural gas channel settings by pressing the ,like picture 11 shows. Press the to adjust the feature and return to channel settings .
Don’t change the alarm value parameter,if there is no special requirement.</td>
</tr>
</table>

fig18

fig19

3. Clear record

Use the ◀ ▶ to clear record, press ● to enter the input password interface, like picture 18 shows, the password is “1111”, enter the clear password judgment, as picture 19 shows.

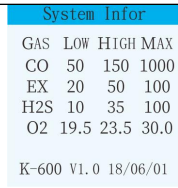


fig20

4. System information

Press the ◀ ▶ to select the system information, press the ● enter the system information interface. As the picture 20 shows.

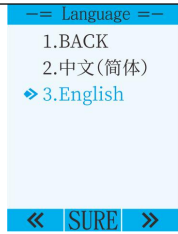
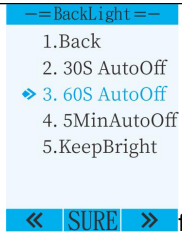
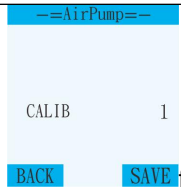


fig21

5. Language

Press the ◀ ▶ to select language, then press the ● enter the language settings interface.As the picture 21 shows.

 fig 22	6. backlight settings press the select backlight settings, and press the enter the backlight settings interface. As the picture 22 shows.
 fig23	7.Air pump setting

4.4.4. Alarm information

The following table shows the details of each alarm:

Alarm type
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

Appendix

Gas	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	250 ppm
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
SO2	0-20ppm	2ppm	5ppm
SO2	0-100ppm	2ppm	5ppm
PH3	0-20ppm	0.3ppm	5ppm
PH3	0-5ppm	0.3ppm	2ppm
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
CO2	0-5000ppm	1000ppm	2000ppm
CO2	0-50000ppm	1000ppm	2000ppm