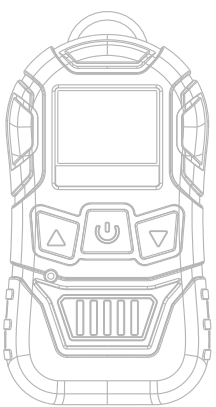
K10
Portable Single gas Detector

Operation Manual

JBK FHU Bogusław Kliś

Piaskowa 52, 39 - 120 Sędziszów Małopolski
Tel: (+48) 17 745 65 30
mail: biuro@jbk.com.pl
Website: www.jbk.com.pl

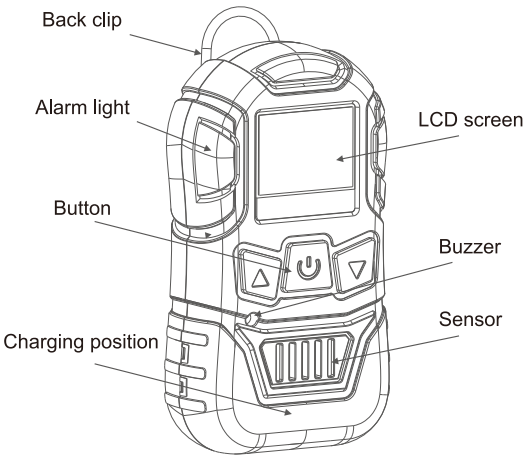


1. Brief Introduction

K10 portable single gas detector is widely used in the area where explosion-proof is required or toxic gas leaks, like petroleum, chemical, environmental protection, metallurgy, refining, gas transmission and distribution, production chemical medicine, agriculture and other industries, so as 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.

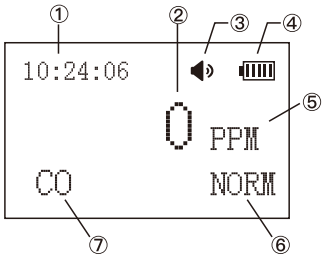
3. Technical Data

Range	Different gas has different range, please refer to the appendix.
Resolution	1%LEL,1ppm,0.1ppm,0.1%vol
Alarm point	Different gas has different alarm point, CO as an example, low alarm 50ppm, high alarm 150ppm
Accuracy	≤±5% F.S.
Response Time	T_{90}<30s
Indication	LCD displays real-time and system status; LED, audio and vibration alert for gas leakage, fault and low battery
Working environment	-10°C-50°C <95%RH (no dew)
Power	DC3.7V Li-on battery, 1500mAh
Protection grade	IP66
Explosion-proof grade	Ex ib IIC T4 Gb
Charging time	4-6h
Working time	≥ 8h continuously (without alarming)
Gas sensor life	2 years (Depends on the specific usage environment)
Dimensions	109mm×60mm×30mm(L × W × H)
Weight	Appr. 130g (without accessories)

4. Operation & Function

4.1 Display interface function description

1. Time
2. Real-time gas concentration
3. Buzzer status indication
4. Battery status
5. Gas concentration unit
6. Alarm status
7. Gas type name



Note: This manual is written on the basis of CO detector, with different requirement and sensor, there will be some differences in the display.

4.2 Turn on,Turn off

Press the button ⏻ for 3s and then release it. After the buzzer gives short sound twice, the detector is turned on. The detector enters the self-checking process, displays information such as sound, light, vibration indication, high and low alarm values (as shown in Figure 1), and finally enters the main interface (as shown in Figure 2). On the main interface, press the left button to enter the device information display interface, which includes: date, battery information, software version, product ID (as shown in Figure 3).

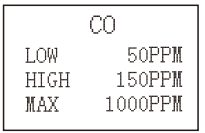


Figure 1

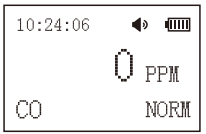


Figure 2

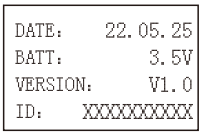


Figure 3

Enter the shutdown confirmation interface method:

In the display state of the main page, press the middle button for more than 3s, the detector will display the confirmation shutdown interface (as shown in Figure 4),

On the menu page, select the shut down function (as shown in Figure 14), press the middle button, the detector displays the correct confirm the shut down interface (as shown in Figure 4).

Figure 4

4.3 Alarm function description

The detector has four alarm modes: sound, light, vibration and display (the alarm sound can be turned off in the alarm mode setting and vibration). When the detected gas triggers an alarm, the buzzer will sound different according to the alarm status.

The sound frequency, the alarm light and the sound flash at the same frequency, the vibrator and the sound start to vibrate at the same frequency, when the screen is off, the screen will be on, and it will display the alarm status at the lower right corner of the screen .

Alarm display is divided into normal, low alarm, high alarm, overrun, STEL, TWA, high concentration, etc. state, and its trigger conditions and display effects will be described in detail below.

4.3.1 Normal without alarm

When the concentration value of the detector is less than the pre-set low alarm value (Note: the oxygen detector concentration value is more than the low alarm value but less than the high alarm value), the alarm status will display "normal" (as shown in Figure 5) , there is no abnormal display.

4.3.2 Low alarm

When the concentration display value of the detector is more than the low alarm value and less than the high alarm value (Note: except for oxygen), four alarm modes of sound, light, vibration and display will be triggered, and the alarm state will display “low alarm” (as shown in the Figure 6), the buzzer gives the alarm sound of "Di! Di! Di!" at an interval of 200ms, and the alarm light and vibrator are on at the same time.

4.3.3 High alarm

When the concentration display value of the detector is more than the high alarm value and less than the full range value, four alarm modes of sound, light, vibration and display will be triggered, and the alarm status will display "high alarm" (as shown in Figure 7), the buzzer gives the alarm sound of "Di! Di! Di!" at an interval of 70ms, and the alarm light and vibrator are on at the same time. (over-limit alarm, high concentration protection alarm, STEL alarm, TWA alarm sound, light, vibration the alarm method is the same as the high alarm, which will not be repeated below).

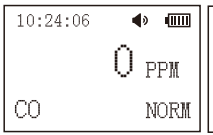


Figure 5

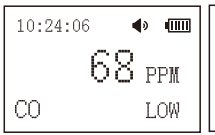


Figure 6

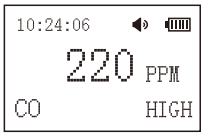


Figure 7

4.3.4 STEL alarm

When STEL alarm switch is on, if the detector detects the gas concentration for 15 minutes and the calculated STEL value exceeds the pre-set value, four alarm modes of sound, light, vibration and display will be triggered, and the alarm status will display “STEL” (Figure 8).

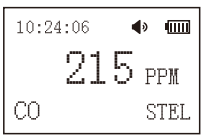


Figure 8

4.3.5 TWA alarm

When TWA alarm switch is on, if the detector detects the gas concentration for 8 hours and the calculated TWA value exceeds the pre-set value, four alarm modes of sound, light, vibration and display will be triggered, and the alarm status will display “TWA” (Figure 9).

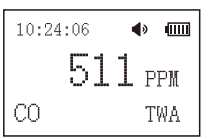


Figure 9

4.3.6 Over-limit alarm

When the detector detects that the gas concentration value is more than the full range and less than 1.2 times the full range, it will trigger the four alarm modes of sound, light, vibration and display, the displayed value will be displayed as "OL", and the alarm status will be displayed as "over limit" (Figure 10).

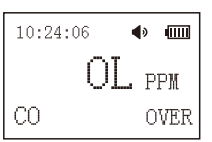


Figure 10

4.3.7 High concentration alarm

When the detector detects that the gas (combustible gas, methane) concentration value is more than 1.2 times the full range, it will trigger four alarm modes: sound, light, vibration and display. ” (Figure 11).

Figure11

Note: 1.In the main interface, when the alarm state is abnormal, short press the right button to turn on a button mute function. If a new alarm condition occurs, the buzzer will resume to sound.

2.When the detector detects multiple alarm states, only the highest priority alarm is performed, and the alarm is given priority.

The levels are as follows:

Normal < TWA < STEL < Low alarm < High alarm < Over limit < High concentration

3.Oxygen, methane, combustible gas and other non-toxic and harmful gases will not have STEL alarm and TWA alarm functions and setting options.

4.4 Operation

The menu including the following options:

Press the middle button on the main interface to enter the main menu page, which contains the following options:

Gas calibration, alarm set, alarm record, time set, alarm mode, factory reset, setup, shutdown, Exit.

Figure 12

Figure 13

Figure 14

Note: 1.On the main menu page, press the left button to point to the previous option, and press the right button to point to the next option. Press the middle button to enter this option.

2.If there is no operation within 5s under the main menu page, it will return to the main interface automatically; If there is no operation within 10s under gas calibration or alarm settings page, it will return to the main menu automatically.

4.4.1 Gas calibration function

On the main menu page, press the middle button to click the function to enter the password input interface (as shown in Figure 16). Through the cooperation of the left and right buttons, input the "1111" password to enter the gas calibration page, which includes zero set, zero drift, calibration, calibration record, and exit function options.It can be described as follows.

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

Figure 15

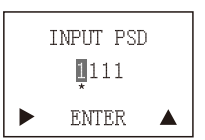


Figure 16

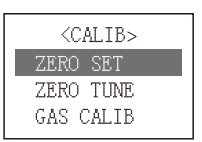


Figure 17

Figure 18

【 Zero setting function 】

This function is used to calibrate the gas zero point. Continue to enter the gas suitable for zero calibration for a certain period of time,after the value is stable, press the right button to save.

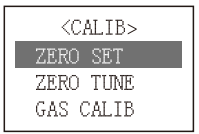


Figure 19

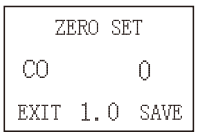


Figure 20

Figure 21

⚠Warning: Make sure that this operation is performed in clean air, otherwise it will affect the accuracy of the detector.

【 Zero shift function 】

This function is used to adjust the abnormal problem of zero value display. After the sensor is used for a long time, zero number maybe changed, and this problem can be solved by drifting the zero point.

【 Gas calibration function 】

This function is used for gas calibration (up to three point calibrations).

Specific calibration operations:

1. Press the middle button to enter the No. 1 calibration point, and set the standard value according to the concentration of the bottle.

The CO default setting standard value is 500), press the middle button to confirm, and enter the real value calibration interface.

2. Input the standard gas of carbon monoxide with a flow rate of 500ml/min and a concentration of 500PPM, and wait for 2 minutes

After the value is stable, press the right button to save gas concentration.

Figure 22

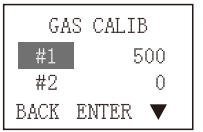


Figure 23

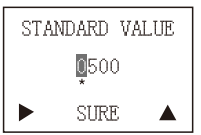


Figure 24

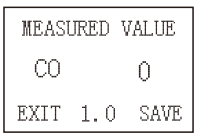


Figure 25

Note: Make multiple concentration points, must be started from the low concentration in turn.

【 Calibration record 】

This function is used to record the date and time of the last gas calibration (as shown in Figure 27).

Press any button to return to the previous menu.

Figure 26

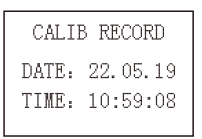


Figure 27

4.4.2 Alarm setting function

Press the middle button to click the function to enter the alarm setting menu page.

This page includes low alarm settings, high alarm settings, STEL settings, TWA settings, and exit functions.

Figure 28

Figure 29

Figure 30

【 Low alarm setting function 】

This function is used to set the low alarm value. When the displayed value is more than the low alarm value and less than the high alarm value, it will enter the low alarm display status (except for oxygen).

Figure 31

【 High alarm setting function 】

This function is used to set the high alarm value. When the displayed value is more than the high alarm value and less than the full range value (1.2 times the full range value), it will enter the high alarm state.

Figure 32

【 STEL setting function 】

This function is used to control the STEL function switch and set the gas STEL alarm value.

Note: This function is only available for toxic and harmful gases.

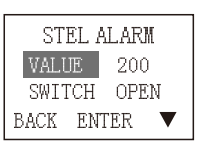


Figure 33

Figure 34

Figure 35

【 TWA setting function 】

This function is used to control the TWA function switch and set the gas TWA alarm value.

Note: This function is only available for toxic and harmful gases.

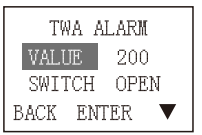


Figure 36

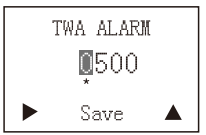


Figure 37

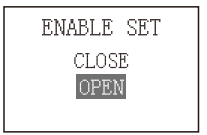


Figure 38

4.4.3 Alarm record function

This function is used to check alarm records. The record including: alarm status + alarm value + alarm date.

When there are many alarm pages, the left and right buttons can be used to turn pages, and the middle button returns to the previous interface.

Figure 39

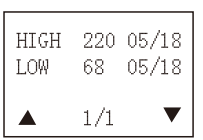


Figure 40

Note: 1.If multiple alarms are triggered, the alarm status of the record is the status with the highest priority.

2.The recorded alarm value is the maximum value in a single alarm cycle (except for low O2 alarm).

4.4.4 Time setting function

This function is used to set the time. In this setting interface, press the left button to move the digit, press the right button to increase the value, press the middle button to save the year value, and the

interface will enter the month setting/date setting/hours settings/minute settings (as shown below), and press the middle button to save the data, and then enter the main menu interface.

Figure 41

Figure 42

Figure 43

Figure 44

Figure 45

4.4.5 Alarm mode setting

This function is used to control the alarm sound and vibration. All alarms are turned on by default after power on.

Figure 46

Figure 47

4.4.6 Language setting

Set the system display language.

Figure 46

Figure 47

4.4.7 Restore factory settings

This function is used to restore factory settings, input the "2020" password. This operation restores the zero setting, gas calibration, low alarm setting, high alarm setting, STEL setting, TWA setting, etc. to the factory settings. Users should operate with caution.

Figure 48

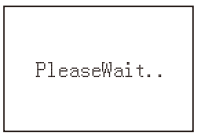


Figure 49

4.4.8 Shutdown function

This function is used to enter the shutdown confirmation interface.

4.4.9 Exit function

This function is used to return to the main interface.

Figure 50

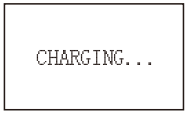
4.5 Description of charging function

Please charge it in time when it indicate 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.

【 Charging 】

When the detector is charging normally, it will display "Charging...";

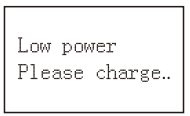
When the power is over, "charging complete" is displayed.



【 Low battery 】

When the power is low, there will be an alarm sound indicate and the interface will display the indicate "please charge",

Please charge in a safe area in time, otherwise the detector will shut down automatically.



⚠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℃ 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. Possible fault and corresponding solution

Possible fault	Possible reason	Corresponding solution
The detectorcan'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

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 Cl2), 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.Standard accessories

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

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	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
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 the facatory.