Portable type four in one gas detector

(Gas detect alarm device)

Operation Manual

Content

First   Summary

This portable type gas detector (hereinafter simply called detector) is completely intelligent gas detector which adopted the most advanced large scale integrated circuit technology, international standard intelligent technical level design technology and special digit imitation mix communication technology to design. The detector adopt the natural disperse method test gas, the sensitivity elements adopt the best quality gas sensor, it has excellent sensitivity and perfect repetitiveness, convenient to use and maintain, mostly meeting the requirements of industry field safety monitor to equipment reliability, the outer shell adopt high strength engineering plastics, high strength, better hand feeling and waterproof, anti dust and explosion proof.

This detector widely applied in the industries like petroleum, chemical industry, environment protection, metallurgy, gas transporting and distribution, biochemistry, medicine and agriculture, etc.

1.1 The design, manufacture and calibration of this product follow the bellow national standards:

GB3836.1-2010 Explosion environment part 1: equipment common requirements

GB3836. 4-2010 Explosion environment part 4: the equipment which protected by the essence safety type "i"

GB15322. 3-2003 Portable type combustible gas detector part 3: the portable type combustible gas detector which measure range are (0~100) %LEL

JJG693-2011 Calibrate regulations of combustible gas test alarm device

JJG365-2008 Calibrate regulations of electric-chemical oxygen tester

JJG695-2019 Calibrate regulations of hydrogen sulfide gas tester

JJC915-2008 Calibrate regulations of carbon monoxide test alarm device

GB12358-2006 Common technical requirements of task area environment gas test alarm instrument

Second Structure feature and working principle

2.1 Structure function contrast table
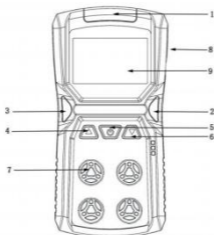
1. 2. 3	Alarm indicate lamp window	7	Gas response hole
4	Left key	8	Charging port
5	Middle key	9	Liquid crystal screen
6	Right key		

2.2 Detector structure: mainly formed with the shell body, circuit board, battery, display screen, sensor, charger and other components.

2.3 Working principle: electric-chemical type and catalyze burning type

Third Technical features

Common gas detect range:

Gas types	Range	Low alarm point	High alarm point	Resolution ratio
EX	(0~100)%LEL	20%LEL	50%LEL	1%LEL
H_2S	(0~100)PPM	10PPM	20PPM	1PPM
CO	(0~1000)PPM	50PPM	200PPM	1PPM
O_2	(0~30)%VOL	19.5%V0L	23.5%V0L	0.1%VOL
Please contact our company for other gas assembly.				

Indicate error: ±5%FS (combustible), ±10% (carbon monoxide), ±2μmol/mol or ±10% (hydrogen sulfide).

Responding time: T<45s

Indicate method: LCD indicate the real time data and system status

Light-emitting diode, sound, vibrate indication alarm, failure and lack voltage

Working environment: temperature -20℃~50℃, humidity <95% RH (no condensation)

Working voltage: DC3.7V (lithium battery capacity 2000mAh)

Explosion proof mark: Ex ib IIB T3 Gb

Charging time: 6h~8h

Standby time: 16h~18h under standard situation

Working life of sensor: EX, H_2S, CO: 2~3 years, O_2 : 5 years

Size: 130*65*45(mm)

Weight: 0.5kg

Fourth   Function and operation

4. 1 Power on self inspection and preheat process

Press down middle key about 3s when detector under power off status, the backlight of detector display screen lighting along with two sound "DI DI", now the detector enter into power on status from power off, the screen indicate welcome interface at the same time. Check fig 1 and fig 2.

Welcome	Starting Please Wait....

Fig 1	Fig 2

After the welcome interface, the screen will indicate the high report value, low report value and range information of combustible gas, oxygen, hydrogen sulfide and carbon monoxide in sequence, check fig 3, fig 4, fig 5 and fig 6.

```
EX
Alarm L   20%LEL
Alarm H   50%LEL
Range    100%LEL
```

```
O2
Alarm L 19.5 %VOL
Alarm H 23.5 %VOL
Range    30.0 %VOL
```

Fig 3	Fig 4

```
H2S
Alarm L   10 PPM
Alarm H   20 PPM
Range    100 PPM
```

```
CO
Alarm L    50 PPM
Alarm H   200 PPM
Range   1000 PPM
```

Fig 5	Fig 6

The system enter into outer setting self inspection status and light self inspection status after information page indication finished: now light will flashing twice; vibrate sheet self inspection: now the vibrate sheet will vibrating then

stop; sound self inspection: now the buzzer will interval sounding twice. The above status normally then means the outer setting self inspection already normally passed. Check fig 7, fig 8 and fig 9.
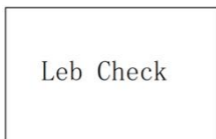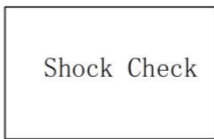
Leb Check

Fig 7

Shock Check

Fig 8

Audio Check

Fig 9

4.2 Normally test and alarm status

The screen will normally indicate the current gas value when the detector not detected the gas which concentration higher than the low limit alarm value. Check fig 10.

```
EX            02
   0%LEL 20.9%VOL
H2S           CO
   0PPM      0PPM
```

Fig 10

The detector will send out interval "DI.....DI...." alarm sound when the detector detected that higher than low limit alarm value of any one gas, the screen backlight lighting, the vibrate sheet vibrating at the same time. The detector only stop sounding and vibrating when the detect gas concentration lower than the low limit alarm value, the screen close the backlight.

4. 3 System status checking

If the users want to check the current system battery use status, date and time then can press down left key under the normal test status, now the screen will indicate the date, time, battery power and voltage information. Check fig 11

```
Date: 00-00-00
Time: 00:00
Bat: 3.78V  50%
Ver: F_5_22_0914
```

Fig 11

4.4 Shut Down

Long time press down middle key about 3s when detector under normal test status, the screen will display the power off interface, press left key then power off, press right key then cancel power off. Check fig 12

```
      ShutDown

OK                Quit
```

Fig 12

4.5 Charging

When the battery voltage of detector lower than 3.5V under the normal test status then will indicate the reminding "Battrry Low, ShutDown", now need insert the USB charging wire to charge immediately, otherwise, it maybe caused system abnormally work because too low voltage. Check fig 13.
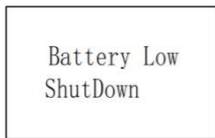
```
Battery Low
ShutDown
```

Fig 13

Charging under power off status, now charging will indicate "Charging....". Check fig 14.

```
Charging...
```

Fig 14

It will indicate "Charge Over" after charging finished. Check fig 15.

```
┌─────────────────────────┐
│                         │
│                         │
│    Charge Over          │
│                         │
│                         │
└─────────────────────────┘
```
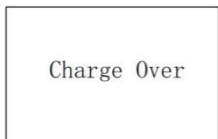
Fig 15

Fifth   Menu operation

(1) Enter into menu: press middle key and enter into main menu interface.

(2) Key performance: press left key in main menu is upward selection, cancel or rightward key position select function according. Press middle key is confirm, save or enter into sub menu function.

(3) If not operate in menu exceed about 5s then system automatically return to normal test interface.

Menu → Zero Adjust Cal Gas Alarm Set	Main menu structure Operating method: Press left key then circling upward select menu item, press right key then circling downward select menu item, press middle key then enter into middle menu item, if select withdraw then withdraw the main menu and return to normal test interface.
Menu → Alarm Rec Time set Language	

```
       Menu
  → Factory Mode
    Default Setting
    Exit
```

```
       Menu
  → Zero Adjust
    Cal Gas
    Alarm Set
```

```
  Input Password

        00
        *
    ►  Enter  ▲
```

```
    Select Gas

        EX

    ▲  Enter  ▼
```

```
    Zero Adjust

       -0000
        *
    ►  SAVE  ▲
```

Zero point micro adjustment
    This function is plus or reduce the setting value based on the actually tested gas concentration. Used in that unable to calibrate gas but display that not rest and have deviation situation.
    Operating method: firstly select the zero point micro adjustment in the menu, press middle key and enter into, the screen display that input password interface, enter into gas select interface after input correct password, press left key then circling upward select gas type, press right key then circling downward select gas type. Press middle key and enter into zero point micro adjustment interface after selected the gas type. Press left key then one by one rightward circling select every one byte of the adjustment value or symbol. Press middle key then save the current value.
Example:
    Able to set -0004 here when the combustible gas value in air always display at 3 and not reset, then save.
    Withdraw normal test interface. Now the combustible gas display value should be 0.
    Note: the setting value a little bigger than the display value at 1 unit then okay, if too big setting then will caused too big concentration deviation between the display value and actual gas and not correct.

	Gas calibration
Menu Zero Adjust → Cal Gas Alarm Set Input Password 00 * ▶ Enter ▲	To avoid the users error enter into this function and affect the portable type gas detector working. This function independently set password, this item function only provide for professional staffs operation, the detail operation steps ignored here.
Menu Zero Adjust Cal Gas → Alarm Set Select Gas EX ▲ Enter ▼	Alarm setting This function used to set the alarm limit when test the gas concentration. Low report means that instrument generate sound-optic alarm when gas concentration exceed the low report value, high report means that instrument generate sound-optic alarm when gas concentration exceed the high report value. Operating method: Firstly select the alarm setting in the menu, press middle key and enter into, the screen display that select gas interface, press left key then circling upward select gas type, press right key then circling downward select gas type. Press middle key and enter into alarm setting interface after selected the gas type, press left key then one by one rightward circling select every one byte of the adjustment value. Press right key adjust the current digit byte value. Press middle key then save the current value.

Low High 0020 0050 * ▶ SAVE ▲	
Menu → Alarm Rec Time set Language	**Alarm record** Alarm record menu include three sub menu items like check alarm, clear alarm and withdraw. Operating method: Press left key then upward circling select the sub menu item, press right key then downward circling select the sub menu item. Press middle after selected the gas type and enter into the corresponding menu item.
Alarm Rec → Alarm View Alarm Clear ▲ Enter ▼	
Alarm Rec → Exit ▲ Enter ▼	

Alarm Rec
→ Alarm View
Alarm Clear
▲ Enter ▼
	Alarm View
	    This function used to check the past alarm records.
	Operating method:
	    Press left key and check the latest one piece record, press right key then check the last one record. Automatically withdraw after not operate 5s.

EX 00-00-00 Time: 00:00 Alarm L 25 ▲ CANCEL ▼	

Alarm Rec
Alarm View
→ Alarm Clear
▲ Enter ▼
 	
Rec Clear
OK   Quit
	Clear the alarm
	    This function used to clear the alarm record
	Operating method:
	    Press left key to select "OK", used to clear the alarm record; press right key to select "Quit", used to cancel that clear alarm record.

Alarm Rec → Exit ▲ Enter ▼	Alarm record Exit This function withdraw the alarm record sub menu. Operating method: Press middle key to withdraw.
Menu Alarm Rec → Time set Language Input Year 2022 * ► Enter ▲ Input Month 00 * ► Enter ▲	Time setting This function used to set the current instrument time. Operating method: Firstly select the time setting in menu, press middle key and enter into, display the year setting interface. Press left key and one by one rightward circling select the back two bytes of value which need be adjusted, press right key to adjust the current digit value, press middle key and used to save the current input year, then enter into month input interface, and so on, press the middle key to save the early input all time information after input minute interface and withdraw the current time setting menu item.

Input Day 00 * ► Enter ▲	
Input Hour 00 * ► Enter ▲	
Input Min 00 * ► Enter ▲	

Menu
Alarm Rec
Time set
→ Language
	Language
	    This function used to shift system language, include three sub menus like Chinese, English and withdraw.
	Operating method:
	    Firstly select the language shift in menu, press middle key and enter into, press the left key and upward select language item, press right key and downward select the language item, press middle key to confirm the current selection. If select the English menu item then system language will shift to English. Select Chinese in the corresponding menu of English interface then the system language will shift to Chinese.

Language → Chinese English ▲ Enter ▼	

Menu
→ Factory Mode
   Default Setting
   Exit
 	
Input Password
 	
    00
    *
▶   Enter   ▲
	Factory Mode
	    This function used to set the current instrument engineer setting.
	Operating method:
	    Firstly select the engineer setting in menu, press middle key and enter into, the engineer setting only limit used to set the instrument by our company's professional staffs, this function independently set password to avoid the user error enter into this function and affect the portable type gas detector work, the detail operation steps ignored.

Menu
   Factory Mode
→ Default Setting
   Exit
 	
Restore Default
 	
OK   Quit
	Default Setting
	    This function used to recover the instrument to leave factory setting status.
	    Detail operations: firstly select the engineer setting in menu, press middle key and enter into, the screen display whether recover to setting interface, press "OK" or "Quit" key to confirm whether save it.

Menu
   Factory Mode
   Default Setting
→ Exit
	Exit
	    This function used to make instrument withdraw operation and return to main interface.
	    Detail operations: firstly select the engineer setting in menu, press middle key then instrument display the normal test main interface.

Warning: please don't charge the portable type gas detector alarm instrument at test field, avoid the spark which generated by that plug in and plug out charger caused fire or

explosion; please do best that not charge the portable type gas detector under start machine status, avoid it affect the charging speed.

Sixth   Operation notices

1. Prevent this machine fallen from high space or under serious vibration;

2. When existing high concentration gas or unable to normally use this machine;

3. Please strictly follow the specification to operate and use, otherwise, it maybe caused incorrect test result or damage this machine.

4. This product can't be storage or utilize in the environment where contain corrode gas (example more higher concentration chlorine, etc), also can't in other serious environment, include too high or too low temperature, use and storage this machine in more higher humidity, electromagnetism and strong sunshine.

5. Please use clean soft cloth soak water to lightly wipe if long time used and has pollutants on this machine surface, don't use the corrode dissolvant and hard objects to wipe surface of this machine, otherwise, it maybe caused the surface of this machine scratched or damaged.

6. This machine should fix time calibrating to guarantee the test precision, the calibrating period not exceed one year.

7. Any application or operation failure which exceed that described in this specification then please contact our company to solve it.

8. Unable to disassemble or renewal the battery group in explode gas environment, also unable to charge the battery

group. Unable to use the outer setting connect equipment which not pass through explosion proof certification in explode gas environment. Also unable to renewal sensor.

Seventh   Common failure and the solve methods

Failure appearance	Possible failure reason	Treatment method
Unable to start machine	Too low voltage	Please charge in time
	Dead machine	Please contact the distributor or manufacturer for repair
	Electric circuit failure	Please contact the distributor or manufacturer for repair
No reaction at the test gas	Electric circuit failure	Please contact the distributor or manufacturer for repair
Incorrect display	Sensor exceed the period	Please contact the distributor or manufacturer for renewal sensor
	Long time not calibrating	Please calibrating in time
Time display error	Battery power completely exhausted	Charging in time and reset the time
	Strong electromagnetism disturb	Reset the time
Unable to use the zero point calibrate function	Too much sensor shifting	Calibrating in time or renewal sensor
Light instrument normal detect interface display full range	Sensor failure	Please contact the distributor or manufacturer for renewal sensor

Eighth   Storage
The detector should be storage in the air venting room where environment temperature is -10℃~55℃ and the relative humidity not bigger than 85%, and the air not contain the harm gas or varias which act corrode performance on the detector.

Ninth   Accessories and others
The assorted detector provide one package box, one set portable type gas detector, one set specification and one set qualified certificate and warrant card.

Tenth   Appendix table (the customized instrument able to select the detect gases in the below table to assemble)

Test gas	Common range	Optional range	Resolution ratio	Low alarm	High alarm
Oxygen	0-30%VOL	0-30%VOL	0.1%VOL	19.5	23.5
Methane	0-4%CH4	0-4%CH4	0.01%CH4	1.00	2.50
Carbon monoxide	0-1000PPM	0-2000/5000PPM	1PPM	50	200
Hydrogen sulfide	0-100PPM	0-50/200/1000PPM	1/0.1PPM	10	20
Combustible gas	0-100%LEL	0-100%LEL	1%LEL	20	50
Ammonia	0-100PPM	0-50/500/1000PPM	1/0.1PPM	20	50
Hydrogen	0-1000PPM	0-40000PPM	1/0.1PPM	200	500
Chlorine	0-20PPM	0-100/150PPM	1/0.1PPM	5	10
Hydrogen chloride	0-20PPM	0-20/150PPM	1/0.1PPM	5	10
Sulfur dioxide	0-20PPM	0-50/100PPM	1/0.1PPM	5	10
Nitric oxide	0-250PPM	0-500/1000PPM	1/0.1PPM	20	125

Nitrogen dioxide	0-20PPM	0-50PPM	1/0.1PPM	5	10
Carbon dioxide	0-5000PPM	0-5%/10%vol (Infrared)	1PPM/0.1% vol	1000/0.2	2000/0.5
Hydrogen phosphide	0-20PPM	0-20PPM	1PPM	5	10
Hydrogen cyanide	0-20PPM	0-20PPM	1PPM	10	25
Epoxy acetylene	0-100PPM	0-100PPM	1PPM	20	50
Epoxy ethane	0-100PPM	0-100PPM	1PPM	20	50
Ozone	0-100PPM	0-20/100PPM	0.1PPM	20	50
Methanal	0-40PPM	0-50/100PPM	1/0.1PPM	8	20
Benzene	0-1000PPM	0-1000PPM	1PPM	200	500
Methyl benzene	0-1000PPM	0-1000PPM	1PPM	200	500
Dimethyl benzene	0-1000PPM	0-1000PPM	1PPM	200	500
VOC	0-1000PPM	0-1000PPM	1PPM	200	500
Chlorethylene	0-250PPM	0-250PPM	1PPM	50	125
Methyl alcohol	0-30PPM	0-30PPM	1PPM	6	15
Isobutene	0-90PPM	0-90PPM	1PPM	18	45
Alcohol	0-80PPM	0-80PPM	1PPM	l6	40