E6000 Portable Multi-Gas Detector

Operation Manual

(Ver: HW1403180296)

Read this manual carefully before using this device.
SAFETY INFORMATION

Incorrect operation or unsuitable using environment may attenuate the instrument’s performance. Therefore, please first read the below safety information carefully before using and then operate this device.

- Please don't use the defective device. Before using, please check if there is crack or spare part missing. If yes, please contact the seller immediately.
- It's suggested that the user carry out the "Bump Test" by following Clause 5.3 of this manual before using the device. If the device reading is beyond the specified range, please calibrate the device by following Clause 5.7 and 5.8 of this manual.
- Periodic Bump test will test the response feature of the sensor. Please make sure that the visual, audible and vibrative alarm signals are ok.
- Only accessories which are specified for E6000 or permitted by the seller are allowed to be used.
- Only the charger which is specified for E6000 is allowed to be used. It's forbidden to charge the device in the dangerous environment.
- Please don't expose the device to the exceeding-range gas environment for long time. Otherwise, it will badly influence the performance and even damage the device.
- If exposed to the environment consisting of leaded compound, sulfoccompound, organic phosphorus compound or silicon, the gas sensor will be poisoned. Please don't use the device in the above environment.
- Please don't expose the device to the environment which consists of H2S, hydrocarbons gas or high corrosive gas for

1
long time. Otherwise, it will restrain the response of the gas sensor and reduce the sensitivity. If the device has to be used in the above environment, please follow Clause 5.3 to carry out the Bump Test before using it.

● Please don't expose the device to the environment which has electric shock, strong magnetic field or serious continuous mechanic shocking.

● There is a lithium battery inside the device. Please don't place the useless battery together with the rubbish. The useless battery should be discarded by qualified withdrawers.

● It's forbidden to disassembly, adjust or repair the device without permission.

● Please avoid the device falling from high place or serious shocking.

● Any other operation beyond this manual, please contact the seller.

1. Brief introduction

E6000 is a compact and lightweight multi gas detector that continuously measures combustibles, O₂, CO, H₂S and other toxic gases in ambient air. By using 6 sensors, it can detect at most 7 gases at the same time. Its functional and watertight design (IP 66) incorporates an Bump proof, rubberized housing to meet the toughest requirements of harsh environments.

2. Main features

● Advanced 16 digit MCU with low consumption

● Ultra-wide angle LCM screen

● Adjustable 2-level alarm points
● Adjustable calibration point
● Self protection design for combustible gas sensor
● Battery low voltage alert function
● With real-time clock
● Interchangeable smart sensor module design
● Self adjustment design
● Audible, visual and vibrative alarm signals
● Data communications function
● STEL/TWA alarm for toxic gases
● Design of self-test, self-diagnose and self-repairing
● Password management
● Intrinsically safe design

3. Technical specification

Detecting method: Natural diffusion
Target gas: Refer to the Annex-1 in the end of this manual

Response time:
Semi-conduct, catalytic, thermal conduct sensor ---------- T90 < 30s
O₂, CO, H₂S sensor---------------------------------------- T90 < 30s
Other sensors ----------------------------------------------- T90 < 120s

Indication error range:
Combustible gas------------------------------------------ ±5% F.S.
Toxic gas----------------------------------------------- ±5ppm

Working condition:
Temperature: -20℃ ~ 50℃          Humidity: < 95%RH
Power source: Lithium battery (DC3.6V, 6600mAh)
Working time per charging: ≤ 30 hours continuously (no alarm)
Charging time: ≤ 6 hours
Explosion-proof grade: Exia IIC T4 Ga
Ingress protection: IP66
Dimensions and weight: 168mm×91mm×45mm  about 500g

4. Structure and functions

Appearance

Display information
5. Operation instructions

5.1 Power on

When machine is power off, hold for more than 3s and the device will be power on. The screen shows as below.

![Power on Screen]

After power on, the detector will proceed self-test and display is as below drawing.

![Self-test Screen]

The device will make self test on the buzzer, alarm lights and vibrator automatically. After self-test, the device enters into normal detection status and the screen displays as below.

![Detection Screen]
**Note:**
- If self-test fails, related information will be displayed. For details, please refer to Clause 10 Troubleshooting of this manual.
- If self test succeeds, the device enters into warm-up period of 3-30s, which depends on the sensor type.

**5.2 Power off**

In normal detection status, hold [power button] for 3 seconds and the screen will show “Shutting down…”. Meanwhile, the buzzer will give out intermittent beep twice. Then machine is power off.

**5.3 Bump test**

Every day before using the device, the user is suggested carry out Bump test, so as to check if the device is working normally.

**Test method:**

When the device is power on, put it into high level gas environment, which is higher than the preset high alarm point of the device. If all the device’s function is ok, then device can be used in the working area.

**Note:**
- If any reading on the screen is beyond the prescribed display error range, please follow Clause 5.7 and 5.8 of this manual to re-calibrate it.
- If detector does not response or showing errors, please contact the seller for repairing.
5.4 Menu explanation

5.4.1 Common menu

In the normal detection interface, press both and simultaneously and the device enters into common menu setting interface. Below is the button function:

<table>
<thead>
<tr>
<th>Menu</th>
<th>Submenu</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE TIME</td>
<td>2013-04-24</td>
<td>When changing the date or time, the selected bit will blink.</td>
</tr>
<tr>
<td>ALARM MODE</td>
<td></td>
<td>When changing the mode, the selected bit will blink.</td>
</tr>
<tr>
<td>RECORD GAP</td>
<td>10 s</td>
<td>Set time gap for record saving.</td>
</tr>
<tr>
<td>CAUTION MESSAGE</td>
<td>10 s</td>
<td>Black box means this item is selected.</td>
</tr>
<tr>
<td>BATTERY MESSAGE</td>
<td>Voltage: 4.14V WorkTime: 29h</td>
<td>Display battery voltage and remaining work time</td>
</tr>
</tbody>
</table>
After entering into certain submenu, the user can change the item value by pressing and save the setting by pressing . The user can also exit without saving changes by pressing .

5.4.2 Advanced menu

In the interface of common menu interface, press both simultaneously twice. The screen shows password inputting interface. Input the password by pressing to increase the bit value and press to confirm the input password. After inputting the correct password, press to enter into advanced menu interface. Select the submenu item by pressing and enter into selected submenu by pressing .
<table>
<thead>
<tr>
<th>Menu</th>
<th>Submenu</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAFETY DEPLOY</td>
<td>I D: ****** NO:******</td>
<td>To set user’s ID.</td>
</tr>
<tr>
<td>ZERO CAL.</td>
<td>Zero moving...........</td>
<td>Zero calibration</td>
</tr>
<tr>
<td>DATA UPLOAD</td>
<td></td>
<td>Data upload</td>
</tr>
<tr>
<td>PERIPHE CONFIG.</td>
<td></td>
<td>One mode must be selected</td>
</tr>
<tr>
<td>POWER MANAGE</td>
<td>GPS  GPRS  PUMP</td>
<td>Activate the other function</td>
</tr>
</tbody>
</table>
5.5 Gas detection
The device monitors and displays gas concentration in real time. Once the gas concentration reaches the preset alarm point, it will initiate alarms.

**Note:**
- Do not block sensors in detecting process.
- To prolong life span, external filters are suggested in detecting process.
- Long time storage, serve physical shock and excessively high concentration may cause zero drift of the gas sensors. If finding the reading in clean air is not zero, please make zero calibration by following Clause 6.7 and 6.8 of this manual.

5.6 Status review
In normal detection mode, press button in normal operation mode and the screen will show automatically current temperature, time, STEL value①, TWA value①, the maximum level of gas②, the minimum level of gas② since power on.

**Note:**
①Only for toxic gas.  ②Only for oxygen.

5.7 Auto zero calibration
In normal detection mode, hold both and buttons for about 1 seconds. The device asks for inputting password. After inputting correct password, the device enters into advanced menu interface.
Move the cursor to icon and press button. The device will make zero calibration automatically. In the end, a “√” icon displays for gas succeed and “×” for gas failed.

**5.8 Calibration**

**WARNING!**
Calibration must be carried out by qualified person. Otherwise, the device may work wrongly.

5.8.1 Enter the setting interface

While the device is power off, hold both and buttons simultaneously for about 3 seconds. Then, the device first performs a self test as after power on and after a short delay, the device asks for inputting the password.

**Input Password:**

0000

After inputting correct password, the device enters into the setting interface shown as below.

![Setting Interface Diagram]
Press \[ \text{ } \] to move the cursor and the selected icon turns black.

Then press \[ \text{ } \] to enter the submenu.

5.8.2 Zero calibration

Select \[ \text{ } \] icon and press \[ \text{ } \] to enter auto zero calibration interface, shown as below. When finished, a “√” icon displays for gas succeed and “×” for gas failed.

![零点校准界面](image)

In the auto zero calibration mode, press \[ \text{ } \] and the device enters manual zero calibration interface, shown as below.

![手动零点校准界面](image)
When the AD value of the sensor is stable, press to make zero calibration manually. After that, a “✓” icon displays for gas succeed and “×” for gas failed, shown as below.

<table>
<thead>
<tr>
<th>CH4</th>
<th>VOC</th>
<th>O2</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>NH3</td>
<td>NO2</td>
<td>CO</td>
</tr>
<tr>
<td>×</td>
<td>×</td>
<td>×</td>
</tr>
</tbody>
</table>

5.8.3 Span Calibration

After zero calibration, the device displays a countdown interface, shown as below.

After that, it displays the calibration gas level, shown as below:

If the level needs to be changed, press to enter the below interface:
Press 🖇️ to move the cursor and press 🖇️ to change the figure. After changing the figure, press 🖇️ button to save and enter the gas inputting mode, shown as below:

![Gas Input Display](image)

When the device senses the input gas, it displays as below:

![Gas Detection Display](image)

During this period, if needint to change to manual calibration mode, press 🖇️. Below is the manual calibration interface.

![Calibration Interface](image)
Press ✏️ again to confirm manual calibration. The below 2 drawings show the succeeded and failed manual calibration.

![Success and Failure Drawings](image)

Once finishing calibration one sensor, the device starts to calibrate the next sensor one by one. The operation is same as above.

During calibration period, press ✏️ and the user can skip calibration for some specific sensors.

5.9 Alarm point setting

Press ✏️ to move the cursor to the ✏️ incon and press ✏️ button to enter the submenu. Screen shows as below.

<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>L</th>
<th>ST</th>
<th>TW</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH4</td>
<td>50</td>
<td>20</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>VOC</td>
<td>200</td>
<td>0</td>
<td>200</td>
<td>35</td>
</tr>
<tr>
<td>H2S</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>NH3</td>
<td>50</td>
<td>25</td>
<td>35</td>
<td>25</td>
</tr>
<tr>
<td>NO2</td>
<td>10</td>
<td>5</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>CO</td>
<td>200</td>
<td>35</td>
<td>200</td>
<td>35</td>
</tr>
</tbody>
</table>
Press \[ \text{button} \] to move the cursor to the figure which needs to be adjusted and press \[ \text{button} \] when the figure flashes. Then it enters into the setting interface, shown as below.

![0050]

Press \[ \text{button} \] button to adjust the figure and press \[ \text{button} \] to move the cursor. After adjusting, press \[ \text{button} \] button to save. Then the device enters setting interface of the next alarm point.

**Note:**

H---High alarm point  
L---Low alarm point  
ST---STEL alert point  
TW---TWA alert point

### 5.10 Channel setting

Press \[ \text{button} \] to move the cursor to \[ \text{icon} \] icon and press \[ \text{button} \] to enter the sumenu. The screen displays as below.

![Channel Setting]

Press \[ \text{button} \] to move the cursor to the target channel and this channel box flashes. Press \[ \text{button} \] to select or not. If selected, the center is black; if cancelled, it’s white.

**Note:**
Select---means this channel is open.
Cancel---means this channel is closed.

Keep preessing until all the channgels have been set. The device will save the setting and exit to the normal detection mode.

Closed channels will have a displayed in the channel box. Otherwise, it is open.

5.11 Password setting

Move the cursor to the incon and press button to enter the submenu, shown as below.

```
Input Password:
0000
```

Press to adjust the figure and press button to move the cursor. After setting, press to save the new password.

**WARNING!**
After setting the new password, please remember it clearly.

6. Battery charging

If low voltage alert is activated or the device cannot be power on, please charge the device immediately in safety area.

Correct the charger connector first to the charge port of the device when power off. Then, connect the plug of the charger to the
suitable power source. The device will be power on automatically and a battery symbol is displayed on the screen. The symbol shows the charging status. When the symbol is all balck and no changes, the charging is finished. When charged enough, the battery symbol is full of black color. Then please disconnect the charger from both the device and power source.

**WARNING!**
- It’s forbidden to charge the device in working area.
- During charging, the detector has no detection function.
- Avoid charging when device is power on. Otherwise, the charging speed will be influenced.

7. **USB communications (optional function)**

This function is only available for the device which includes CD and USB data cable.

Connect the USB data cable correctly between the device and computer. Then, run the matching program as instructed in the manual for the software.

For details, please refer to the software manual.

8. **Using and replacement of sensor modules**

The device adopts smart sensor modules, which are suggested be calibrated every 6 months If life span is overdue, please contact the seller for replacement.

9. **Standard accessories**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand ring</td>
<td>1 pc</td>
</tr>
<tr>
<td>Alligator clip</td>
<td>1 pc</td>
</tr>
<tr>
<td>Calibration cover</td>
<td>1 pc</td>
</tr>
<tr>
<td>Operation manual</td>
<td>1 copy</td>
</tr>
<tr>
<td>Charger</td>
<td>1 pc</td>
</tr>
</tbody>
</table>
How to use the clips and hand ring?

- Belt clip, alligator clip and hand ring could be screwed to the back of the instrument when necessary.
- If belt clip is used more frequently, the user can remove the alligator clip first and then install the instrument.

10. Troubleshooting

<table>
<thead>
<tr>
<th>Normal problem</th>
<th>Possible reasons</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not power on</td>
<td>Too low voltage</td>
<td>Charge it immediately</td>
</tr>
<tr>
<td></td>
<td>System breakdown</td>
<td>Contact the seller</td>
</tr>
<tr>
<td></td>
<td>Circuit fault</td>
<td>Contact the seller</td>
</tr>
<tr>
<td>No response to gas</td>
<td>Warm-up not finished</td>
<td>Wait till it finishes</td>
</tr>
<tr>
<td></td>
<td>Circuit fault</td>
<td>Contact the seller</td>
</tr>
<tr>
<td>Reading of gas level not accurate</td>
<td>Sensor overdue</td>
<td>Contact the seller</td>
</tr>
<tr>
<td></td>
<td>Sensor drift</td>
<td>Re-calibrate it</td>
</tr>
<tr>
<td>Time and date are not correct</td>
<td>Battery voltage has been used up</td>
<td>Charge it and re-set the time and date</td>
</tr>
<tr>
<td></td>
<td>Intense electromagnetic interference</td>
<td>Reset the time and data</td>
</tr>
<tr>
<td>Zero calibration function not available</td>
<td>Too much sensor drift</td>
<td>Re-calibrate or replace the sensor module</td>
</tr>
<tr>
<td>Display “-0” in normal detection status</td>
<td>Sensor drift</td>
<td>Make zero calibration</td>
</tr>
</tbody>
</table>
11. Using notice

- Do not drop it from high place and protect it from severe shocking.

- The instrument may not function properly in an atmosphere with gas of excessively high concentration level.

- Please follow this manual to operate the device. Otherwise, it will cause incorrect readings or damage to the device.

- Do not store or operate the device in an environment containing corrosive gas or vapor (for example chlorine of high concentration). Do not expose the device to other harsh environments (including excessive cold, heat, humidity, electromagnetic field and intense light).

- Clean the housing of the device by using damp cloth. Do not use corrosive agents or hard object which may cause damage or scuffing on the housing.

- Operations of disassembly, replacement and must be carried by qualified person.

- It’s suggested re-calibrate the device once every 6 months.

- Considering environmental protection, do not throw away the old batteries and sensors freely. Please send them to the specified place.

- It’s forbidden to charge the device and upload data to the computer in the hazardous area.

For any application or trouble beyond description in this manual, please the seller for advice.
## Annex1—Gas List

<table>
<thead>
<tr>
<th>Gas</th>
<th>Detection range</th>
<th>L-alarm point</th>
<th>H-alarm point</th>
<th>TWA (ppm)</th>
<th>STEL (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH₄</td>
<td>0-100%LEL</td>
<td>20%LEL</td>
<td>50%LEL</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>C₃H₈</td>
<td>0-100%LEL</td>
<td>20%LEL</td>
<td>50%LEL</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>H₂</td>
<td>0-100%LEL</td>
<td>20%LEL</td>
<td>50%LEL</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>H₂</td>
<td>0-1000ppm</td>
<td>35ppm</td>
<td>250ppm</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>O₂</td>
<td>0-30%vol</td>
<td>19.5%vol</td>
<td>23.5%vol</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>H₂S</td>
<td>0-100ppm</td>
<td>10ppm</td>
<td>15ppm</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>CO</td>
<td>0-1000ppm</td>
<td>35ppm</td>
<td>200ppm</td>
<td>35</td>
<td>200</td>
</tr>
<tr>
<td>CO</td>
<td>0-2000ppm</td>
<td>35ppm</td>
<td>200ppm</td>
<td>35</td>
<td>200</td>
</tr>
<tr>
<td>CO₂</td>
<td>0-6000ppm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NH₃</td>
<td>0-100ppm</td>
<td>25ppm</td>
<td>50ppm</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td>CL₂</td>
<td>0-20ppm</td>
<td>5ppm</td>
<td>10ppm</td>
<td>0.5</td>
<td>1.0</td>
</tr>
<tr>
<td>SO₂</td>
<td>0-100ppm</td>
<td>2ppm</td>
<td>5ppm</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>NO</td>
<td>0-1000ppm</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>NO₂</td>
<td>0-20ppm</td>
<td>5ppm</td>
<td>10ppm</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HCL</td>
<td>0-100ppm</td>
<td>20</td>
<td>50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>HF</td>
<td>0-20ppm</td>
<td>5ppm</td>
<td>10ppm</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>