

IMR EX610



Portable Gas Detector

Operation Manual



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Read this manual carefully before using the detector.

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Safety Information

Please read the following security information carefully before using the detector:

- Do not use the damaged gas detector. Before using the detector, please check whether there's crack or parts missing. If the detector is damaged or uncompleted, please contact with us or our agent immediately.
- We highly recommend do "impact test" as in 4.3 (put the detector in the target gas which the concentration is higher than high-alarm level, you can use standard gas) to make sure the good performance of detector. Calibrate as in 4.8 if the test value is beyond detection range.
- Do "impact test" periodically to confirm sensor's ability of good response to gas. Ensure that the audio, visual and vibration alarms working properly
- Use only accessories specially designed for EX610 or accessories approved by the distributor.
- Use only the charger supplied with the detector, Do not recharge the detector in hazardous area.
- For Detectors with catalytic or semiconductor sensor, if to be long time exposed to the target gas which concentration is beyond its detecting range, will increase its working load, thus badly affect its function or damage the detector.
- Detectors with catalytic or semiconductor sensor will be poisoned if exposed to environment containing lean chromate, sulfur compound, phosphorus compound or silicon; do not use the detector in such environment.
- Please don't expose the device to the environment which consists of hydrogen sulfide, halogenated hydrocarbon or high corrosive gases for 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 4.3 to carry out the Impact 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's lithium battery inside the detector and do not put the used-battery together with rubbish. The used-battery should be handled by the qualified recoverer or dangerous goods handling operators.
- Unauthorized disassemble, adjustment or repair of the gas detector is forbidden
- Avoid falling from high or severe vibration to the detector
- For any problem beyond the description of this manual, please contact the distributor or the manufacturer for help.

1. Brief Introduction

EX610 portable single gas detector (hereinafter refer to as “detector”) is an intrinsically safe instrument which can make continuous detection to combustible and toxic gases. It is suitable for combustible and toxic gas leakage detection in underground pipe or mines, and keeps the workers safe, prevents the facilities from being destroyed. The detector, adopting excellent-quality sensor, makes detection in the way of natural diffusion. It has good sensitivity and repeatability. The detector adopts embedded MCU controller, easy to operate. The shell adopts special high strength material and anti-smooth rubber, with the characters of water-proof and dust-proof.

2. Main Function and Specification

2.1 Main Function and Features

- Advanced 16-digit MCU control with low power consumption;
- Wide view LCD screen;
- Adjustable high alarm and low alarm setting;
- Adjustable calibrating level, easy for customers to calibrate.
- Device with LEL range has high-concentration protection function
- Self-test for the combustible gas sensor;
- Under-voltage alert;
- Real time clock display
- Real-Smart Sensor module design, easy for maintenance and replacement;
- Self-adjustment function, reduce the detecting error.
- Audio, visual and vibration alarming method;
- Data uploading
- STEL and TWA alarming for toxic gases

- Self-test after power on; advanced fault diagnosis and auto reset;
- Password management to avoid wrong operation;
- Intrinsically safe.

2.2 Technical Specification

Range: See attached table 1.

Gas Detected: combustible gas, toxic gas, oxygen

Response time:

Semiconductor, Catalytic, Thermal conductivity $t_{90}<30s$

Oxygen, Carbon monoxide, hydrogen sulfide $t_{90}<30s$

Indication method:

LCD displays the real time data and status;

Alarm method: Audio, video and vibration alarm

Working Temperature:

Combustible Gas: $-40^{\circ}\text{C} \sim 70^{\circ}\text{C}$

Toxic Gas $-20^{\circ}\text{C} \sim 50^{\circ}\text{C}$

Working humidity: $\leq 95\% \text{RH}$ no condensation

Power source: DC3.7V (Lithium battery 1800mAh LIS103450)

Charging time: 4~6 hours

Continuous working time:

≥ 8 hours (for combustible gas)

≥ 300 hours (for toxic gas under temperature of 20°C)

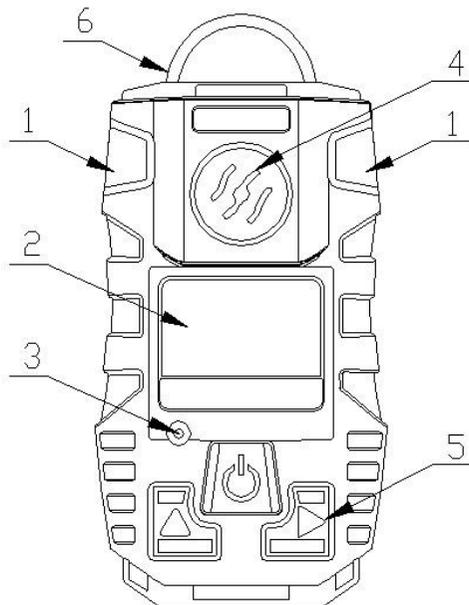
Protection Grade: IP65

Weight: about. 191g (with battery)

Dimensions: 108.4mmx61mmx36mm (L x W x H)

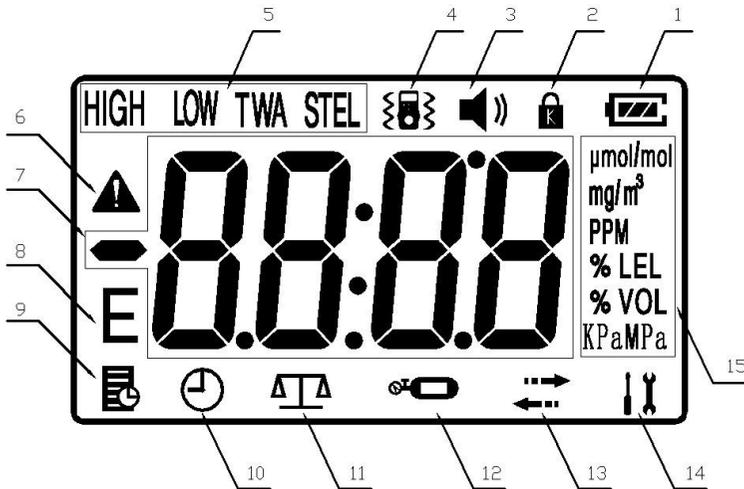
3. Configuration and function

3.1 Appearance



NO	NAME	NO	NAME
1	Alarm light	4	Sensor Port
2	LCD Screen	5	Button
3	Buzzer port	6	Buckle

3.2 Display information



NO	FUNCTION
1	Battery Condition
2	Lock on or Password
3	Buzzing Status
4	Vibrating Status
5	Alarm information
6	Warning or Max Value
7	Gas Concentration
8	Error
9	Record
10	Clock Icon
11	Zero Calibration
12	Calibration Point or Calibration Status
13	Communication icon ①
14	Data Setting
15	Unit

Note: ①only appear when your device has data uploading function.

3.3 Buttons

Button	Function
	<ul style="list-style-type: none"> ● Press and hold  for more than 3 seconds to turn on the device. ● Press  to cancel the data setting. ● When power off, press  and  for more than 5 seconds to calibrate the device. ● Hold  for seconds to turn off the device.
	<ul style="list-style-type: none"> ● Press  to adjust the value ● Press  to enter setup for selected item ● Press  and  for over 3 seconds to set the data.
	<ul style="list-style-type: none"> ● Press  and  to review temperature, time, STEL , TWA^① and Max Value ^② ● Press  to check the setup ● Press  to save the setting. In alarming status, press  to cancel audible alarming and vibration.

Notice: ①Only available for toxic gas detector

②Oxygen has Max/Min exposer value

4. Using the detector

4.1 Turning ON the Detector

In power off status, hold  for over 3 seconds and the device will be turned on. Then the device starts self test as follows:

- 1) All the data and figures displayed; back light on;
- 2) Buzzer gives a sound;
- 3) All the alarming signal function;
- 4) Version number displayed



5) Date & Time display



Year



Date

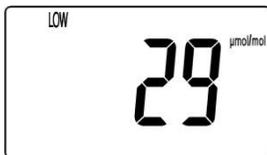


Time

6) Gas type



7) L-alarm and H-alarm

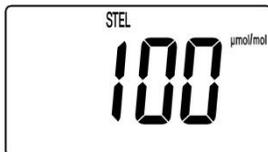


L-alarm

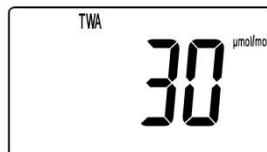


H-alarm

8) Display STEL and TWA levels:



STEL



TWA

Note: Only available for Toxic gas.

9) Self test pass

After self test, the device starts a short warm-up time countdown (3-30 seconds). After warm-up, the screen display as below which means the device finish starting up.



Note:

If self test failed, it will display relative information. Please refer to the "Time fault alarm" and "Storage fault alarm" in the manual, if self test passed, detectors will automatically choose a warm up time from 3s~30s basing on different sensors.

4.2 Turn off the device

In power on status, when the device is not in detection status, hold



and the screen displays as follows:



The buzzer gives "beep" sound. After 3 seconds, when the screen

displays as follows, please release  and the detector is turned off.



Note: When the device is not in detection interface, you can press



again and again till the device exits to detection interface.

4.3 Impact Test

Perform an “Impact Test” before each day’s use to check if the detector functions properly.

Method: After turning on the device, put the device into gas which concentration is higher than the H-alarm level or standard gas. If the device works normally, then the user can carry the device to enter the detection area. If the reading on the screen is beyond the error range, please follow Clause 4.8 to re-calibrate the device. If the device doesn't response or displays abnormally, please contact the seller for solution.

4.4 Menu Description

The menu includes the following:

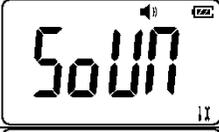
- Zero translation.
- Date and time setting.
- Vibration on / off。
- Keytone on/off
- Communication mode①
- Password setting

Note: ① only available when the purchased instrument is supplied with USB communication function.

In normal detection status, press both  and , the screen displays as follows. After 1 second, it enters into menu interface.



Press  to adjust the item you need. The following is the detailed instruction on each item.

Display	Meaning and function
	When these figures are flickering, press  to zero the detector.
	When these figures are flickering, press  to set time.
	When it appears, press  to turn on / off the sound.
	When the it appears; press  to turn on / off vibration.
	When the it appears; press  to enter communication mode ①.
	When it appears, press  to set the password (initial passwords is 0000).

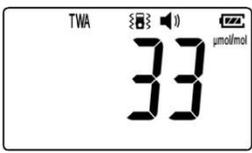
Note: ① only available when the purchased instrument is supplied with USB communication function.

Press  to make adjustment for selected items, then press  to confirm the changes or press  to exit the selected item without saving the change; below are the meanings of the items

Display	Meaning
	To turn off the function
	To turn on the function

4.5 Alarm information

Alarm type	Display
L-alarm: <ul style="list-style-type: none"> ● Slow sandhi alarm sound ● Flickering alarm lights ● Vibration ① 	
H-alarm: <ul style="list-style-type: none"> ● Fast sandhi alarm sound ● Flickering alarm lights ● Vibration ① 	
High concentration protection: ② <ul style="list-style-type: none"> ● Slow sandhi alarm sound ● Flickering alarm light 	
Sensor fault alert: <ul style="list-style-type: none"> ● Fast sandhi alarm sound 	
STEL Alert: <ul style="list-style-type: none"> ● Slow sandhi alarm sound ● Flickering alarm lights ● Vibration ① 	

<p>TWA Alert:</p> <ul style="list-style-type: none"> ● Slow sandhi alarm sound ● Flickering alarm lights ● Vibration ① 	
<p>Over range Alert:</p> <ul style="list-style-type: none"> ● Slow sandhid alarm sound ● Alarm LED flickering 	
<p>Time fault:</p> <p>The device will try to solve this problem by itself. If solved, the device will enter into time setting after power on. The user can set the time. If failed, the device will turn off automatically. Please contact the seller for solution.</p>	
<p>Storage fault:</p> <p>The device will try to solve this problem. If solved, the device will enter into calibration status after power on. Please follow Clause 4.7 to set the device. If failed, the device will turn off automatically. Please contact the seller for solution.</p>	
<p>Low voltage alert:</p> <ul style="list-style-type: none"> ● Sandhi alarm sound once every 1 minute. ● In severe under-voltage, the device can work 15 minutes at most. Please charge the device in safety area. Otherwise, it will turn off automatically. 	

Note: ①Only available when vibration function is on.

②Only available for Combustible Gas detector.

In continuous alarm status, user can press  to turn off audio alarm and vibration. The  and  icon on the screen will flicker.

4.6 Status Checking

In detection status, press , the screen displays in turns the temperature, time, Max. Value, Min Value^②, STEL Value^①, TWA Value^②, etc

Note: ① Only available for toxic gas detector

② Only available for Oxygen detector

4.7 Zero calibration

If the display in the clean air is not zero, please follow the following steps to calibrate zero point.

In detection status, hold both  and  for more than 1 second till the screen indicates the setup interface, During this period, the screen will display as follows:

Status	Display
When holding both  and  , it displays as the right picture. After 1 second, it will enter into the next status.	
When the display show the right picture, press  to enter into the next status.	
When the device is auto-calibrating zero, it displays as the right picture, calibration will be finished in 5s and then it will return to detecting interface.	

Note: Zero calibration must be in the clean air. Otherwise, it will influence the detection accuracy.

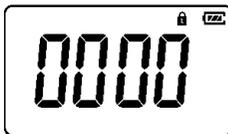
Oxygen detectors use a concentration of 20.9%VOL for the above calibration as in air.

4.8 Calibration and alarm level adjustment

If the detector needs to be re-calibrated or adjusted the alarm level, please follow the below steps.

1) Enter into the mode of calibration and alarm level adjustment.

In power off status, hold both  and  for 3 seconds, the detector starts self test and then a short delay. Then it indicates to input the password. The display is as follows:



Input the correct password to enter into the calibration mode.

Note: As all the parameters of this mode may endanger the safety of the operator, so please operated prudently. The detector will power off automatically if there is no operation within 5s after indicating inputting the password or the input password is incorrect. So please input the correct password in time. If you forget the password, please contact to the supplier.

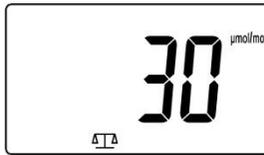
2) Warming Up

After inputting the password, the device will count down to warm up the gas sensor. The counting down time will be different depending on different gasses(30s~90s).

During this status, you can press  to skip the calibration procedure and enter into the mode of Alarm Level Setting(see following items 6,7).

3) Zero point adjustment mode

In this mode, the detector will display a figure which is detected currently as shown in the following chart:



At this status, if there is no operation within 1 minute, the detector will accept the present concentration as the zero point, and then enters into the mode of SPAN Calibration. During this status, you can press



to skip the calibration procedure and enter into the mode of Alarm Level Setting(see following items 6,7).

During this status, if press  it will display the AD value, then

press  to return to display current gas concentration.

Warning: This operation should be carried out in the clean air. Otherwise the accuracy of the detector will be affected severely.

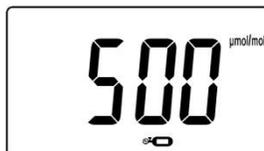
When entering into the next mode, it will displays **E** if the air is not clean or the sensor is damaged. So please change to another place for adjustment or replace the sensor.

4) Span point adjustment

In this mode, the screen displays a set of flickering figures. Press



to modify this figure. This figure is the standard sample gas level with which the operator will need to calibrate the detector, as shown in the following chart:



If there is no operation within 10 minutes, the detector will consider as preparation work not ready, and then display Calibration Error and enter into Alarm Level Setting mode(see following items 6,7).

If gas has been input within 10 minutes, the detector will consider the figure showing on the display as the concentration of the calibrating gas, and then enter into the SPAN Calibration mode.

Note: See Chart 1 for the available adjustable range of the calibration gas concentration.

5) SPAN Calibration

In this mode, the detector displays a concentration value detected as shown in the following chart:



At this time, please cover the gas response hole with the calibration cap and input the calibration gas. Within 30 seconds, if the detector detects the calibration gas, the detector will start up the calibration data analysis procedure by itself. And the detector will automatically adjust the conversion arithmetics till all the standard gas complete the response. Then the detector saves the best arithmetics and complete the calibration. After that it enters into the L-alarm set up.

Note: Please contact the supplier or local service center to get the flow rate of different calibration gases.

In this mode, please avoid touching any buttons, otherwise the accuracy will be effected badly.

If the detector indication figure can't reach half the calibration figure within 30s, or the gas concentration is beyond the maximum drift range of the sensor, the **E** icon will light, which means the gas is not proper for calibration or the sensor is damaged. Please replace the gas or the sensor.

The calibration of O₂ sensor will jump over step 3. and 4.

6) Low Alarm Level Setting

In this mode, the L-alarm level can be adjusted, and the screen

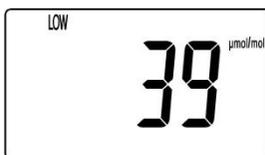
displays as the following chart, with the figure flickering. Press 

or  to adjust the flickering figure according to your need, and

then press  to hold the figure and complete the set up.

meanwhile it enters into the H-alarm set up.

If you don't need to adjust the setting, press  to skip the L-Alarm setting and enter into H-Alarm setting.



Note: Adjusting range of L-Alarm for different gases please find Chart 2.

7) High Alarm Level Setting (H-Alarm)

In this mode, the H-alarm level can be adjusted, and the screen

displays as the following chart, with the figure flickering. Press 

or  to adjust the flickering figure according to your need, and

then press  to hold the figure and complete the set up. After that the device will turn off automatically.



Note: Adjusting range of H-Alarm for different gases please find Chart 1.

5. Recharging

When the battery power is low or the detector cannot work normally due to the low voltage, please charge in time.

Note: You can't activate the detector when it is being charged in the status of power off. In order to avoid fire or explosion, please do not charge the detector when it is working in the working spot. Please do not charge when the detector is power on, otherwise the charge speed will be affected.

6. Data Uploading (Optional)

Connect the detector to PC through the USB cable. Then open the software for uploading the detection record.

Note: This function can be available only when the product you bought has the function of data communication.

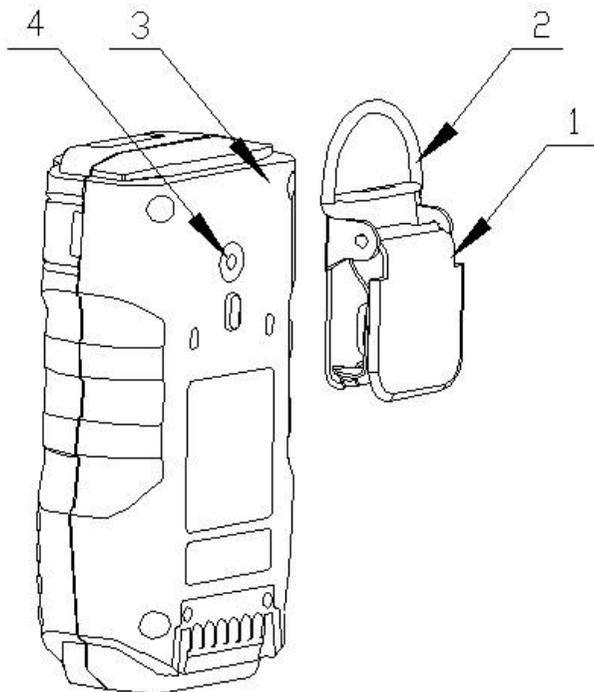
7. Using and Replacement of the sensor

As the sensor of the detector is modularized, so please pay attention to the life of the sensor. When it is overdue, please replace it. Every half year you need to calibrate the sensor in order to guarantee the accuracy of the detector.

The sensor replacement should be carried out by the seller or the local repairing department. If there is no distributor or repairing department, please replace the sensor after you get permission from the manufacturer. The sensor should be replaced with the same modularized sensor supplied by the manufacturer.

8. Using of Accessories

For the user's convenient, we equip buckle, crocodile buckle and flying ring with the detector. If you need the above accessories, you can fix them on the back shell of the detector with the screw. If you mainly use the buckle, please take out the crocodile buckle and then fix the buckle.



1	Buckle	3	Fixing hole
2	Flying ring	4	Screw hole

9. Trouble Shooting Guidance

Trouble	Possible Reason	Solutions
Unable to turn on the detector	Too low voltage	Charge in time
	Detector dead	Contact the seller
	PCB fault	Contact the seller
No response to gas	Warm up not finish	Wait till it finishes
	PCB fault	Contact the seller
Display not correct	Overdue sensor	Replace the sensor
	Not calibrated long time	Calibrate in time
Wrong time display	Battery used up	Charge and reset the time
	Electromagnetic interference	Reset the time
Zero calibration function not available	Too much drift	Calibrate or replace the sensor
It displays “-0”	Too much drift	Calibrate or replace the sensor
If it displays 	Sensor fault	Replace the sensor

10. Precautions

- 10.1. Prevent the detector from falling down high places or serious vibration.
- 10.2. When there is interferential high-concentration gas, the detector may not work normally.
- 10.3. Please operate and handle in strict accordance with the

introduction, otherwise the result may be incorrect or you may destroy the detector.

10.4. The detector should not be stored or used under the circumstance with caustic gas (such as CL₂ gas), or be use or stored under the other rigorous circumstances (including excessive high and low temperature, higher humidity, electromagnetic field and strong sunlight).

10.5. After long-term use, if there is dust on the surface of the detector, please clean it lightly with clean soft cloth, instead of caustic impregnant or hard objects. Otherwise, the surface of the machine may be scratched.

10.6. To assure the testing accuracy, the detector should be calibrated termly, and the calibration period should not more than one year.

10.7. Do not recharge nor upload data in dangerous area.

10.8. Please send the abandoned Li batteries from the detectors to the appointed places or our company. Don't throw them into the dustbin at random.

10.9. Any malfunction not being included in this manual, please contact us for solutions.

Table--Gas List

Gas	Detecting Range	L-Alarm setting range	H-Alarm setting range	L-Alarm	H-Alarm	TWA	STEL
CH ₄	0-100%LE L	10%LEL ~ 25%LEL	25%LEL ~ 80%LEL	20%LEL	50%LEL	N/A	N/A
C ₃ H ₈	0-100%LE L	10%LEL ~ 25%LEL	25%LEL ~ 80%LEL	20%LEL	50%LEL	N/A	N/A
H ₂	0-100%LE L	10%LEL ~ 25%LEL	25%LEL ~ 80%LEL	20%LEL	50%LEL	N/A	N/A
H ₂	0-1000ppm	20ppm ~ 150ppm	150ppm ~ 500ppm	35ppm	250ppm	N/A	N/A
H ₂ S	0-100ppm	5ppm ~ 15ppm	15ppm ~ 30ppm	10ppm	15ppm	10ppm	15ppm
CO	0-1000ppm	25ppm ~ 100ppm	100ppm ~ 500ppm	35ppm	200ppm	35ppm	200ppm
CO	0-2000ppm	25ppm ~ 100ppm	100ppm ~ 500ppm	35ppm	200ppm	35ppm	200ppm
O ₂	0-30%vol	16%vol ~ 19.5%vol	22.5%vol ~ 24%vol	19.5%vol	23.5%vol	N/A	N/A
C ₂ H ₅ OH	0-100%LE L	10%LEL ~ 25%LEL	25%LEL ~ 80%LEL	20%LEL	50%LEL	N/A	N/A
NH ₃	0-100ppm	20ppm ~ 30ppm	30ppm ~ 70ppm	25ppm	50ppm	25ppm	35ppm
Cl ₂	0-20ppm	3ppm ~ 10ppm	5ppm ~ 15ppm	5ppm	10ppm	0.5ppm	1.0ppm
SO ₂	0-100ppm	1ppm ~3ppm	3ppm ~ 10ppm	2ppm	5ppm	2ppm	5ppm

