IMR® Environmental Equipment, Inc.

IMR IX616 Portable Multi-Gas Detector
User Manual

Read this manual carefully before using this device.

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Ver. 1.0A4

CONTENTS

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SERVICE GUIDELINES

1. Thank you for purchasing this product. Before operation, please read this manual carefully to help prevent any accidents or damage to the device due to miss use.
2. Do not modify, repair, or replace parts in the device without contacting IMR, we assume no liability for any harm caused due to improperly modified equipment.
3. Any damage caused due to incorrect operation shall not be covered.

SAFETY INFORMATION

Before using the detector please carefully read the below safety information first and follow the operation requirement:

1. Do not use if damaged or defective. Before use check physical damage or missing parts.
2. Each day before use it is recommended to perform a "bump test" to ensure the detector is operation properly. See section 4.6
3. It is recommended that a "bump test" be performed periodically to ensure that the audible, visual and vibration alarms are set to the correct level and are functioning properly.
4. Only use authorized accessories provided by IMR. Use of unauthorized accessories may result in damage to the device.
5. Only use the charger provided with the instrument to charge the detector. Only charge in a safe environment. Charging in a hazardous environment is not advisable.
6. Detectors using catalytic sensors or semi-conductor sensors cannot be exposed to gases with concentrations over the detector's range. Doing so will overload the detector and interfere with its performance or even cause damage.
7. Detectors using catalytic sensors or semi-conductor sensors cannot be exposed to gas environments that contain lead compounds, sulfur compounds, phosphorous compounds or silicon. These environments will damage a catalytic sensor or semi-conductor sensor.
8. Detectors using catalytic sensors or semi-conductor sensors cannot be exposed to gas environment which contain hydrogen sulfide, halogenated hydrocarbon or highly corrosive environments. These environments will dampen the sensor's response and decrease the sensor's sensitivity to gases. If the detector has to be used in the above environments. Then preform a "bump test" after use.
9. Do not expose the detector to electric shock, strong electromagnetic fields or intense continuous mechanical vibration.
10. Do not discard the battery in the standard trash. Please follow all local regulatory and environment regulations pertaining to lithium battery disposal.
11. Disassembly, modification, or repair of the detector by the end user is prohibited.
12. Take precautions to prevent the detector from being dropped at high elevations and intense vibration.
13. For any usage or trouble shooting not covered in this manual contact IMR.

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1. BRIEF INTRODUCTION

The IX616 is a multi-gas detector with continuous detection of these combustible gases O2, CO and H2S gases in the air. It has a functional and watertight design (IP 66) incorporates an impact absorbing rubberized housing to meet the toughest requirement of harsh environments like underground tunnels, mines etc.

2. MAIN FEATURES AND SPECIFICATION

2.1. MAIN FEATURES

- Intrinsically safe design
- 100000 records storage capacity including peak value
- Calibration point adjustable
- Adjustable 2-level alarm levels; STEL and TWA alarm
- Audible, visual and vibration alarms
- Self-protection design for combustible gas sensor
- Low battery voltage alert function
- Data uploading (to PC)
- Password management
- Self-test when powered on
- Self-diagnostic and auto-correction function.

2.2. TECHNICAL SPECIFICATION

- Detection method: Natural diffusion
- Detecting gas: See the "Sensor Table" on page 10
- Response time:
  - Flammable gas: T90＜30s
  - O2, CO, H2S: T90＜30s
- Accuracy: ±5% FS (LEL) / ±5ppm (toxic gas)

- Working condition:
  - Temperature: -20℃～50℃
  - Humidity: ＜95%RH (non-condensating)
- Power source: Lithium battery, DC3.7V 1800mAh
- Charging time: ≤ 6 hours
- Battery working time: ≥ 8 hours (no alarming status)
- Explosion proof: ExiaIICT3
- Ingress protection: IP66
- Dimension: L*W*H 120mm×68mm×30mm
- Weight: About 220g

3. STRUCTURE AND FUNCTION

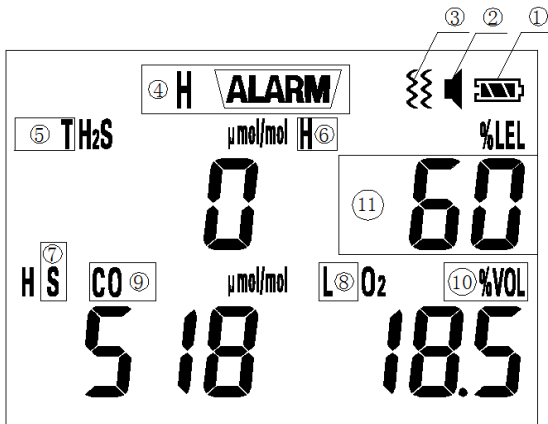### 3.1. APPEARANCE
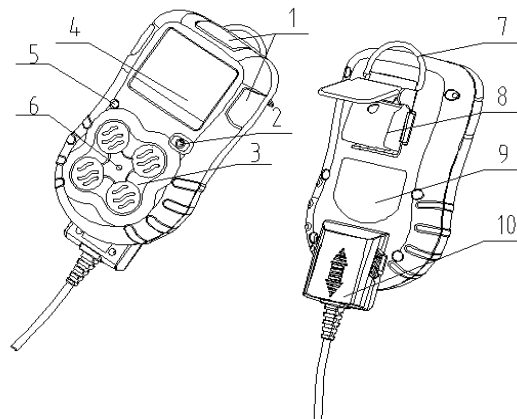
1. Alarm indication LED
2. Button
3. Sensor ports
4. Display
5. Buzzer
6. Calibration cover fastener hole
7. Hand strap
8. Alligator clip
9. Label
10. Charging/ Communication port

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3.2. DISPLAY INFORMATION

1. Battery charge
2. Sound
3. Vibration
4. Alarm
5. TWA alarm
6. High alarm
7. STEL alarm
8. Low alarm
9. Gas name
10. Unit of measurement
11. Gas concentration

3.3. BUTTON FUNCTION

- Power on: Hold for 1 second and then release
- Power off: Hold for 3 seconds until the screen is off
- Enable backlight: Press it once
- Mute and cancel vibration: During alarming status, press once
- Check device status: While powered on, backlight on and detection mode is active. Press once and the screen will show the device status including max value, min. value, STEL value, TWA value, current time, serial number and version number.
- Calibration: After the device has entered detection mode hold the button for more

than 20 seconds. The screen will then turn off and then back on. When the screen shows calibration mode release the button.

Note: The initial alarming method is buzzer + flasher + vibrator. If the user needs to set the alarming method install the PC software and modify the setting there.
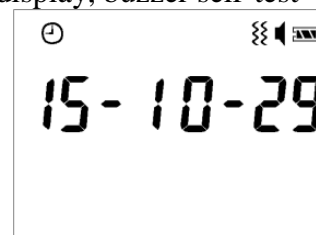
4. OPERATION INSTRUCTION

4.1. POWER ON

When the device is powered off hold the button for 1 second and then release it. The buzzer will sound once and the device then powers on. The screen will cycle the below.

1. Full digit display, background light self-test.

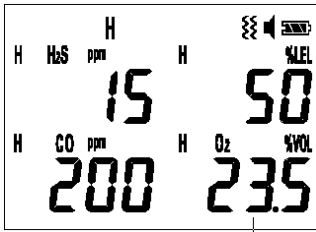2. Time display, buzzer self-test

3. Version display, vibration self-test
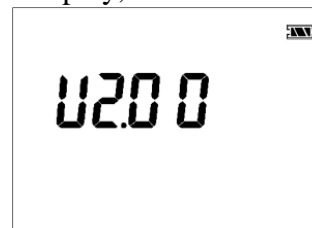
4. High alarm value display, red light self-test

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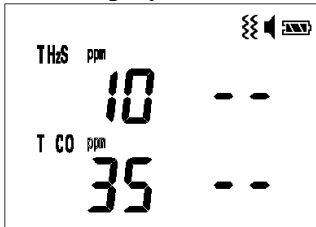
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5. Low alarm value display, yellow light self-test
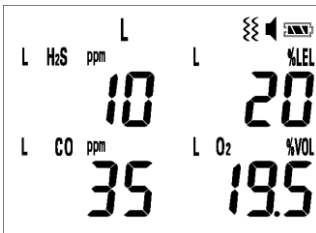
6. STEL alarm display, green light self-test
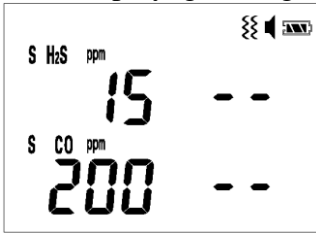
7. TWA alarm display

8. Count down

After the start up self-test has completed the device then enters into detection mode. The screen will show the concentration value of the target gases.

Note: The device is set to auto zero calibration after power on. It is necessary to power on the device in an environment with "clean air". Otherwise an unreliable "zero" will be obtained. This can lead to serious injury or death. We assume no responsibility for the failure to follow these guidelines.

4.2. POWER OFF
While in detection mode hold the button for 3 seconds. Buzzer does a long beep 3 times and short beep twice. Then the device is powered off.

4.3. ALARM
When the gas concentration in the air reaches or exceeds the preset alarm levels the alarms will trigger audible, visual and vibrate signals. If the user cannot quickly exit this environment quickly the audible and vibrate alarms can be suspended by pressing the button.

If the target toxic gas concentration reaches or exceeds the preset value, the device will also give STEL and TWA alert signals.

The instrument also has sensor fault alerts and low voltage alerts. The screen will show the relative alert indication.

Note: Verify that the STEL alert, TWA alert, sensor fault alert and low voltage alert are enabled before using.

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4.4. DEVICE STATUS

In detection mode press the button once and the screen will show the device status including max value, min. value, STEL value, TWA value, current time, serial number and version number.

4.5. CALIBRATION
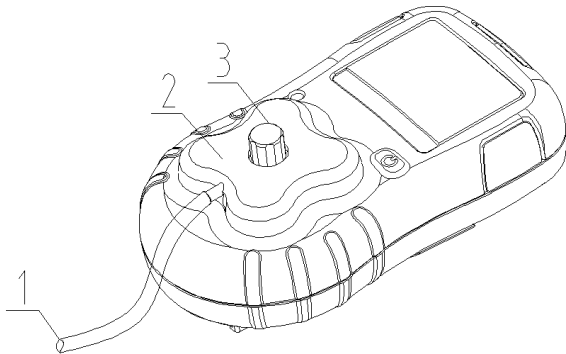
1. Gas input
2. Calibration cover
3. Fastener

With the device is in detection mode hold the button for more than 20 seconds. The screen will then turn off and then back on. When the screen shows calibration mode release the button.

The below screen will be displayed:

1. Entering the calibration interface

2. Sensors warming up
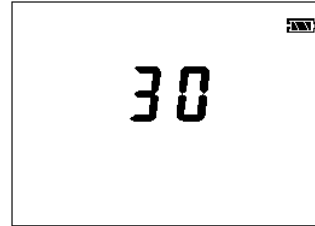
3. Zero calibration
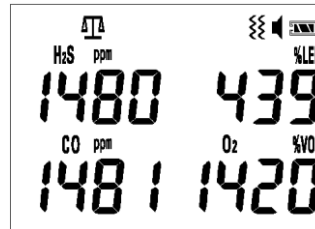
Ensure the instrument is in "fresh air"

4. Gas input
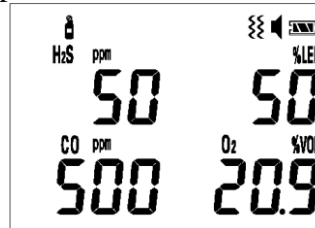
The screen will display calibration gas concentrations. After applying the standard gas, the detector will start to analyze.

5. Auto calibration

6. Calibration pass/fail

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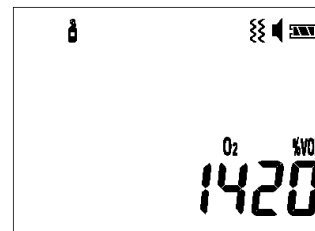
7. Calibration completion
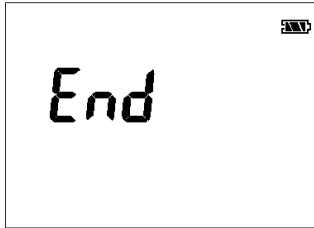
If you are going to calibrate more than one type gas repeat the process. Mixed gases can also be used to calibrate all the gases together and then complete calibration in one cycle.

4.6. BUMP TEST

In order to make sure the IX616 is working correctly it is suggested to do a "bump test" before every use.

Test method: With the device is powered on expose it to the target gas or standard gas environment with high a concentration that is beyond the high alarm level. If the device reacts correctly and the reading is accurate then the detector may be used in the field.

If the reading is beyond the regular error ranges recalibrate the device. See section 4.5.

If the device does not respond or display is faulty (error) contact IMR.

5. DATA COMMUNICATION

The PC software can be used to configure the detectors settings and download sample data to a computer for analysis.

Use the provided USB/Charging cable to connect the device to a PC. After the device is connected run the PC software.
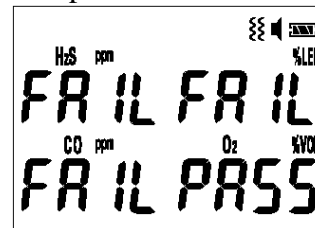
Warning: DO NOT connect the device with a computer in the detection site. The connection or disconnection of the cable may cause sparks which may lead to fire or explosion.

6. CHARGING

When the device cannot be powered on because of low battery then the device should be charged with the provided charger. Connect it to an AC100~240V power source. The device will automatically power on and begin charging. The screen will show the charging icon. When the icon shows the battery is full disconnect the device from AC power. The device will then work normally again.

Warning:
1. When charging the device while powered off. It cannot be powered on and used to detect.
2. It is hazardous to charge the device on site. Doing so may cause fire or explosion.
3. Charging the device while powered off is the fastest and most efficient method.

Note: Charge the device once every 3 months if the device is not in regular use.
Avoid charging the device in an environment with a temperature below 0°C as this might damage the battery.

7. SENSOR'S USE AND REPLACEMENT

The device uses modular sensors. Keep in mind the age of the sensor modules. When the sensor module is 3-5 years old replace it with new one.

In order to guarantee accuracy it is suggested to re-calibrate the sensor modules at least once every 6 months.

Please ask IMR about sensor replacement. After installing the new sensor module into the device calibrate the new sensor before returning the device to the field.

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8. TROUBLE SHOOTING GUIDE

Issue	Potential Cause	Solution
Unable to power on	Low battery	Charge for the recommended duration
	Unresponsive	Contact IMR
	Circuit fault	Contact IMR
No response to gas	Warming up	Wait for completion
	Circuit fault	Contact IMR
Testing reading incorrect	Sensor overdue for replacement	Contact IMR
	Calibration out of date	Calibrate the sensor
Incorrect time	Battery depleted	Charge the device and set the time
	Electromagnetic interference	Reset the time
Gas value displayed is negative value	Sensor drift	Make zero calibration
Sensor fault displayed on the screen	Sensor fault	Contact IMR

9. USAGE NOTICE

- Avoid intense dropping or shocking.
- If using in high concentration gas environments the device will not work normally.
- Strictly follow this manual while using the device. Failure to do so will cause incorrect detection result or damage the device.
- It is forbidden to use and store the device in corrosive environments (high concentrations of CL2) or harsh environments (exceedingly high or low temperature, high humidity, electromagnetic field, intense sunlight etc.)
- After prolonged use if the device is dusty use a clean soft cloth to clean it. Otherwise the surface may become scratched or damaged.
- In order assure detection accuracy the re-calibration period is every 6 months and cannot be more than 1 year.
- Do not discard the battery in the standard trash. Please follow all local regulatory and environment regulations pertaining to lithium battery disposal.
- For any usage or trouble shooting not covered in this manual contact IMR.
- Disassembly, modification and repair of the device should be carried out by authorized personnel only.
- It is dangerous to charge the device or upload data to a PC in hazardous environments.

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SENSOR TABLE

Gas	Detection Range	Preset Low Alarm	Preset High Alarm	TWA	STEL
O2	0-30%vol	19.5%vol	23.5%vol	╱	╱
H2S	0-100ppm	10ppml	15ppml	10ppml	15ppml
CO	0-1000ppm	35ppml	200ppml	35ppml	200ppml
LEL	0-100%LEL	20%LEL	50%LEL	╱	╱

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10. WARRANTY

IMR Environmental Equipment, Inc. states the following:

IMR, as manufacturer hereby grants the following worldwide IMR warranty for an IMR analyzer purchased from an authorized dealer.

1. The IMR warranty shall entitle every IMR customer to demand a free replacement or repair of the defective parts from any IMR dealer authorized for the respective IMR unit.
2. The IMR warranty shall be granted on the factory new unit and shall commence on the date of the delivery of the original IMR unit to the customer.
3. The IMR warranty shall refer to absence of faults with respect to the state of the art nature of the sold unit in terms of material and finish. The warranty for all parts fitted during the twelve-month warranty period shall end with the unit warranty.
4. After the establishment of a material or production fault by IMR or the authorized IMR dealer, the faults will be eliminated by means of free repair or replacement. Replaced parts shall become the property of IMR.
5. No warranty claims may be made for maintenance and setting work, cleaning or other utility materials required for the function of the unit and other wear parts unless they have a direct bearing on work performed under the warranty.
6. The terms and conditions for the acknowledgement of this warranty shall be the presentation of the fully completed warranty card, which must contain the confirmation from the authorized IMR dealer on its delivery and, if applicable, the prescribed maintenance work.
7. The IMR warranty shall only be applicable if
   7.1. The analyzer has been maintained in accordance with the instructions issued by the manufacturers and the operating instructions by an authorized IMR dealer.
   7.2. Only original IMR spare parts have been used for any repairs.
   7.3. The unit has been used properly, the operating instructions observed and the unit has not been used for a purpose other than the one for which it has been designed.
   7.4. The IMR unit has been left in its original design and meets the original IMR specifications.
   7.5. The fault is not due to external influences or use for a purpose other than the one for which it has been designed.
   7.6. Exclusively authorized IMR dealers have made repairs to the IMR unit.
   7.7. The IMR unit has been sent to an authorized IMR dealer immediately after the fault was discovered.
8. Warranty time for the analyzer, including electrochemical sensors is 12 months.

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11. CONTACT INFORMATION

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