



Environmental Equipment, Inc.

IMR IX176 Portable Gas Detector User Manual



Read this manual carefully before using this device.

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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 4.7
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.

1. BRIEF INTRODUCTION

The IX176 portable single gas detector can make continuous detection to combustible and toxic gases. It is suitable for combustible and toxic gas leakage detection in underground pipe or mines, keeps workers safe and prevents damage to facilities. The detector uses high quality sensors. The shell is special high strength material with anti-slip rubber. It has a functional and watertight design (IP 65).

2. FEATURES AND SPECIFICATIONS

2.1. MAIN FEATURES:

- Large LCD display
- Adjustable low and high alarm level
- High concentration protection for combustible gas
- Self-test of the combustible gas sensor
- Low battery alert
- Real time clock
- Replaceable sensor module
- Self-adjustment function
- Data upload to PC (optional)
- STEL and TWA alarming for toxic gases
- Intrinsically safe

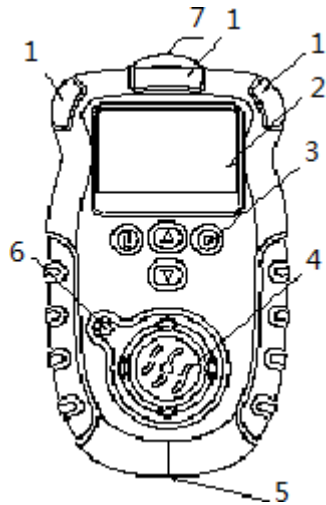
2.2. TECHNICAL SPECIFICATIONS:

- Detection method: Natural diffusion
- Target gas: LEL, O₂, toxic gases etc.
- Accuracy: $\leq \pm 5\%$ F.S.
- Response time: $T < 30s$
- Indication:
 - LCD indicates the time and state
 - Audible, visual and vibration alarm signals
- Working temperature:
 - $-40^{\circ}\text{C} \sim 70^{\circ}\text{C}$ (for combustible gas)
 - $-20^{\circ}\text{C} \sim 50^{\circ}\text{C}$ (for toxic gas)
- Working humidity: $< 95\%$ RH
- IP rating: IP65
- Power supply: DC3.7V, 1300mAh Li-ion battery
- Continuously working time:
 - Combustible gas: $\leq 8\text{h}$ continuously
 - Toxic gas: $\geq 300\text{h}$ continuously
- Charging time: $4 \sim 6$ hours
- Sensor life: 3 years
- Dimension and weight: $104.0\text{mm} \times 60.8\text{mm} \times 30.5\text{mm}$ about 125g

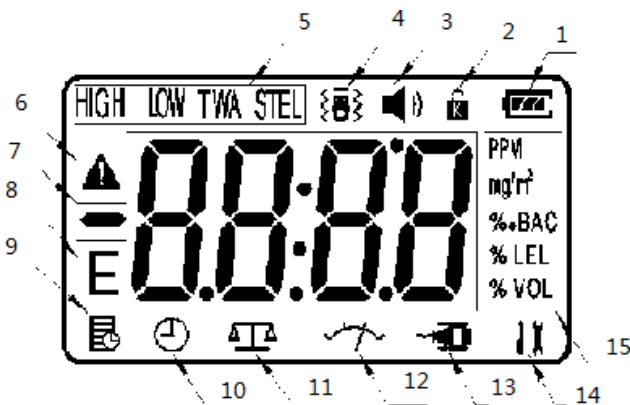
3. STRUCTURE AND FUNCTIONS

3.1. APPEARANCE

1. Alarm LED
2. Display
3. Buttons
4. Gas port
5. Data / Charging port
6. Buzzer
7. Hand strap



3.2. DISPLAY INFORMATION



1. Battery voltage
2. Lock
3. Buzzer
4. Vibrator
5. Alarm type
6. Warning
7. Value figure
8. Fault
9. Record
10. Clock
11. Zero calibration
12. Calibration span & status
13. Charging
14. Settings
15. Unit of measurement

Note: Data upload function is only available only if requested at time of purchase.

3.3. BUTTON FUNCTIONS


Button	Description
	<ul style="list-style-type: none"> • To power on the detector press and hold for 3 seconds • Press to cancel an operation • Calibration: When the device is powered off press and for more than 3s • To power off the detector press and hold for 3 seconds
	<ul style="list-style-type: none"> • Press to increase the display value • To check the device status press and . This will display Temperature, time, STEL & TWA levels^②, and maximum level^③ • Press and for more than 3s to access the configuration menu
	<ul style="list-style-type: none"> • Press to decrease the display value • To start zero calibration press & then hold for more than 3s ^①
	<ul style="list-style-type: none"> • Confirm entered information • Press to enable/disable the beep and vibration

Note:

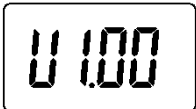
- ① Password is needed when this operation does.
- ② Only the detector for toxic gas has this function.
- ③ Only O2 sensor has maximum and minimum level.

4. OPERATING INSTRUCTION

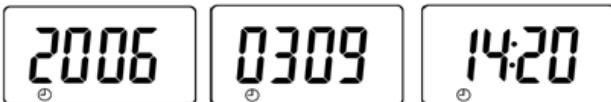
4.1. POWER ON THE DETECTOR

Hold  for 3 seconds and the detector will power on. The detector then begins a self-test.

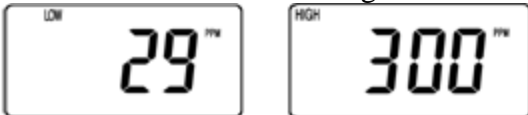
1. The LCD displays all of the screen elements.
2. Alarm check: audible, visual and vibration signal.
3. Software version number:



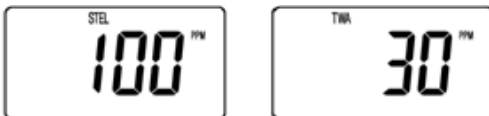
4. Date and Time:



5. Preset Low Alarm and High Alarm value:



6. STEL and TWA values



Note: The above pictures can only appear with toxic gas sensors.



7. Self-test and Warm up

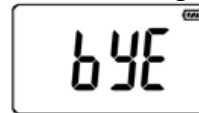
If the detector passes the self-test then it will begin a short countdown for warm up. After that it begins normal operating mode. The ambient gas reading is then displayed.




Note: If the self-test fails the display will show relevant information. For details refer to the table in section 4.4. The countdown occurs when there are no faults. The device will automatically select the necessary time for the countdown of 3-30s according to the installed sensor.


4.2. POWER OFF THE DETECTOR


Hold  the screen will display “OFF” and the buzzer will sound. After 3 seconds the following figure is seen. Release  and the detector will power off.





Note: When not in detection mode press  several times until it returns to detection mode.



4.3. MENU












- Setup date and time
- On/off of the vibration
- On/off of the key sound
- Communications Mode 
- Setup the password


Note:  Data upload function is only available only if requested at time of purchase.





In normal detection mode hold  and  simultaneously until the screen displays the following figure for 1 second and then release the buttons. It enters the menu.

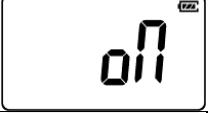



Press  or  to change menu items. The following table outlines each item:

Display	Description
	Press  to adjust the time
	Press  to turn on or turn off the key press sound
	Press  to turn on of turn off vibration
	Press  to enter communications mode with a PC 
	Press  to modify the password (initial : 0000)








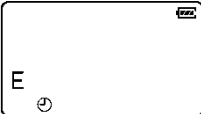


Note:  Data upload function is only available only if requested at time of purchase.

After entering into an item press  or  to change settings. Press  to confirm and press  to exit without saving. The following table outlines each option:

Display	Description
	Enable the function
	Disable the function

4.4. ALARM CODES




The following table describes detector alarms and shows how the LCD looks for each alarm:

Alarm type	Display
Low-alarm: <ul style="list-style-type: none"> • Slow tone • Flash • Vibration ① 	
High-alarm: <ul style="list-style-type: none"> • Fast tone • Flash • Vibration ① 	
High concentration protection: ② <ul style="list-style-type: none"> • Slow tone • Flash 	
Sensor Fault: <ul style="list-style-type: none"> • Fast tone 	
STEL alarm: <ul style="list-style-type: none"> • Slow tone • Flash • Vibration ① 	
TWA alarm: <ul style="list-style-type: none"> • Slow tone • Flash • Vibration ① 	
Over F.S. alarm: <ul style="list-style-type: none"> • Slow tone • Flash 	
Time error: In this state the device will try to automatically correct it. If successful then after start-up it will open the time menu set up. If saving a new time fails the device will power off. Please contact IMR for repair.	
Memory error: When detecting the device will try to automatically correct it. If this fails it will power off. Please contact IMR for repair.	
Low voltage: <ul style="list-style-type: none"> • Alternating alarm sound per second • When battery is near empty the icon will flicker. The device can continue to operate for about 15min. 	



Note:

① It will only vibrate if the vibration setting is enabled.

② Only for combustible gases.

If the alarm is triggered for extended periods press  to suppress the audible and vibration alarms  and  will flash.

4.5. CHECK DEVICE STATUS

Pressing  and  together will display the Temperature, Time, STEL & TWA levels①, maximum level and minimum level②.



Note:

① Only available for toxic gases.









② Only O2 sensors have min/max levels.

4.6. ZERO CALIBRATION

In clean air if the detector does not 0 then select zero calibration to reset the zero point.

In detection mode pressing both  and  for 1 second will prompt to “please input password” once this is displayed release the buttons. Input the password to access zero point calibration.

The detector will display the following:

Status?	Display
Pressing both  and  will display this. After 1 second it will continue to the next step.	
At this step enter the password. The digit that is flickering figure can be modified by pressing  or  .	
The zero point will automatically calibrate. Press  to save the new setting.	

Note: When it is calibrated the concentration of oxygen in clean air for O2 is 20.9% VOL.

Warning: This operation should be carried out in clean air. Otherwise the accuracy of the detector will be affected due to gas concentrations in the air.

4.7. BUMP TEST

In order to make sure the IX176 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 5.



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

5. CALIBRATION AND ALARMS

This section covers recalibrating the detector and adjusting alarm levels.

5.1. CALIBRATION AND ALARMING

LEVEL:

When the device is powered off press and hold  and  for 5 seconds and the detector will begin a self-test. If the self-test passes the enter password prompt will be displayed:

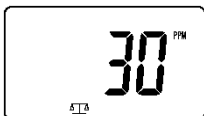




Entering the correct password will result in the detector entering into zero calibration mode.

Note: A misconfiguration in this section can endanger the safety of the operator and equipment. Take care during this process Ten seconds after entering the password if no buttons are pressed or if the password is incorrect the detector will power off.

5.2. ZERO CALIBRATION

The currently detected concentration will be shown:



If  is pressed or no input is made within 1 minute. The detector will use the current concentration as the zero point and then enter into the calibration span set up. Press  to skip calibration set up and enter into alarm level set up. Continue at section 5.5 and 5.6.



Warning:

This operation should be carried out in clean air. Otherwise the accuracy of the detector will be affected due to gas concentrations in the air. If the detector displays an “E” this indicates that air is not clean or that the sensor


is damaged. Move to another location and test again. If the problem persists replace the sensor.

5.3. CALIBRATION SPAN ADJUSTMENT

Set the calibration gas concentration. The currently selected number will be flashing.

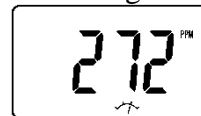
Press  or  to modify this value:



If  is pressed or no input is made within 1 minute. The detector will use the current concentration as the calibration gas concentration. It will then enter into calibration span set up.

5.4. CALIBRATION SPAN SET UP

The detector will now display the currently detected gas concentration:



Attach the calibration cover. Open the calibration gas tank and adjust the flow to 120mL/min. If the detector senses the calibration gas within 30 seconds it will begin to automatically analyze the applied gas. The detector will automatically process and save the new span setting. The detector will then advance to L-alarm set up.




Note: Avoid pressing any of the buttons as this can cause the detector to save incorrect information.

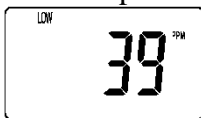
If the detector does not reach half of the calibration gas concentration within 30 seconds or the detected calibration gas concentration goes into overflow the “E” error icon will illuminate. This indicates that the calibration gas concentration is too high for the installed sensor or that the sensor is

defective. Test again with a lower calibration gas concentration or replace the sensor of the issue persists.

Calibration of an O2 sensor will skip section 5.3 and 5.4.




5.5. L-ALARM SET UP

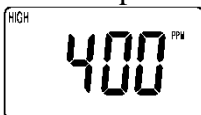
Now the L-alarm can be adjusted. The screen will display the current alarm setting. Press  or  to adjust the flashing value as needed and then press  to complete set up.



The detector will then advance to H-alarm set up.

5.6. H-ALARM SET UP

Now the H-alarm can be adjusted. The screen will display the current alarm setting. Press  or  to adjust the flashing value as needed and then press  to complete set up.



The detector will then power off.

6. BATTERY CHARGING

If the battery is low or the detector is not being responsive the battery need to be charged.

Note: The detector cannot be powered on while it is charging. To avoid fire or explosion do not charge the detector on site at a hazardous location. Attempting to charge the detector while it is powered on will prolong the time needed to fully charge the device.

7. DATA UPLOAD

Connect the detector to a PC with the provided USB cable. Then open the data software.

Note: Data upload function is only available only if requested at time of purchase.

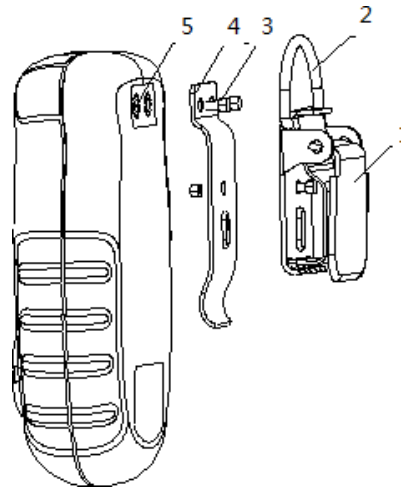
8. SENSOR USAGE AND REPLACEMENT

The sensors that this detector utilizes are modularized. It is important to keep track of the sensors age and replace it every 3 to 5 years depending on sensor type. The device should be calibrated every 6 months to ensure best accuracy of the installed sensor.

Sensor replacement should only be done by IMR or an authorized repair center. In the event that neither of these options are possible contact IMR for support. Do not replace the sensor with unauthorized parts.


9. CARRY CLIP CONFIGURATION

The device can have either a belt clip or a crocodile buckle and ring. See the diagram below for more information.



1. Crocodile Buckle
2. Ring
3. Mounting hole
4. Belt clip
5. Screw hole

10. TROUBLESHOOTING GUIDE

Issue	Possible Reason	Solutions
Unable to power on	Low battery	Charge for the recommended duration
	Unresponsive	Contact IMR
	Circuit fault	Contact IMR
No response to gas	Warm up not finish	Wait till it finishes
	PCB fault	Contact IMR
Testing reading incorrect	Sensor overdue for replacement	Replace the sensor
	Calibration out of date	Calibrate the sensor
Incorrect time	Battery depleted	Charge the device and set the time
	Electromagnetic interference	Reset the time
Unable to complete a “Zero” calibration	Sensor drift	Calibrate or replace the sensor
It displays “-0”	Sensor drift	Calibrate or replace the sensor
It displays 	Sensor fault	Replace the sensor

11. 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.



TARGET GAS LIST

Gas	Range	L-alarm	H-alarm	TWA	STEL
CH ₄	0-100%LEL	20%LEL	50%LEL		
C ₃ H ₈	0-100%LEL	20%LEL	50%LEL		
H ₂	0-100%LEL	20%LEL	50%LEL		
H ₂	0-1000ppm	35ppm	250 ppm		
H ₂ S	0-100ppm	10ppm	15ppm	10ppm	15ppm
CO	0-1000ppm	35ppm	200ppm	35ppm	200ppm
CO	0-2000ppm	35ppm	200ppm	35ppm	200ppm
O ₂	0-30% vol	19.5% vol	23.5% vol		
C ₂ H ₅ OH	0-100%LEL	20%LEL	50%LEL		
NH ₃	0-100ppm	25ppm	50ppm	25ppm	35ppm
CL ₂	0-20ppm	5ppm	10ppm	0.5ppm	1.0ppm
SO ₂	0-100ppm	2ppm	5ppm	2ppm	5ppm

**12. 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.



Environmental Equipment, Inc.

IX176

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13. CONTACT INFORMATION



Environmental Equipment, Inc.

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