



Environmental Equipment, Inc.

IMR EX660

IMR EX660

Personal Multi-Gas Detector

User Manual



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1. SAFETY AND USAGE INFORMATION

Improper use or usage in an inappropriate environment may degrade the instruments performance. Read the safety information below before using/operating this device.

- Do not use a damaged device. Check for cracked or missing parts before use.
- Before use it is advised that a “Bump Test” be performed. See section 6.3 for more information. If the reading is out of range then the device should be calibrated. See section 6.7 and 6.8.
- Periodic “Bump Tests” will allow for testing of the sensor response, visual, audible and vibrate functions.
- Do not use accessories that are not designed to be used with the EX660.
- Only use the charger provided with the EX660. Do not charge the device in hazardous environments.
- Do not expose the device to high gas concentrations for an extended period. Doing so can harm sensor performance and possibly damage them.
- Do not use the device in environments that contain lead compounds, sulfate compounds, organic phosphorus compounds, or silicon. These compounds can damage the sensor cells.
- Avoid exposure to environments that contain H₂S, Hydrocarbons or acidic gases for an extended period. If the device has been used in these environments preform a “Bump Test” before its next use. See section 6.3.
- Avoid exposure to environments with the potential for electric shock, strong magnetic fields or extreme continuous mechanical vibration.
- Do not discard the lithium battery in the trash. Follow local regulatory requirements for disposal of the battery.
- Do no preform any unauthorized maintenance of the device.
- Avoid dropping the device from heights and extreme impacts.
- For usage information not included in this manual contact IMR.

2. INTRODUCTION

The EX660 is a compact and lightweight multi-gas detector that continuously measures combustibles such as O₂, CO, H₂S and other toxic gases in ambient air. It can be equipped with up to 6 different sensors. It has a rugged and watertight design (IP66). With an impact resistant rubberized case to meet the toughest requirements of the harshest environments.

IMR EX660 Manual

3. MAIN FEATURES

- Advanced 16 bit MCU with low noise
- Ultra-wide angle LCD screen
- Adjustable 2-level alarm
- Automatic zero calibration
- Self-protection for combustible gas sensor
- Low battery alarm function
- Real-time clock
- Interchangeable smart sensor module design
- Audible, visual and vibrate alarms
- Data export functionality
- STEL/TWA alarm for toxic gases
- Password management
- Intrinsically safe design

4. TECHNICAL SPECIFICATION

Detection method: Natural diffusion
 Target gas: See calibration certificate

Response time:

Semi-conductor, catalytic, thermal conduct sensors.....T90<30s
 Electrochemical sensors.....T90<30s
 Other sensors.....T90<120s

Indication error range:

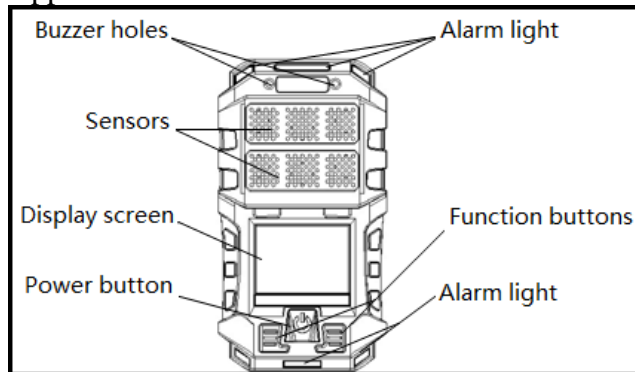
Combustible gas.....±5% F.S.
 Toxic gas.....5ppm

Working condition:

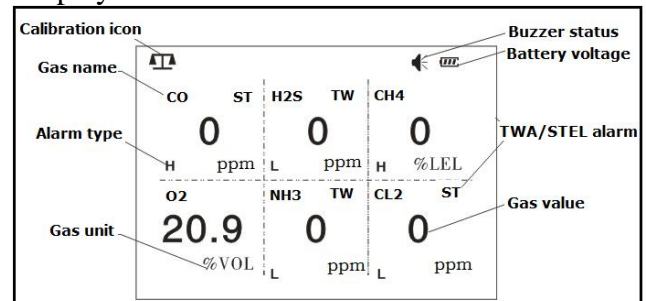
Temperature: -20°C~50°CHumidity: <95%RH
 Power source: Lithium battery (DC3.6V, 6600mAh)
 Working time per charging: ≤ 30 hours continuously (without alarms)
 Charging time: ≤ 6 hours
 Explosion –proof grade: Exia IIC T4 Ga
 Ingress protection: IP66
 Dimensions and weight: 168mm×91mm×45mm about 500g

5. STRUCTURE AND FUNCTIONS

Appearance




Display information



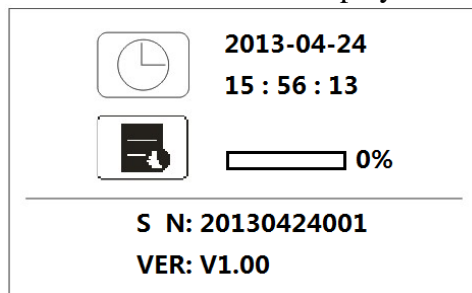
6. OPERATION INSTRUCTIONS

6.1. POWER ON

When the device is powered off, hold  for more than 3s and it will power on. The screen will display as below.



After powering on, the device will proceed to self-test and the screen will display as below.




The device will then test the buzzer, alarm lights and vibrator. After the self-test it will enter into normal mode and the screen will display as below.

CH4 0 %LEL	VOC 0 ppm	O2 20.9 %VOL
NH3 0 ppm	NO2 0 ppm	CO 0 ppm

Note:

- If a self-test fails the relevant information will be displayed. See section 11 for more information.
- If self-test succeeds the device enters into a warm-up period of 3-30s which depends on the sensor type.

6.2. POWER OFF

In normal mode hold  for 3 seconds and the screen will show “Shutting down...” and the buzzer will give beep twice. Then device is then powered off.

6.3. BUMP TEST

It is suggested that before each use to perform a Bump Test to verify the device is working normally.

Test method:



With the device powered on put it into a high concentration gas environment. This area should be higher than the preset high alarm point. If all of the devices alarm functions react then the device can be used normally.


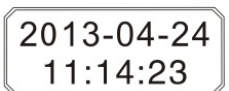

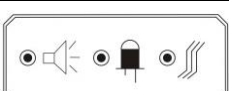

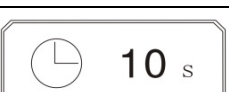

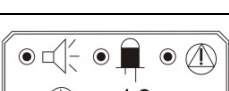

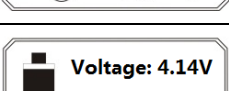

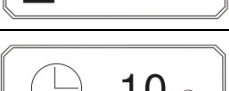
Note:




- If any reading is the expected error range then see section 6.7 and 5.8 to recalibrate the device.
- If the device does not respond as expected or displays errors then contact IMR.

6.4. MENUS








6.4.1. Settings Menu


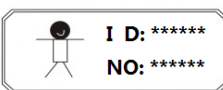





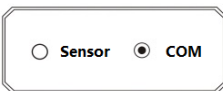

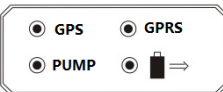


In normal mode press both  and  simultaneously and the device will enter into the settings menu. Below is a list of menu items:

Menu	Submenu	Remarks
 DATE TIME		When changing the date or time, the current selection will blink.
 ALARM MODE		When changing modes the current selection will blink.
 RECORD GAP		Set the time interval for measurement saving.
 CAUTION MESSAGE		Black dot means this item is selected.
 BATTERY MESSAGE		View battery voltage and remaining running time.
 BACKLIGHT TIME		Backlight on time can be viewed and set in 5s increments.

After entering into a submenu pressing  changes the selected item value. Pressing  will save the setting. Pressing  will exit without saving changes.

6.4.2. Advanced Menu

When in the settings menu press both  and  simultaneously twice; the password prompt will appear. Press  to increase the value and press  to confirm the input. If the password is correct press  to enter the advanced menu. Select a submenu by pressing . Then press  to enter the selected submenu.

Menu	Submenu	Remarks
 SAFETY DEPLOY		Set users ID
 ZERO CAL.		Set a new zero calibration
 DATA UPLOAD		Upload saved data
 PERIPHE ONFIG.		One mode must be selected
 POWER MANAGE		Enable/disable extra functions
 LANGUAGE SELECT		English or Mandarin

Note: the default password for the advanced menu is “0000”.

6.5. GAS DETECTION

The device monitors and displays gas concentration in real time. When a gas concentration reaches the preset alarm point the alarms will activate.

Note:

- Do not block sensors when in use.
- The use of filters will extend sensor life.
- Extended non-use, extreme physical shock or exceedingly high concentrations of gas may cause the zero point to drift. If the reading in clean air is not zero then a zero calibration is needed. See section 7.7 and 7.8.

6.6. STATUS REVIEW

In normal mode press to change the screen to show the current temperature, time, STEL value①, TWA value①, maximum level of gas② and minimum level of gas② since power on.

Note:

- ①Only for toxic gas. ②Only for oxygen.

6.7. AUTO ZERO CALIBRATION

In normal mode hold both and for about 1 second. The device prompts for the password. After entering the correct password the advanced menu will be displayed.

Select and press . The device will perform zero calibration. When completed a “√” is displayed for success and “×” if failed.

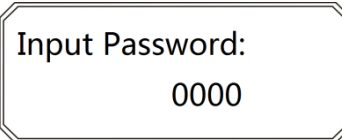
6.8. CALIBRATION

WARNING!

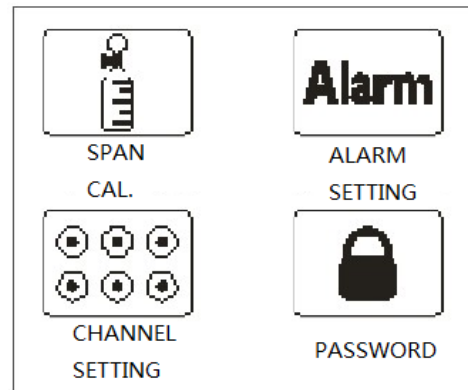
Only qualified personnel should attempt calibration. An improper calibration will cause the device to not work properly

6.8.1. Configuration Menu

While the device is powered off hold and simultaneously for about 3 seconds. The device will then perform a self-test after a short delay. Then the password screen will be shown.



After the correct password is entered the device will enter the configuration menu seen below.



Press to change the current selection. The current selection will be shown in black.

Press to enter a submenu.

6.8.2. Zero Calibration

Select and press to enter the auto zero calibration interface. As seen below. When completed a “√” is displayed for success and “×” if failed.

CH4 0 %LEL	VOC 0 ppm	O2 20.9 %VOL
NH3 0 ppm	NO2 0 ppm	CO 0 ppm

In zero calibration mode press and the device enters the manual zero calibration interface. As seen below.

CH4 20419	VOC 32699	O2 21935
NH3 33074	NO2 32570	CO 32845

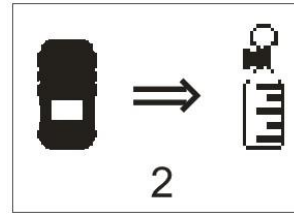
When the AD value of the sensor is stable

press to save the new values zero calibration. Then a “√” is displayed for success and “×” if failed. As seen below.

CH4 ✓	VOC ×	O2 ×
NH3 ×	NO2 ×	CO ×

6.8.3. Span Calibration

After zero calibration the device displays a countdown. As seen below.



On the next screen enter the calibration gas concentration. As seen below.



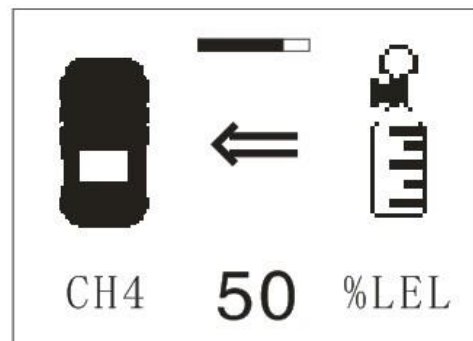
If the concentration needs to be changed press

to enter the screen below.



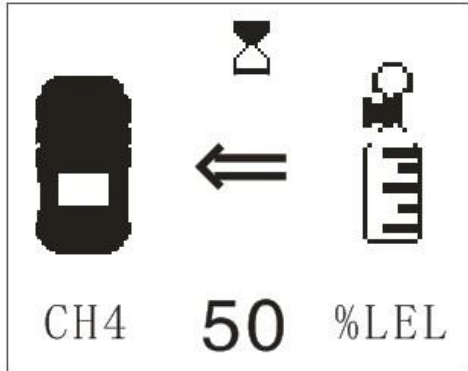
Press to change the selected digit and press to change the value. After the last

value is entered press to save and continue to applying the test gas. As seen below.



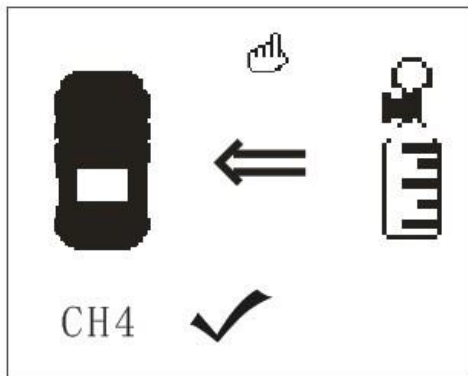
→

Once the device senses the test gas the display will update. As seen below.

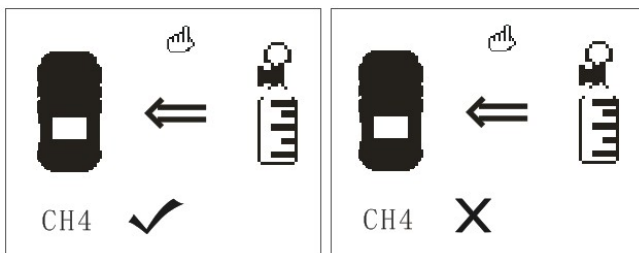


If there is a need to do the calibration

manually press . The screen will update and will now continue in manual calibration mode.



Press again to confirm the manual calibration. The below 2 images depict a successful and failed manual calibration.



Once a sensors calibration is completed the device will continue on to the next sensor until all are calibrated. This operation follows as noted in previous sections.

If a sensor does not need to be calibrated press

to skip that sensor.

6.9. ALARM POINT

Press to highlight **Alarm** and press

to enter the submenu. As seen below.

	H	L	ST	TW
CH4	50	20	----	----
VOC	200	0	200	35
H2S	15	10	15	10
NH3	50	25	35	25
NO2	10	5	15	10
CO	200	35	200	35

Press to change the selected digit then press on the value that needs to be changed. The next screen will allow for the value to be modified. As shown below.






Press to change the selected digit then press to change the value.

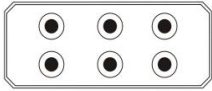
Press to save changes. The next alarm point will then be displayed.



Note:


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

6.10. SENSOR CHANNEL

Press  to highlight  and press  to enter the submenu. As seen below.



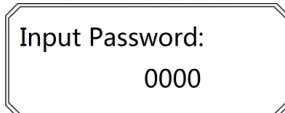
Press  to change the selected sensor location; the channel box will flash. Press  to enable or disable a channel. An enabled channel has a black dot in the center.




Keep pressing  until all the channels have been set. The device will save the settings and exit to normal mode. Closed channels will

have a  displayed.

6.11. PASSWORD

Press  to highlight  and press  to enter the submenu. As seen below.



Press  to change the selected digit then press  to change the value. Once completed press  to save the new password.

CAUTION!
After setting the new password make note of the new one!

7. BATTERY CHARGING

If a low battery alert is activated or the device cannot be powered on charge the device immediately in a non-hazardous area.

First ensure the device is powered off. Then connect the charger to it. Lastly connect the charging plug. The device will be power on automatically and display a battery symbol on the screen. The symbol will indicate the charging status. When the symbol is all back and not changing; charging is complete. The A/C plug can now be disconnected and then the device plug can be removed.

WARNING!

- **Do NOT charge the device in a hazardous area.**
- **The device cannot be used when charging.**
- **Avoid charging the device while it is powered on as this will increase charging time.**

8. USB COMMUNICATION (OPTIONAL)

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

Connect the USB data cable correctly between the device and computer. Then run the EX660 software.

9. REPLACING SENSORS

The device uses smart sensor modules which are suggested be calibrated every year. If a sensor is no longer working contact IMR for replacements.



10.ACCESSORIES

Hand ring	1 pc	Alligator clip	1 pc
Calibration cover	1 pc	Operation manual	1 copy
Charger	1 pc		

How to use the clips and hand ring:

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

11.TROUBLESHOOTING

Symptom	Problem	Solution
Not powering on	Low voltage	Charge it
	Hardware damaged	Contact IMR
No response to gas	Circuit fault	Contact IMR
	Warm-up not finished	Wait till it finishes
Gas reading not accurate	Circuit fault	Contact IMR
	Sensor replacement overdue	Contact IMR
Time and date are wrong	Sensor drift	Re-calibrate it
	Battery is fully discharged	Charge it and re-set the time and date
Zero calibration function is unavailable	Intense electromagnetic interference	Reset the time and data
	Too much sensor drift	Re-calibrate or replace the sensor module
Displaying “-0” in normal mode	Sensor drift	Make zero calibration

**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.



13. CONTACT IMR

IMR Environmental Equipment, Inc.
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