
GAS•TRAC LZ-30

INSTRUCTION MANUAL



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FOR YOUR SAFETY



NOTICE: This safety symbol is used to indicate a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



WARNING: Read and understand this manual fully before use.



WARNING: Disassembly and maintenance is forbidden in explosive atmosphere.



WARNING: Any disassembly or repair of the instrument must be done by a factory certified technician.



WARNING: Follow the manual instructions and testing methods.



WARNING: Continuously low calibration check results or fluctuation of zero readings may indicate sensor end of life or failure. Consult SENSIT Technologies with any questions.



CAUTION: Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



CAUTION: Do not point the instrument towards the sun, or other extreme sources of light/heat. Damage may occur.



DANGER: Do not use the device in an explosive environment.



DANGER: Avoid direct eye exposure to the laser and do not point in the direction of others. Visible and Invisible Lasers are deployed by this instrument.

FOR YOUR SAFETY



CAUTION: Laser radiation. Avoid direct eye exposure. Class 3R laser product.

LASER WARNING LABEL LOCATION

The laser warning label is located on the back of the instrument. Refer to the label pictured in the lower right for details.



LASER APERTURES

GAS-TRAC[®] LZ-30
METHANE GAS DETECTOR

VISIBLE AND INVISIBLE LASER

CAUTION
LASER
3R

WARNING: Only recharge in an area known to be Non-Flammable. Utilizes non-user replaceable 4.2 Volt, 4.2 Watt-hour Lithium Ion battery.

MAXIMUM OUTPUT:
≤5mW, wavelength 635 nm
≤5mW, wavelength 520 nm
≤50mW, wavelength 1650 nm

SENSIT TECHNOLOGIES
WWW.GASLEAKSENSORS.COM

S/N: _____

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PARTS AND ACCESSORIES

STANDARD ACCESSORIES (INCLUDED)

330-00049	D-ring
360-00040	Wrist strap
750-00080	Instruction manual
871-00062	Charging Base
871-00063	Charging base power supply

ACCESSORIES AND REPLACEMENT PARTS

331-00155	Screw for D-ring
871-00064	Charging Kit (charging base + power supply)

GENERAL DESCRIPTION

The **GAS•TRAC LZ-30** is a methane selective laser based gas detector. The device is based on world-leading photonic technology and is designed using the effect that methane gas absorbs a certain laser wavelength, and the absorbing strength is related to the concentration of the methane.

The device is a handheld gas detector, for the remote detection of methane and gases containing methane (natural gas and naturally occurring sources of methane). By pointing its beam of laser light to the testing target, a concentration result can be read immediately within a distance of 0.5 to 30 meters. By sending the beam of the laser to the target destination (such as a gas pipeline, ceiling, wall, floor, ground, etc.), the device measures the laser signal returned from the target destination and the methane concentration along the reflected beam path will be calculated and displayed.

In addition, the **GAS•TRAC LZ-30** measures the distance to the target and displays the result in real-time along with the gas reading.

The laser modules specifications are Class IIIR, with a power output of less than 5mW for the distance detection laser and spotter laser, and a power output of less than 50mW for the IR (gas detection) laser.



SPECIFICATIONS

Detection Technology:	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Methane Detection Range:	0-50,000ppm-m in 1ppm-m increments
Sensitivity:	5ppm•m ≤15m (50ft)/10ppm•m ≤30m (100ft) @ ≥ 300ppm•m
Response Time:	≤0.1 seconds
Detection Distance:	0.5m to 30m (1.5' to 100') Distance may vary depending on reflection
Distance Indicator:	0.2m to 30m (6" to 100') Range may vary depending on reflection
Beam Dimension:	Conical, 20cm diameter at 30m (8" at 100')
Alarms:	Adjustable threshold alarm with baseline: Visual and audible
Warnings:	Low reflection, low battery
Calibration/Self check:	No calibration required. Built-in self-test. Bump test vial available.
Laser classifications:	IR laser (methane detection) Class III R Target laser (green) Class III R Distance laser (red) Class III R
Communication:	Bluetooth
Display:	OLED

SPECIFICATIONS

Operational Temp:	-20C to 50C (-4F to 122F)
Storage Temp:	-40C to 60C (-40F to 140F)
Humidity:	≤98% non-condensing
Enclosure:	Designed to meet IP54
Intrinsic Safety:	Designed to meet US and ATEX
Weight:	300g (0.7lbs)
Size:	164mm (6.5") x 78mm (3.0") x 36mm (1.5")
Power Source:	Internal Lithium Ion, 2000mAh
Battery Life:	6 Hours Continuous
Recharge Time:	3 to 4 Hours

PRODUCT FEATURES

GAS•TRAC LZ-30 instruments are constructed of durable flame-retardant polycarbonate plastic to withstand the rigors of field use.

The housing contains a rechargeable Lithium Ion battery, which is charged by inserting the instrument into the charging base.

Open-path TDLAS technology ensures that gas detection is instantaneous, accurate, and methane specific up to a distance of 30m (100ft).

The operator will be given real-time gas readings on an easy to read OLED display, displayed in PPM•M by default, along with a distance measurement for the current target.

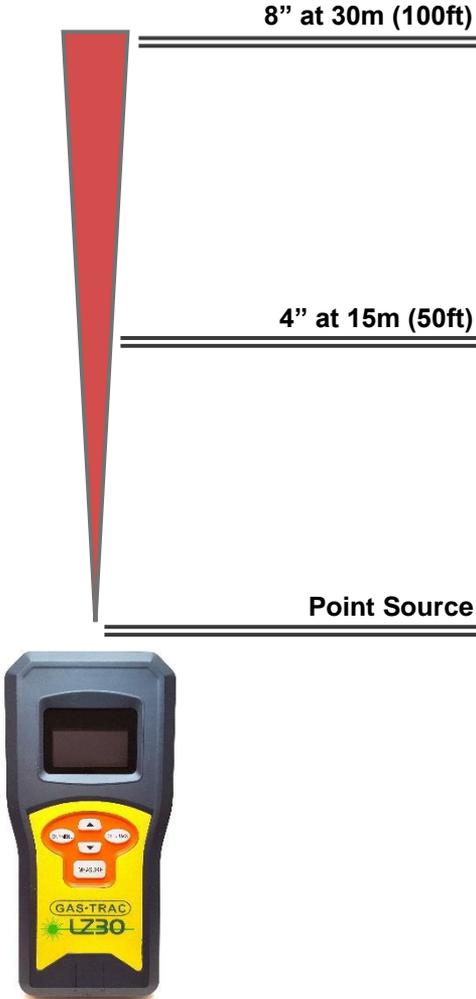
The alarm comes in the form of an audible tone as well as a vibrating motor. There is 1 adjustable alarm threshold, and 3 varying types of alarms at 20%, 50%, and 100% of this threshold.



PRODUCT FEATURES

BEAM DIMENSIONS

The **GAS•TRAC LZ-30** produces a conical beam of laser light, that starts from the front of the instrument and gradually spreads as the distance increases. At the maximum detection distance, 30m, this beam is 8" in diameter. This is depicted in the image below (not to scale).



SENSOR TECHNOLOGY

GAS DETECTION

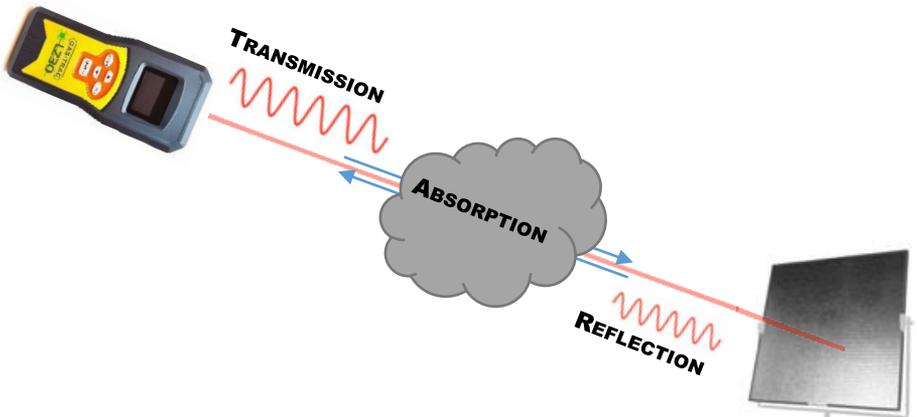
The **GAS•TRAC LZ-30** uses open path TDLAS (tunable diode laser absorption spectroscopy) technology. The laser generates a specific wavelength of light that is sent through the gas monitoring area, partially absorbed by any methane source, and reflected back to the instrument by the reflection surface. The higher the methane concentration, the larger the absorption will be, resulting in a higher reading. Using this technology in an open path allows for the instrument to detect gas remotely, simply by pointing at the target anywhere from 0.5 to 30 meters away from the operator.

This technology ensures that the gas is analyzed instantaneously and accurately, as low as 5ppm•m, as well as being specific to only methane.

DISTANCE DETECTION

There is a separate laser that is used specifically for distance detection. It sends a laser pulse to the target in a narrow beam and measures the time taken from when it leaves the instrument to when it returns, from the reflection surface. Using this time measurement, the distance is determined based on the speed of light.

Both the distance and gas detection rely on a surface that is reflective enough to return the signal to the instrument. Most solid surfaces will work.



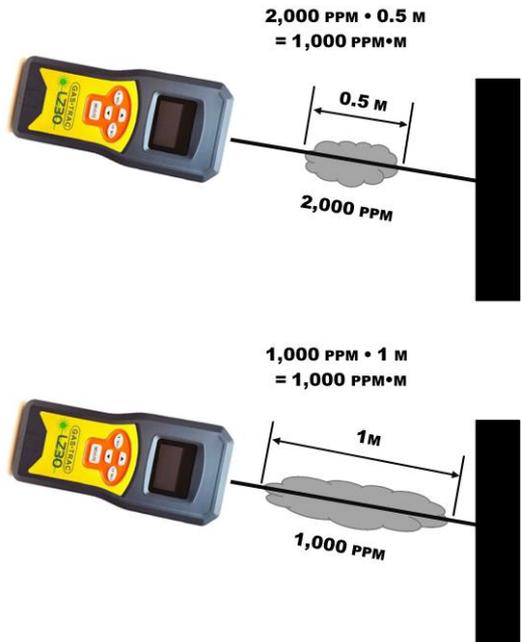
EXPLANATION OF PPM•M

The **GAS•TRAC LZ-30** displays its readings in parts per million meter (PPM•M). This is a representation of the average gas concentration over 1 meter, or roughly 3.3 feet.

The detection laser of the **GAS•TRAC LZ-30** measures the amount of light absorbed by a concentration of gas. However, there is no way of knowing the size of the plume. Because of this, higher concentrations over a small area or smaller concentrations over a large area can give the same reading on the screen. While point and shoot technology such as this is a great indication tool and can be used to pinpoint the source of a leak by comparing readings, it cannot be used to quantify a gas leak.

See the diagram to the right. On the top, there is a gas plume 0.5 meter in length with a concentration of 2,000 ppm methane. On the right, there is a gas plume 1 meter in length with a concentration of 1,000 ppm methane. The **GAS•TRAC LZ-30** will see the same amount of absorption in both scenarios, and therefore give the same reading of 1,000 ppm•m.

In addition, in a real-world scenario there will be some small amount of background methane in ambient air. This is generally about 2 ppm•m. So for a reading at 100m, the reading on the screen would be about 200 ppm•m higher.



BATTERY CHARGING

The **GAS•TRAC LZ-30** has an internal, rechargeable lithium-ion battery pack, and includes a recharging base. This battery is not user replaceable.

To recharge the internal battery, ensure that the charging base is plugged in and insert the instrument into the base, bottom first. Contacts on the bottom of the instrument touch spring loaded pins in the bottom of the charging base to make an electrical connection.

The LED on the front of the charging base indicates the charging status:

- Solid Green & Red flicker: No connection
- Solid Red: Instrument charging
- Solid Green: Instrument fully charged

Charging takes approximately 3 to 4 hours if the battery is fully depleted.

**CHARGING
INDICATION LED**



OPERATION AND USE



WARNING: When the **GAS•TRAC LZ-30** is powered on, the laser module will be energized.

1. Push and hold the **ON/MENU** button until the screen illuminates. The software version will be displayed during a brief warmup period (~15 seconds).
2. If the displays fails to illuminate or a low battery indication is show, place the instrument in the charging base to charge the battery.
3. After warmup, the instrument will show the following on what is called the work display:
 - a. (Upper left)
Distance measurement
 - b. (Upper right)
Fuel gauge
 - c. (Center)
Current methane reading
 - d. (Lower left)
Peak methane reading
 - e. (Lower right)
Measurement unit/scale
4. To begin a measurement, press and release the **MEASURE** button. During measurement, the targeting laser will flash on and off continuously, as well as an audible beeping to alert the operator that a measurement is active. A distance measurement and the current and peak methane readings will be displayed on the screen.



OPERATION AND USE

5. Using the indication lasers, survey the area according to federal, state, municipal, and/or company procedures. Observe the readings on the display and any alarm conditions that should occur. In general, it is good practice to conduct surveys using an 'S' or 'Z' pattern. This both maximizes the area scanned as well as reduces the chance for false-negatives.
6. If at any time the instrument gives a low or high reflection warning, indicated by **REF/L** or **REF/H** on the display and an audible tone, try a different angle, position, or distance in order to increase or decrease the amount of reflected light. These messages indicate that the instrument is not getting an appropriate amount of reflected light. Be aware that not all surfaces may be suitable for reflection.
7. If at any time the instrument displays **HIGH METHANE**, this is an overload warning indicating that you are detecting gas greater than the upper detection limit of the instrument (50,000 ppm•m).
8. To stop a measurement, press and release the **MEASURE** button again.
9. To access the user menu, press and release the **ON/MENU** button. The user menu cannot be accessed if a measurement is currently active. See the user menu section in this manual for more details.
10. To power off the instrument, press and hold the **OFF/BACK** button. A brief animation will show. Keep the button held down until the screen goes blank.

OPERATION AND USE TIPS

Factors such as line of sight, wind, and sunlight conditions are not something that most operators have had to take into account in the past. This section gives a few tips and tricks for getting the most out of the **GAS•TRAC LZ-30**.

NOTE: Federal, state, municipal, and/or company procedures supersede what is outlined in this section.

INVESTIGATING THROUGH WINDOWS

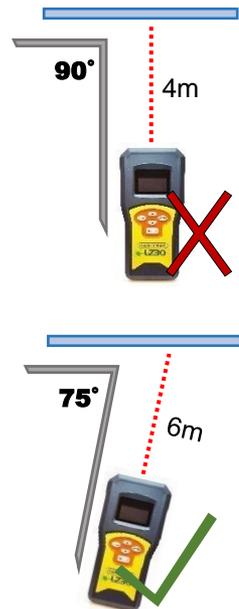
The laser technology used in the **GAS•TRAC LZ-30** allows the instrument to detect through standard window glass. This is a big advantage as it allows the user to investigate the inside of a building (for example) when he/she otherwise might not have been able to gain access.

In order to get the best results in this type of a scenario, there are two important steps that should be followed:

1. Maintain an angle of attack that is less than 90° to your target, and ideally greater than about 70° . This is depicted in the image to the right.

This greatly reduces the chance of what is known as “specular reflections”, which is when a portion of the laser reflects off of the surface of the window. It is also especially helpful for double-pane windows where the laser might reflect/bounce multiple times between the panes.

2. Maintain a distance between the instrument and the window of 5m (~15ft) or greater.



OPERATION AND USE TIPS

SHAPE OF THE DETECTION BEAM AND LINE OF SIGHT

Since the **GAS•TRAC LZ-30** uses a point of light for targeting, it can be easy to forget that the actual detection path is in the shape of a cone, which starts from a point (the instrument) and gets wider on the path to the target. At a distance of 30m (100 ft.), this width is 20cm (8 in.). The operator will get the most consistent results if he/she keeps as much of this path in/over the target as possible.

Some scenarios can be problematic as a result of this, such as if part of the beam is reflecting off of a different surface than another. This is known as “beam skipping”. The operator will get the most consistent results if he/she keeps as much of this beam in/over the target as possible.

In the picture to the right (beam not to scale), part of the beam is partially blocked by the fence, potentially causing reduced sensitivity, or in some cases, false positives. The operator should simply move slightly to the left, ensuring that the full width of the beam will make it to the target.

If the operator were surveying the ground behind the fence, this wouldn't be too great of a mismatch, but if the target was the face of the building in the background, there would be a very large difference in return signal between the portion of the beam that is hitting the building and the portion that is hitting the fence.



OPERATION AND USE TIPS

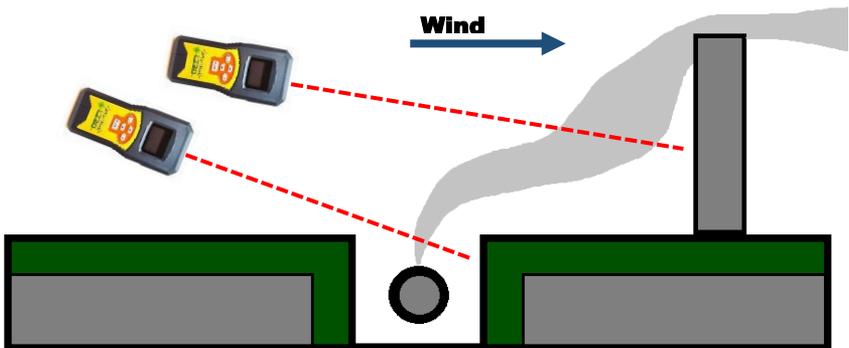
WIND CONDITIONS AND PLUME SIZE

Since the path of the laser has to pass through the methane plume for detection, wind conditions can greatly affect how the instrument operates, unless you are targeting the actual source. Because of this, especially when scanning a large area, it makes sense to have a plan of attack.

In a scenario where the laser might pass through the plume from downwind, upwind, or crosswind, either of the first two will generally result in much higher readings because the path distance through the gas is much greater than from crosswind. However, higher readings does not always mean there is also a higher chance for detection. Many times a crosswind scenario would yield a much higher chance that the gas will be detected, because a much larger portion of the user's field of view, or scan-able area, will contain gas.

Additionally, sometimes the instrument will be more likely to detect a gas source in a location that is not directly at the source. Methane naturally rises, and the plume will naturally enlarge over time. The picture below shows that if the instrument is pointed closer to the gas source, there will be a much smaller area / distance that the laser beam is passing through, making it more likely for the user to miss it. Maximizing this area will increase the chance of detection. Even though the reading on the display would be higher at the source, a large plume greatly increase the likelihood that the laser will actually pass through it. After detection, the operator can further narrow down the survey area to pinpoint the source.

In this case, the wind is helping the operator as it is taking the gas plume towards a large reflection surface. If instead the wind direction was parallel to the pipe, the operator may not be able to use the same tactic of sweeping against the wall as reliably.



OPERATION AND USE TIPS

LOCATING TARGETING LASER

With bright sunlight, the targeting laser may be difficult for some to see. This is unfortunately a downside of any technology of this nature. There are a few things that can help with this.

One thing that might help in this scenario is to begin tracking the laser from a location where you can see it clearly. For example, point the instrument at the ground in front of your feet, and gradually sweep it forward, away from you, to your target. Your eyes will have a much easier time following a moving target than finding a missing one.

Additionally, the operator can use laser enhancement glasses. This can increase the contrast of the targeting laser, making it easier to see against certain backgrounds. Below is a view with and without these glasses.



CALIBRATION CHECK (BUMP TEST)

To verify the accuracy of any **GAS•TRAC LZ-30**, a bump test must be performed. This is done using the calibration cell, which is built into the hard carrying case.

A sensor that does not meet the specifications listed in this manual may require calibration or repair. Any time it is suspected that the **GAS•TRAC LZ-30** is not working properly, check calibration. Power on the instrument and allow the warmup process to complete before proceeding.

STEP 1: Place the instrument in the carry case. Ensure both the instrument and calibration cell are fully seated. Ensure there are no obstructions in the path between the instrument and cell.

STEP 2: Press and release the **MEASURE** button to begin a measurement. Allow the unit to read for a few seconds.

STEP 3: Press and release the **MEASURE** button again to stop the measurement. The **MAX** reading on the screen, in the lower left, should be 1,500 ppm•m or greater for a successful test.

NOTE: If the result is less than 1,500 ppm•m, attempt the bump test again. If still unsuccessful, perform a calibration.

CALIBRATION



WARNING: Using calibration kits other than recommended by Sensit Technologies may cause inaccurate readings. Repairs may be required if the instrument fails to calibrate. Consult the factory for details.

Calibration is the process of setting the reading of the instrument equal to the value of the certified calibration gas inside the calibration cell. Power on the instrument and allow the warmup process to complete before proceeding.

- STEP 1:** Place the instrument in the carry case. Ensure both the instrument and calibration cell are fully seated. Ensure there are no obstructions in the path between the instrument and cell.
- STEP 2:** Press and release the **MEASURE** button to begin a measurement. Allow the unit to read for a few seconds.
- STEP 3:** Press and release the **MEASURE** button again to stop the measurement. The current reading of the calibration cell will remain on the screen.
- STEP 4:** Press and release the on/menu button to enter the user menu. Continue to press and release the button until calibration appears on the display.
- STEP 5:** Press and release the measure button. If the calibration is successful, passed will be displayed on the screen.

NOTE: If instead failed is displayed, the calibration was unsuccessful. Attempt calibration again. Any instrument that cannot be successfully calibrated should be taken out of service. Please contact Sensit Technologies for further assistance.

USER MENU

The user menu gives the user access to the calibration menu and various settings, including the alarm point and turning the indication lasers on or off.

To access the user menu, press and release the **ON/MENU** button from the work display. The first menu item, **CALIBRATION**, will be displayed.

NOTE: The menu is not accessible if the measurement function is activated.

To scroll through this menu, continue to press and release the **ON/MENU** button. The arrow buttons will adjust/change the current setting on the screen.

To exit the user menu, press and release the **OFF/BACK** button.



USER MENU

SET ALARM

Allows the user to adjust the alarm threshold. By default, this is 500ppm•m. To adjust, use the **UP** and **DOWN ARROW** buttons until the desired number is reached. Adjustments are made in increments of 100ppm•m, 1%LEL•m, or 0.1%VOL•m, depending on the unit display setting. Once correct, press and release the **MEASURE** button to save the setting and return to the work display.

The **GAS•TRAC LZ-30** has 3 different alarm types: low, medium, and high. Both the audible alarm and vibrating motor will increase in frequency from low to high. The low alarm begins at 20% of the alarm threshold, the medium alarm begins at 50% of the alarm threshold, and the high alarm begins at 100% of the alarm threshold.

To discard any changes you have made, press and release the **ON/MENU** button to scroll to the next menu item or press and release the **OFF/BACK** button to exit the menu.

SET RED LASER

Toggles whether the distance measurement (red) laser is on or off during measurement. Unlike the green laser, turning this off will turn off the distance measurement. Use the **UP** and **DOWN ARROW** buttons to change between **ON** and **OFF**. Press and release the **MEASURE** button to save the setting and return to the work display.

To discard any changes you have made, press and release the **ON/MENU** button to scroll to the next menu item or press and release the **OFF/BACK** button to exit the menu.

USER MENU

SET GREEN LASER

Toggles whether the green targeting laser is on or off during measurement. This laser is only used for targeting purposes, to assist the user, and does not affect the gas or distance measurement. Use the **UP** and **DOWN ARROW** buttons to change between **ON** and **OFF**. Press and release the **MEASURE** button to save the setting and return to the work display.

To discard any changes you have made, press and release the **ON/MENU** button to scroll to the next menu item or press and release the **OFF/BACK** button to exit the menu.

RESET



WARNING: Use this function with caution and only if you are sure you want to restore default settings.

Resets the settings to factory defaults. Use the **UP** and **DOWN ARROW** button to toggle between **NO** and **YES**. If you want to reset to factory defaults, toggle to **YES** and then press and release the **MEASURE** button.

Press and release the **ON/MENU** button again to scroll to the next menu item. Press and release the **OFF/BACK** button to exit the menu.

USER MENU

CALIBRATION



WARNING: Using calibration kits other than recommended by Sensit Technologies may cause inaccurate readings. Repairs are required if the instrument fails to calibrate. Consult the factory for details.

Calibrates the instrument using the built-in calibration cell in the carrying case. See the calibration section in this manual for instructions on how to calibrate the instrument.

Press and release the **ON/MENU** button again to scroll to the next menu item. Press and release the **OFF/BACK** button to exit the menu.

SET UNIT

Changes the display unit used during measurement (**PPM•M** / **%LEL•M** / **%VOL•M**). Use the **UP** and **DOWN ARROW** buttons to adjust. Press and release the **MEASURE** button to save the setting and return to the work display.

This setting affects the units used both for display and for the alarm point.

To discard any changes you have made, press and release the **ON/MENU** button to scroll to the next menu item or press and release the **OFF/BACK** button to exit the menu.

MAINTENANCE AND CARE

The **GAS•TRAC LZ-30** is virtually maintenance free when cared for properly. Here are some common things to avoid in order to keep your instrument in proper working order.

Keep the optics at the front of the instrument as clean as possible, and avoid water, dirt, or other debris from making contact. If anything does build up and needs to be cleaned, use canned air/duster to avoid contact with the optics.

Keep the charging contacts at the bottom of the instrument as clean as possible. Any dirt build up may impede charging. If dirt builds up and needs to be cleaned do not use a conductive brush to do so, as this will damage the battery.

If the body of the instrument needs to be cleaned, use an all-purpose cleaner such as Simple Green. Avoid acetone or any other chemical that could damage ABS plastic.

Do not point the instrument at the sun, as this could damage the optics or the laser modules.

Only use the wall transformer supplied by SENSIT Technologies for use with the charging base. Using other transformers may damage the base or the instrument.

WARRANTY

Your **GAS•TRAC® LZ-30** is warranted to be free from defects in materials and workmanship for a period of two years after purchase (excluding calibration). If within the warranty period, your instrument should become inoperative from such defects, the unit will be repaired or replaced at our option.

This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Proof of purchase may be required before warranty is rendered. Units out of warranty will be repaired for a service charge. Internal repair or maintenance must be completed by a **SENSIT TECHNOLOGIES** authorized technician. Violation will void warranty. Units must be returned postpaid, insured and to the attention of the Service Dept. for warranty or repair. This warranty gives you specific legal rights and you may have other rights which vary from state to state.

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GAS•TRAC® LZ-30 Instruction Manual
Part#: 750-00080

Revision 2/15/2018