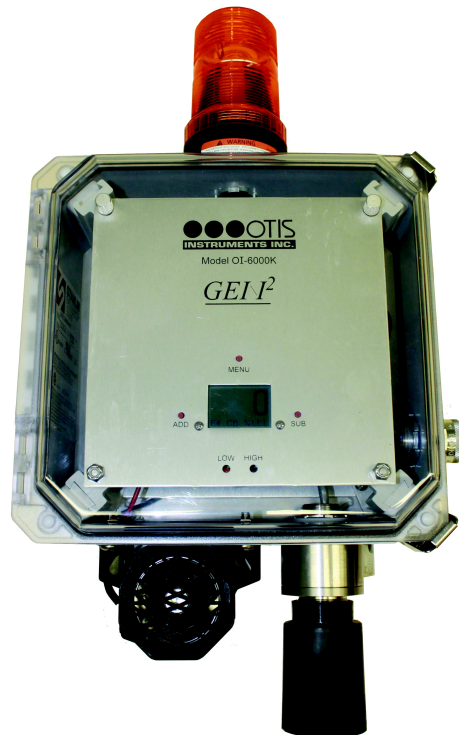


GEN²

Model OI-6000K Sensor Assembly

Operation Manual

Revision 2.0w



Product Overview

The Otis Instruments, Inc. Model OI-6000K Gen II ambient air gas sensor assembly is a 2-relay wired (Notis) sensor assembly that uses a Catalytic Bead, Electro-Chemical, PID, or Infrared sensor element to detect a variety of gases.

The OI-6000K comes standard with a 102 x 64 graphical LCD screen and Otis Instruments standard three-button interface, and features 4-20mA (3-wire) or RS-485 Modbus output. Features such as the auto-setting Null, relay/alarm tests, and system diagnostics make this device a truly remarkable gas detection system.



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Introduction

This document is an Operation Manual containing diagrams and step-by-step instruction for proper operation of the Otis Instruments, Inc. WireFree Model OI-6000K Sensor Assembly. This document should be read before initial operation of the product.

Should a question arise during the use of the product, this document will serve as a first reference for consultation. If further questions arise, or if the device is not working properly, please contact the sales representative of this product.

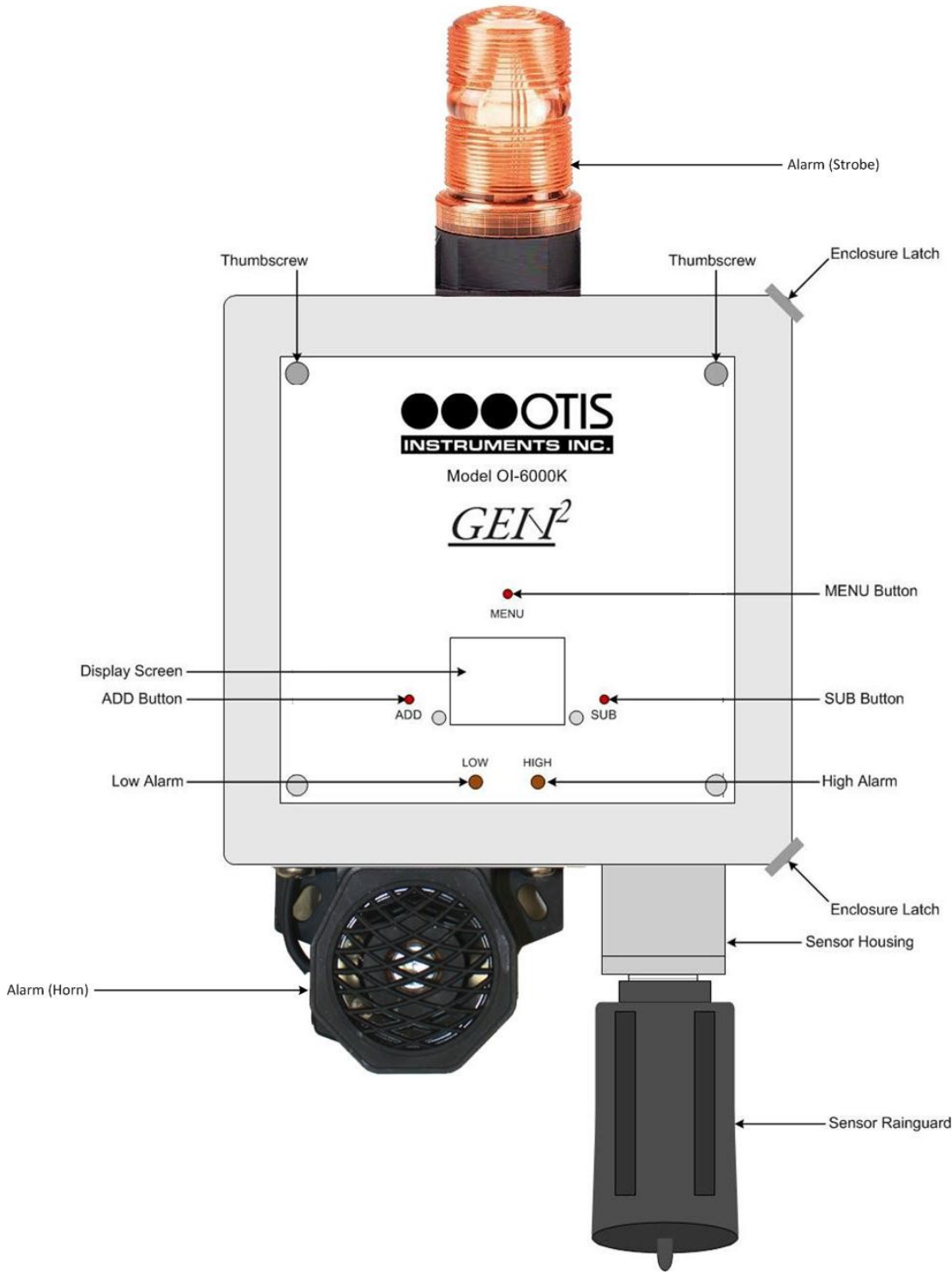
Warnings

- CAUTION: FOR SAFETY REASONS THIS EQUIPMENT MUST BE OPERATED AND SERVICED BY QUALIFIED PERSONNEL ONLY. READ AND UNDERSTAND INSTRUCTION MANUAL COMPLETELY BEFORE OPERATING OR SERVICING.
- ATTENTION : POUR DES RAISONS DE SÉCURITÉ, CET ÉQUIPEMENT DOIT ÊTRE UTILISÉ ENTRETENU ET RÉPARÉ UNIQUEMENT PAR UN PERSONNEL QUALIFIÉ. ÉTUDIER LE MANUEL D'INSTRUCTIONS EN ENTIER AVANT D'UTILISER, D'ENTERETENIR OU DE RÉPARER L'ÉQUIPEMENT.
- CAUTION: HIGH OFF-SCALE READINGS MAY INDICATE AN EXPLOSIVE CONCENTRATION.
- ONLY THE COMBUSTIBLE GAS DETECTION PORTION OF THIS INSTRUMENT HAS BEEN ASSESSED FOR PERFORMANCE.
- CAUTION: RELAYS ARE USER-SETTABLE TO LACTCHING OR UNLATCHING.

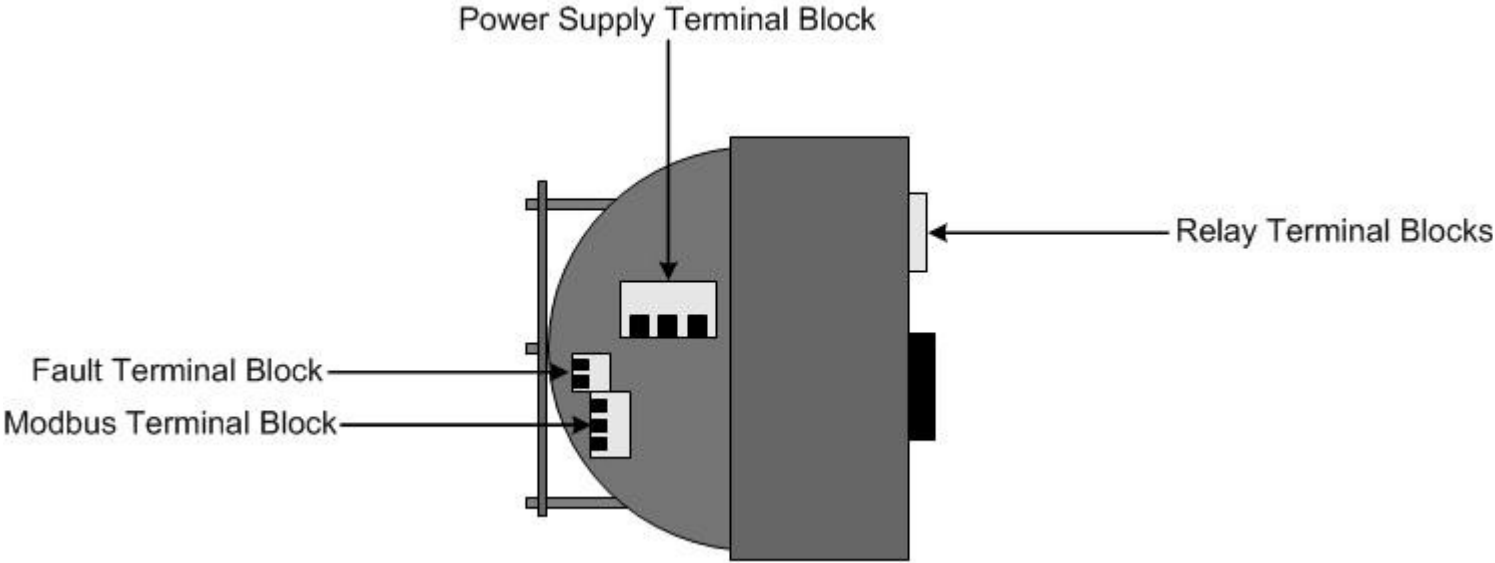
Complete System Diagram

The following diagrams should be consulted for identification of the system and all parts that may be referred to in this Operation Manual.

Complete System (External)



Terminal Board Drawing



Wiring Configurations

To ensure full-functionality of the product, complete ALL of the following wiring configurations before installing the device in the field (a non-classified area).

Wiring Configuration Notes

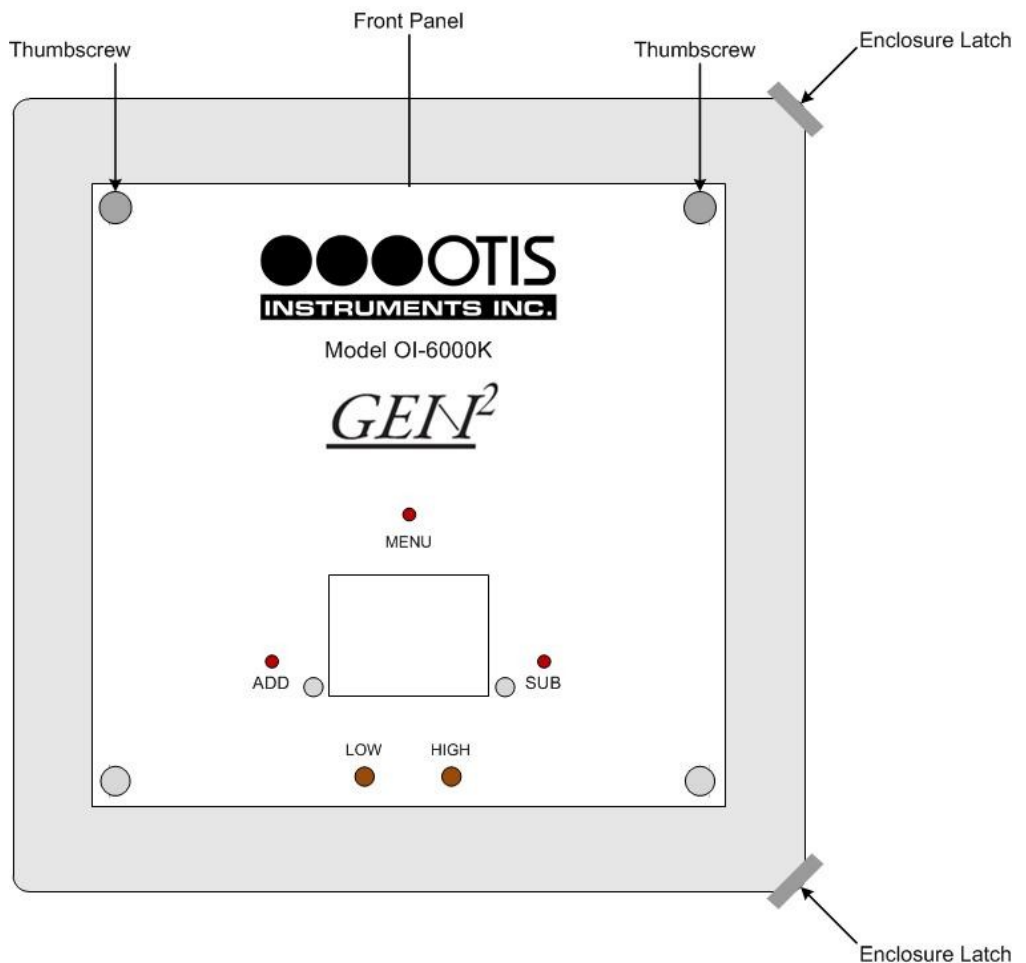
- Otis Instruments, Inc. recommends wiring the relays as “NO” for most applications. With a “NO” relay, the relay will only be triggered if gas is seen.
- The user may choose to wire the relays as “NC” if desired. To do so, connect the neutral wire from the power supply to the terminal labeled “NC” (Normally Closed) instead of the terminal labeled “NO” (Normally Open).
- Verify that there is no power being sent from the power supply while wiring the OI-6000K.
- The wire colors used in the following drawings are used for ease of displaying which wires go where. Although the wire colors used in these drawings are standard colors, not all applications will use the same wire colors.

DC Power Supply Configuration

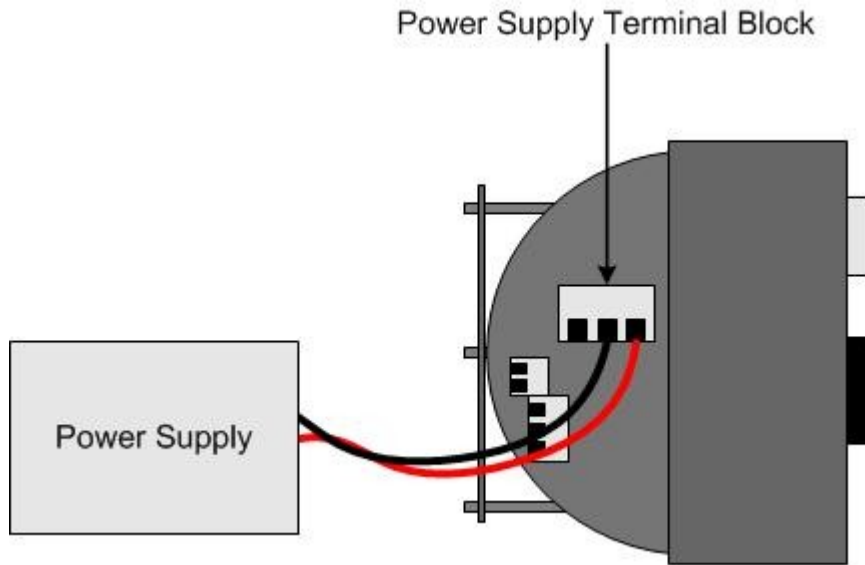
If the OI-6000K is to be powered by AC Power, the device will be pre-wired for AC when shipped from the factory. If DC Power is to be used, please use the following wiring configuration instructions.

NOTE: Verify that there is no power being sent from the power supply while wiring the power supply.

1. Unlatch the two Enclosure Latches.
2. Open the Enclosure Door.
3. Unscrew the two Thumbscrews.
4. Open the Front Panel.

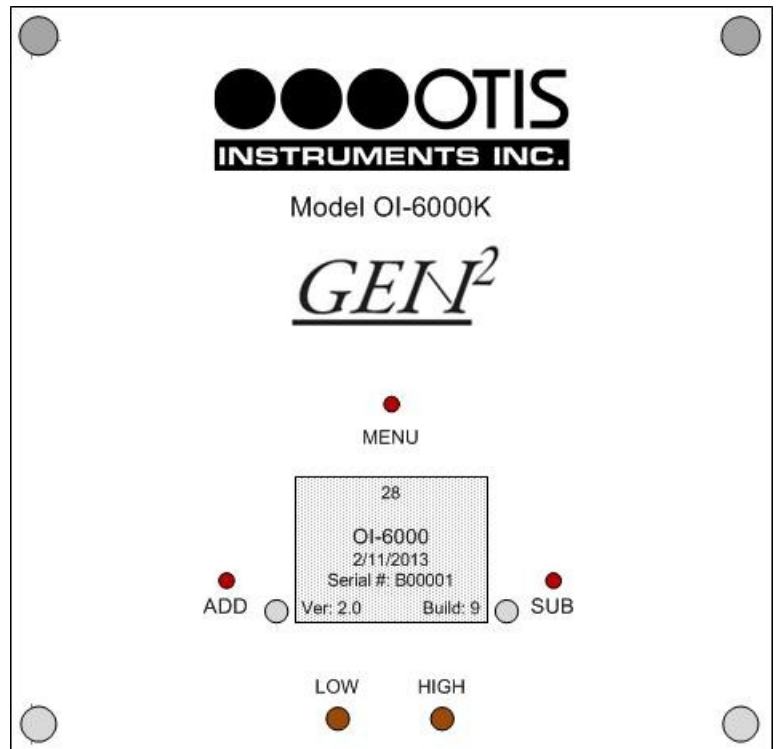


5. Locate the DC Power Terminal Block.
6. Connect the positive wire (red) to the power supply terminal block labeled “+12-35 VDC”.
7. Connect the neutral wire (black) to the power supply terminal block labeled “GND”.

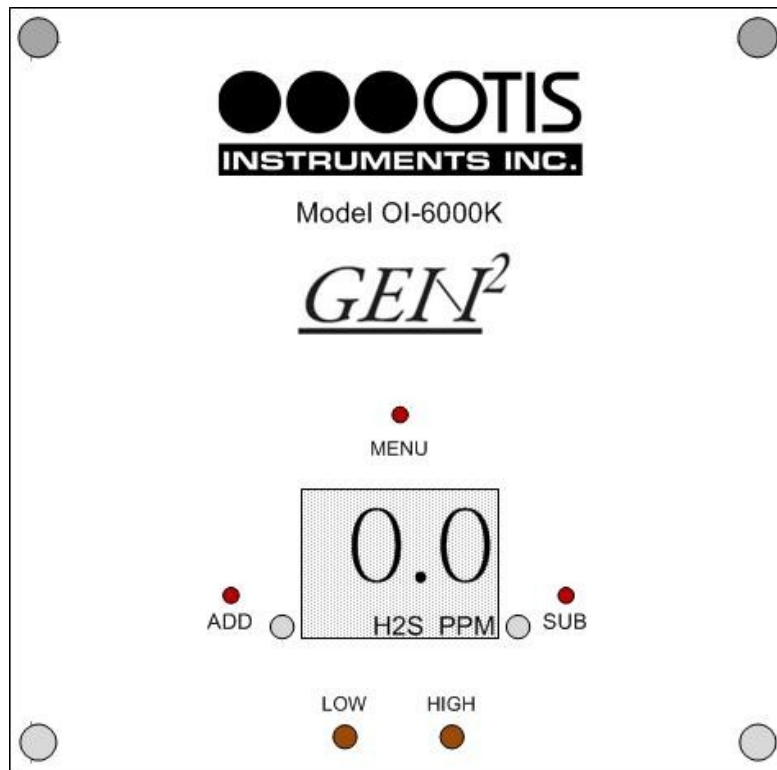


8. Close and latch the enclosure door.
9. Apply +12-35 Volts DC power from the controller/monitor to the unit.
10. The device will then count down from 60 to 0.

- From 60 to 30, the Display Screen will show the Otis Instruments, Inc. logo.
- From 30 to 0, the Display Screen will show:



11. When “0” is displayed, the device is in Normal Operating Mode and ready to operate.

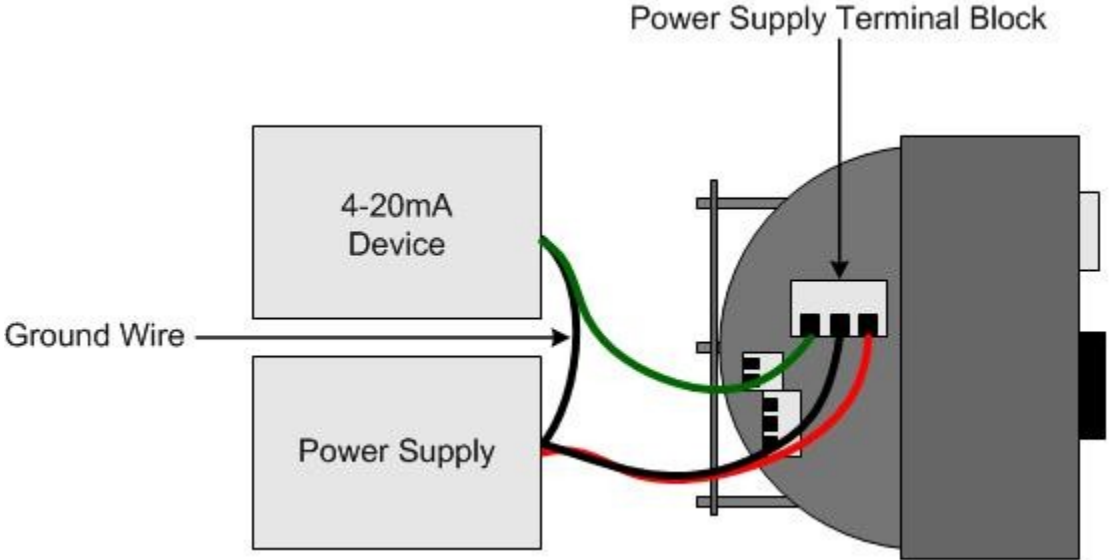


For information regarding system faults, see the OI-6000K Troubleshooting Guide.

Connecting 4-20mA

The OI-6000K is capable of communicating via 4-20mA and/or RS-485 Modbus.

- 1. Locate the Power Supply Terminal Block on the Terminal Board.
- 2. Connect a wire (green) from the 4-20mA device to the terminal labeled "4-20mA" on the Power Supply Terminal Block.
- 3. Connect a ground wire (black) from the Power Supply to the 4-20mA device.



4-20mA Current Loop Introduction

This section is only an introduction. The information in this section should serve as a brief overview of 4-20mA, and should not be considered a complete reference for proper implementation or use.

Prior knowledge of industry standards pertaining to 4-20mA specifically, and other aspects of electronics, are assumed to be known by the technician. For proper connection to a monitor or PLC, refer to the manufacturer's specific manual or instructions for that particular piece of hardware.

Overview

4-20mA ("four to twenty"), is an analog electrical transmission standard used by Otis Instruments for some of its ambient gas sensors and monitors. The signal is a current loop where 4mA represents zero percent signal, and 20mA represents 100 percent signal (full scale of the sensor assembly). The relationship between the current loop and the gas value is linear.

The 4mA allows the receiving monitor/PLC to distinguish between a zero signal, a broken wire, or a dead instrument. Benefits of 4-20mA convention are that it is: an industry standard, low-cost to implement, can reject some forms of electrical noise, and the signal does not change value around the "loop" (as apposed to a voltage). Only one current level can be present at any time; each device which operates via 4-20mA must to wired directly to the monitoring device.

Calculations

$$I_{(4-20)} = \left(\frac{16 \cdot \text{value}}{\text{scale}} \right) + 4$$

- $I_{(4-20)}$: current of loop, measured in mA
- value : PPM or %, of gas concentration
- scale : full scale of sensor (see below for usual ranges)

Target Gas	Range	Temp.
H2S = Hydrogen Sulphide	0-100 ppm	-20 to 50C
O2 = Oxygen	0-25 %	-30 to 55C
SO2 = Sulfur Dioxide	0-20 ppm	-20 to 50C
CL2 = Chlorine	0-10 ppm	-20 to 50C
H2 = Hydrogen	0-4 %	-20 to 40C
NH3 = Ammonia	0-100 ppm	-40 to 40C
CO = Carbon Monoxide	0-999 ppm	-20 to 50C
F2 = Florine	0-1 ppm	-10 to 40C
HF = Hydrogen Fluoride	0-10 ppm	-10 to 40C
H2S-2 = Hydrogen Sulphide (extended temp)	0-100 ppm	-40 to 50C

Table – Gas Sensor Details

Actual ranges may vary with our product. If unsure, confirm with the actual gas sensor assembly distributor, Otis Instruments sales representative, or call the main Otis Instruments office for more details.

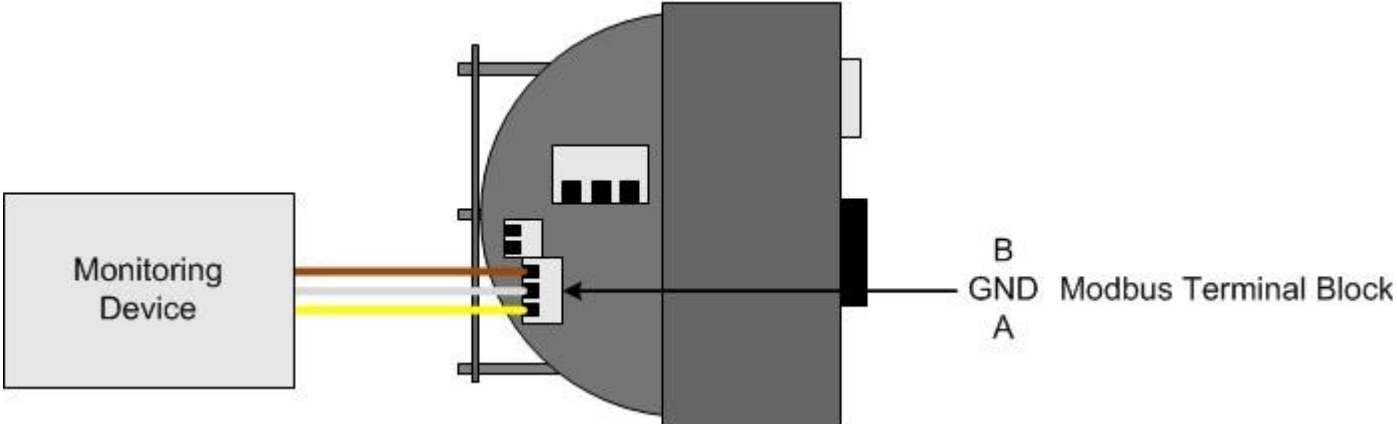
Measuring Current

If the value measured is 0mA, then: the loop wires are broken, the sensor assembly is not powered up, the sensor assembly is malfunctioning, or the monitor is malfunctioning. A DMM (digital multi meter) or Current Meter may be used to test a 4-20mA signal. Place the DMM or Current Meter in line with the loop and measure current. The DMM/Current Meter may be used in conjunction with the normal monitoring device.

Connecting Modbus

The OI-6000K is capable of communicating via 4-20mA and/or RS-485 Modbus.

- 1. Locate the Modbus Terminal Block on the Terminal Board.
- 2. Connect a wire (yellow) from the monitoring device to the terminal labeled "A".
- 3. Connect a ground (white) wire from the monitoring device to the terminal labeled "GND".
- 4. Connect a wire (brown) from the monitoring device to the terminal labeled "B".



Using Modbus Sensors with Otis Instruments, Inc. Monitors

Certain monitors sold by Otis Instruments, Inc. have the capability of accepting Modbus sensor inputs. Modbus is a communication protocol that uses an RS-485 serial connection, and can accept a number of different devices.

Based on the type of circuit used, there is a limit on how many devices can be connected to a Modbus sensor network. Currently at Otis Instruments, there is a limit of 32 devices on a single network. The data is transferred along the Modbus network at a specified rate, which means that there will be a small delay proportional to the number of connections.

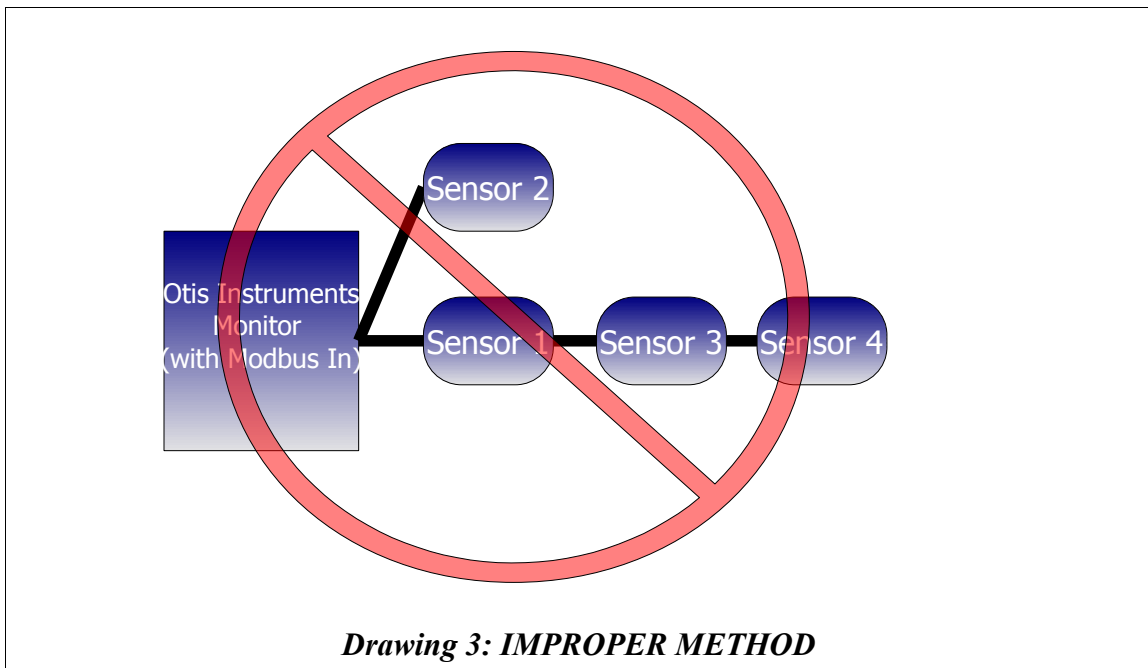
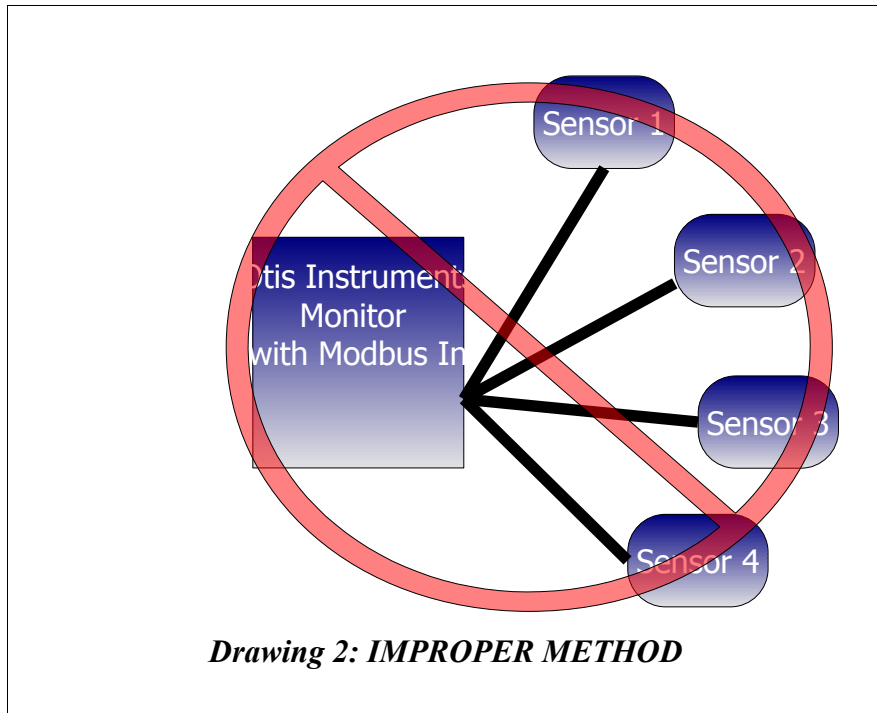
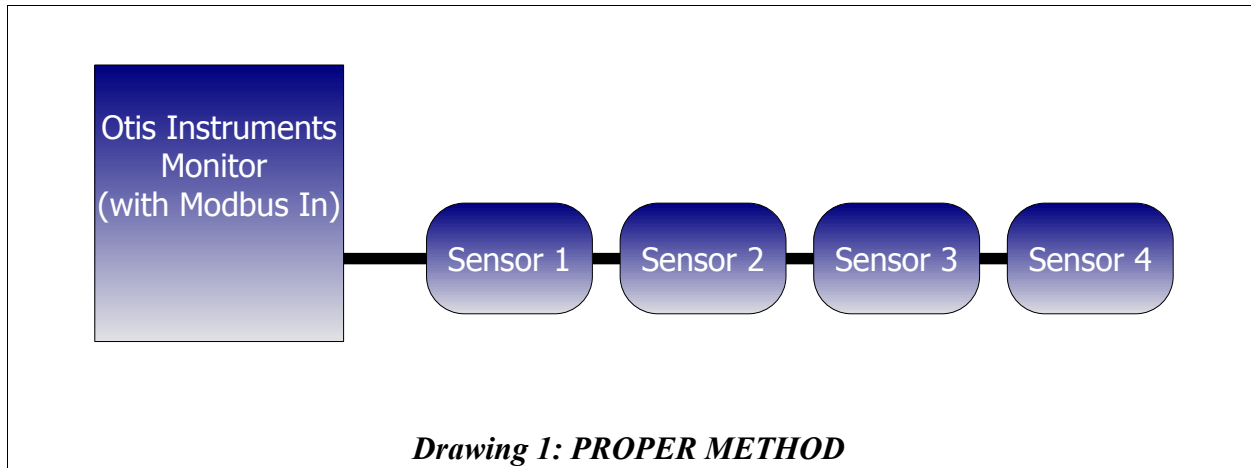
Proper Connection

The physical length of a Modbus connection from the monitor to the last sensor cannot exceed 4000 feet. Twisted pair is required for connections, and shielded twisted pair is recommended if there will be any additional noise in the area of operation (such as motors, switching relays, etc.). Also, with distances greater than 100ft, 18-20 gauge wire is recommended, where 22-24 gauge wire will be sufficient for short distances.

The proper way to connect a Modbus network is to “daisy-chain” the devices. This means that the signal of each sensor is run to the signal of the following sensor and so on. Each sensor is connected to the previous sensor via the signal wire, therefore the first sensor is connected directly to the monitor.

Terminating resistors should also be taken into consideration for long distances, while short and medium lengths can function normally without the resistor. Short lengths are generally less than 100ft, medium lengths range from 100-1000ft, and long lengths can be considered any distance greater than 1000ft. In the daisy-chained network, if the terminating resistor is required it should be placed at the last device in the chain.

Consult the following diagrams for proper (and improper) daisy-chain wiring methods.



Requirements Summary

Short Distances:

- Less than 100 feet
- 22-24 gauge wire
- Twisted Pairs (shielded if in area of high noise)

Medium Distances

- 101 – 1000 feet
- 18-20 gauge wire
- Twisted Pairs (shielded if in area of high noise)

Long Distances

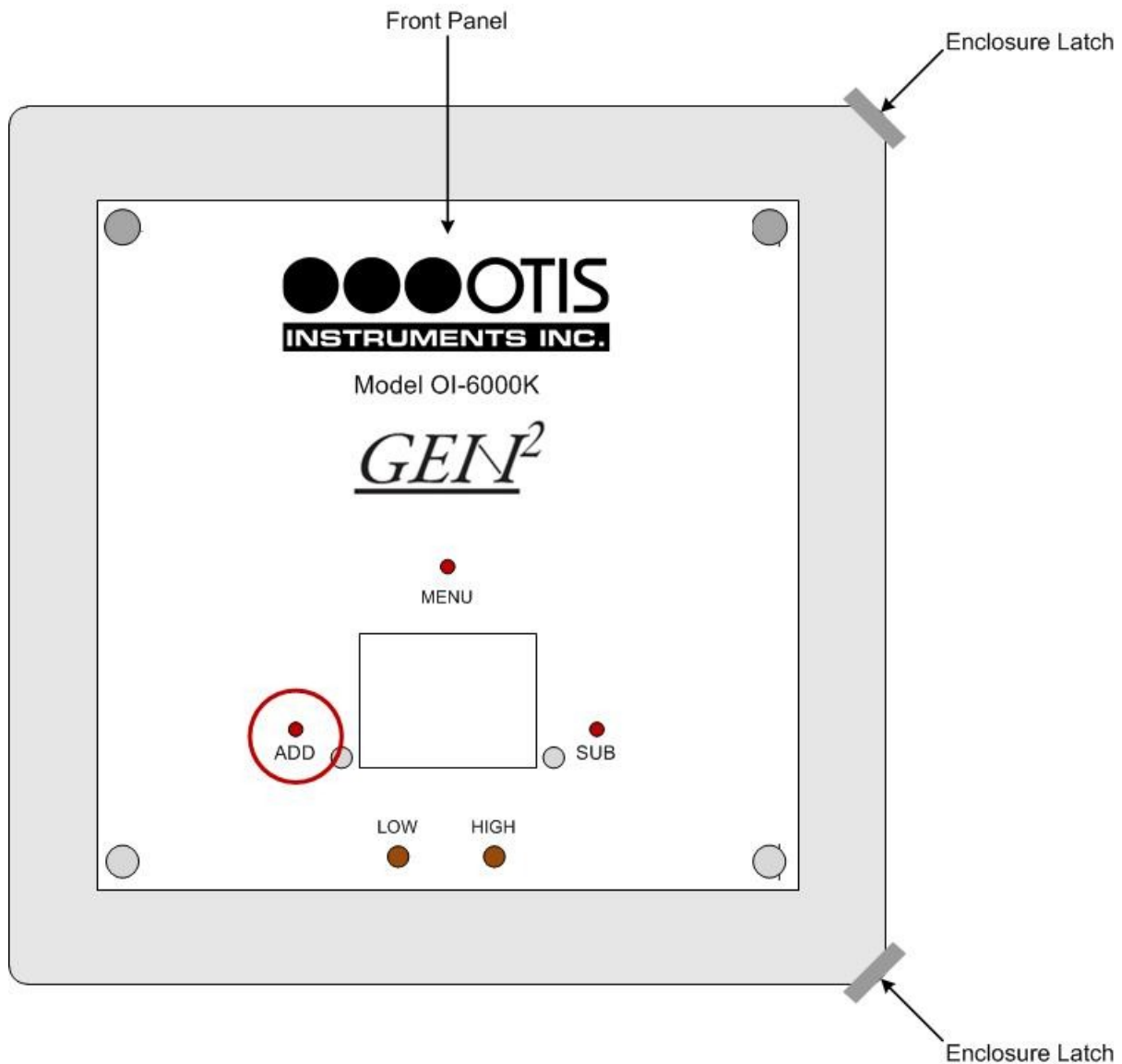
- 1001 – 4000 feet
- 18-20 gauge wire
- Twisted Pairs (shielded if in area of high noise).
- Terminating resistors may be required (on last device in chain)

Power On (from Power Off Mode)

Powering on the device activates its functions. When powered on, the device is fully functional and access to system and settings menus is allowed.

NOTE: The sensor assembly will automatically turn on when power is applied.

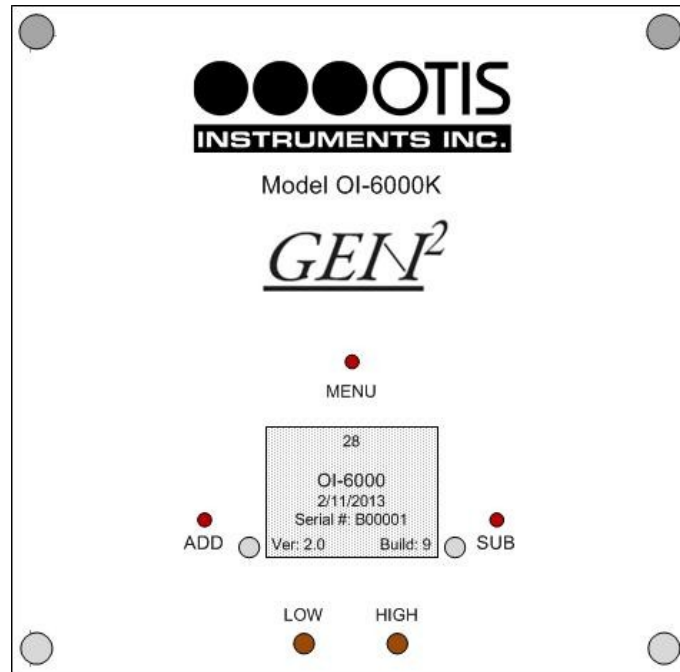
1. Unlatch the two Enclosure Latches.
2. Open the Enclosure Door.



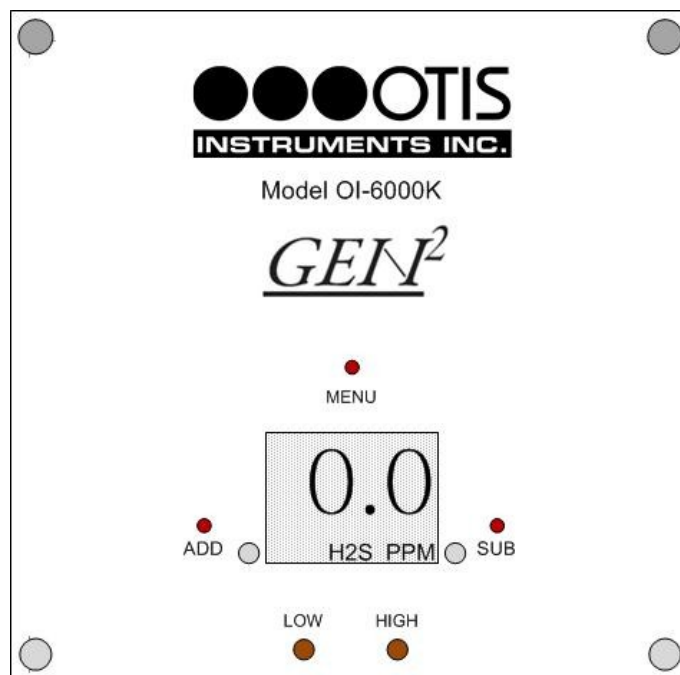
3. Locate *ADD* on the Front Panel.
4. Press *ADD* to turn on the device.

5. The device will then count down from 60 to 0.

- From 60 to 30, the Display Screen will show the Otis Instruments, Inc. logo.
- From 30 to 0, the Display Screen will show:



6. When "0" is displayed, the device is in Normal Operating Mode and ready to operate.

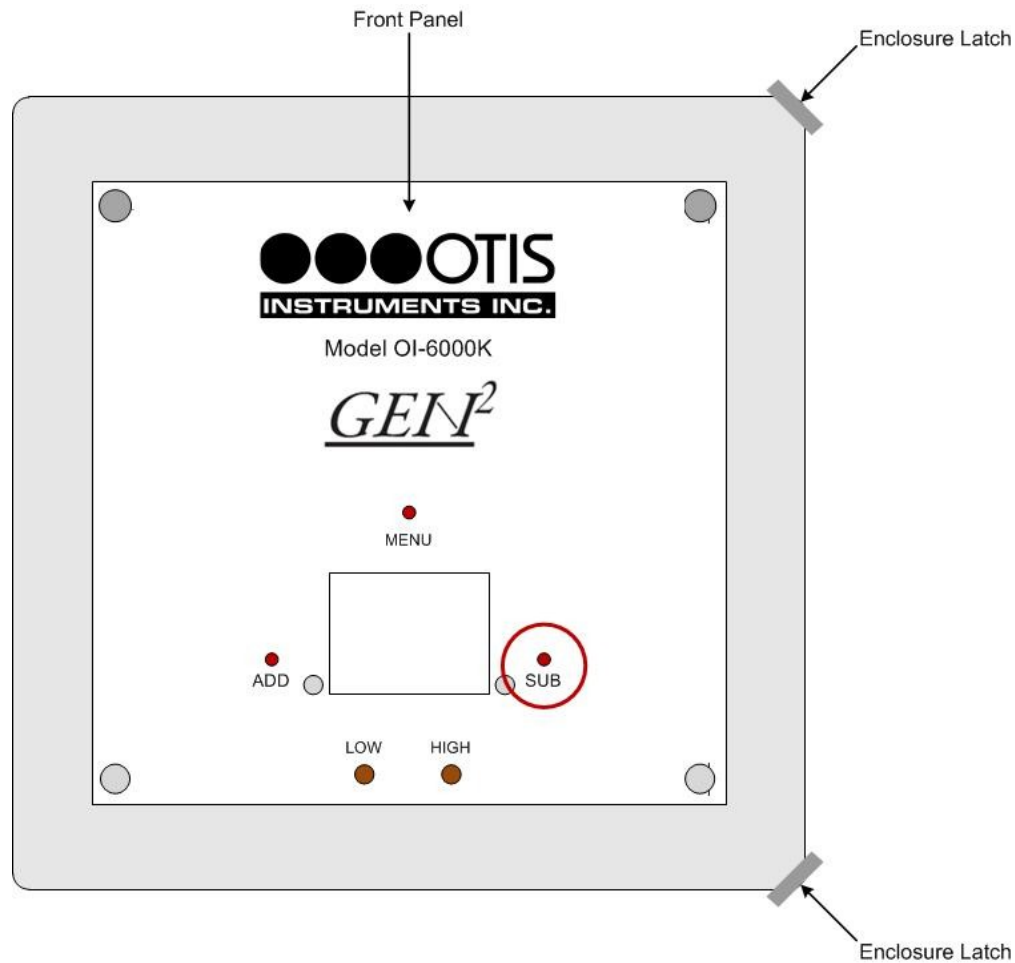


For information regarding system faults, see the OI-6000K Troubleshooting Guide.

Power Off

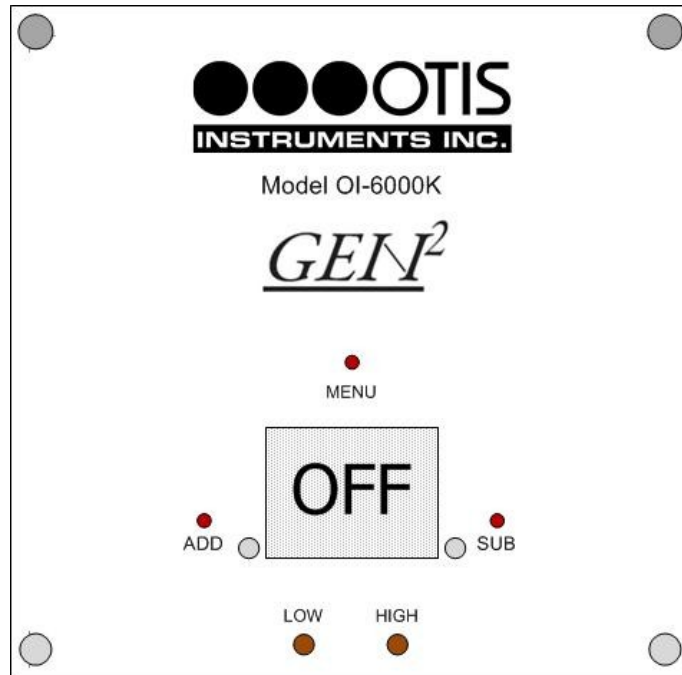
Powering off the device shuts down the system. When powered off, the device is no longer transmitting signals so the receiving controller will display “FAU” for that sensor channel.

1. Unlatch the two Enclosure Latches.
2. Open the Enclosure Door.
3. Locate *SUB* on the Front Panel.



2. Press and hold *SUB* for 4 seconds to power off the OI-6000K.

3. When powering off, the display screen will switch from showing “0” to “OFF”. The display will continue to show “OFF” (when power is being supplied to the unit) until the device is powered on.



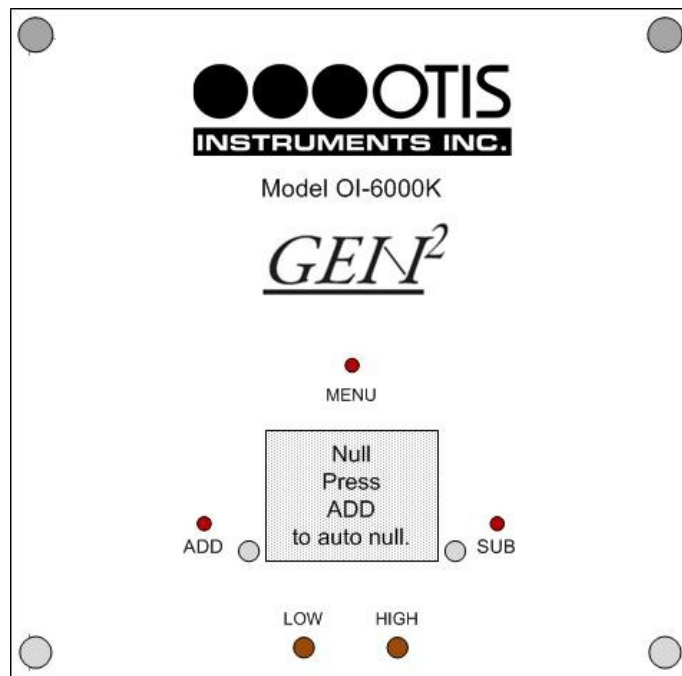
Basic Menu Mode

The Basic Menu Mode should be used to set the basic settings of the OI-6000K before initial use, and/or to adjust the basic settings to accommodate use. Basic Menu Mode options include: Null, Calibration, Set Low Alarm, Set Low Alarm Rise/Fall, Set High Alarm, and Set High Alarm Rise/Fall.

Nulling the Sensor

NOTE: When using an O₂ sensor, the nulled reading will be 20.9.

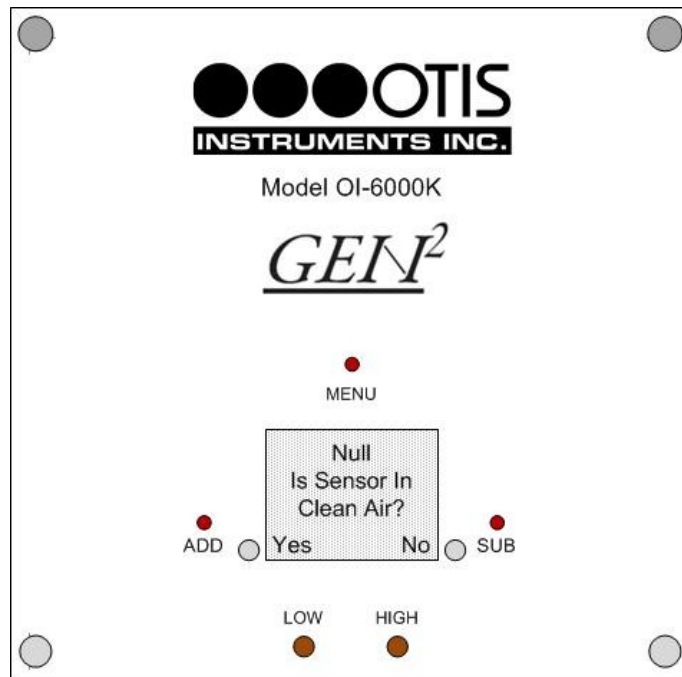
1. Unlatch the two Enclosure Latches.
2. Open the Enclosure Door.
3. Press *MENU*.
4. The display screen will show:



NOTE: A message will be sent to the receiving controller indicating that the sensor is in Null Mode.

5. As the Display Screen instructs, press *ADD* to auto null.

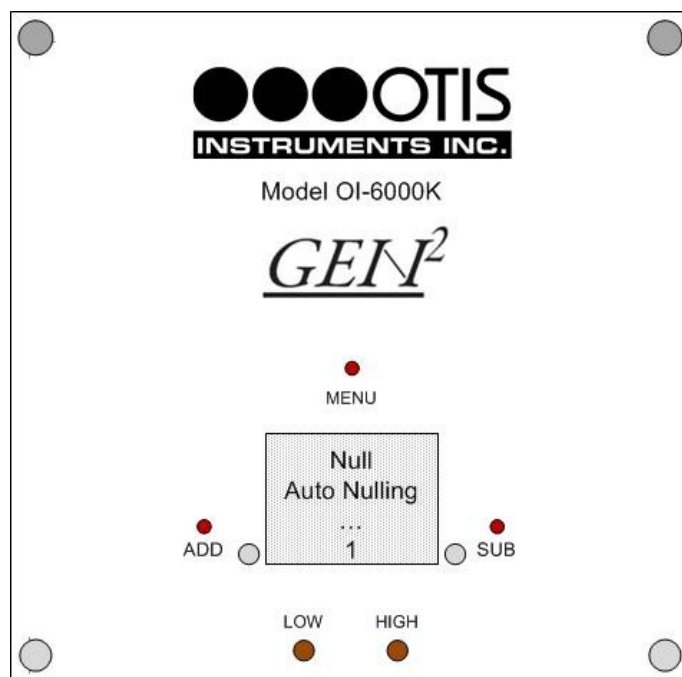
6. The Display Screen will then show:



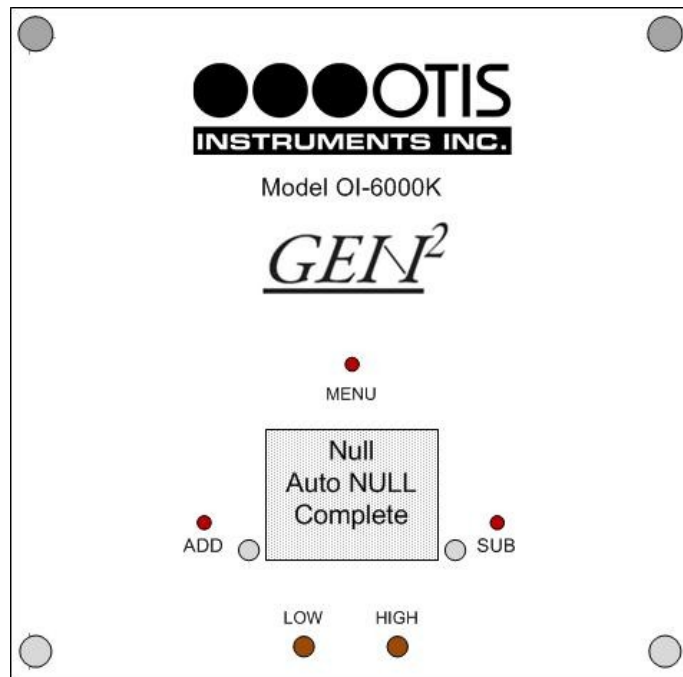
7. Press *ADD* for “Yes” or *SUB* for “No”.

NOTE: If too much time elapses between when ADD is pressed and when the question regarding clean air is answered, the device will default back to the primary Null screen. If this occurs, simply press ADD again.

8. The Display Screen will show (counting down from 6-0):



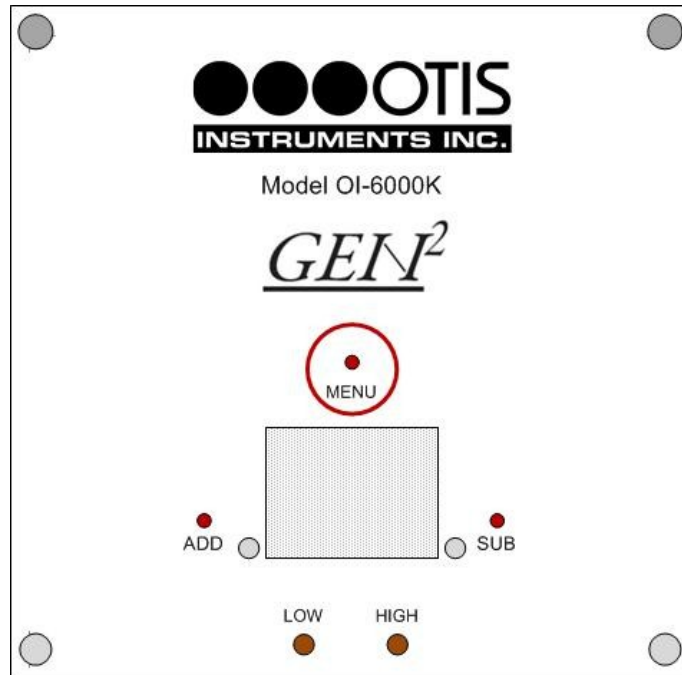
9. Once the sensor has been Nulled, the Display Screen will show:



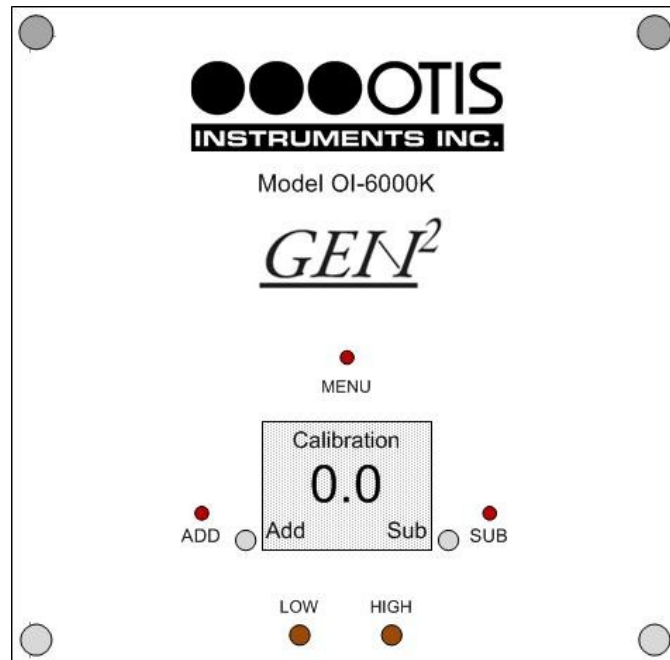
10. Auto Null is complete, proceed to the next step.

Calibration

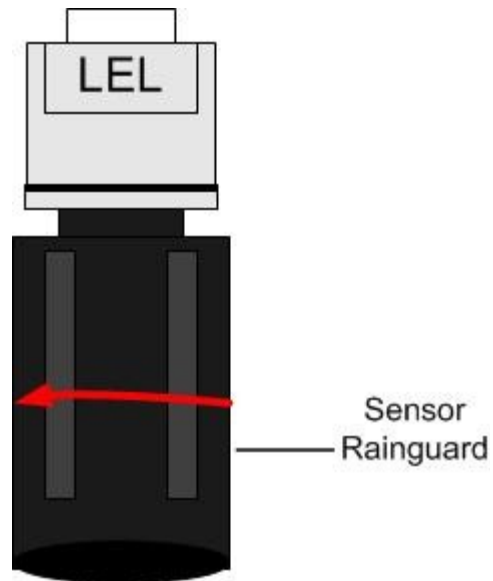
1. After Auto Null is complete (see above), press *MENU*.



2. The display screen will show:

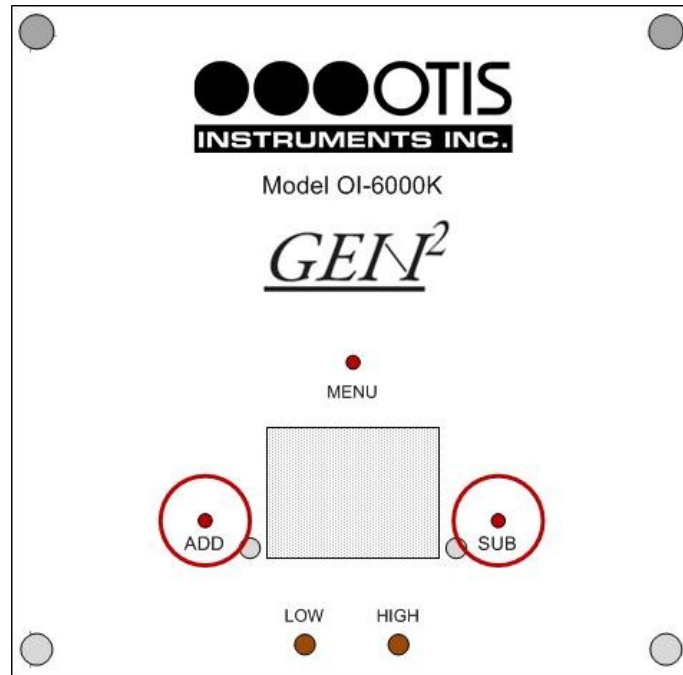


3. Unscrew and remove the sensor rainguard from the sensor housing.



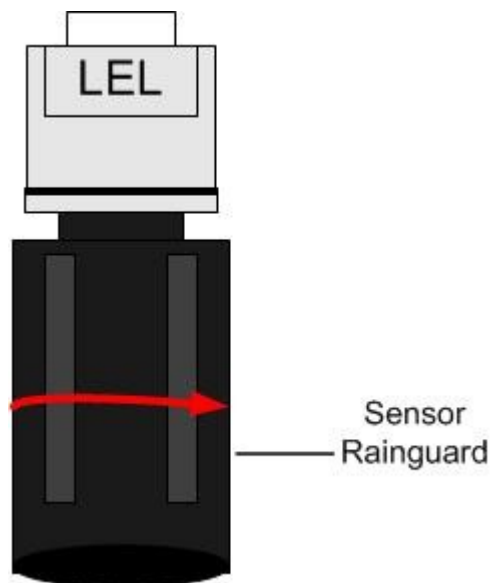
4. Replace the sensor rainguard with an Otis OI-410 Calibration Cup.
5. Apply a known calibration gas to the OI-410 Calibration Cup that is attached to the sensor housing.
6. The sensor's detection of gas will begin to climb in value as shown on the display screen.
7. Watch the display screen until the displayed number stops increasing (or after approximately 90 seconds).

8. Press *ADD* (increase) or *SUB* (decrease) to manipulate the reading on the display screen to match that of the calibration gas.



EXAMPLE: If the calibration gas is 25 PPM (or %) and the number on the display screen is 22 PPM (or %), press *ADD* until the screen reads 25 PPM (or %)

9. The device is now calibrated.
10. Unscrew the OI-410 Calibration Cup.
11. Reattach (screw on) the sensor rainguard to the sensor housing.



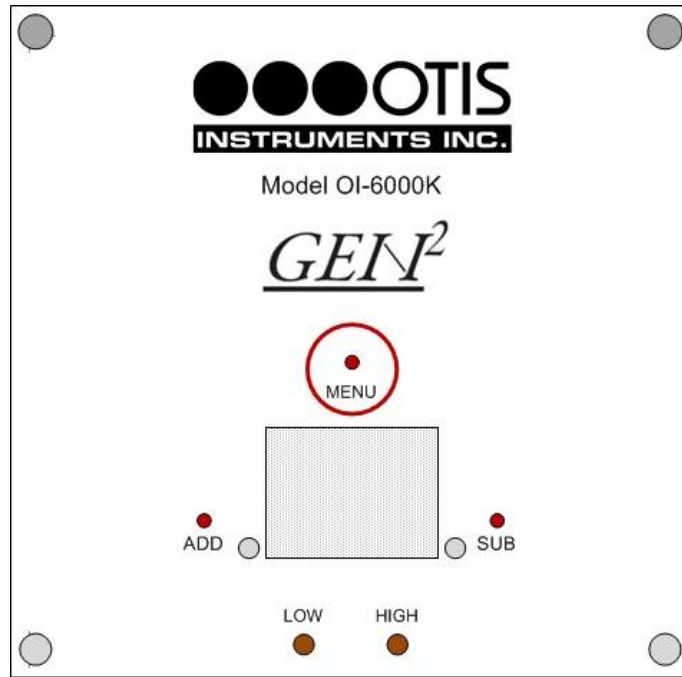
12. Once Calibration is complete, proceed to the next step.

Setting Low Alarm

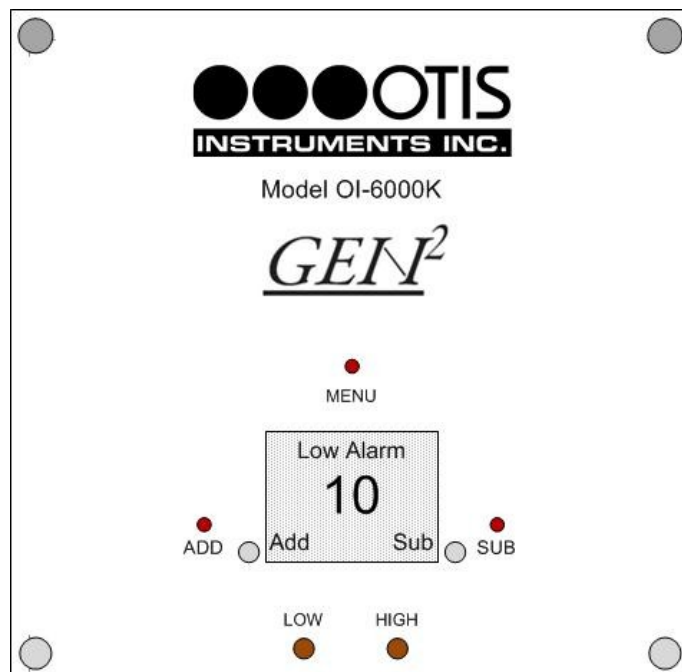
NOTE: The maximum value that can be set for either relay is 60% of full scale concentration.

NOTE: When using an O2 sensor two relays will be available, however: Relay 1 will trigger when the reading is below the Low Alarm Set Point; Relay 2 will trigger when the reading is above the High Alarm Set Point.

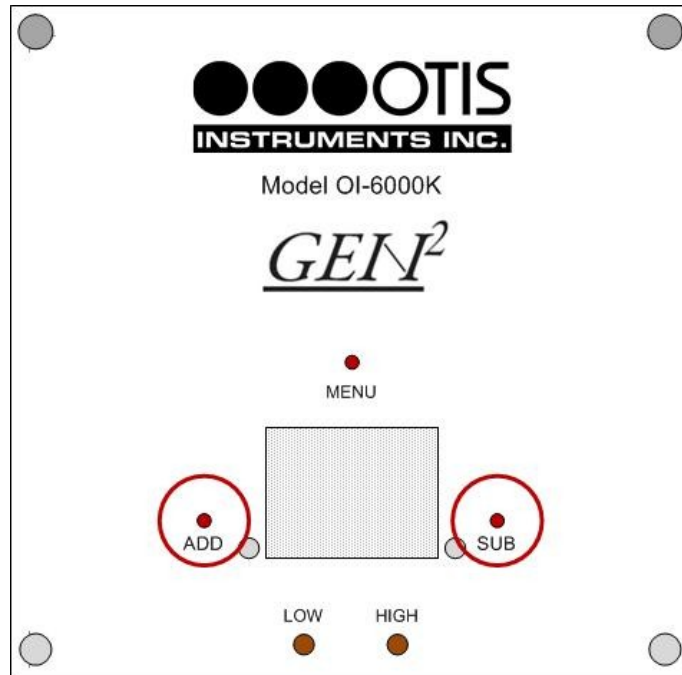
1. After Calibration is complete (see above), press *MENU*.



2. The display screen will show:



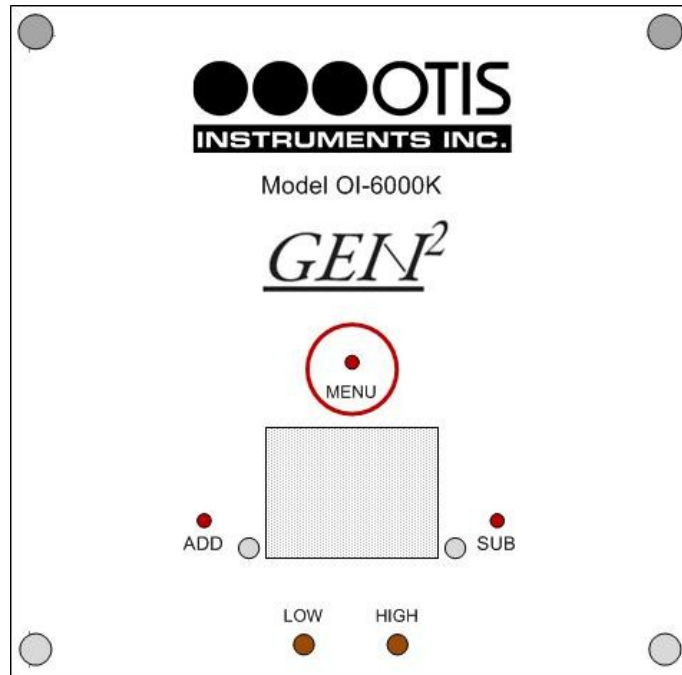
3. Press *ADD* to increase, or *SUB* to decrease the Low Alarm setting.



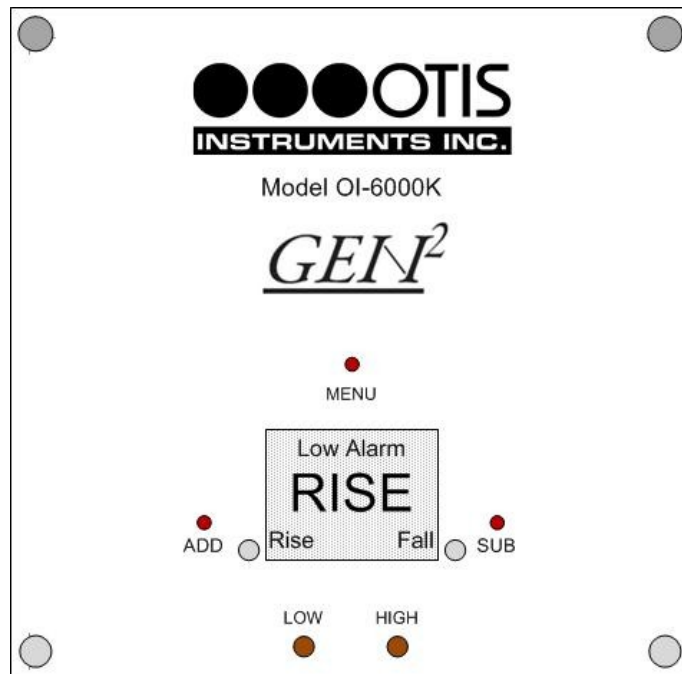
4. Once the Low Alarm is set, proceed to the next step.

Setting Low Alarm Rise/Fall

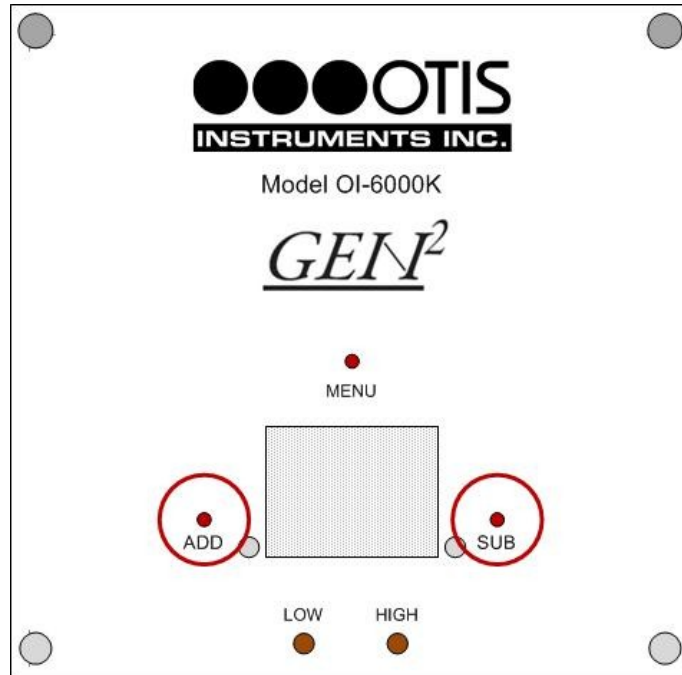
1. After the Low Alarm is set (see above), press *MENU*.



2. The display screen will show:



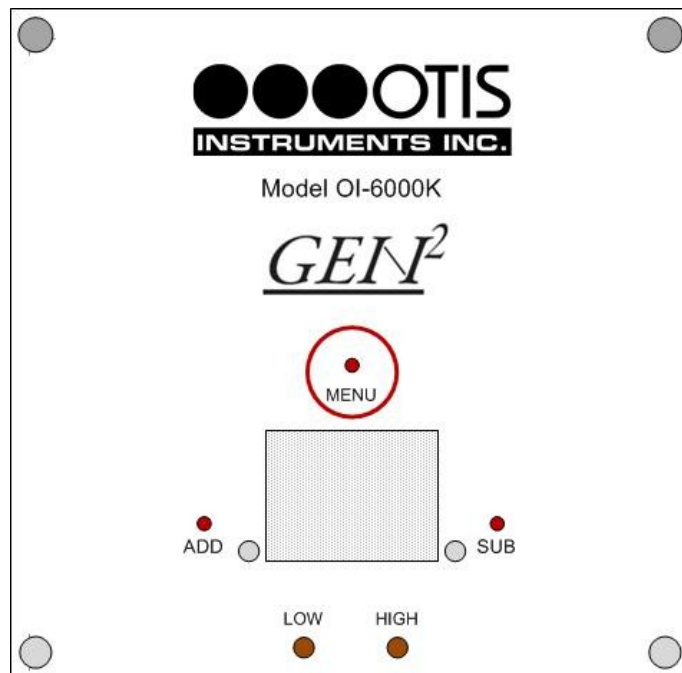
3. Press *ADD* to increase, or *SUB* to decrease, the Low Alarm Rise/Fall setting.



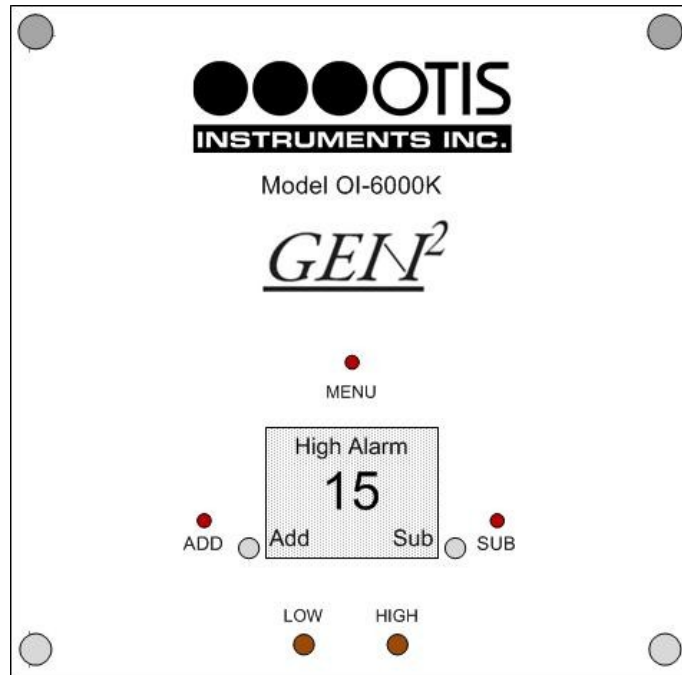
4. Once the Low Alarm Rise/Fall is set, proceed to the next step.

Setting High Alarm

1. After the Low Alarm Rise/Fall is set (see above), press *MENU*.



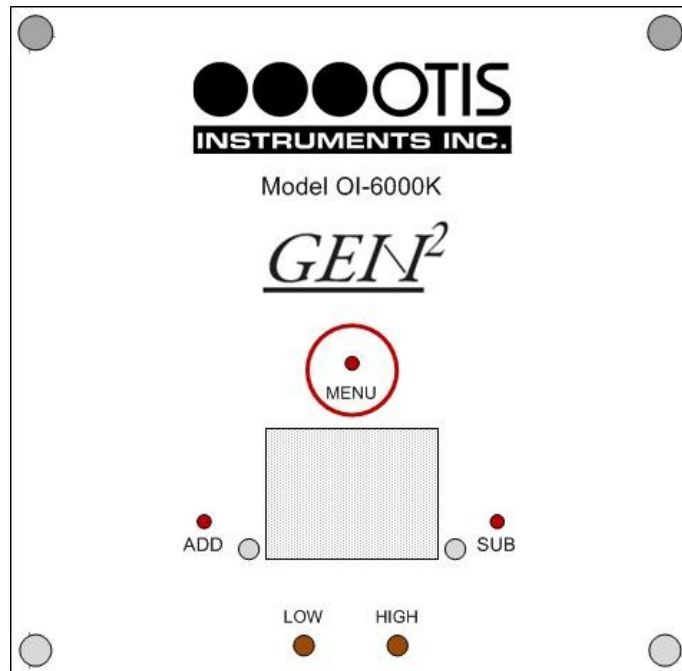
2. The display screen will show:



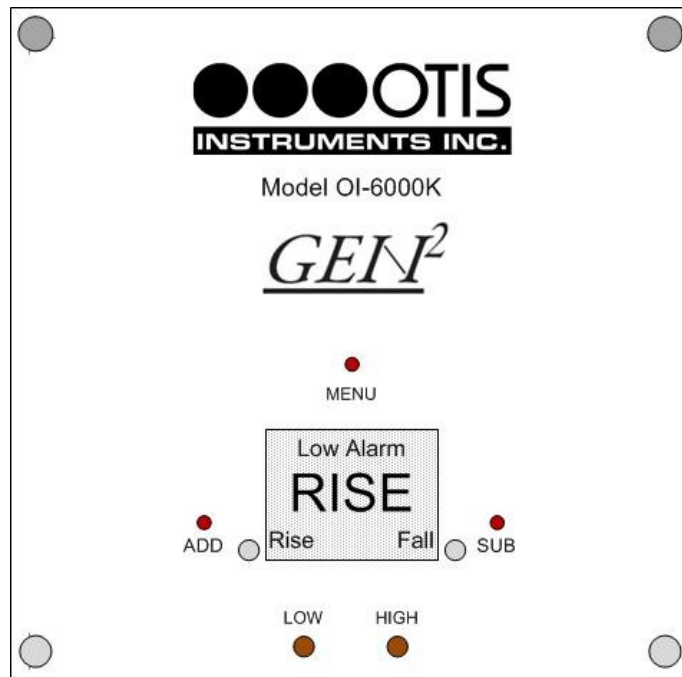
3. Press *ADD* to increase, or *SUB* to decrease the High Alarm setting.
4. Once the High Alarm is set, proceed to the next step.

Setting High Alarm Rise/Fall

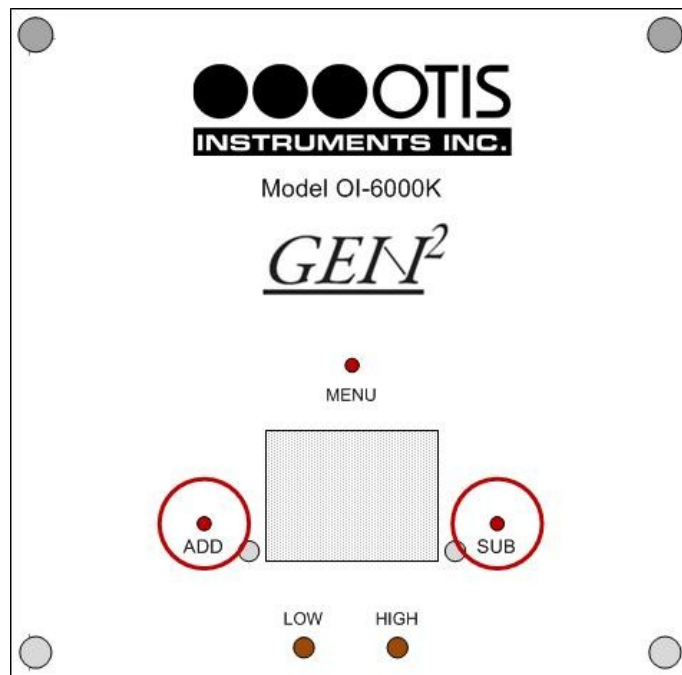
1. After the High Alarm is set (see above), press *MENU*.



2. The display screen will show:

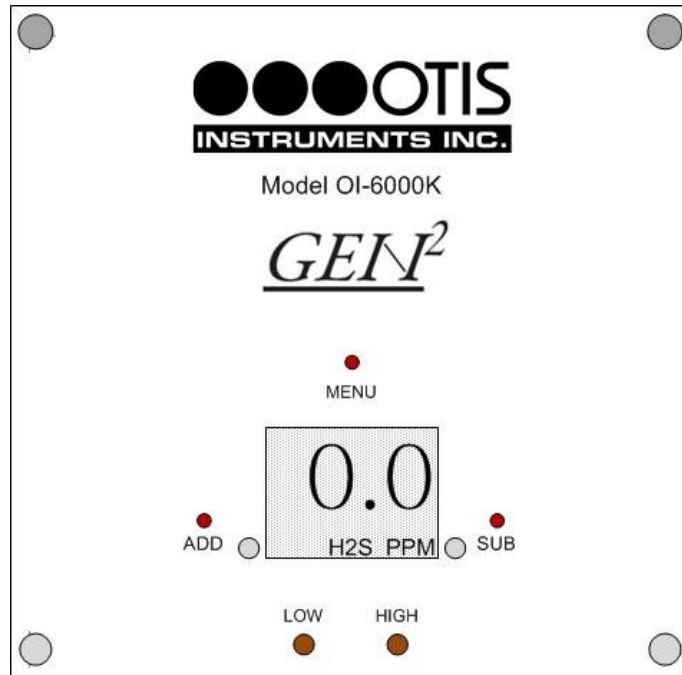


3. Press *ADD* to increase, or *SUB* to decrease, the Low Alarm Rise/Fall setting.



4. Once the High Alarm Rise/Fall is set, press *MENU* to exit Basic Menu Mode.
5. The device is now in Normal Operating Mode. The Display Screen should resemble the following illustration:

NOTE: When using an O2 sensor and exiting Menu Mode the reading will start at "20.9" (instead of "0") and then change to the whatever the unit is actually reading.



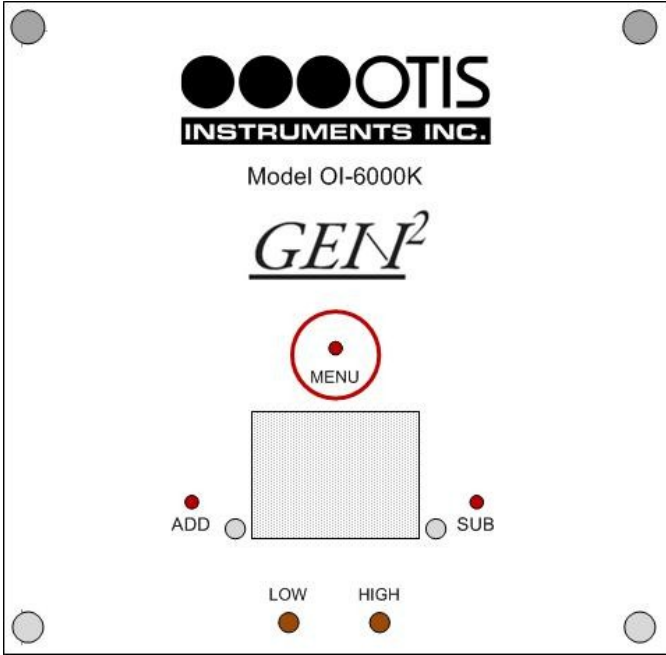
Advanced Menu Mode

The Advanced Menu Mode allows the user to: Test Relays/Alarms, view Diagnostics, view Last Setup Times, view Unit Info, Set Relay 1 (Latching or Unlatching), Set Relay 2 (Latching or Unlatching), Set Relay 1 Failsafe, Set Relay 2 Failsafe, Set Cal Method, Set Modbus Address, Set Baud, Set 4-20 Offset?, Set Contrast, and opt to (or not to) return the unit to Factory Default Settings.

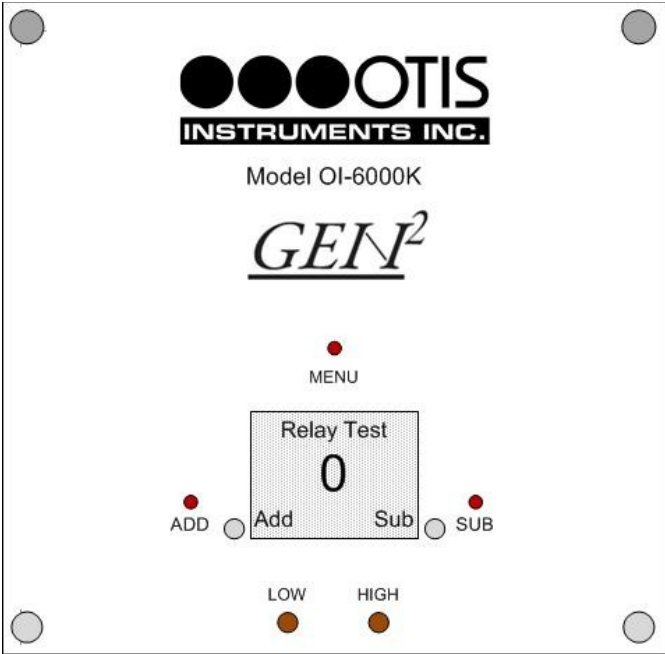
Relays/Alarms Test Setting

The relays/alarms test should be completed periodically to ensure full functionality of the relays/alarms.

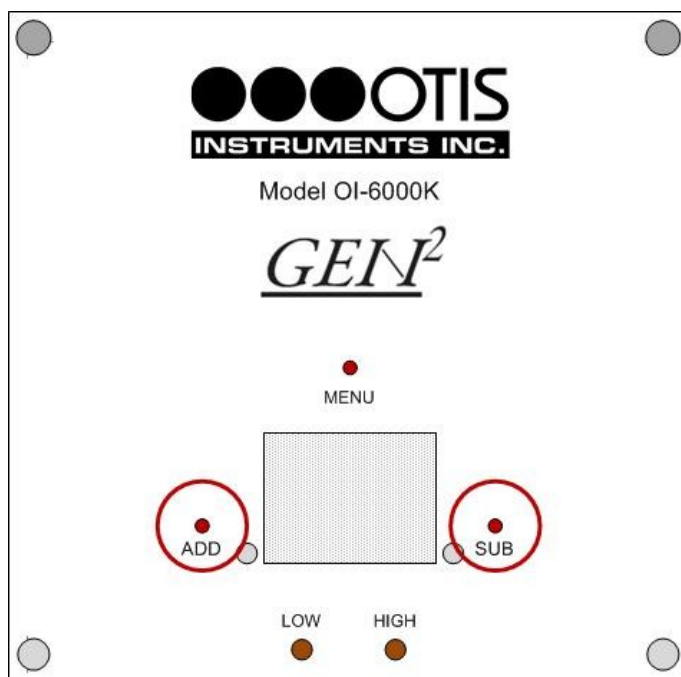
1. While the device is in Normal Operating Mode, press and hold *MENU* for approximately 6 seconds to enter the Advanced Menu Mode.



2. The Display Screen will show:



3. Press *ADD* to increase the reading by 5 PPM (or %). Continue pressing *ADD* until the increasing number reaches the pre-set level to trigger the relay/alarms.

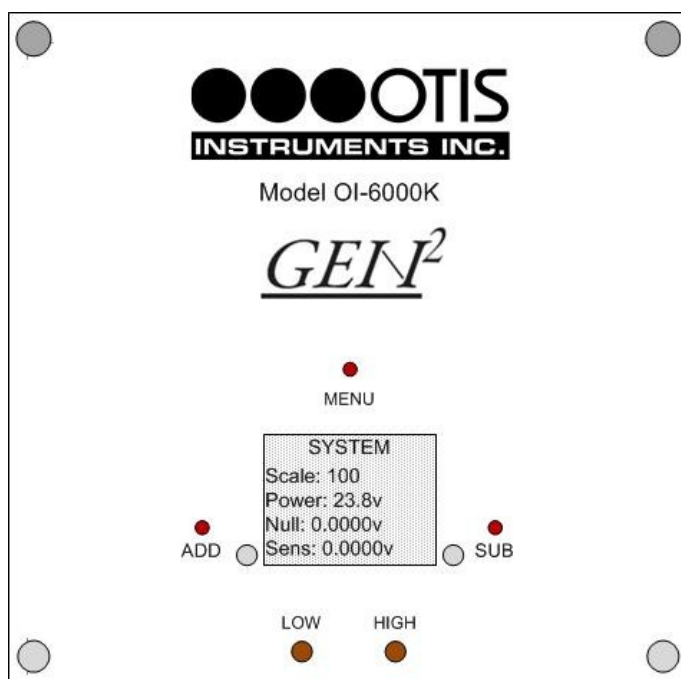


4. Once the Relay/Alarm Test is complete (both LEDs and Alarms have been triggered), continue to the next step.

Diagnosics

The diagnostics screen allows the user to view the Scale, Battery Voltage (Power), and Sensor Voltage.

1. After the Relay/Alarms Test Setting is complete (see above), press *MENU*.
2. The display screen will show:

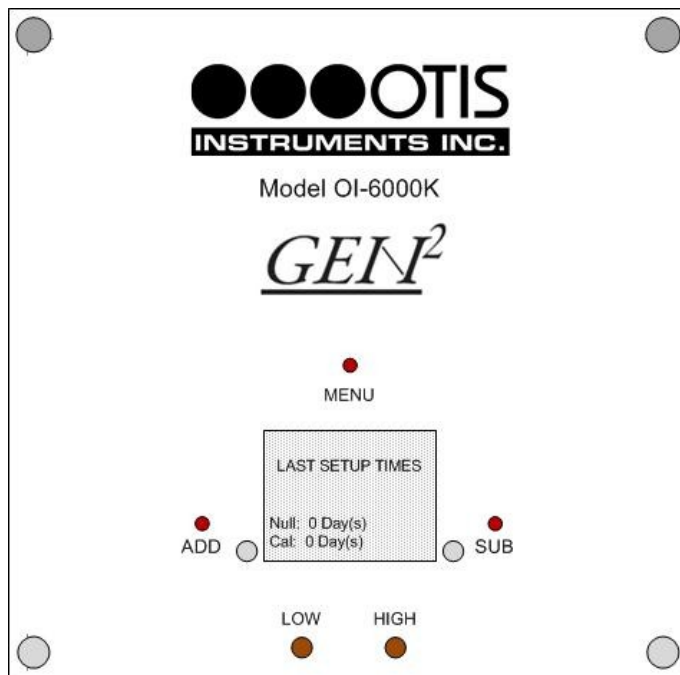


3. Once the Diagnostics have been viewed, continue to the next step.

Last Setup Times

The Last Setup Times screen allows the user to view the date the unit was last Nulled and Calibrated.

1. After the Diagnostics have been viewed (see above), press *MENU*.
2. The display screen will show:

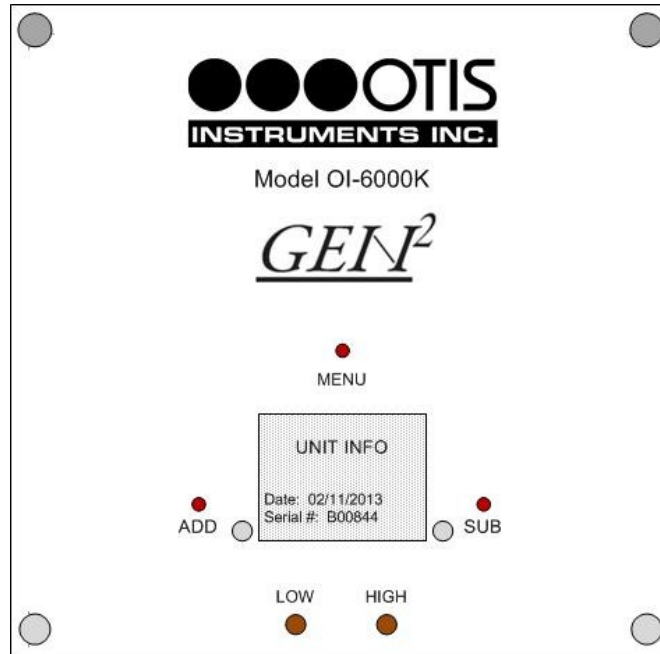


3. Once the Last Setup Times has been viewed, continue to the next step.

Unit Info

The Unit Info screen allows the user to view the date and serial number of the unit.

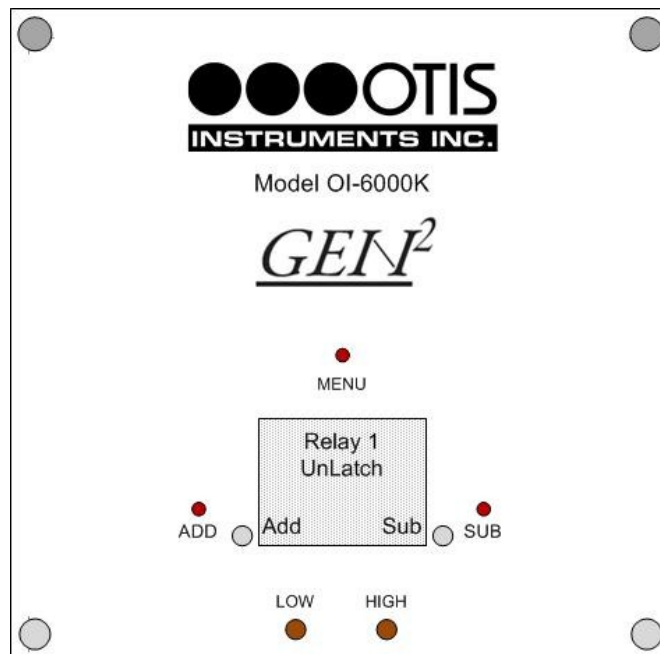
1. After the Last Setup Times have been viewed (see above), press *MENU*.
2. The display screen will show:



3. Once the Unit Info has been viewed, continue to the next step.

Relay 1: Latching/Unlatching

1. After the Unit Info has been set (see above), press *MENU*.
2. The display screen will show:

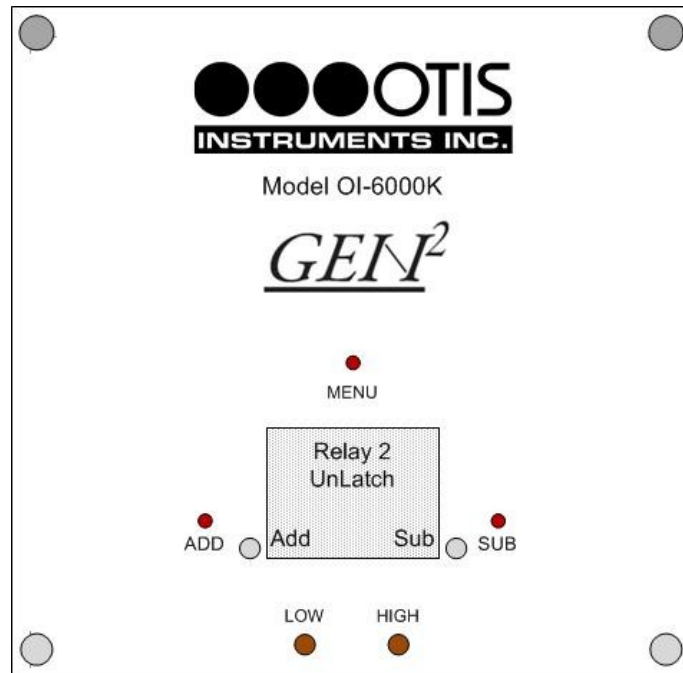


Relay 1: Latching/Unlatching cont...

3. Press *ADD* or *SUB* to toggle between “Latch” and “UnLatch”.
4. Once the Relay 1: Latching/Unlatching has been set, continue to the next step.

Relay 2: Latching/Unlatching

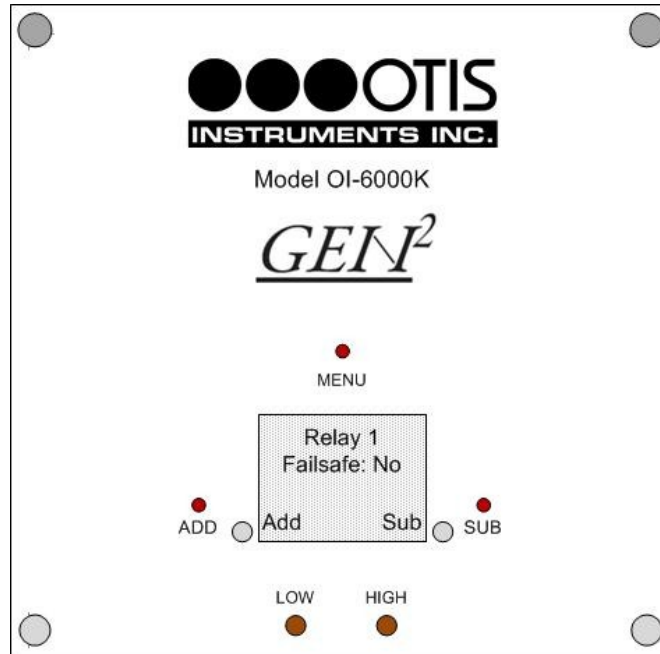
1. After Relay 1: Latching/Unlatching has been set (see above), press *MENU*.
2. The display screen will show:



3. Press *ADD* or *SUB* to toggle between “Latch” and “UnLatch”.
4. Once the Relay 2: Latching/Unlatching has been set, continue to the next step.

Setting Relay 1 Failsafe

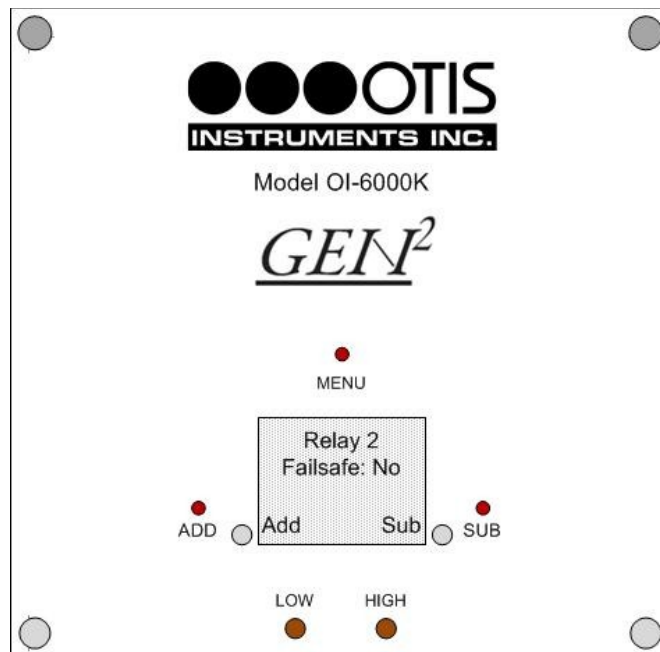
1. After Relay 2: Latching/Unlatching has been set (see above), press *MENU*.
2. The display screen will show:



3. Press *ADD* or *SUB* to toggle between “Yes” and “No”.
4. Once the Relay 1 Failsafe has been set, continue to the next step.

Setting Relay 2 Failsafe

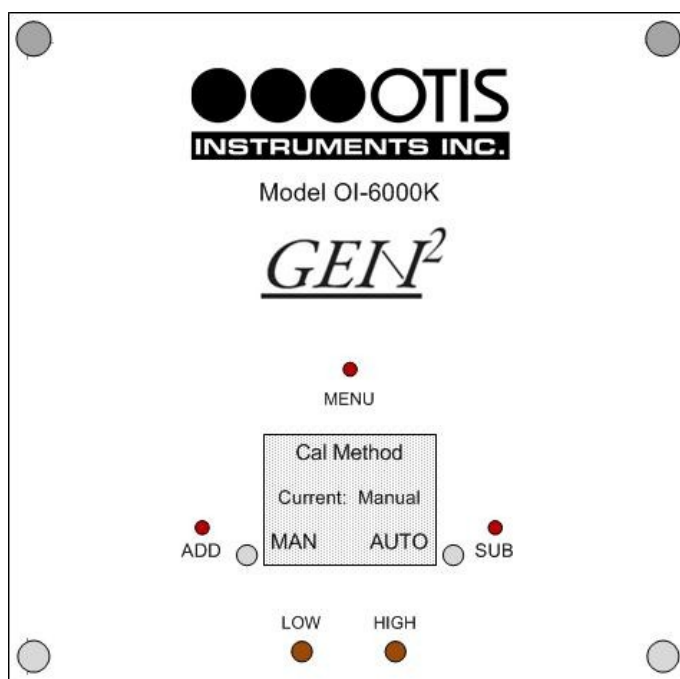
1. After Relay 1 Failsafe has been set (see above), press *MENU*.
2. The display screen will show:



3. Press *ADD* or *SUB* to toggle between “Yes” and “No”.
4. Once the Relay 2 Failsafe has been set, continue to the next step.

Setting Cal Method

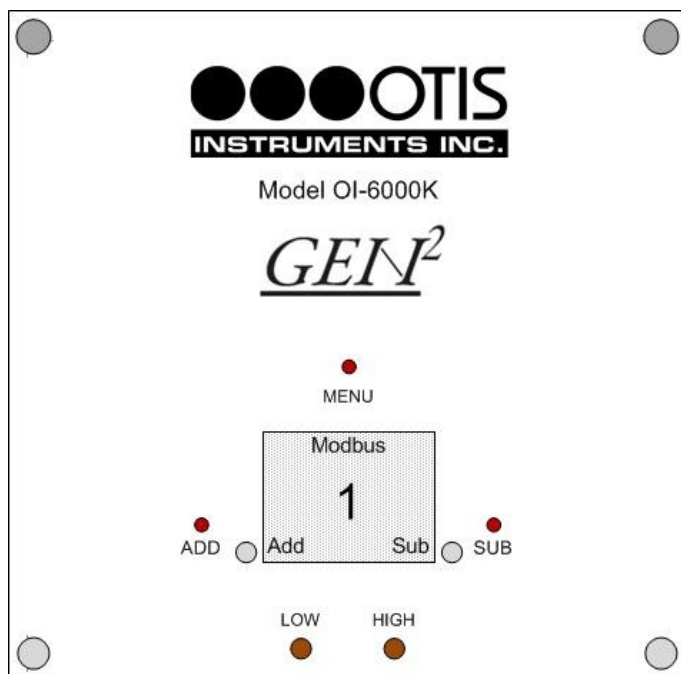
1. After Relay 2 Failsafe has been set (see above), press *MENU*.
2. The display screen will show:



3. Press *ADD* for Manual or *SUB* for Automatic.
4. Once the Calibration Method has been set, continue to the next step.

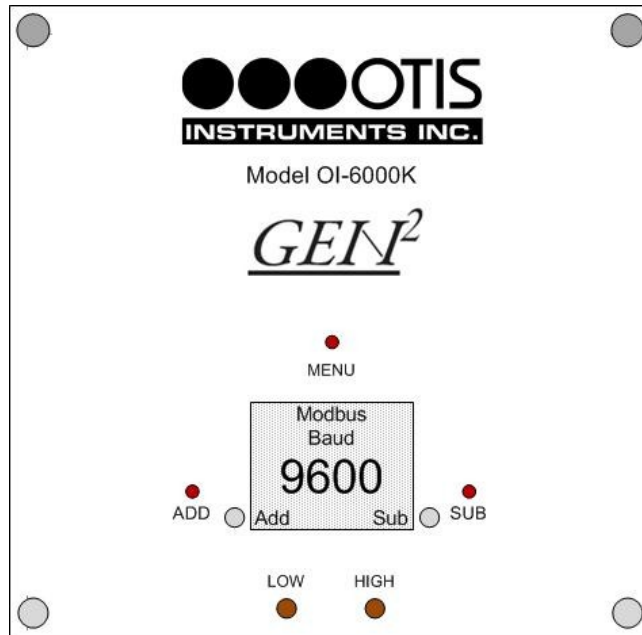
Setting Modbus Address

1. After the Calibration Method has been set (see above), press *MENU*.
2. The display screen will show:
3. Press *ADD* (increase) or *SUB* (decrease) until the desired Modbus Address is displayed (between 1-247).
4. Once the Modbus Address has been set, continue to the next step.



Setting Modbus Baud

1. After the Modbus Address has been set (see above), press *MENU*.
2. The display screen will show:



3. Press *ADD* (increase) or *SUB* (decrease) until the desired Baud is displayed.
4. Once the Baud has been set, continue to the next step.

Set 4-20mA Offset?

1. After the Baud has been set (see above), press *MENU*.
2. The display screen will show:



Set 4-20mA Offset? cont...

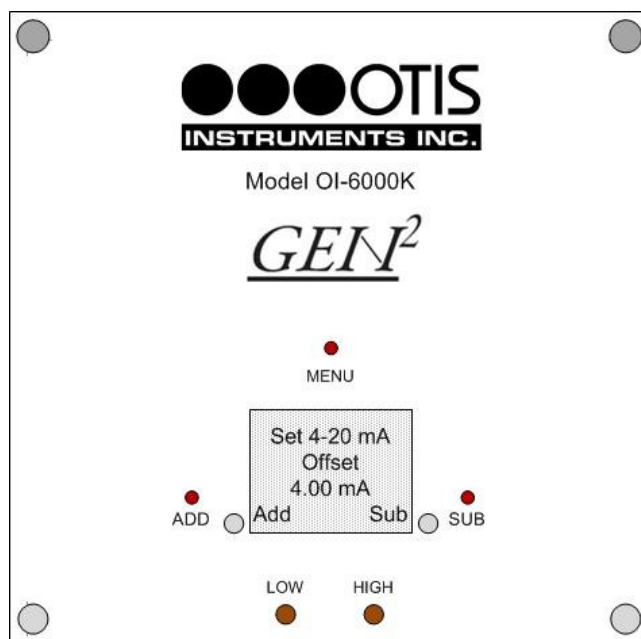
3. Press *ADD* for “Yes”, or *SUB* for “No”.

NOTE: If “Yes” is selected, proceed to the next step. If “No” is selected, continue to the step titled “Setting LCD Contrast”.

4. Once the 4-20mA Offset (Low) has been set, continue to the next step.

Set 4-20mA Offset (Low)

1. If “Yes” was chosen in the previous step, press *MENU* and the display screen will show:

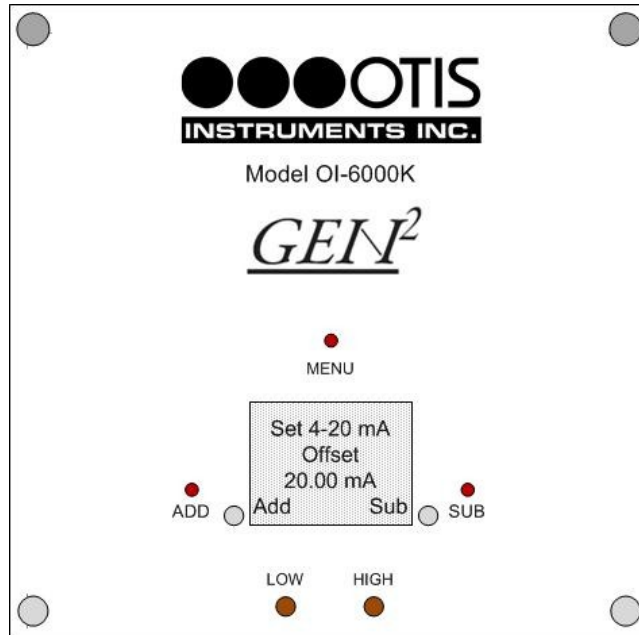


NOTE: If there is a device connected to the 4-20mA output, proceed with calibration. If there is nothing connected to the 4-20mA output, proceed to the next step.

3. While setting up the 4-20mA, the 4-20 will output a 4mA—this is the equivalent of a zero reading of PPM (or %). On the device connected to the 4-20, make sure it indicates the low end of the desired scale. Press *ADD* (increase) or *SUB* (decrease) until the correct value is displayed on the connected device.
4. Once the 4-20mA Offset (Low) has been set, continue to the next step.

Set 4-20mA Offset (High)

1. After the 4-20mA Offset (Low) has been set (see above), press *MENU*.
2. The display screen will show:

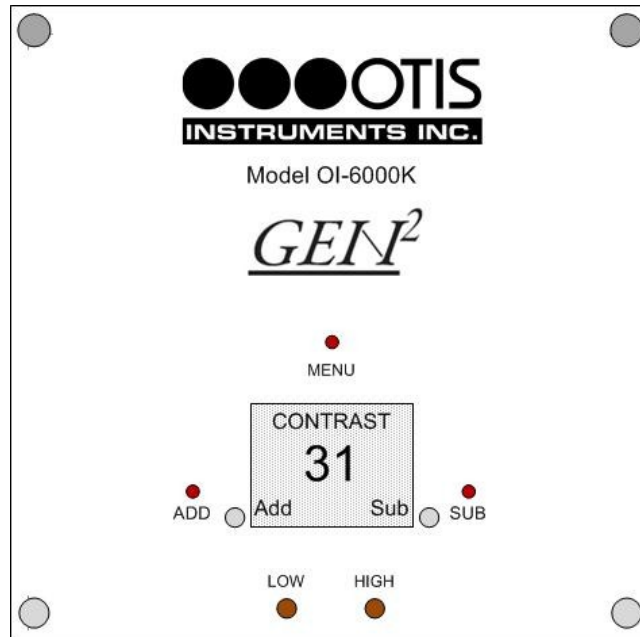


NOTE: If there is a device connected to the 4-20mA output, proceed with calibration. If there is nothing connected to the 4-20mA output, proceed to the next step.

3. While setting up the 4-20mA, the 4-20 will output a 20mA—this is the equivalent of a full scale reading of PPM (or %). On the device connected to the 4-20, make sure it indicates the high end of the desired scale. Press *ADD* (increase) or *SUB* (decrease) until the correct value is displayed on the connected controller.
4. Once the 4-20mA Offset (High) has been set, continue to the next step.

Setting LCD Contrast

1. After the 4-20mA has been set, or if “No” was selected for the option that allows the 4-20mA to be set (see above), press *MENU*.
2. The display screen will show:

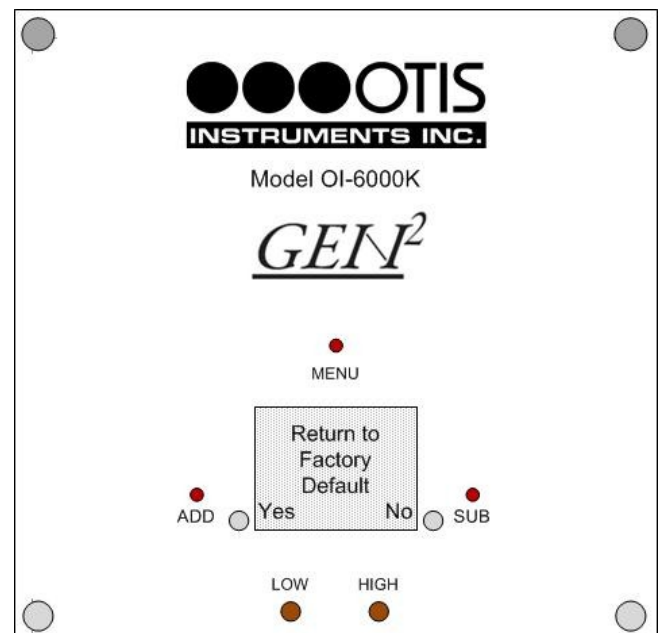


3. Press *ADD* (increase) or *SUB* (decrease) until the contrast is at the desired setting.
4. Once the Contrast has been set, continue to the next step

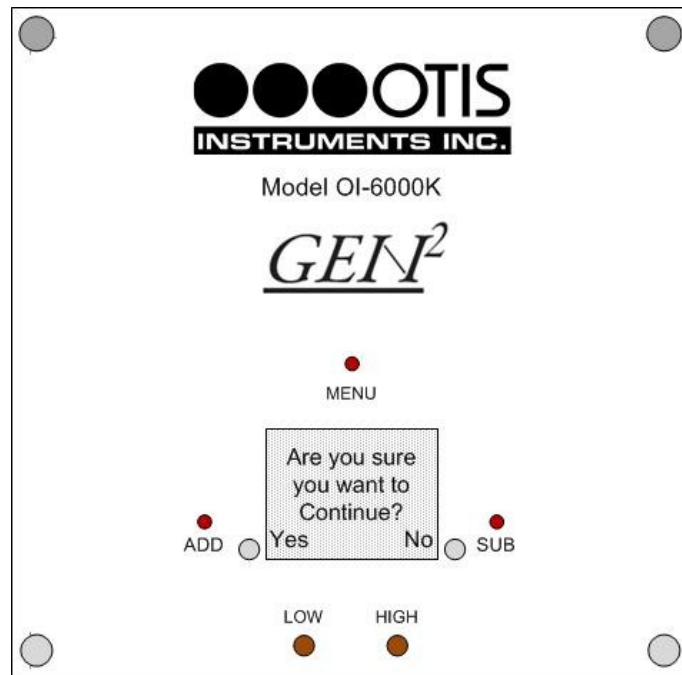
Return to Factory Default

1. After the Contrast has been set (see above), press *MENU*.
2. The display screen will show:
3. Press *ADD* for “Yes” or *SUB* for “No”. Factory Default Settings are:

- Relays set at 10% and 15% of full scale (respectively)
- All relays set to “Unlatching”
- Baud set at 9600
- Modbus Address set at 1
- Null and Calibration Data is reset



4. If “No” is selected, the device will return to Normal Operating Mode. If “Yes” is selected, the display screen will show:



5. Press *ADD* for “Yes” or *SUB* for “No”.
6. The device is now in Normal Operating Mode.

Appendix A: O2 Sensor Information

O2 Sensor Information

OI-6000K Sensor Assemblies for sensing O2 gas will perform differently than other OI-6000K Sensor Assemblies. The following items are variance that OI-6000K Sensor Assemblies for sensing O2 gas will have from other OI-6000K Sensor Assemblies.

Null

When Nulled, the reading will be 20.9.

Background Gas Setting

Two background setting modes will be available—Low and High. When in these modes, the Background Low will be called “BackgroundL”; the Background High will be called “BackgroundH”.

When the background reading is below the Background Low setting—or above Background High setting—the unit will transmit every five seconds.

Relay Settings

There will still be two available relays when using an O2 sensor, however: Relay 1 will trigger when the reading is below the Low Alarm Set Point; Relay 2 will trigger when the reading is above the High Alarm Set Point.

Exiting Menu Mode

When using an O2 sensor and exiting Menu Mode the reading will start at “20.9” (instead of “0”) and then change to the whatever the unit is actually reading.

Response Time

When sent out with a flame arrestor, the unit is slower to respond than GenI O2. This is because a different flame arrestor (than GenI) is being used.

O2 Percentile Range

The unit is designed for detecting O2 levels ranging from 10-25%.

Appendix B: OI-6000K Troubleshooting Guide

OI-6000K Troubleshooting Guide

When the OI-6000K is in fault, the Normal Operating Mode display screen will show the fault number. The alternating display screen will show the fault number and an “Indication” message.

- Fault 1

Indication: Sensor Timeout

Reason: OI-6000K digital sensor board problem

Solution: Check connections; replace sensor housing if still in Fault

Applies to: Setups that use a GenII sensor assembly

- Fault 4

Indication: ADC not responding

Reason: OI-6000K analog sensor board not responding

Solution: Ensure that the analog board is properly connected; replace analog sensor board if still in Fault

Applies to: Setups that use a GenII sensor assembly

ADC Info: ADC (Analog Digital Conversion) is the process by which the analog sensor reading is converted to a digital reading for display on the screen.

Appendix C: Sensor Temperature Ranges

Sensor Temperature Ranges

Electrochemical:

CO: Operating temperature: -20°C to + 50°C (NEMOTO)
H2S: Operating temperature: -20°C to + 50°C (NEMOTO)
NH3: Operating temperature: -30°C to + 50°C (NEMOTO)
Cl2: Temperature Range -20°C to + 40°C (CITYTECH)
HCl: Temperature Range -20°C to +40°C (CITYTECH)
HCN: Temperature Range -40°C to +40°C (CITYTECH)
O2: Temperature range °C -30 to 55 (ALPHASENSE)
SO2: -20°C to +50°C (CITYTECH)
H2: Temperature Range -20°C to +40°C (CITYTECH)
HF: Temperature Range -20°C to +40°C (CITYTECH)
F2: Temperature Range -10°C to + 40°C (CITYTECH)

Catalytic Bead:

Gen I: Temperature Range: -20°C to +70°C (NEMOTO)
Gen II: Temperature Range: -20°C to +150°C (NEMOTO)

Infrared:

IR: Operating temperature range: -20°C to +50°C (-4°F to 122°F) (DYNAMENT)
IRLT: Operating temperature range: -40°C to +50°C (-4°F to 122°F)

Specifications

Sensor Type:	Catalytic Bead, Electro-Chemical, PID, or Infrared
Power:	+12-35 Volts DC 110/240 Volts AC (with cord grips and cable)
Current Draw:	11.25 A (max @ 24VDC)
Display:	Graphical LCD (102x64), transfective, sunlight readable, LED backlight
Relays:	Two Dry Contact (5 Amp) w/ 4 Amp Fuses
Protection:	Power EMI filter, surge suppression, 4-20mA and RS-485 surge suppression
Output:	4-20mA (3-wire); RS-485 Modbus
Unit Modbus Address:	1-247
Interface:	Three push buttons (<i>MENU, ADD, SUB</i>)
Enclosure:	8" x 8" x 4" Stahlin fiberglass with clear window; wall mount
Warranty:	Hardware: One year (limited) Sensor: One year (varies with sensor type)

Warranty Statement for **WireFree Model OI-6000K**

Hardware

Otis Instruments, Inc. (Manufacturer) warrants its products to be free of defects in workmanship and materials—under normal use and service—from the date of purchase from the manufacturer or from the product's authorized reseller. The hardware for this device is under a one-year limited warranty.

The manufacturer is not liable (under this warranty) if its testing and examination disclose that the alleged defect in the product does not exist or was caused by the purchaser's (or any third party's) misuse, neglect, or improper installation, testing or calibrations. Any unauthorized attempt to repair or modify the product, or any other cause of damage beyond the range of the intended use, including damage by fire, lightening, water damage or other hazard, voids liability of the manufacturer.

In the event that a product should fail to perform up to manufacturer specifications during the applicable warranty period, contact the product's authorized reseller or return the product directly to the manufacturer with a Return Material Authorization (RMA). This number will be assigned upon contacting customer service at 979.776.7700 or Otis@otisinstruments.com. The manufacturer will—at its option and expense—repair or replace the product, or deliver an equivalent product or part to the purchaser at no additional charge.

Any replaced or repaired product or part has either a 90-day warranty or the remainder of the initial warranty period (whichever is longer).

Sensor

The sensor contained in the device is covered under a one-year limited warranty (varies with sensor type).



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