GEN²

Model OI-6940 Notis Quad

4-Gas Sensor Assembly

Operation Manual

Revision 2.0w

OTIS
INSTRUMENTS INC.

Product Overview

The Otis Instruments, Inc. GenII WireFree OI-6940 Notis Quad is a battery-powered explosion-proof 4-gas sensor assembly that simultaneously uses up to four sensors—Electrochemical or Low-Power Infrared—for sensing an array of toxic gases in ambient air.

The Notis Quad comes standard with a 160x104 pixel graphical LCD screen, four-button interface, non-intrusive magnetic switches, and one radio (900MHz or 2.4GHz).

Like other Otis Instruments sensor assemblies, the Notis Quad features non-intrusive calibration and configuration. With all adjustments made at the sensor assembly, one-man non-intrusive calibration is quick, easy, and allows the sensor housing and enclosure to remain Class I, Division 1, Group C and D certified while in the field. Non-intrusive calibration is made possible by using an Otis Instruments, Inc. distributed magnet to activate the *MENU*, *BACK, ADD*, and *SUB* buttons.

The Notis Quad is designed to be self-contained and to last for up to 6 months using a 3.6V 76 Amp Hour battery-pack.

The Notis Quad is field adjustable for background gas, and addressable to eliminate interference with other systems. The device has been designed to reject EMI and other forms of interference in order to avoid false gas readings.

Table of Contents

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-6940 Notis Quad 4-Gas Sensor Assembly. <u>This document should be read before initial operation of the product</u>.

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.
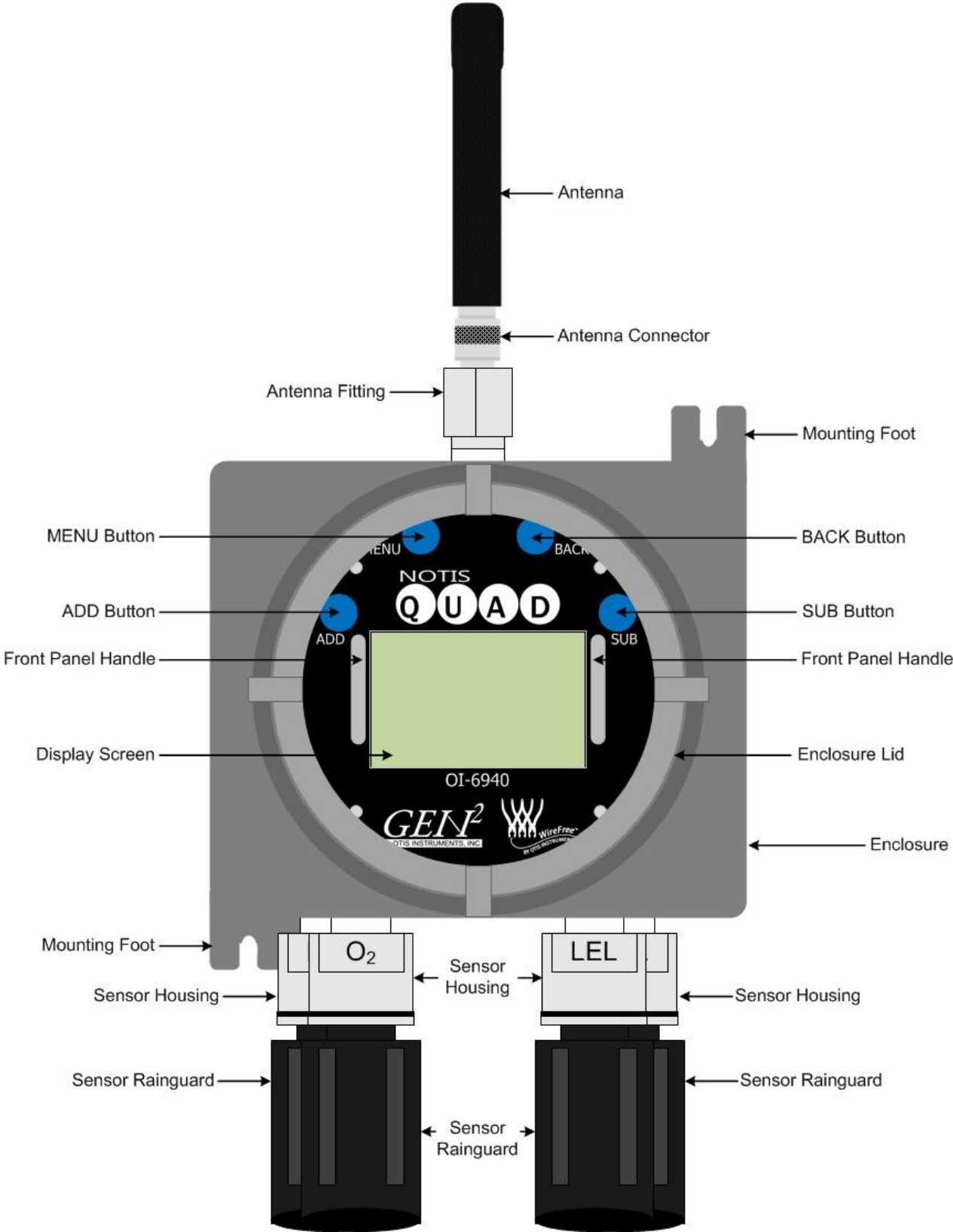
Warnings

- Do not open the enclosure when the device is energized.

- Do not open the enclosure if an explosive gas atmosphere may be present.

- The Otis Instruments WireFree OI-6940 Notis Quad 4-Gas Sensor Assembly is Class I Division I, Groups C&D Certified. The assembly is able to maintain its certification at all times while in the field, simply by using the non-intrusive calibration method which requires the use of an Otis Instruments, Inc. distributed magnet. However, if the enclosure lid is removed, for whatever reason, the OI-6940 Notis Quad certification is not valid. To avoid invalidating the certification, once the device is put in the field, always use the Otis Instruments, Inc. distributed magnet to ensure non-intrusive calibration.

- Strong magnetic fields may interfere with the non-intrusive magnetic switches. A strong magnetic field may momentarily active a switch, or permanently disable the switch to the "on" or "off" position.

- Do not cover the hole in the calibration cup, as this will cause the calibration to be inaccurate.

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)

Antenna

Antenna Connector

Antenna Fitting

Mounting Foot

MENU Button

BACK Button

NOTIS
QUAD

ADD Button

SUB Button

Front Panel Handle

Front Panel Handle

Display Screen

OI-6940

Enclosure Lid

GEN²
OTIS INSTRUMENTS, INC.   WireFree™

Enclosure

Mounting Foot

O₂

LEL

Sensor Housing

Sensor Housing

Sensor Housing

Sensor Rainguard

Sensor Rainguard

Sensor Rainguard

Terminal Board (Internal Diagram)

Radio

Mounting Post

Mounting Post

Sensor Connection Terminals

Antenna Connector

Mounting Post

Mounting Post

Internal Power Connector
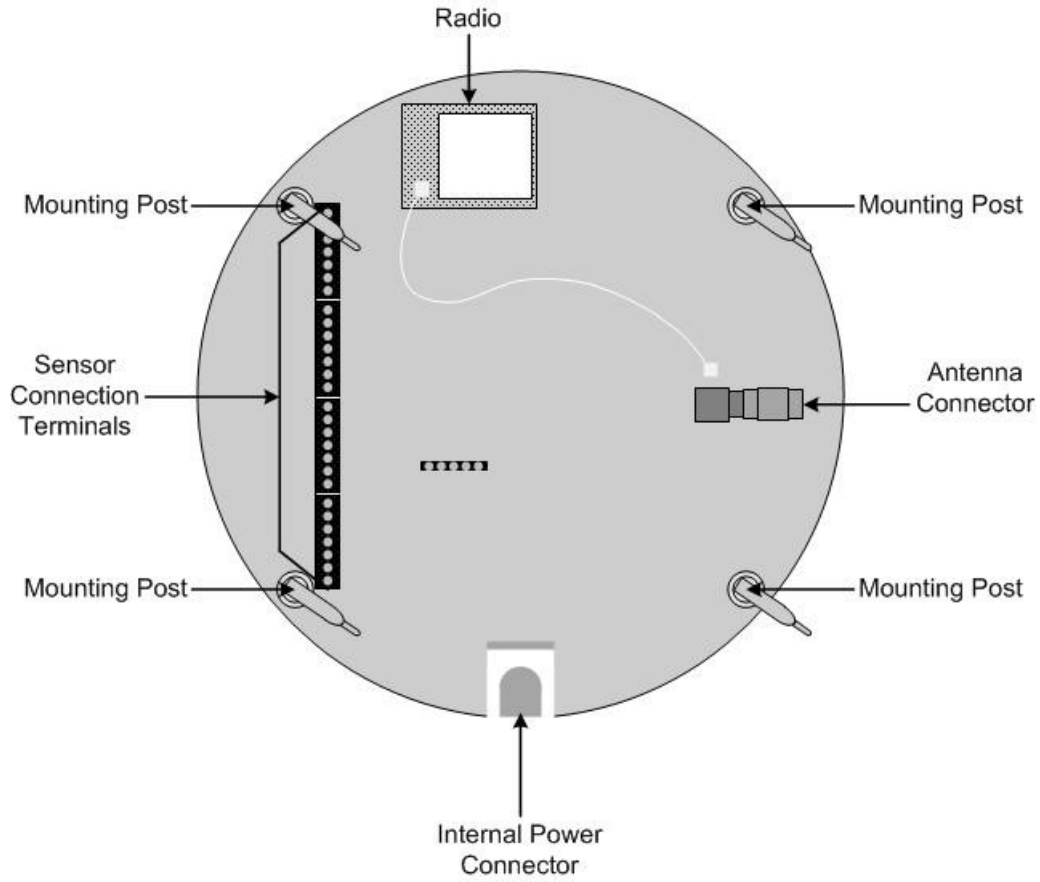
Battery Board (Internal Diagram)

Mounting Post Eyelets

Battery-Pack Input

Internal Power Connector

Battery Mount Strip

Battery-Pack

Mounting Post Eyelets
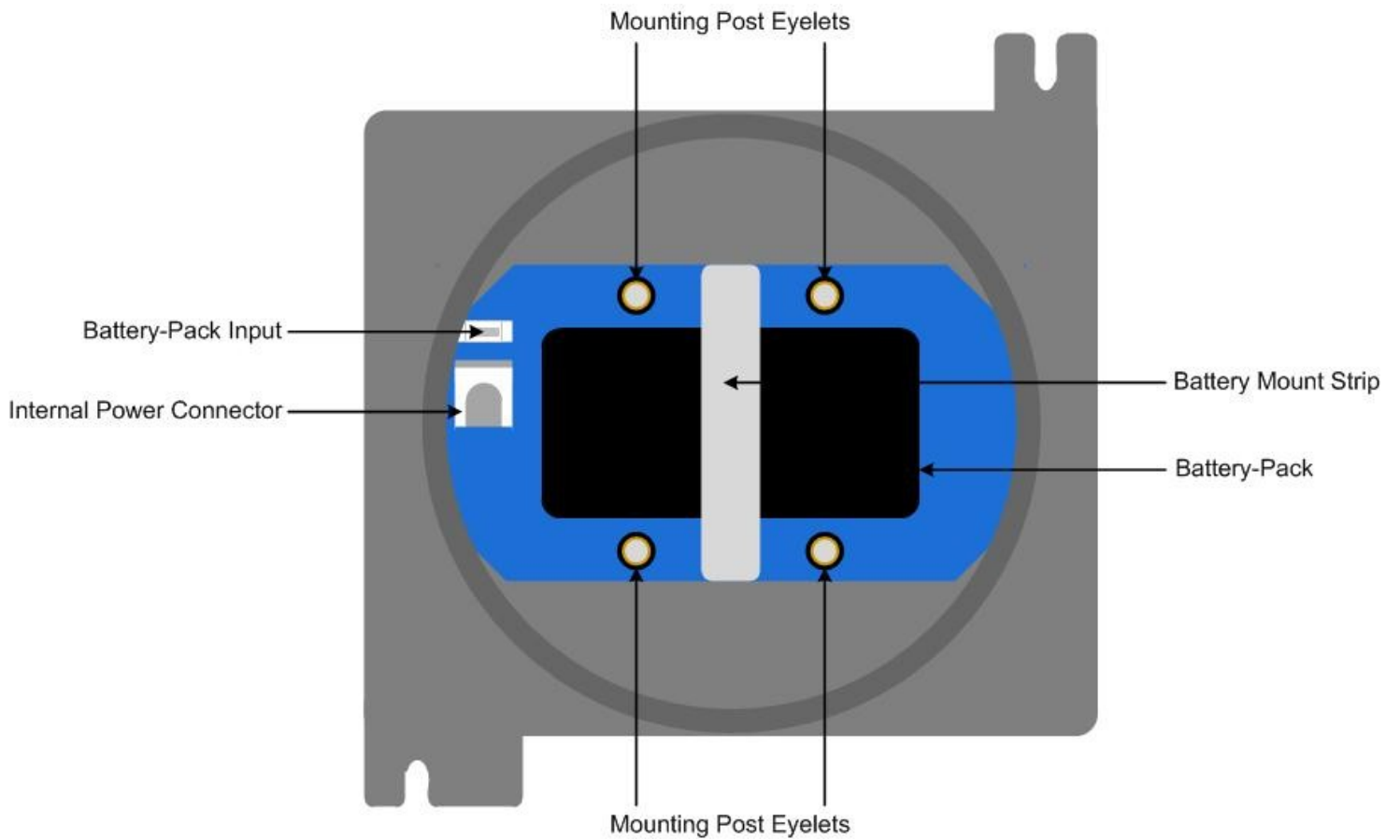
Button Functions

When navigating through the Global Settings Menu Mode or Sensor Settings Menu Mode: touch *ADD* to advance to the next screen; touch *SUB* to return 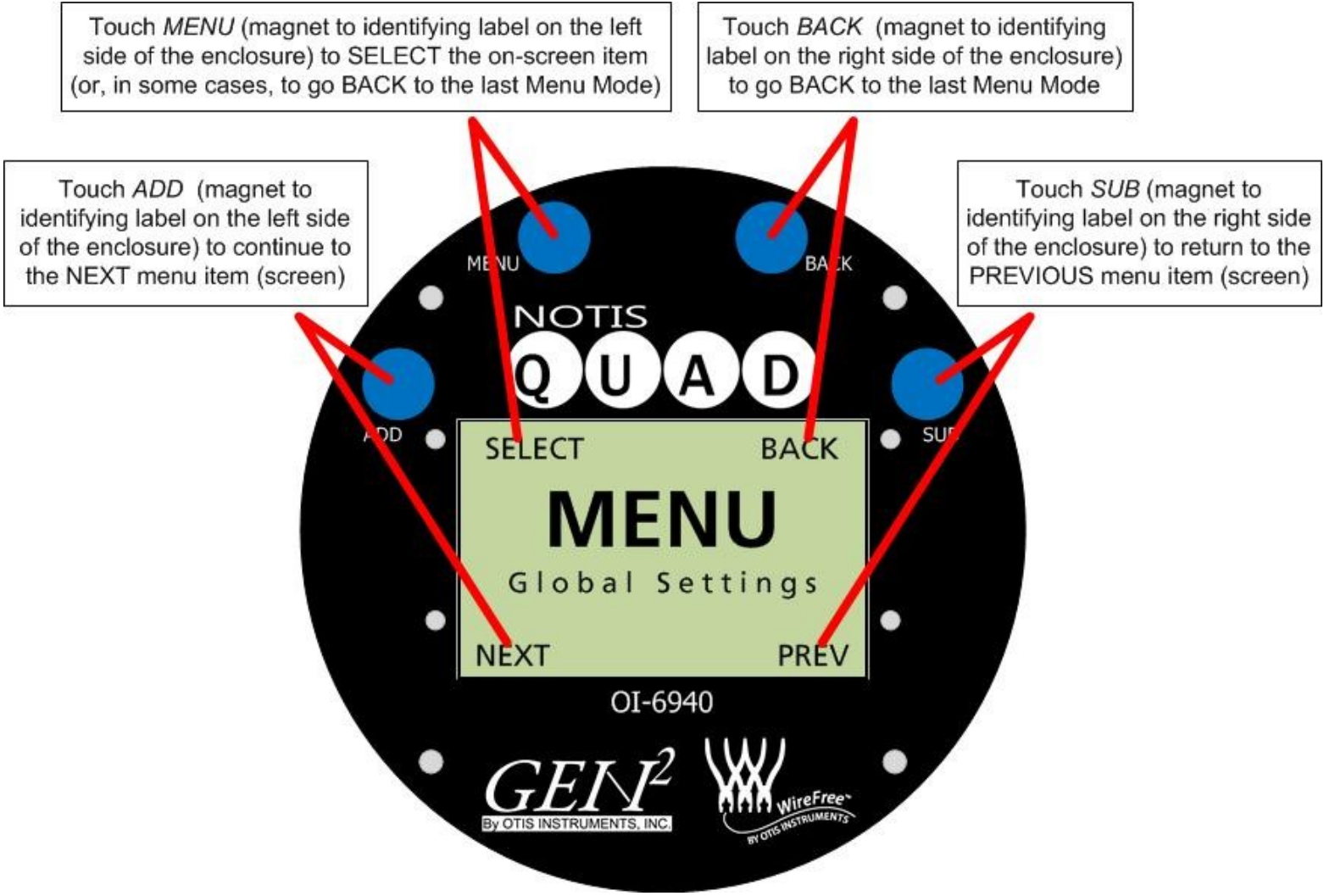to the previous screen; touch *MENU* to select the displayed option (or, in cases when "BACK" is displayed on the top left side of the Display Screen, to return to the previous option); and touch *BACK* to return to the previous option. For an illustration of the button functions with on-screen labels displayed, see the Button Functions Diagram at the beginning of this Operation Manual.


Touch *MENU* (magnet to identifying label on the left side of the enclosure) to SELECT the on-screen item (or, in some cases, to go BACK to the last Menu Mode)

Touch *BACK* (magnet to identifying label on the right side of the enclosure) to go BACK to the last Menu Mode

Touch *ADD* (magnet to identifying label on the left side of the enclosure) to continue to the NEXT menu item (screen)

Touch *SUB* (magnet to identifying label on the right side of the enclosure) to return to the PREVIOUS menu item (screen)

MENU   BACK

NOTIS
QUAD

SELECT   BACK

MENU

Global Settings

NEXT   PREV

ADD   SUB

OI-6940

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By OTIS INSTRUMENTS, INC.

WireFree
BY OTIS INSTRUMENTS

Radio Transmission Information

- When the radio sends, it sends all sensors—starting with sensor 1—unless in Relay Test Mode. When in Relay Test Mode: the radio only sends the sensor that is in Relay Test Mode; the radio only sends when *ADD* or *SUB* are touched.

- When sending a radio transmission in any mode other than Normal Operating Mode, the sensor that is currently being viewed will send what mode it is in, while the other sensors will send that they are in the Advanced Menu Mode. If none of the sensors are in a mode, all sensors will send that they are in the Advanced Menu Mode.

- When in Normal Operating Mode, the radio sends a transmission once per minute (approx.)—when no sensor is seeing gas. When at least one sensor is seeing gas, the radio sends a transmission once every 5 seconds (approx.). Regardless of how many sensor are seeing gas, the radio will send transmissions for all sensors at one of the previously listed time intervals—based on if one or no sensors are seeing gas.

- When in Cal Mode or Null Mode, the radio will transmit once every 8 seconds (approx.).

- If the Notis Quad is in any mode other than Relay Test Mode the radio will transmit every 13 seconds (approx.). 13 seconds is from the last time *MENU* was touched—or the last time the radio transmitted—depending on which one happened last.

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.

1. Touch an Otis Instruments, Inc. distributed magnet to the ADD indicator label on the left side of the Notis Quad to activate *ADD* (and turn on the device).

Power On cont...
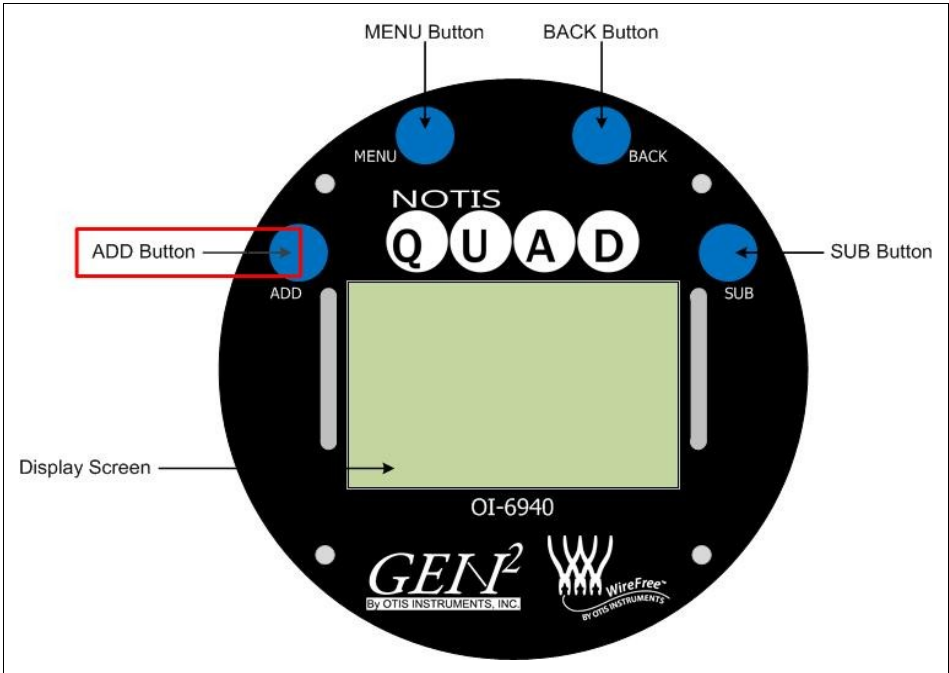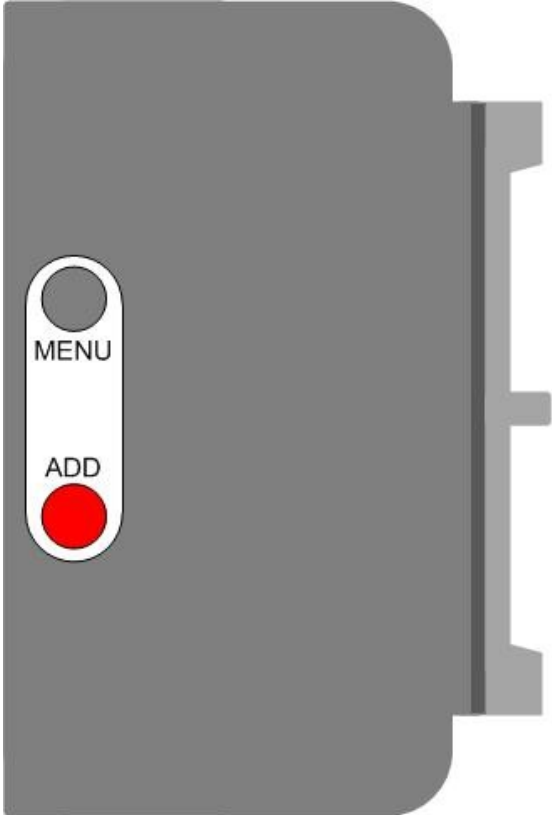
2. The Notis Quad will then countdown from 30 to 0. During the countdown, the Display Screen will scan through a series of logos, as well as continuously display sensor assembly information, as follows:

    ▪ From 60 to 45, the Display Screen will show the Otis Instruments, Inc. logo and unit information.

    ▪ From 44 to 30, the Display Screen will show the Gen II logo and unit information.

    ▪ From 29 to 15, the Display Screen will show the WireFree logo and unit information.

    ▪ From 14 to 0, the Display Screen will show the Notis Quad logo and unit information.

3. When the Notis Quad's Display Screen resembles the following illustration, the device is in Normal Operating Mode and ready to operate.


NOTE: If the Notis Quad is in Fault, the Display Screen will show "F_" instead of the gas-type unit of measure for the sensor that is in fault.

For additional information regarding system faults, see the OI-6940 Notis Quad Troubleshooting Guide of this operation manual.

Power Off

Powering off the device shuts down the sensor assembly. When powered off, the device is no longer transmitting signals so the receiving controller will display "Fault 9" for that sensor channel.

1. Touch and hold an Otis Instruments, Inc. distributed magnet against the right side of the Notis Quad for four seconds to activate *SUB* (and turn off the device).
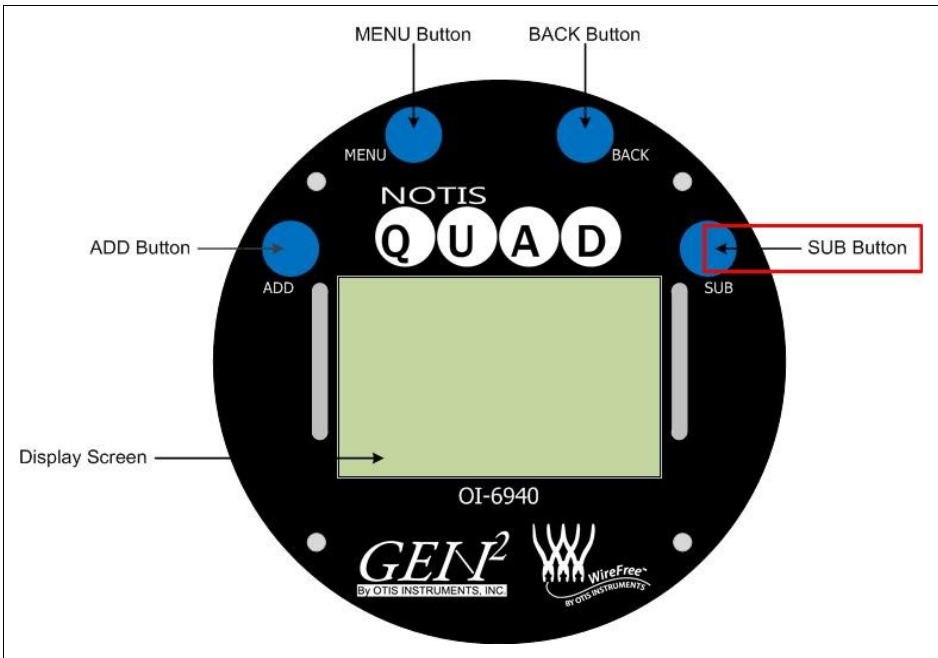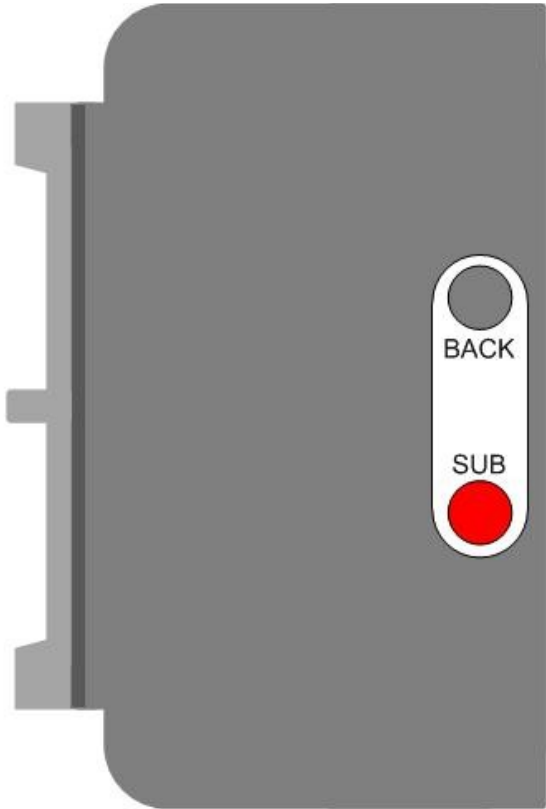
2. When powering off, the display screen will show "OFF". The display will continue to show "OFF" (when power is being supplied to the unit) until the device is powered on.
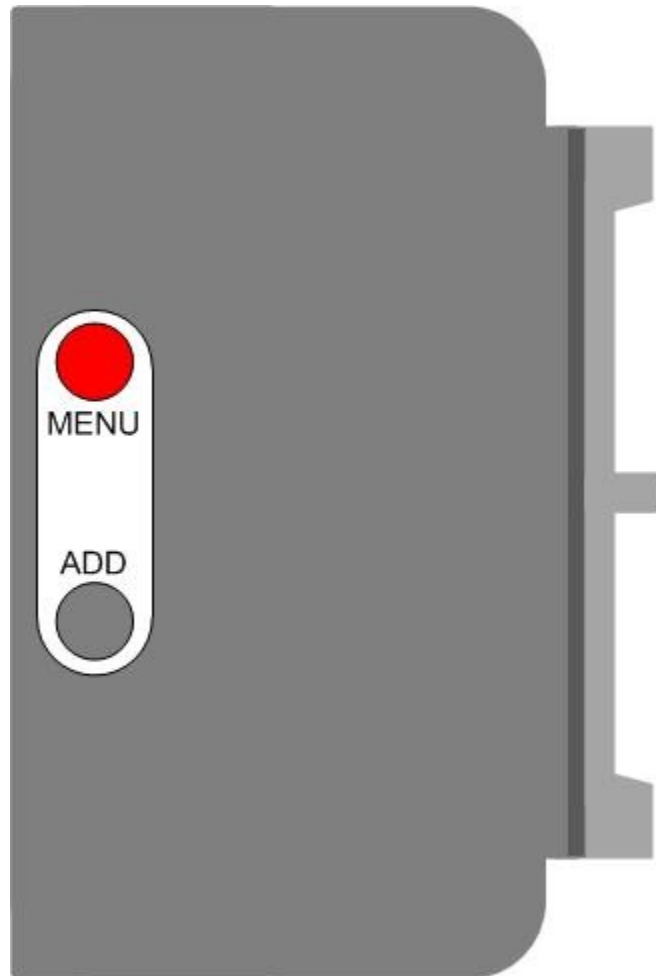
Global Settings Menu Mode

The Global Settings Menu Mode should be used to set the universal settings of the OI-6940 Notis Quad before initial use, and/or to adjust the universal settings to accommodate use. Global Settings Menu Mode options include: Setting Network I.D., Viewing the Information (Info) Screen, Setting Contrast, and Return to Factory Default.

When navigating through the Global Settings Menu Mode: touch *ADD* to advance to the next screen; touch *SUB* to return to the previous screen; touch *MENU* to select the displayed option (or, in cases when "BACK" is displayed on the top left side of the Display Screen, to return to the previous option); and touch *BACK* to return to the previous option. For an illustration of the button functions with on-screen labels displayed, see the Button Functions Diagram at the beginning of this operation manual.

Entering Global Settings Menu Mode

1. Touch and hold an Otis Instruments, Inc. distributed magnet against the MENU indicator label on the left side of the Notis Quad for approximately six seconds to active *MENU* and enter Global Settings Setup Mode.
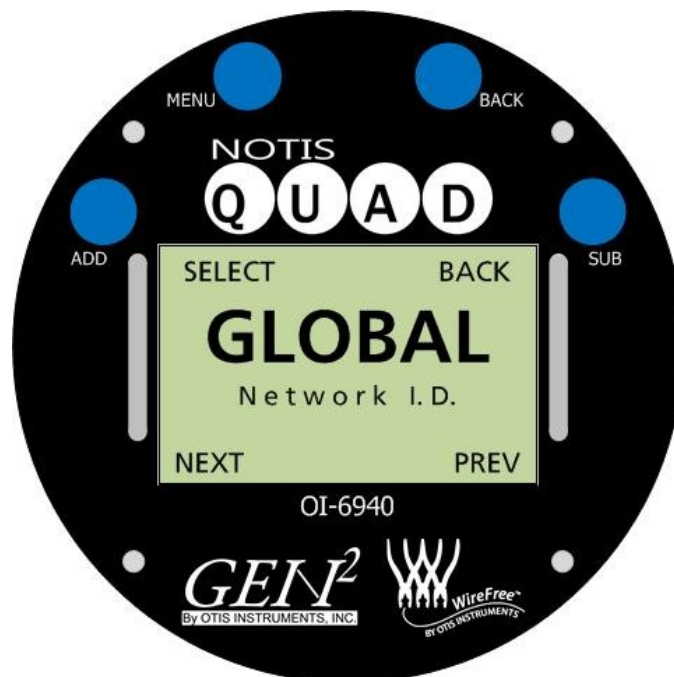
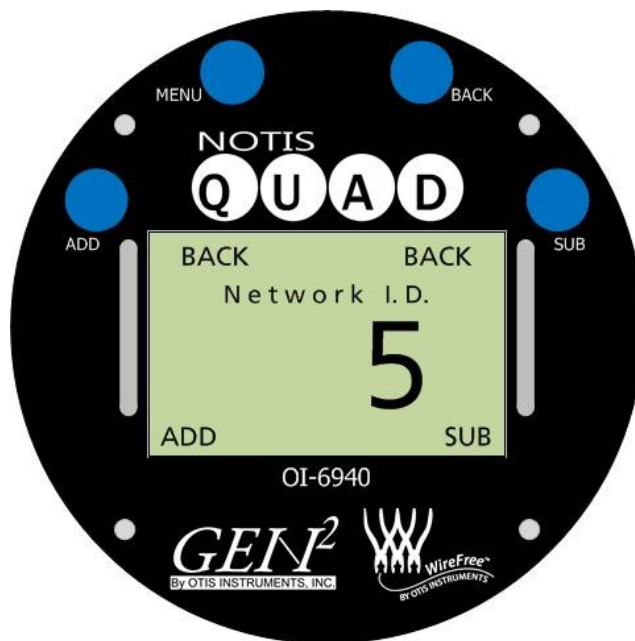2. The Display Screen should resemble the following illustration:

Setting Network ID

1. Touch the magnet to *MENU* to enter Global Settings Menu Mode. The display screen should resemble the following illustration:

3. Touch *MENU* (SELECT) to setup the Network I.D. Touch *ADD* (NEXT) to continue to the next Global Settings Menu Mode option.

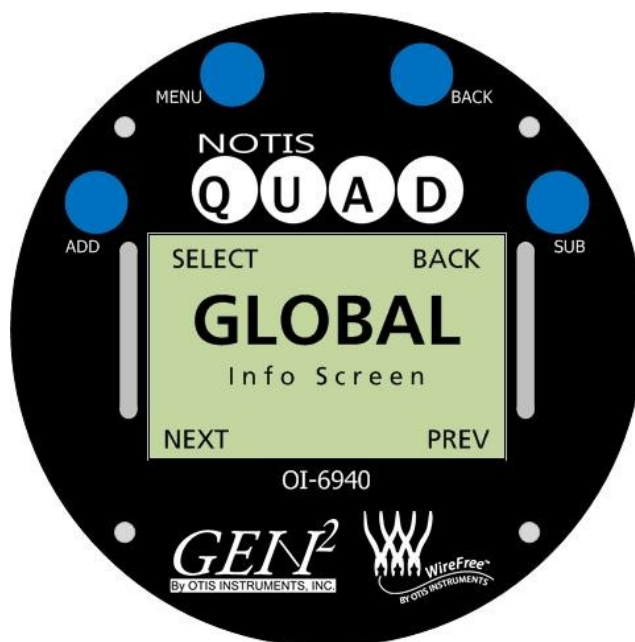4. The Display Screen should resemble the following illustration:

5. Touch *ADD* (increase) or *SUB* (decrease) to manipulate the Network I.D. Setting.

> *NOTE: The Network I.D. may be set between 1 and 52 when using a 900 MHz, or between 1 and 78 when using a 2.4 GHz radio.*

6. Once the desired Network I.D. Setting is displayed on the screen, touch *MENU* or *BACK*.

Viewing the Info Screen

1. Touch *ADD* (NEXT) to continue to the next setting: Viewing the Info Screen.

2. Touch *MENU* (SELECT) to view the Info Screen. When viewing the Info Screen, the Display Screen should resemble the following illustration:

3. After the information has been viewed, touch *MENU* (BACK) or *BACK* (BACK).
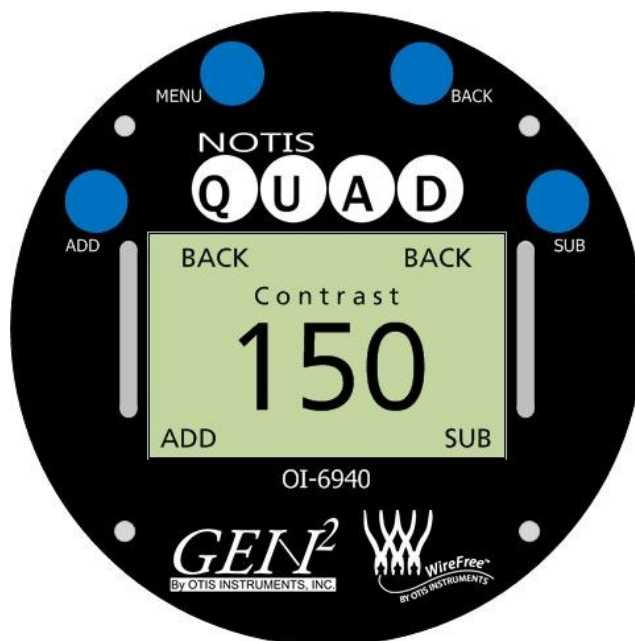
Setting Contrast

1. Touch *ADD* (NEXT) to continue to the next setting: Contrast.

2. Touch *MENU* (SELECT) to set the Contrast. The Display Screen should resemble the following illustration:


3. Touch *ADD* (increase) or *SUB* (decrease) to manipulate the Contrast Setting.

NOTE: The contrast may be set between 0 and 255. If ADD or SUB is continuously touched, the number sequence will loop (e.g., If ADD is touched when the Display Screen shows "255", the next number to appear will be "0").
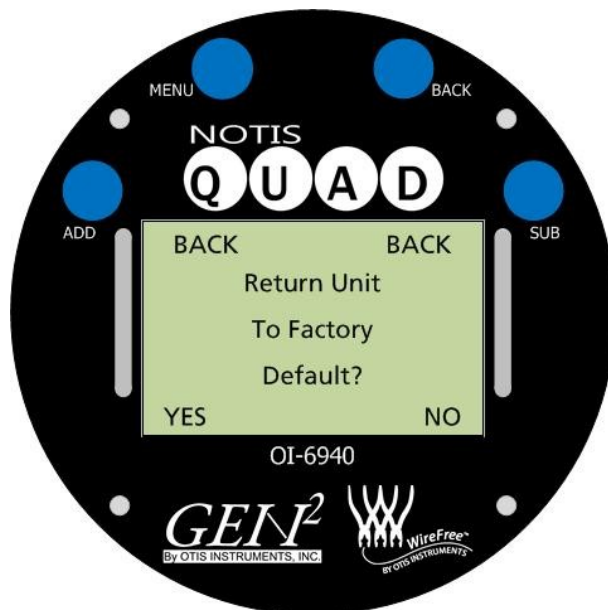
4. Once the desired Contrast Setting is displayed on the screen, touch *MENU* (BACK) or *BACK* (BACK).

Return to Factory Default Settings

1. Touch *ADD* (NEXT) to continue to the next setting: Return Default.
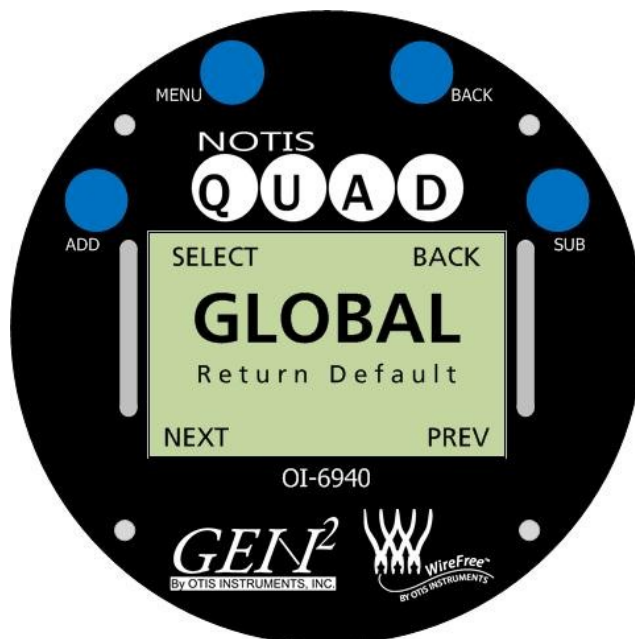
2. Touch *MENU* (SELECT) to select the "Return Default" screen. The Display Screen should resemble the following illustration:

3. Touch *ADD* (YES) to return to factory default; touch *SUB* (NO), *MENU* (BACK), or *BACK* (BACK) if no change is to be made. Factory Default Settings are:

  • All sensors On
  • Null values reset
  • Cal values reset
  • Faults reset
  • Last day nulled reset
  • Last day called reset
  • Sensor addresses set to 1, 2, 3, and 4 (respectively)
  • Network I.D. set to 5
  • Background: O2 High set to 22.0; O2 Low set to 19.0; all other gases set to 4% of full scale
  • Set to the value that the autocal will cal to: O2 is 25; all other gases set to 50% of full scale
  • Cal method set as manual (except for IR sensors, which must be set as autocal)

4. After a selection has been made, touch *ADD* (NEXT) to continue to the next screen.

5. From the final Global Settings Menu Mode screen, select one of the following options:

  • Touch *ADD* (NEXT) to advance to the Sensor Settings Menu Mode.
  • Touch *MENU* (SELECT) or *BACK* (BACK) to return to the first Global Settings Menu Mode screen.
  • Touch *SUB* (PREV) to return to the previous Global Settings Menu Mode setting: Return to Factory Default Setting.

Sensor Settings Menu Mode

The Sensor Settings Menu Mode allows each of the four sensors to be individually setup. Options in the Sensor Settings Menu Mode are different than those in the Global Settings Menu Mode.

> *NOTE: Each sensor must be setup individually. Once all settings in the Sensor Setup Menu Mode are complete for Sensor 1, repeat all steps for Sensor 2, then Sensor 3 and Sensor 4.*

Settings options that are included in the Sensor Menu Mode are: Sensor On/Off, Sensor Null, Sensor Cal, Sensor Radio Address Setting, Sensor Relay Test, Sensor Background Setting, Sensor Cal Method Setting, Sensor Info, Sensor Last Time Null/Cal, and Sensor Return Null/Cal to Default.

When navigating through the Sensor Settings Menu Mode, touch an Otis Instruments, Inc. distributed magnet to the corresponding indicator labels on either side of the device to activate the necessary buttons. Touch *ADD* to advance to the next screen; touch *SUB* to return to the previous screen; touch *MENU* to select the displayed option (or, in cases when "BACK" is displayed on the top left side of the Display Screen, to return to the previous option); and touch *BACK* to return to the previous option.

Entering Sensor Settings

1. Touch and hold an Otis Instruments, Inc. distributed magnet against the *MENU* indicator label on the left side of the Notis Quad for approximately six seconds to active *MENU* and enter Sensor Settings Menu Mode.
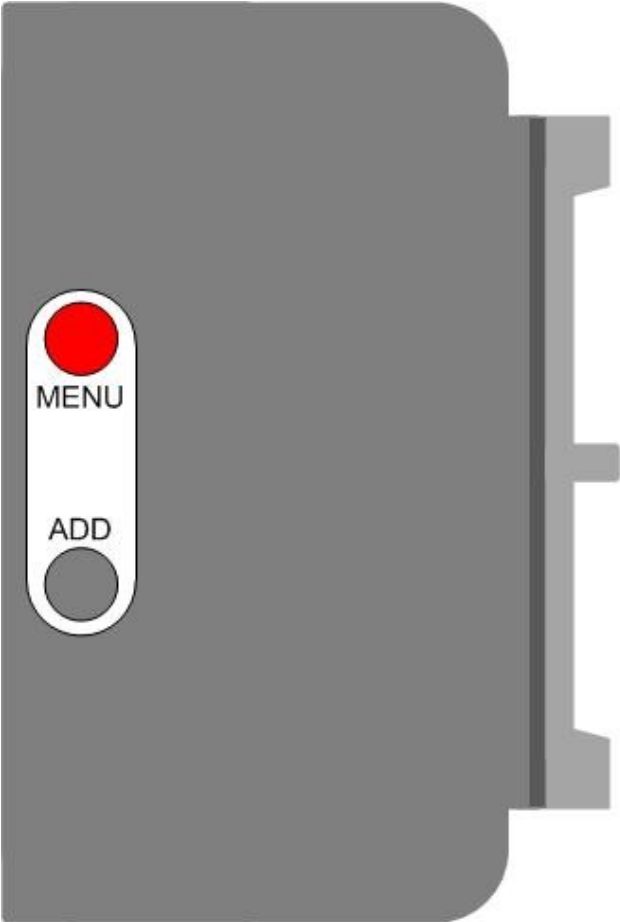
2. The Display Screen should resemble the following illustration:
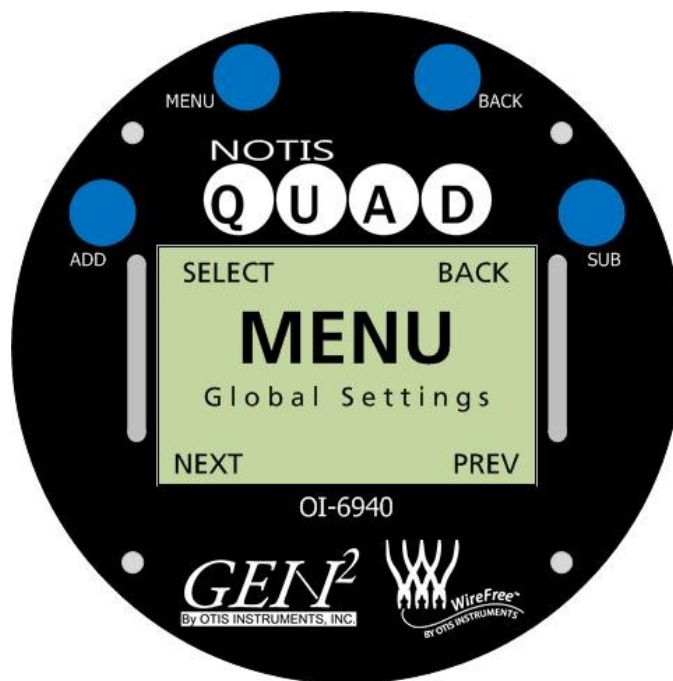
## *Sensor Settings Setup*

1. Touch *ADD* (NEXT) to enter the Sensor Settings Menu Mode for Sensor 1. The Display Screen should resemble the following illustration:


2. Touch *MENU* (SELECT) to enter Sensor 1 Settings Setup. If no changes are needed for Sensor 1, touch *ADD* (NEXT) to advance to Sensor 2 Settings Setup (and continue to the next section of this operation manual).

Sensor On/Off Setting

1. Touch *MENU* (SELECT) to set the Sensor 1 On/Off setting; touch *ADD* (NEXT) to continue to the next menu option.
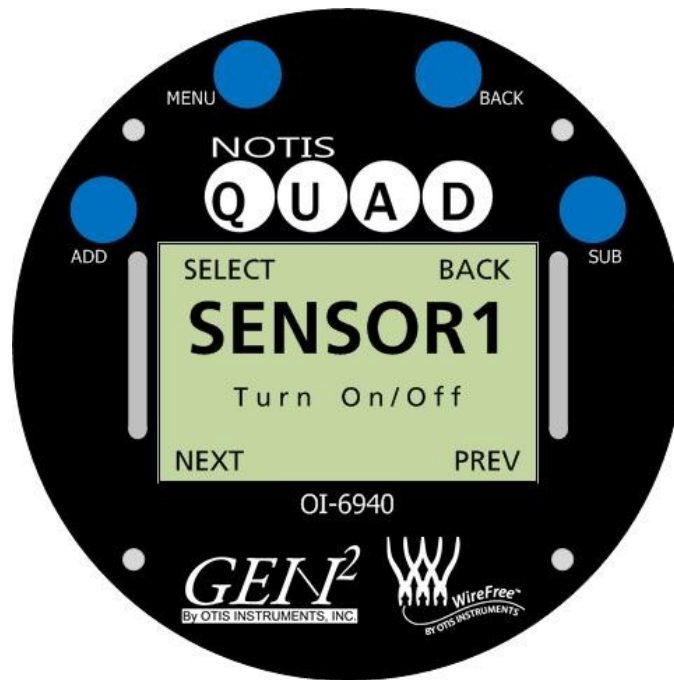
2. Touch *ADD* (ON) to turn Sensor 1 On. Touch *SUB* (OFF) to turn Sensor 1 Off.
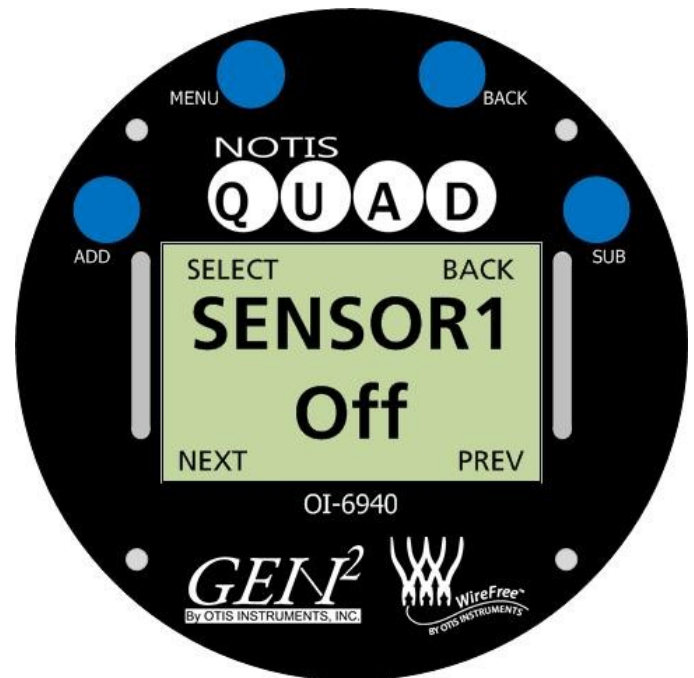

3. Once the desired setting is displayed on the screen ("SENSOR1 On" or "SENSOR1 Off"), touch *MENU* (BACK) or *BACK* (BACK).

4. If the sensor is turned On, continue to the next step. If the sensor is turned Off, continue to setting up the next sensor.

Sensor Settings Menu Mode cont...

> *NOTE: When a sensor is turned Off, the following menu items will not be available for setup, and the display screen will show "OFF" for that sensor when the Notis Quad is in Normal Operating Mode. In the following illustration, Sensor 1 is Off and Sensors 2, 3, and 4 are On (while in Normal Operating Mode).*

Sensor Null

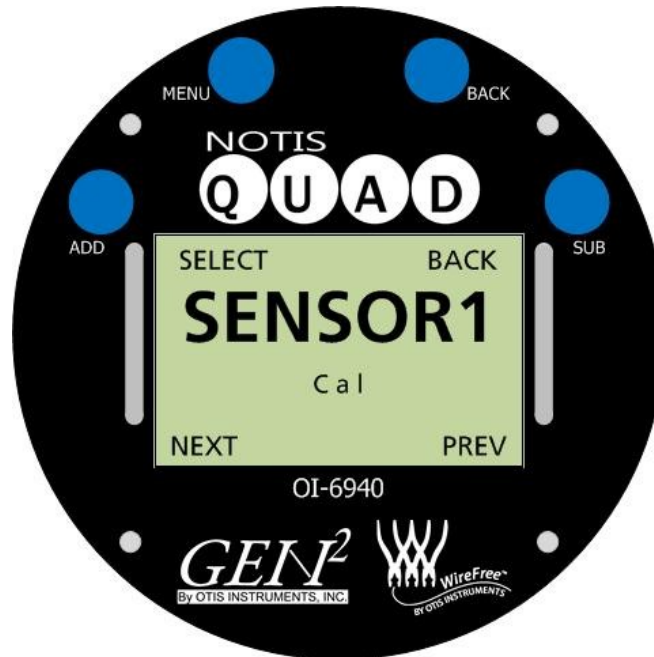1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Null.
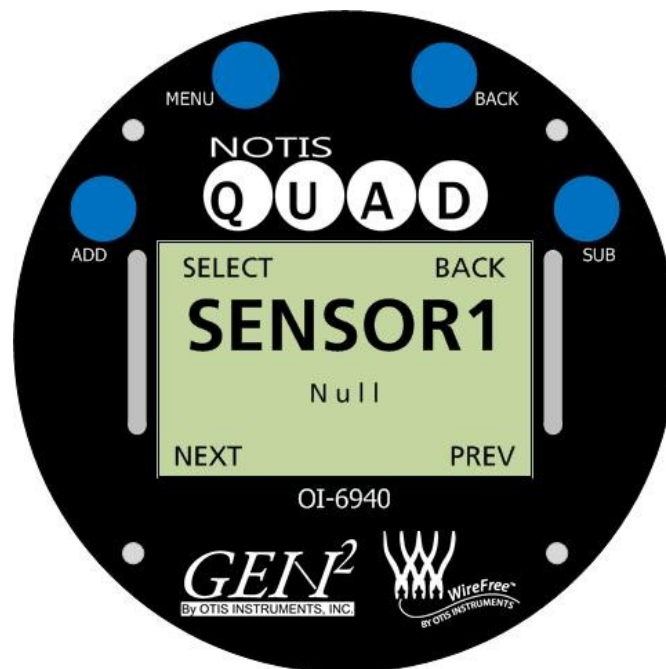
2. Touch *ADD* (NEXT) to continue to the next menu option.

> *NOTE: This section of the Operation Manual is for Sensor Setup only. For Null and Calibration instructions, see the Calibration section in the Operation Manual.*

Sensor Calibration (Cal)

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Cal.

2. Touch *ADD* (NEXT) to continue to the next menu option.

> *NOTE: This section of the Operation Manual is for Sensor Setup only. For Null and Calibration instructions, see the Calibration section of this operation manual.*
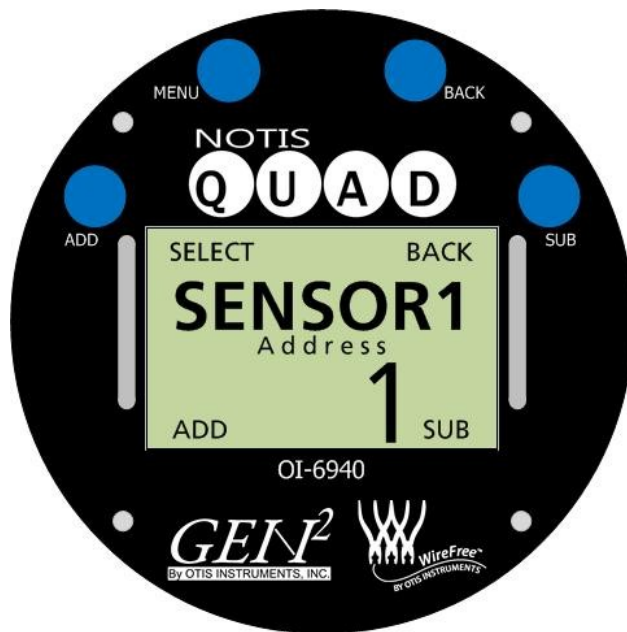
Radio Address Setting

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Radio Address.

2. Touch *MENU* (SELECT) to set the Sensor 1 Radio Address; touch *ADD* (NEXT) to continue to the next menu option.

3. If *MENU* was touched, the Display Screen should resemble the following illustration:

4. Touch *ADD* (increase) or *SUB* (decrease) to manipulate the Sensor 1 Radio Address setting.

   NOTE: When scrolling through the Radio Address Setting Options, address settings that are already in use will not be available.
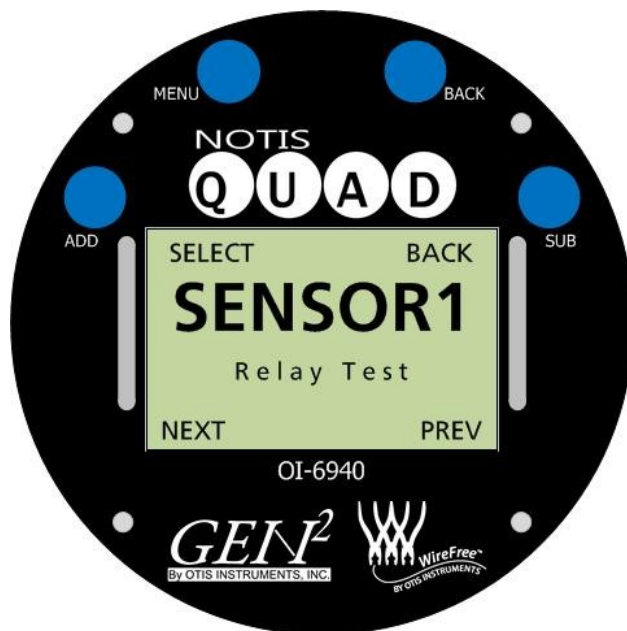
   NOTE: The Radio Address can be set between 1 and 255.

   NOTE: Two sensors cannot have the same address.

5. Once the desired Radio Address setting is being displayed on the screen, touch *MENU* (BACK) or *BACK* (BACK).

Sensor Relay Test

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Relay Test.

2. Touch *MENU* (SELECT) to begin the Sensor 1 Relay Test; touch *ADD* (NEXT) to continue to the next menu option.

3. If *MENU* was touched, the Display Screen should resemble the following illustration:

4. Touch *ADD* (increase) or *SUB* (decrease) to manipulate the Sensor 1 Relay Test setting (in increments of 1/20th of the full sensor range) until the value is high enough to trigger the pre-set alarms.
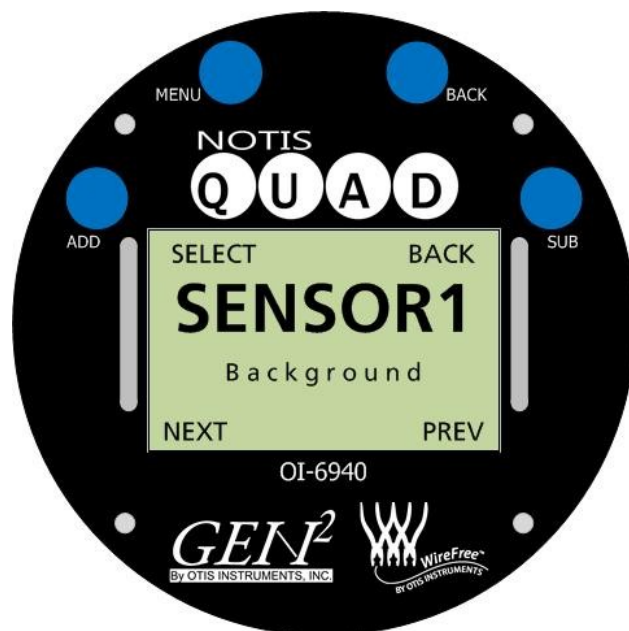
> *NOTE: The radio will only send the sensor that is in Relay Test Mode.*
>
> *NOTE: The Notis Quad will only send values from 0 to full range of the sensor.*

5. Once the Sensor 1 Relay Test is complete, touch *MENU* (BACK) or *BACK* (BACK).

Sensor Background Setting

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Background Setting.

2. Touch *MENU* (SELECT) to begin adjust the Sensor 1 Background Setting; touch *ADD* (NEXT) to continue to the next menu option.
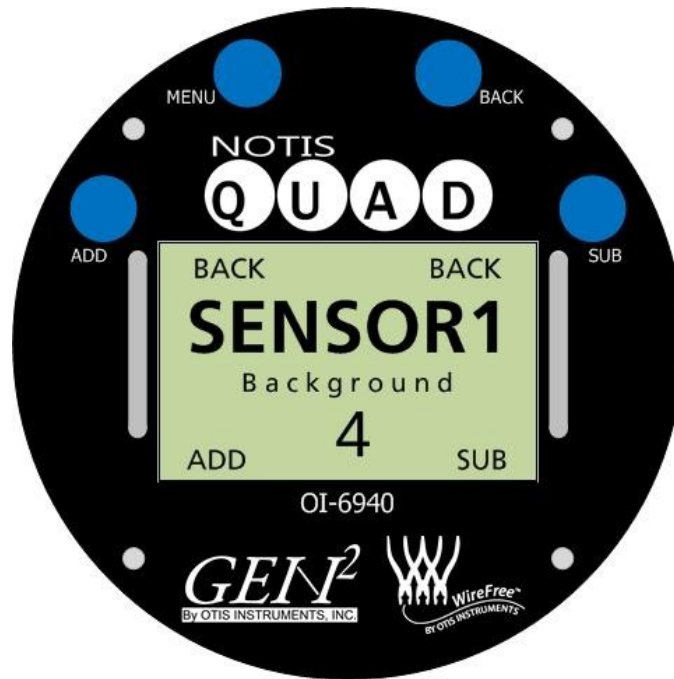
3. Touch *ADD* (increase) or *SUB* (decrease) to manipulate the Sensor 1 Background Setting.

> *NOTE: When using an O2 sensor, there will be a "Background High" and a "Background Low" to set. When using any other sensor type, there will only be one "Background" to set.*

> *NOTE: When using an O2 sensor, the Background High is from 19.0 to 25.0, and the Background Low is from 17.0 to 23.0. When using any other sensor type, the background setting is the lowest number that can be displayed above 0 to 10% of full scale.*
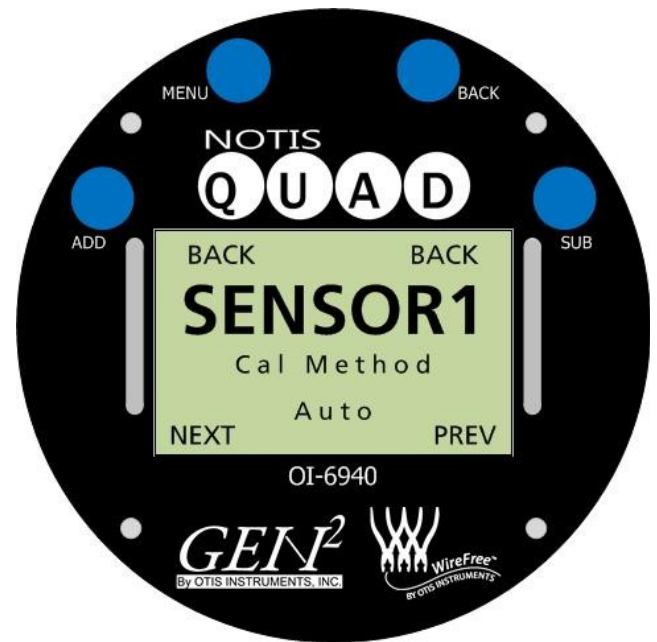
4. Once the desired Background Setting is displayed on the screen, touch *MENU* (BACK) or *BACK* (BACK).

Sensor Cal Method

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Cal Method.

2. Touch *MENU* (SELECT) to begin adjust the Sensor 1 Cal Method; touch *ADD* (NEXT) to continue to the next menu option.
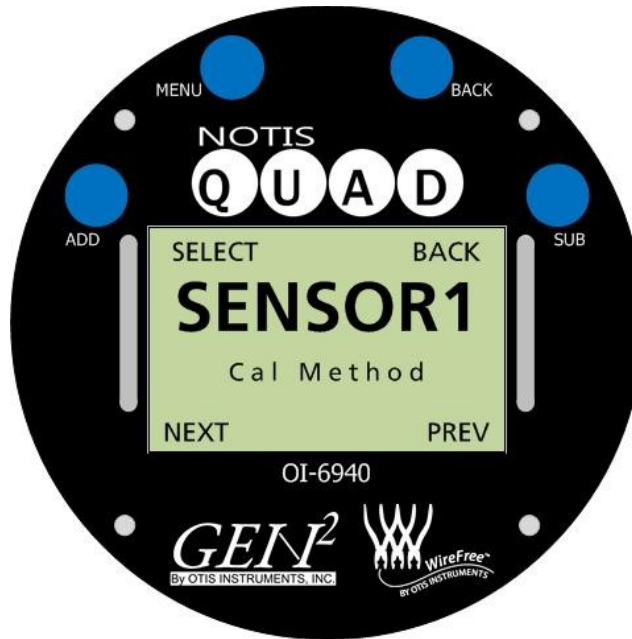
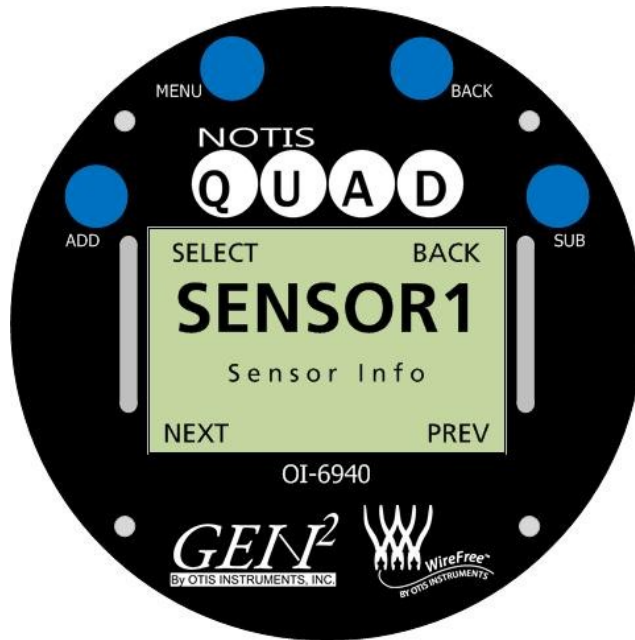3. If *MENU* was touched, the Display Screen should resemble one of the following illustrations:

4. Touch *ADD* (NEXT) or *SUB* (PREV) to toggle between "Manual" or "Auto" as the Sensor 1 Calibration Method Setting.

   NOTE: Cal Method is not available for LEL sensors.

5. Once the desired Sensor 1 Calibration Method Setting is displayed on the screen, touch *MENU* (BACK) or *BACK* (BACK).
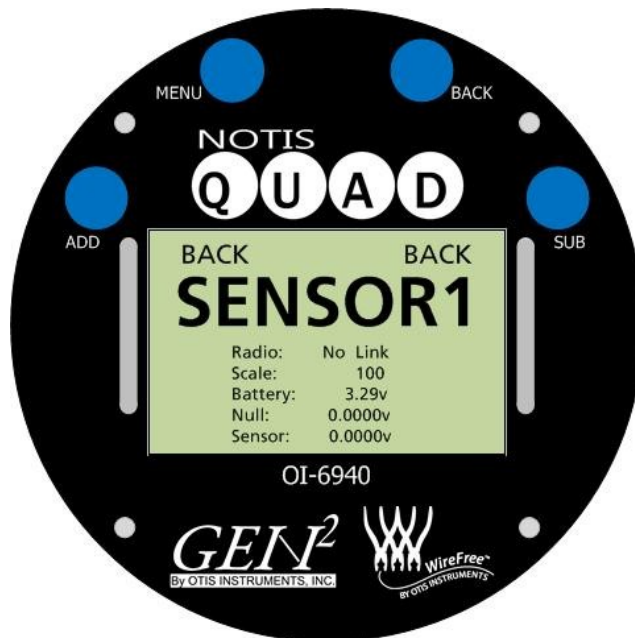
Sensor Info

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Info.
2. Touch *MENU* (SELECT) to view the Sensor 1 Info; touch *ADD* (NEXT) to continue to the next menu option.

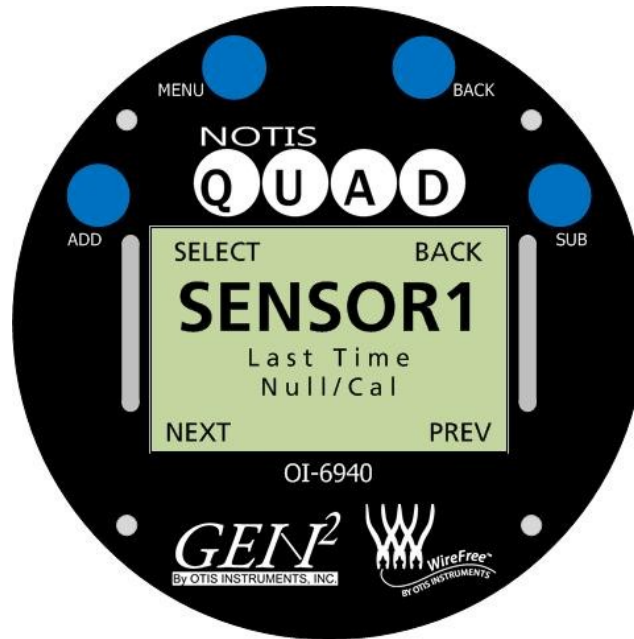3. If *MENU* was touched, the Display Screen should resemble the following illustration:

NOTE: Touch ADD/SUB to turn the backlight On/Off while viewing the Sensor Info Screen.

4. Once the Sensor 1 Info has been viewed, touch *MENU* (BACK) or *BACK* (BACK).

Sensor Last Time Null/Cal

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Last Time Null/Cal.

2. Touch *MENU* (SELECT) to view the last time Sensor 1 was nulled and calibrated; touch *ADD* (NEXT) to continue to the next menu option.

3. If *MENU* was touched, the Display Screen should resemble the following illustration:

NOTE: If the sensor has never been nulled or calibrated, or if the null/cal values have been reset since the last time the sensor was nulled/caled, the Display Screen will show "NEVER".

NOTE: The Last Time Since Null/Cal is only calculated when the Notis Quad is turned On.

NOTE: The Last TimeSince Null/Cal is only saved in hours and days. Therefore, if the last time the sensor was nulled/caled was 59 minutes and 59 seconds ago (or if the unit was turned off 59 minutes and 59 seconds after the null/cal was complete), the Last Time Since Null/Cal reading would be "NEVER" (because an hour had not been reached).

4. Once the Sensor 1 Last Time Null/Cal information has been viewed, touch *MENU* (BACK) or *BACK* (BACK).

Sensor Return Null/Cal to Default

1. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Return Null/Cal to Default.

2. Touch *MENU* (SELECT) to return Sensor 1's Null/Call to Default; touch *ADD* (NEXT) to continue to the next menu option.
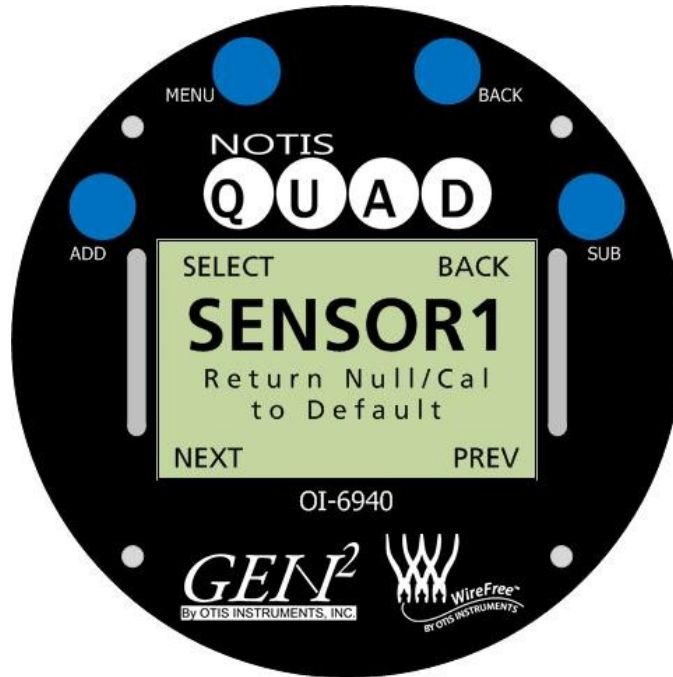
3. If *MENU* was touched, the Display Screen should resemble the following illustration:
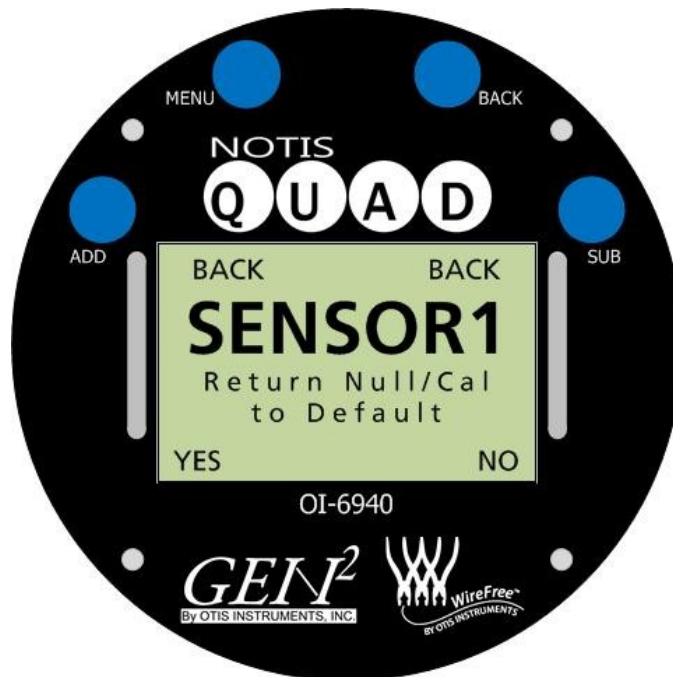
4. Touch *ADD* (YES) to return Sensor 1's Null/Cal to default. Touch *SUB* (NO) to leave Sensor 1's Null/Cal as previously setup.

> NOTE: *The Return Null/Call to Default Setting will only change the null/cal values of the sensor that is being setup.*

5. If *ADD* (YES) was touched, the Display Screen will ask for confirmation (as shown below). Touch *ADD* (YES) or *SUB* (NO) to confirm or deny the option to return Sensor 1's Null/Cal to default.

6. Once the selection has been made, the Display Screen will return to the "Sensor 1 Return Null/Call to Default" screen. Touch *ADD* (NEXT) to continue to the next screen.
7. Select one of the following options:

   - Touch *ADD* (NEXT) to return to the Sensor Setup Menu Mode.

       NOTE: All sensors must be setup individually. To setup the next sensor, use this option (touch ADD), then touch ADD (NEXT) again to move to Sensor 2 Setup. Once Sensor 2 has been setup, repeat the Sensor Setup Menu Mode steps again for Sensor 3 and Sensor 4.

   - Touch *MENU* (SELECT) or *BACK* (BACK) to return to the first Global Settings Menu Mode screen
   - Touch *SUB* (PREV) to return to the previous Global Settings Menu Mode setting: Return to Factory Default Setting.

Calibration

System calibration is necessary for the device to accurately sense gas and to send messages to the transmission controller in relation to gas presence in parts per million. Each time a sensor is replaced the device must be re-calibrated.

The Notis Quad is equipped with a dual set of switches for *MENU*, *ADD, SUB* and *BACK*. The manual and magnetic switches are located on the Front Panel. Manual switching may be used in calibration when the Otis explosion-proof enclosure lid is removed. The magnetic switches, for non-intrusive calibration, are activated by an Otis Instruments, Inc. distributed magnet.

NOTE: Each sensor must be nulled/calibrated individually. After all steps in this section are complete for Sensor 1, repeat the instructions for each consecutive sensor.

NOTE: Do not cover the hole in the calibration cup, as this will cause the calibration to be inaccurate.

NOTE: For best results, calibration should be performed using individual gases (per sensor type). Otis Instruments does not recommend using quad gas mixtures.

NOTE: Any mixture of calibration gas other than a 50% Methane (2.5% by volume) with air balance usage will result in damage to the sensor element—and will void warranty of the element.
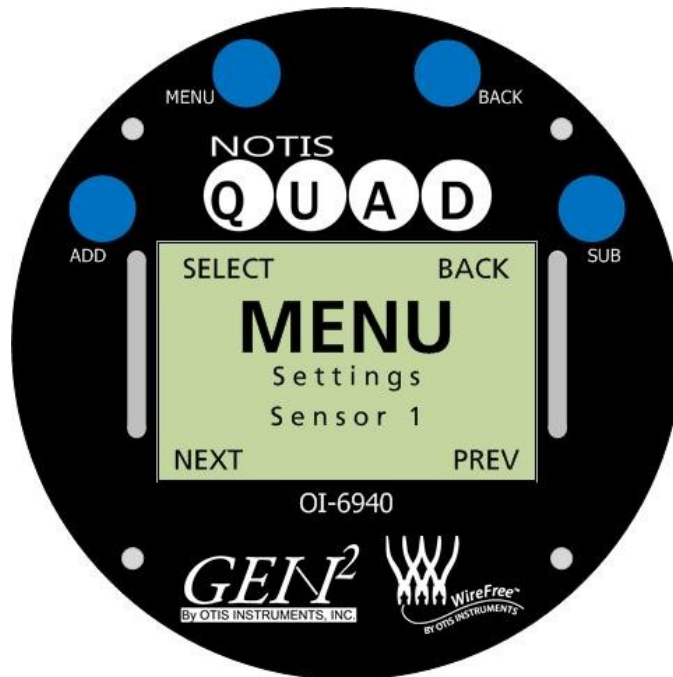
Nulling the Sensor

1. Touch and hold an Otis Instruments, Inc. distributed magnet against the *MENU* indicator label on the left side of the Notis Quad for approximately six seconds to active *MENU* and enter Menu Mode.
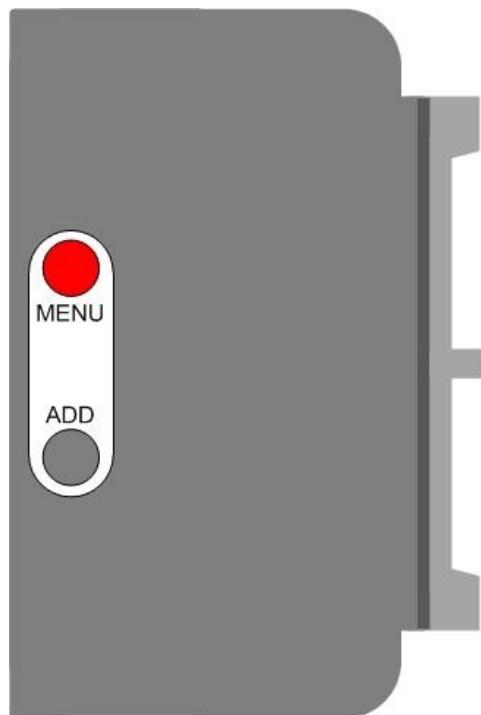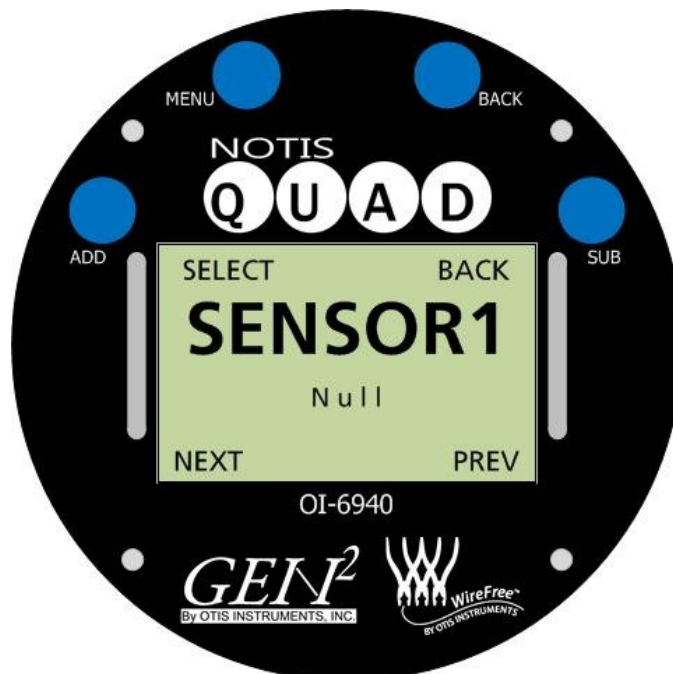
2. Touch *ADD* (NEXT) once. The Display Screen should resemble the following illustration:

3. Touch *MENU* (SELECT) to select the Sensor 1 Settings Menu.

NOTE: To Null Sensor 2, 3, or 4: touch ADD (NEXT) one, two, or three more times, then touch MENU.

4. Touch *ADD* (NEXT) to continue to the next setting: Sensor 1 Null.

5. Touch *MENU* (SELECT) to Null Sensor 1. The Display Screen should resemble the following illustration:

6. If *ADD* (YES) is selected, the backlight will turn Off and the Display Screen will begin counting down from 12 to 0, as shown below. If *SUB* (NO) is selected, the Display Screen will return to the original Sensor 1 Null screen.

> *NOTE: While counting down, the BACK feature is disabled.*

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


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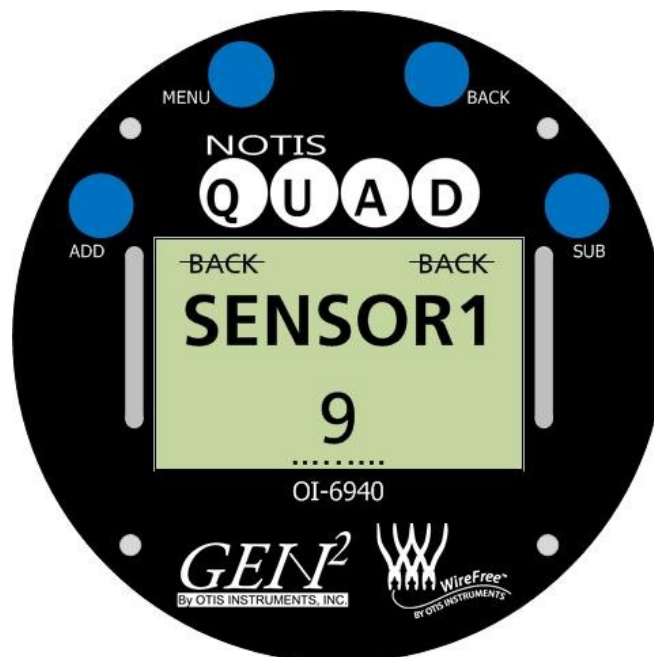
7. Once Null is complete (successfully), the Display Screen should resemble the following illustration:

If the Null was not successful, the Display Screen will show "F5 NULL Failed Check Sensor Voltage". This fault will be displayed when one of the following instances occur:

- If the voltage is wrong when using a positive sensor, "F5" will be displayed if the voltage is above 1 volt. If the voltage is wrong when using a negative sensor, "F5" will be displayed if the voltage is less than 1 volt (or higher than 2.4 volts).
    - Positive sensors are: H2S, SO2, CO, HCl, NH3, H2, ClO2, HCN, F2, HF, CH2O.
    - Negative sensors are: Cl2, O3, NO2.
    - LEL and O2 are both different from any other sensor and from each other. When using an O2 sensor, "F5" will be displayed if the voltage is outside the voltage range of working.

- If the Notis Quad cannot communicate with the sensor.

8. Once Null is complete, touch *MENU* (BACK) or *BACK* (BACK).
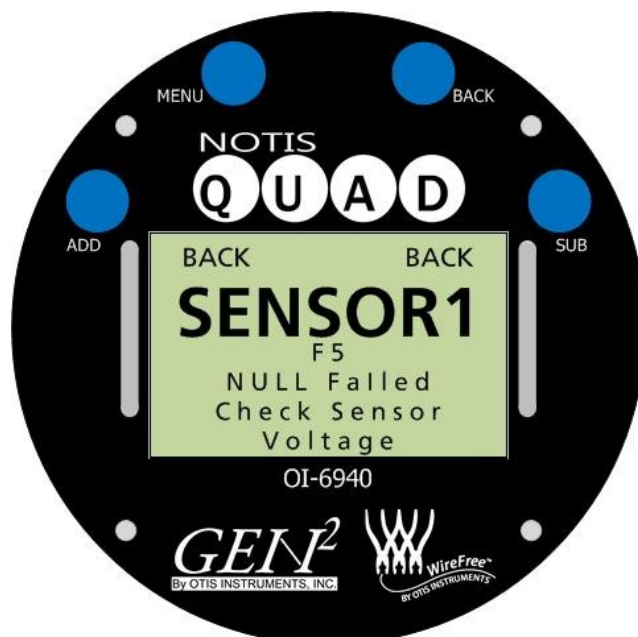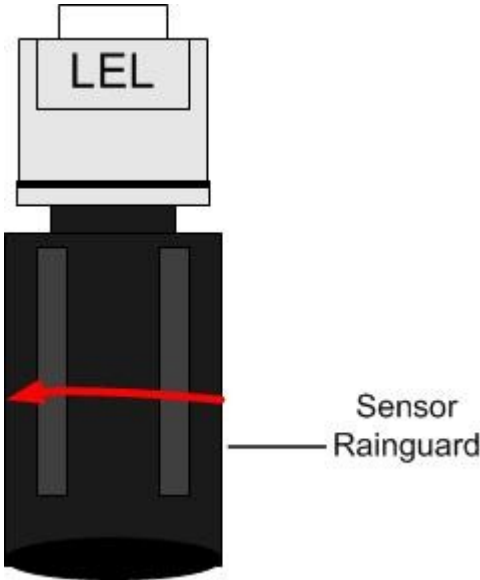
Sensor Calibration (Manual Calibration)

The Notis Quad may be Autocaled or Manually Caled. To choose the calibration method, see the Sensor Setup Menu Mode section of this Operation Manual.

The following instructions are for Manual Calibration. For Automatic Calibration instructions, see the previous section of this Operation Manual.

1. After the sensor has been Nulled, touch *ADD* (NEXT) once.

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

3. Replace the rainguard of the sensor being calibrated with an Otis OI-410 Calibration Cup.

4. Apply a known calibration gas to the OI-410 Calibration Cup that is attached to the sensor housing.

5. Touch *MENU* (SELECT) to calibrate (Cal) Sensor 1.

6. The Display Screen should resemble the following illustration:
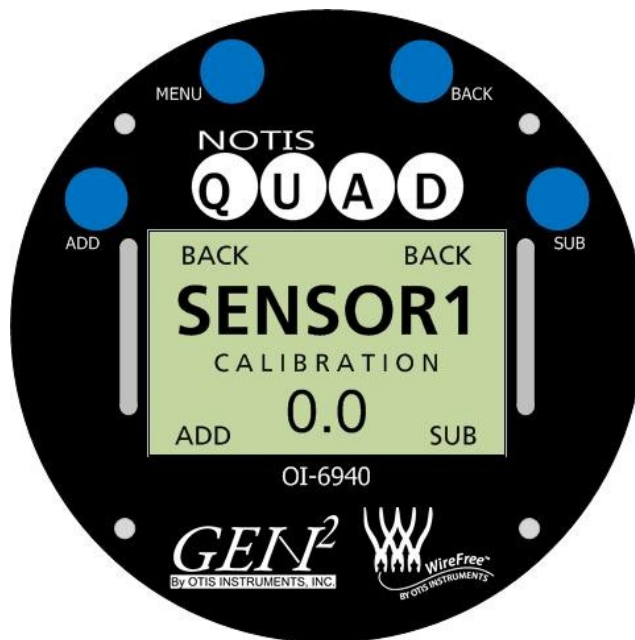
7. Once the number on the Display Screen has stabilized (or after approximately 90 seconds), touch *ADD* (increase) or *SUB* (decrease) to manipulate the reading shown on the Display Screen until the displayed reading matches that of the calibration bottle.

   NOTE: If the Display Screen is showing "O", touching ADD or SUB will not affect the reading.

8. Once the number displayed on the screen matches that of the calibration bottle, touch *MENU* (BACK) or *BACK* (BACK).

9. Unscrew the OI-410 Calibration Cup.

10. Reattach (screw on) the sensor rainguard to the sensor housing.
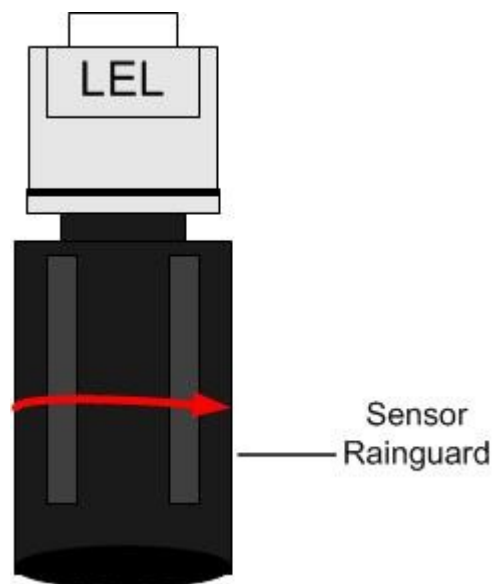
Sensor Calibration (Automatic Calibration)

The Notis Quad may be Autocaled or Manually Caled. To choose the calibration method, see the Sensor Setup Menu Mode section of this Operation Manual.

The following instructions are for Automatic Calibration. For Manual Calibration instructions, see the next section of this Operation Manual.

1. After the sensor has been Nulled, touch *ADD* (NEXT) once.

2. Touch *MENU* (SELECT) to calibrate (Cal) Sensor 1.
3. The Display Screen should resemble the following illustration:

4. Touch *ADD* (YES) to calibrate the sensor, or *SUB* (NO) to return to the Sensor 1 Cal screen.

5. If *ADD* (YES) was touched, the Display Screen should resemble the following illustration:


6. Touch *ADD* (YES) to calibrate the sensor, or *SUB* (NO) to return to the Sensor 1 Cal screen.

7. If *ADD* (YES) was touched, the Display Screen should resemble the following illustration:
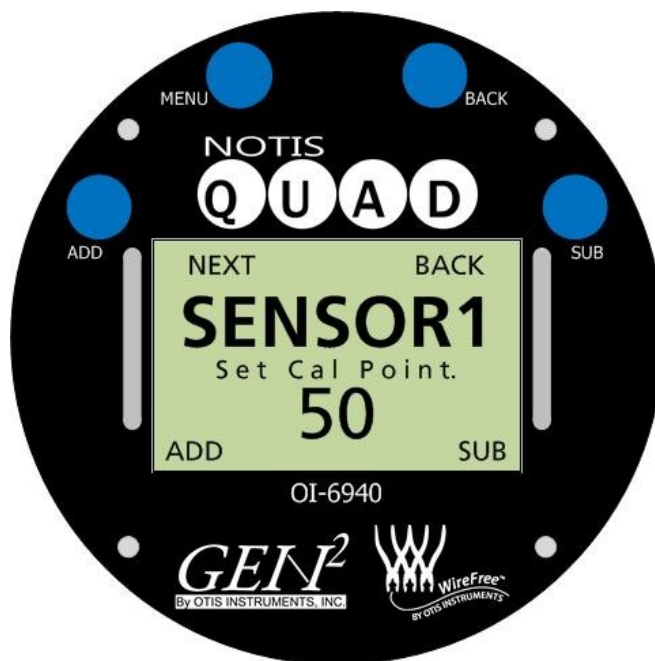
8. Touch *ADD* (increase) or *SUB* (decrease) to manipulate the Cal Point Setting so that it matches that of the calibration gas.

9. Touch *MENU* (NEXT) once.

10. Unscrew and remove the sensor rainguard from the sensor housing.
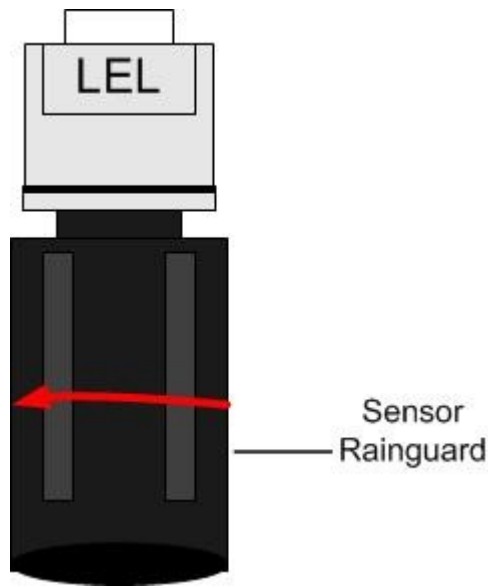
11. Replace the rainguard of the sensor that is being calibrated with an Otis OI-410 Calibration Cup.

12. Apply a known calibration gas to the OI-410 Calibration Cup that is attached to the sensor housing.
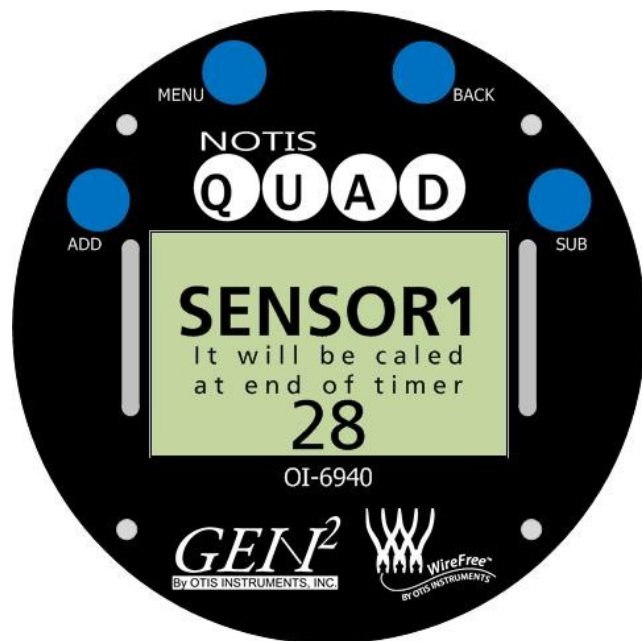

13. Touch *MENU* (NEXT) once.

14. The sensor will be called when the timer countdown that is displayed on the screen reaches "0". Countdown times for different gases are as follows:

> - H2S, SO2, O2, CO, NH3, CH2O, NO2, O3 = 90 seconds
> - LEL = 120 seconds
> - HCl = 310 seconds
> - Cl2 and H2 = 180 seconds
> - ClO2 = 360 seconds
> - HCN = 170 seconds
> - F2 = 320 seconds
> - HF = 330 seconds

15. Once calibrated (correctly), the Display Screen will show the value that is currently being read ("Reading").
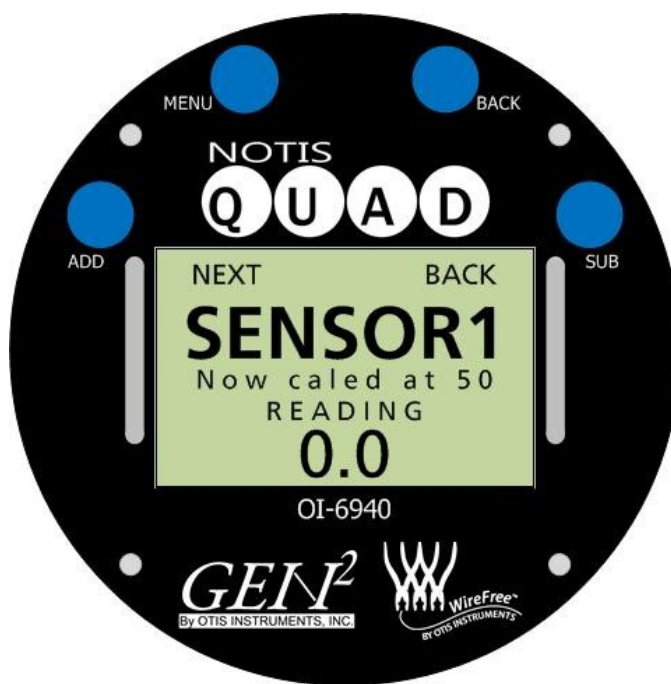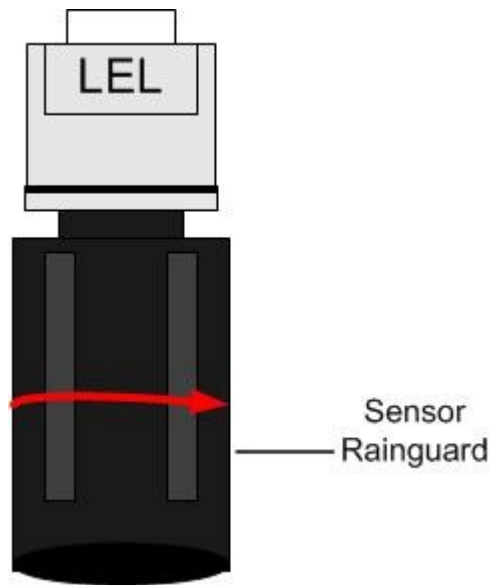

NOTE: If the sensor was not caled correctly, the Display Screen will show "F6 Fault while trying to autocal".

NOTE: The autocal values can be set to the full range of the sensor (i.e., any value except 0).

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16. Unscrew the OI-410 Calibration Cup.

17. Reattach (screw on) the sensor rainguard to the sensor housing.


Sensor Rainguard

Battery Replacement

To ensure full-functionality, the battery should be replaced if the voltage is less than 2.8. To check the battery voltage, view the Info Screen (as indicated in the Global Settings Menu Mode section of this Operation Manual).

Note: Replacement of the battery should be done in a non-classified environment, where no explosive gas is present.

The Notis Quad uses an Otis Lithium Ion 76AH battery-pack with connector. New batteries should only be obtained from Otis Instruments, Inc. or an affiliated distributor.

1. Power off the device by touching and holding an Otis Instruments, Inc. distributed magnet against the *SUB* indicator on the right side of the Notis Quad for four seconds to activate *SUB*.
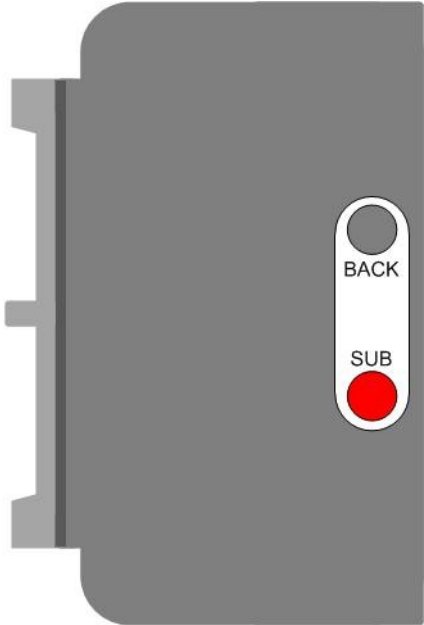
2. Unscrew, remove, and set aside the explosion-proof lid.
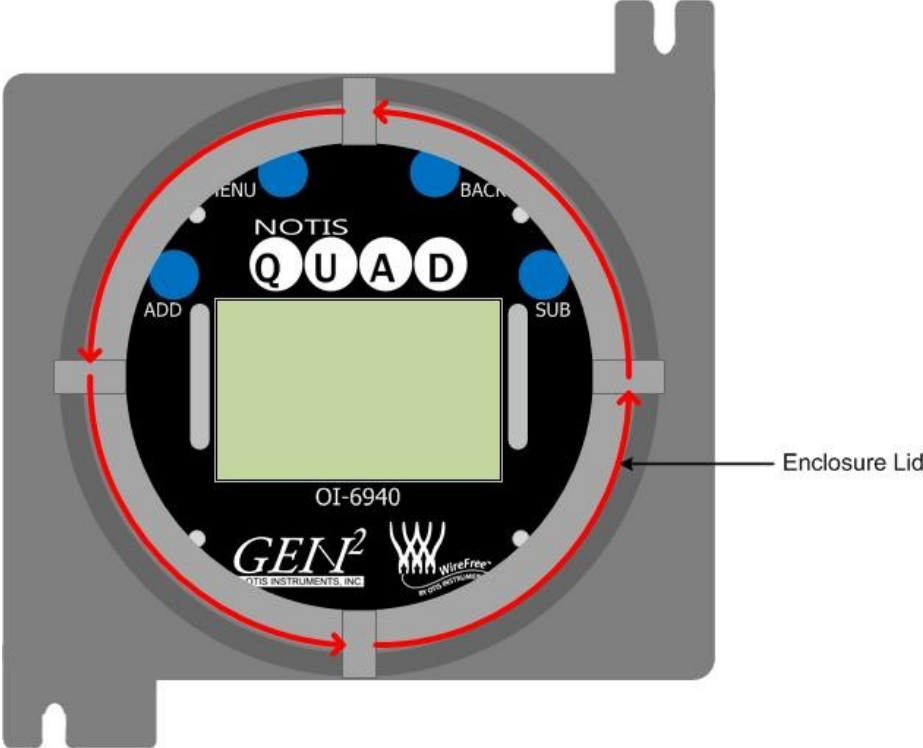
3. Using only your fingers, pull straight up on the Front Panel Handles until the unit is removed from the standing eyelets.

    NOTE: Do not use any metal object to help remove the Front Panel.

    NOTE: Do not remove any connecting wires.

4. Gently lay the Front Panel to the side of the Notis Quad so that the battery-pack inside the Otis enclosure is visible.
5. Unscrew and remove the Battery Mount Strip
6. Locate the Battery-Pack Input.

Battery-Pack Input

Battery Mount Strip
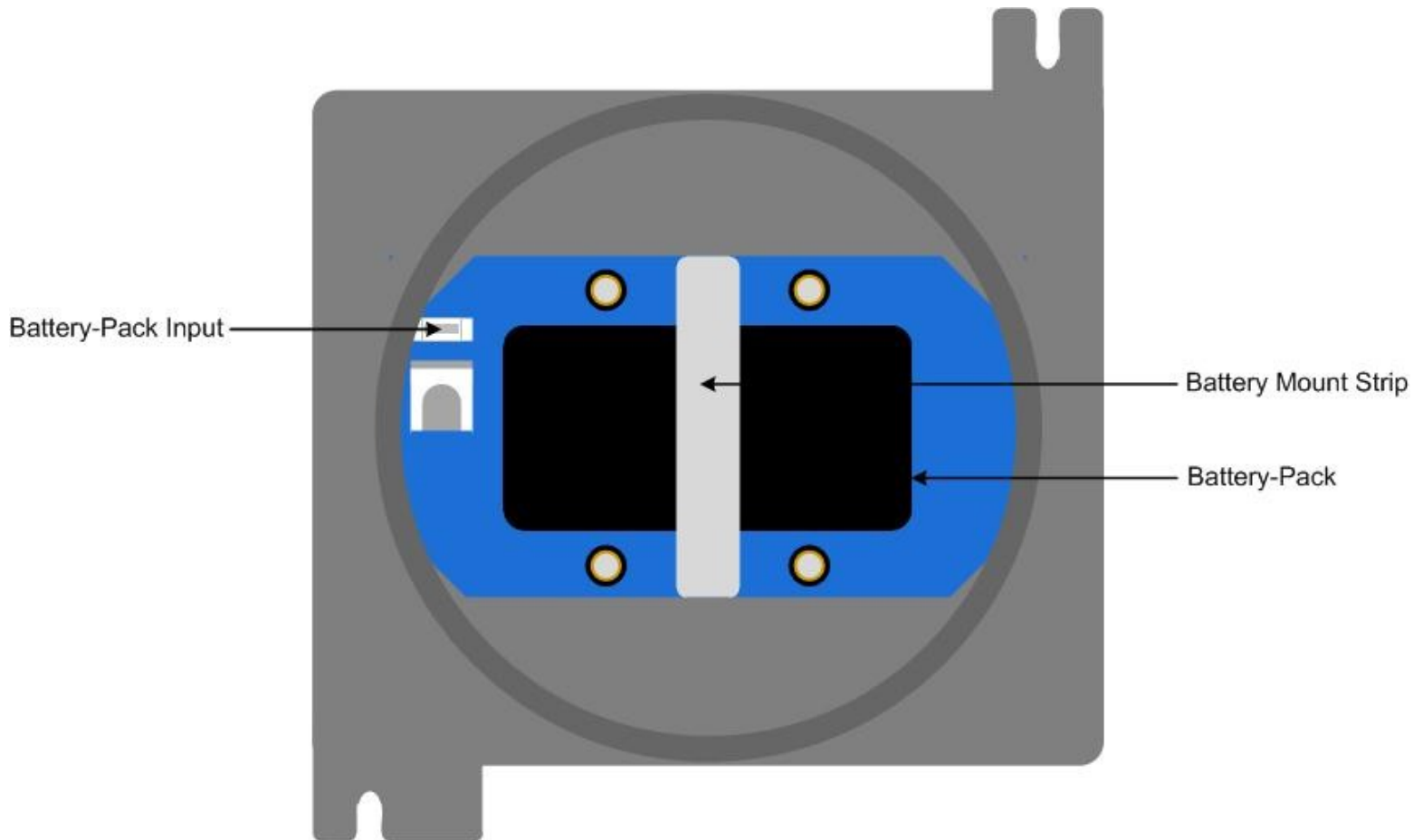
Battery-Pack

7. Squeeze the left and right sides of the Battery-Pack Input and pull the Battery-Wire Plug straight out of the Battery-Wire Input.

8. Slide the new battery's Battery-Wire Plug into the Battery-Pack Input.

9. Place the new battery on the Battery Board and secure it in place by screwing the Notis Quad's Battery Mount Strip back onto the Battery Board.

10. Replace the Front Panel back in the enclosure by matching each mounting post to its corresponding eyelet inside the enclosure.

11. Place the enclosure lid on top of the enclosure base.

12. Rotate the lid until it is tightly screwed in place.
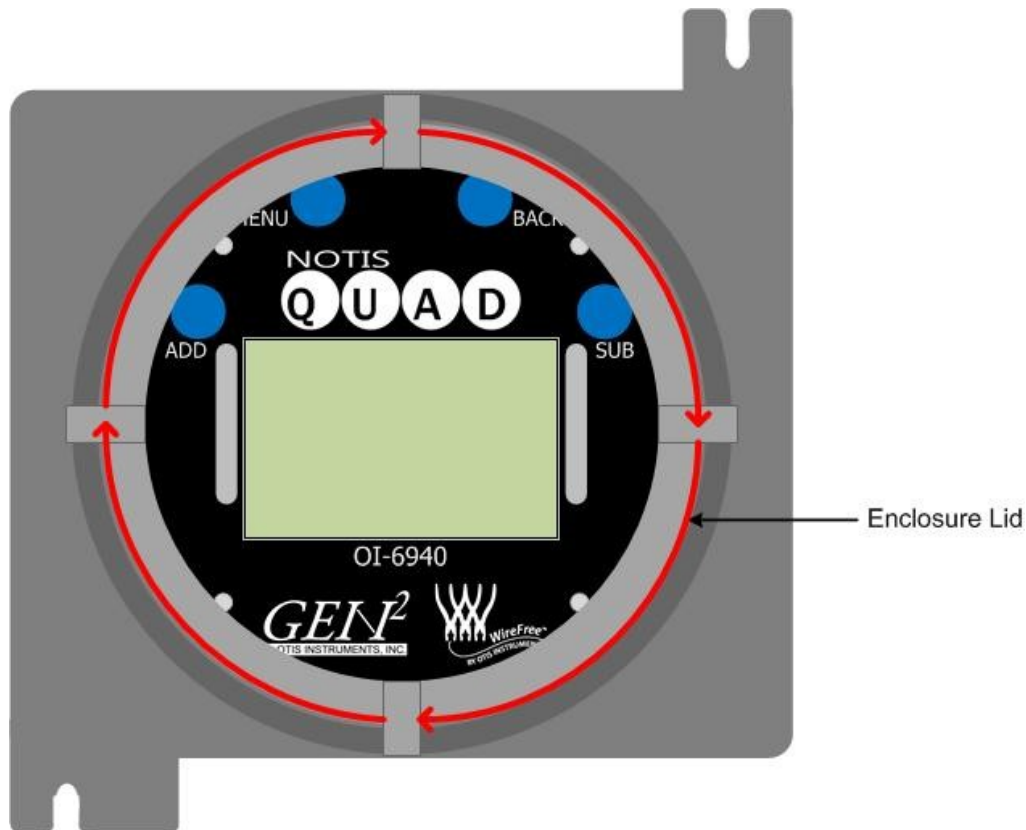
13. Power on the device and check the battery voltage to ensure that the new battery is fully functional and at 3.2 volts. For instructions on how to check the battery voltage, see the Global Settings Menu Mode of this operation manual.

Sensor Replacement

The Notis Quad's sensors must be fully functional in order to alert the user of the presence of toxic gas at a dangerous level. Failed alarm tests could be an indicator of the Notis Quad needing a sensor(s) replaced.

1. Power off the device by touching and holding an Otis Instruments, Inc. distributed magnet against the *SUB* indicator label on the right side of the Notis Quad for four seconds to activate *SUB*.
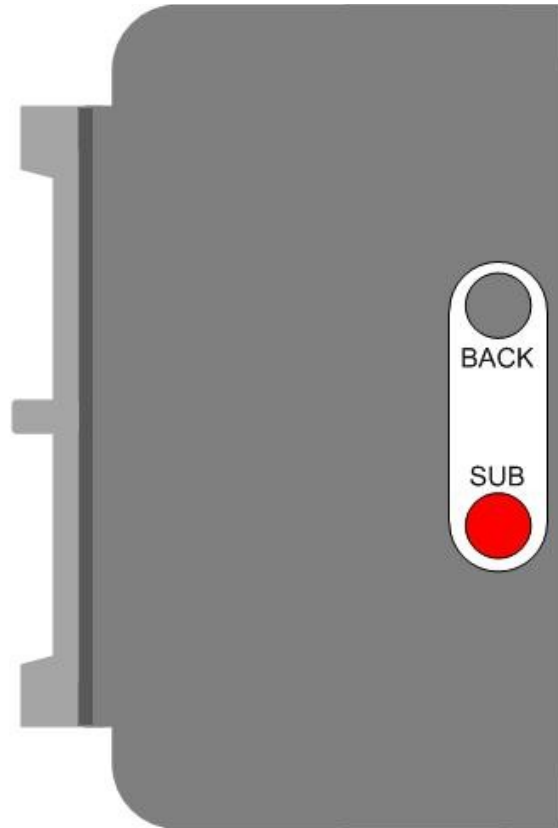
2. Unscrew and remove the sensor housing cap.
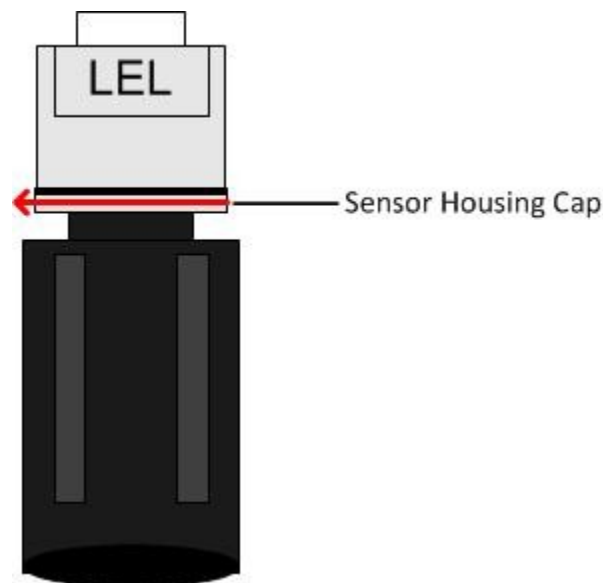
3. With the sensor housing cap removed, the visible sensor will resemble the following illustration:
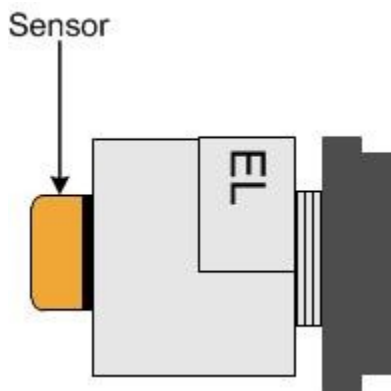
4. Using the thumb and forefinger, slide the sensor out of the Notis Quad.
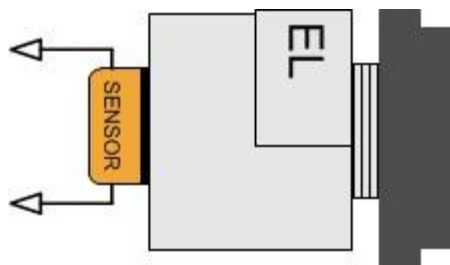
NOTE: Do not use any metal object to remove the sensor.

NOTE: Be careful to not remove the sensor board when removing the sensor.

5. Slide the new sensor into device, matching the sensor prongs to the corresponding eyelets inside.
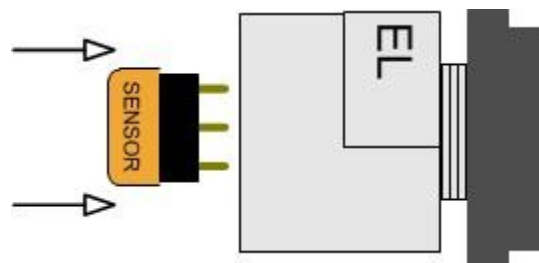
6. Screw the sensor housing cap back in place.

NOTE: Once the sensor has been changed it must be re-nulled and re-calibrated (see the Calibration section of this Operation Manual).

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Antenna Replacement

The antenna is used to aid in sending clear and reliable radio signals to the transmission controller. If necessary, the current antenna can be replaced by an Otis Instruments, Inc. approved 2.4 GHz or 900 MHz antenna.

1. Power off the device by touching and holding an Otis Instruments, Inc. distributed magnet against the *SUB* indicator label on the right side of the Notis Quad for four seconds to activate *SUB* (which turns off device).
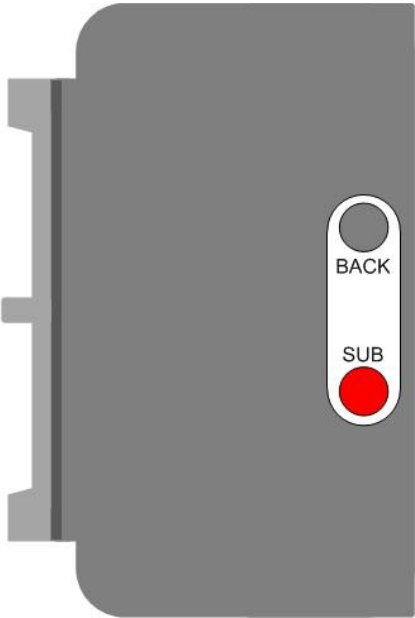
2. Locate the Antenna Connector.
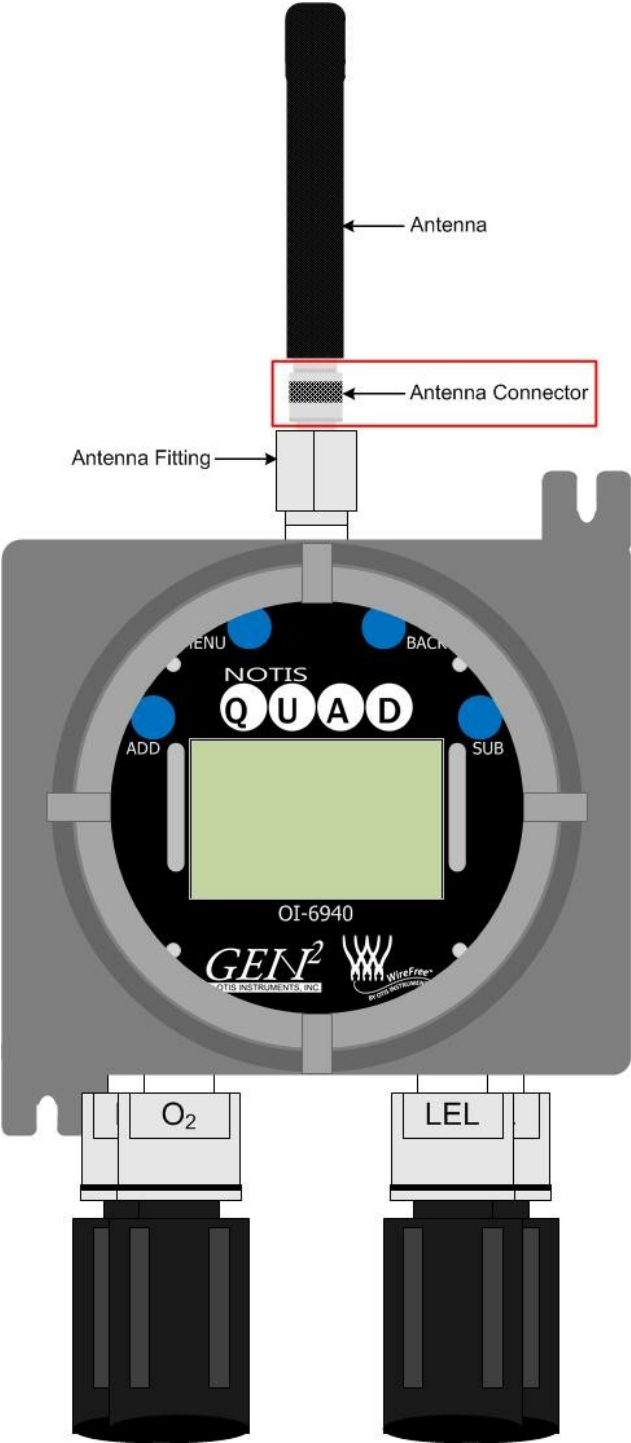
3. Unscrew the current Antenna Connector from the Antenna Fitting.
4. Screw the new Antenna onto the Antenna Fitting.
5. Power on the device by touching the magnet to *ADD*.

MENU

ADD

OI-6940 Notis Quad Troubleshooting Guide

- Fault 4

  Reason: The Notis Quad's analog sensor board not responding

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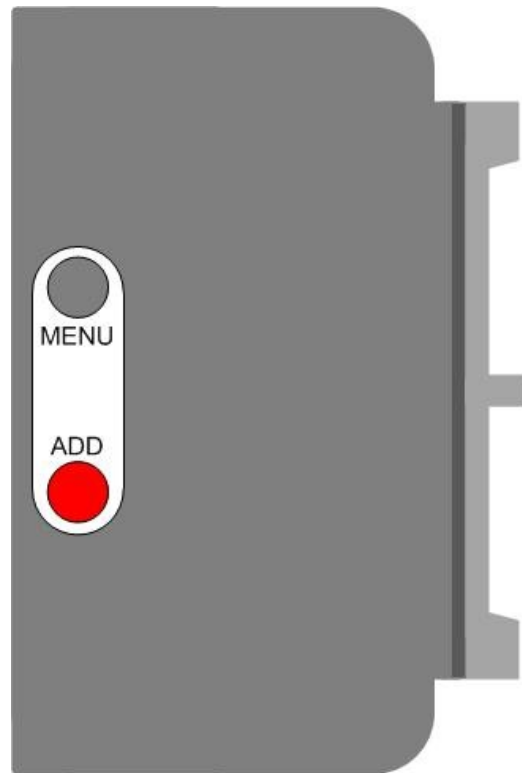

- Fault 5

  Indicator: F5 NULL Failed Check Sensor Voltage

  Reason: 1. If the voltage is wrong—on a positive sensor, "F5" will be displayed if the voltage is above 1 volt. On a negative sensor, "F5" will be displayed if the voltage is less than 1 volt (or higher than 2.4 volts).

  - Positive sensors are: H2S, SO2, CO, HCl, NH3, H2, ClO2, HCN, F2, HF, CH2O.
  - Negative sensors are: Cl2, O3, NO2.
  - LEL and O2 are both different from any other sensor and from each other. When using an O2 sensor, "F5" will be displayed if the voltage is outside the voltage range of working.

  2. If the Notis Quad cannot communicate with the sensor.

  Solution: Check the voltage of the sensor. Replace the sensor if still in Fault

  Ensure that the sensor is properly connected. Replace the analog sensor board if still in Fault

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- Fault 6

  Indicator: F6 Fault while trying to autocal

  Reason: The sensor did not read any gas.

  Solution: Make sure the calibration gas bottle and regulator are properly connected.

  Ensure that the sensor is properly connected.

  Replace gas bottle/regulator if empty or defective.

  Replace the sensor if problems persist.

- Fault 14

  Reason: No primary monitor

  Solution: Ensure that a primary monitor is on

  Ensure that the sensor assembly and monitor are set to the same radio address and Network ID

Specifications

Number of Sensors:	2-4 (1 Low-Power Infrared)
Sensor Type:	Electrochemical or Low-Power Infrared
Battery Type:	3.6V 76 Amp Hour Battery-pack
Battery Life:	Up to 6 months
Gases:	H2S, O2, SO2, CL2, H2, NH3, CO, LEL (hydrocarbons), and more
Remote Sensors:	Kit to remote-mount the sensors 10, 25, 50, 75, or 100 feet from the enclosure
Radio Type:	2.4 GHz ISM, 100 mW or 900 MHz 200mW
Display:	Graphical LCD, sunlight readable (transflective), LED back-light, 160x104 pixel resolution
Interface:	Four push buttons (*MENU*, *BACK*, *ADD*, *SUB*); four corresponding magnetic, non-intrusive switches; non-intrusive calibration
Operating Temperature:	-40º F to 129º F -40º C to +54º C
Enclosure:	10x9x6 explosion-proof
Enclosure Certifications:	Class I, Groups B, C, D; Class II, Groups E, F, G; Class III; Class I, Zone 1, Aex d IIB+H2; Ex d IIB+H2
Warranty:	Hardware: One year (limited) Sensor: One year (varies with sensor type) Battery: 90 days (from ship date); see Warranty Statement for additional stipulations

Warranty Statement for **WireFree Model OI-6940**

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.

Battery

All batteries supplied by Otis Instruments, Inc. are covered, from ship date, under a 90-day warranty. The OI-6940 Notis Quad battery warranty is only valid when using up to 1 LEL and 3 Electrochemical sensors on a properly functioning OI-6940.

Otis Instruments, Inc.

Corporate Office
2200 E. Villa Maria Dr.
Bryan, TX 77802
979.776.7700
www.otisinstruments.com