

GEN²
Model OI-9850
WireFree Interface

Operation Manual

Revision 2.8.0



Product Overview

The Gen II WireFree *Interface* OI-9850 is a 255 channel receiver that accepts and interprets radio transmissions from up to 255 WireFree Sensor Assemblies.

The *Interface* operates with 12-35 Volts DC or 110/240 Volts AC, is compatible with a 900MHz or 2.4 GHz radio, and is used in conjunction with a PLC, PC or other Monitor. Communication connection options include: RS-485 Modbus Output, RS-232 RTU Modbus Output, up to 32 4-20mA Outputs, Virtual COM port over USB, and website for displaying real time values.



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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. Gen II WireFree *Interface* OI-9850.
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.

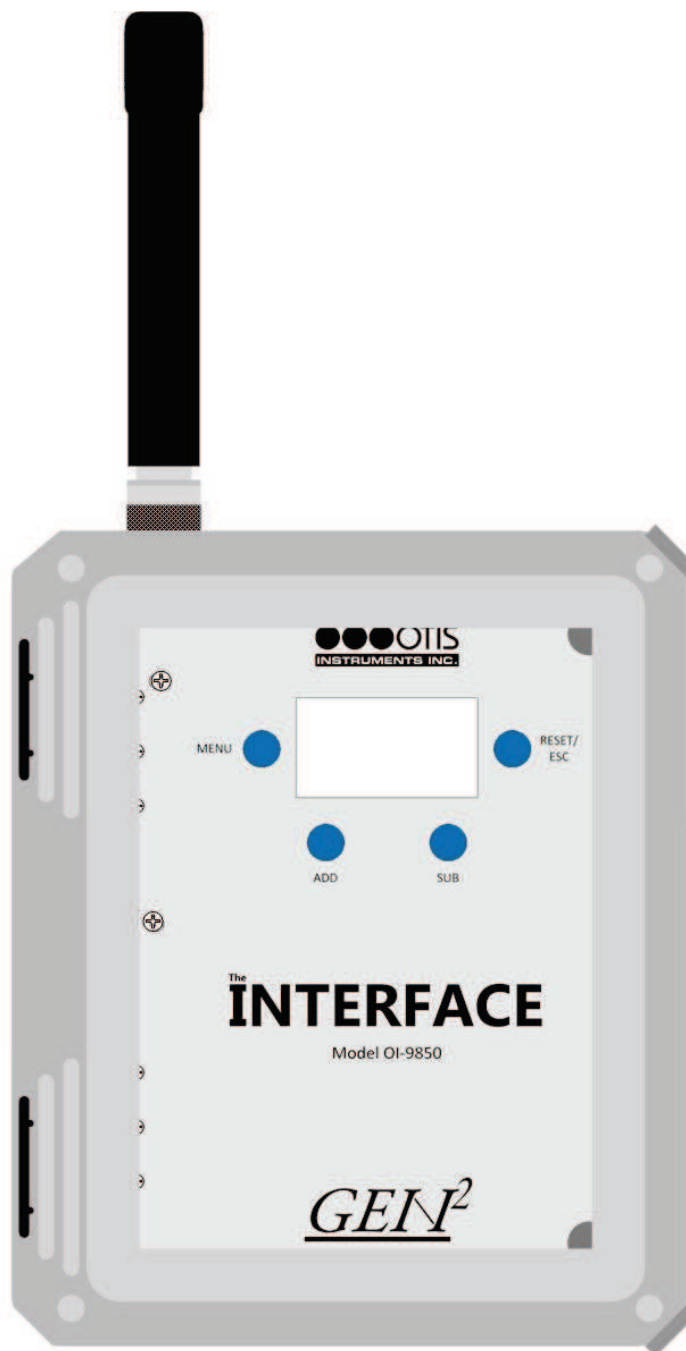
Product Warnings and Compliance Information

- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- Otis Instruments recommends using a minimum of 22 gauge wire for all Wiring Configurations. Different loads require different gauge wire. Use the appropriate wire size—depending on the voltage and current requirements.
- Otis Instruments recommends that a switch, over-current fuse, or circuit breaker be near the equipment in the building installation.
- No cleaning of the OI-9850 is required
- Pollution Degree 2
- Installation Category II
- Altitude up to 2,000 meters
- The 12-35 Volts DC input is to be provided by a Class 2

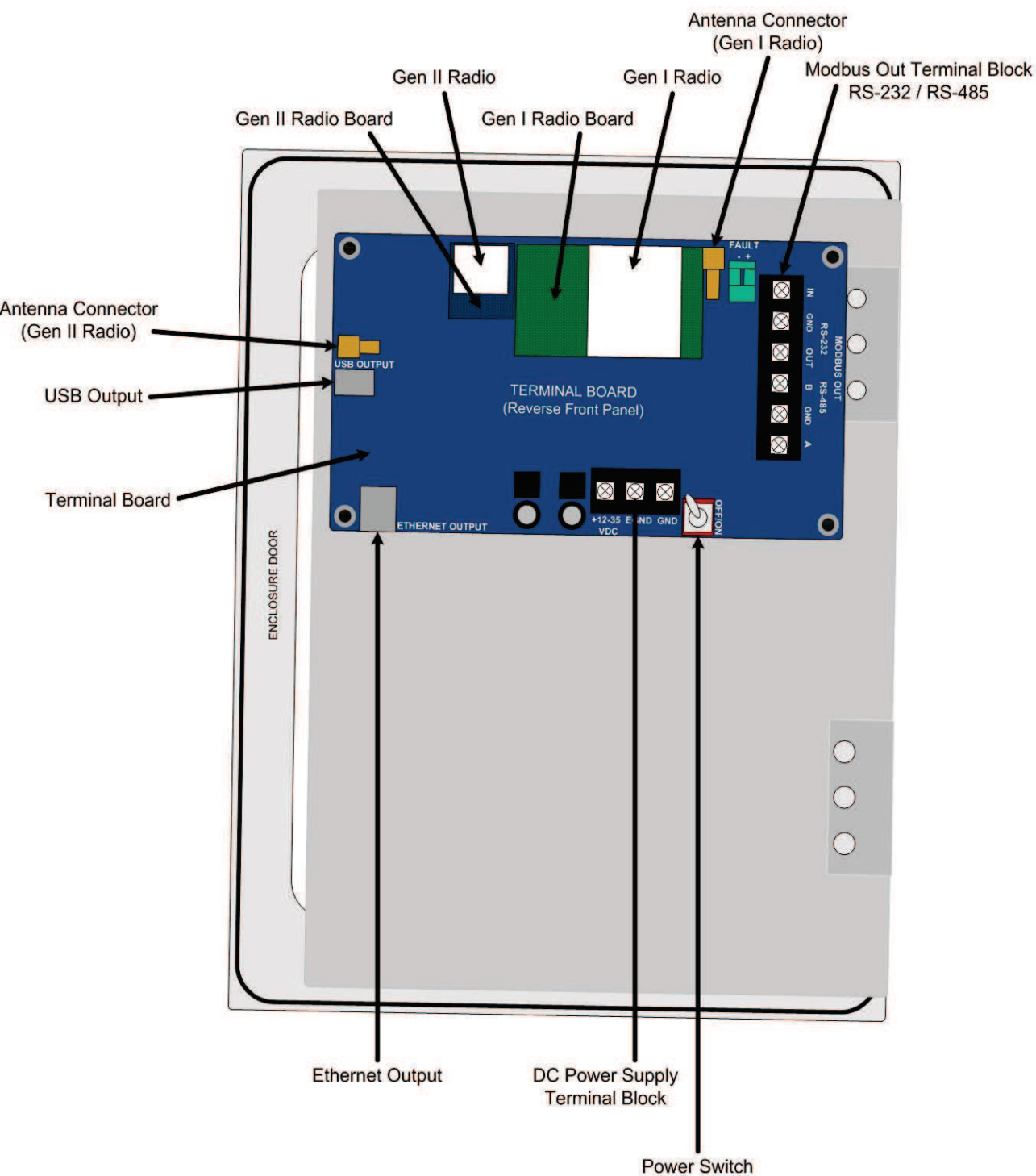
Complete System Diagrams

The following diagram should be consulted for identification of the OI-9850 system and components.

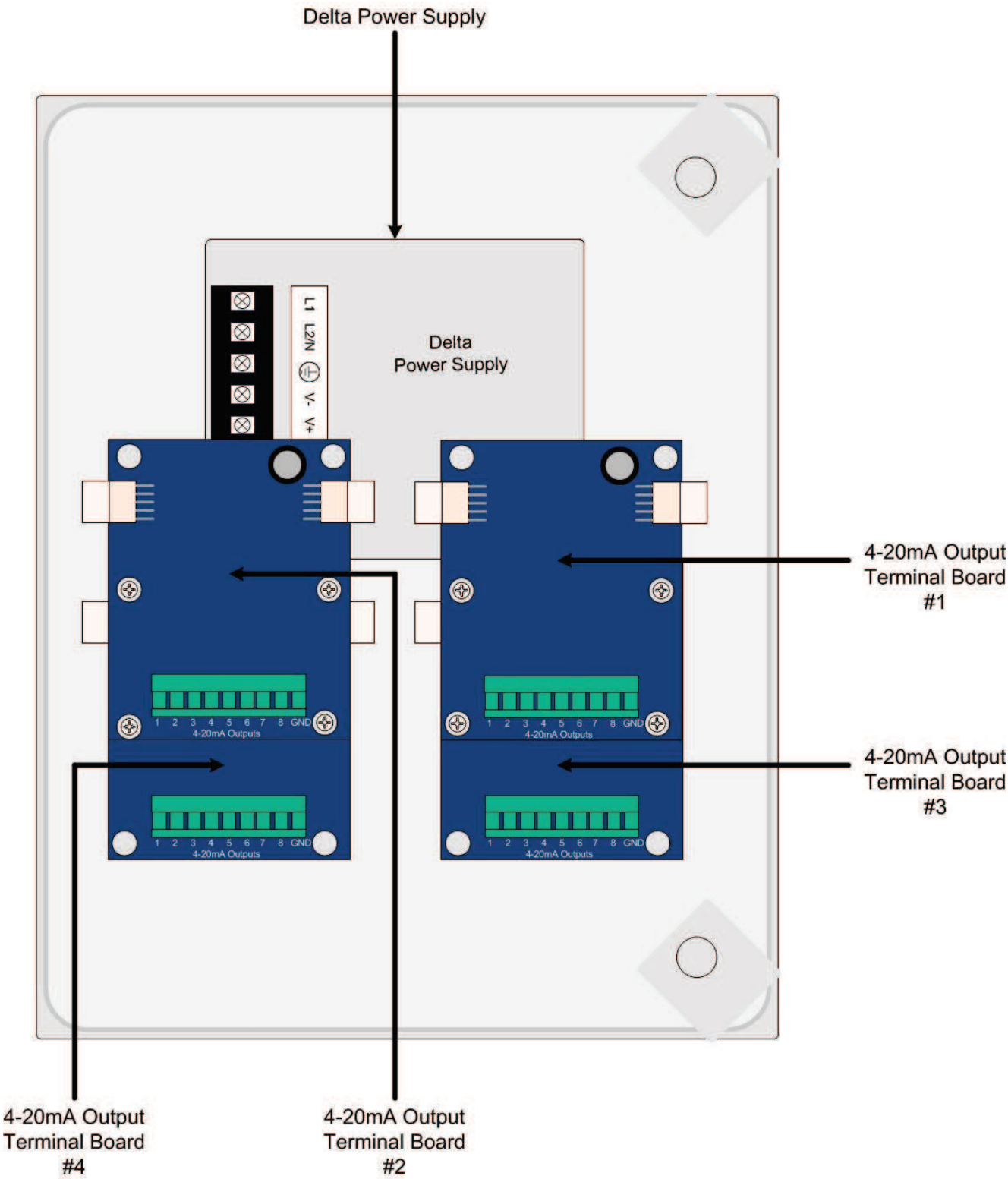
Complete System



Internal Diagram (Left Side)



Internal Diagram (Right Side)



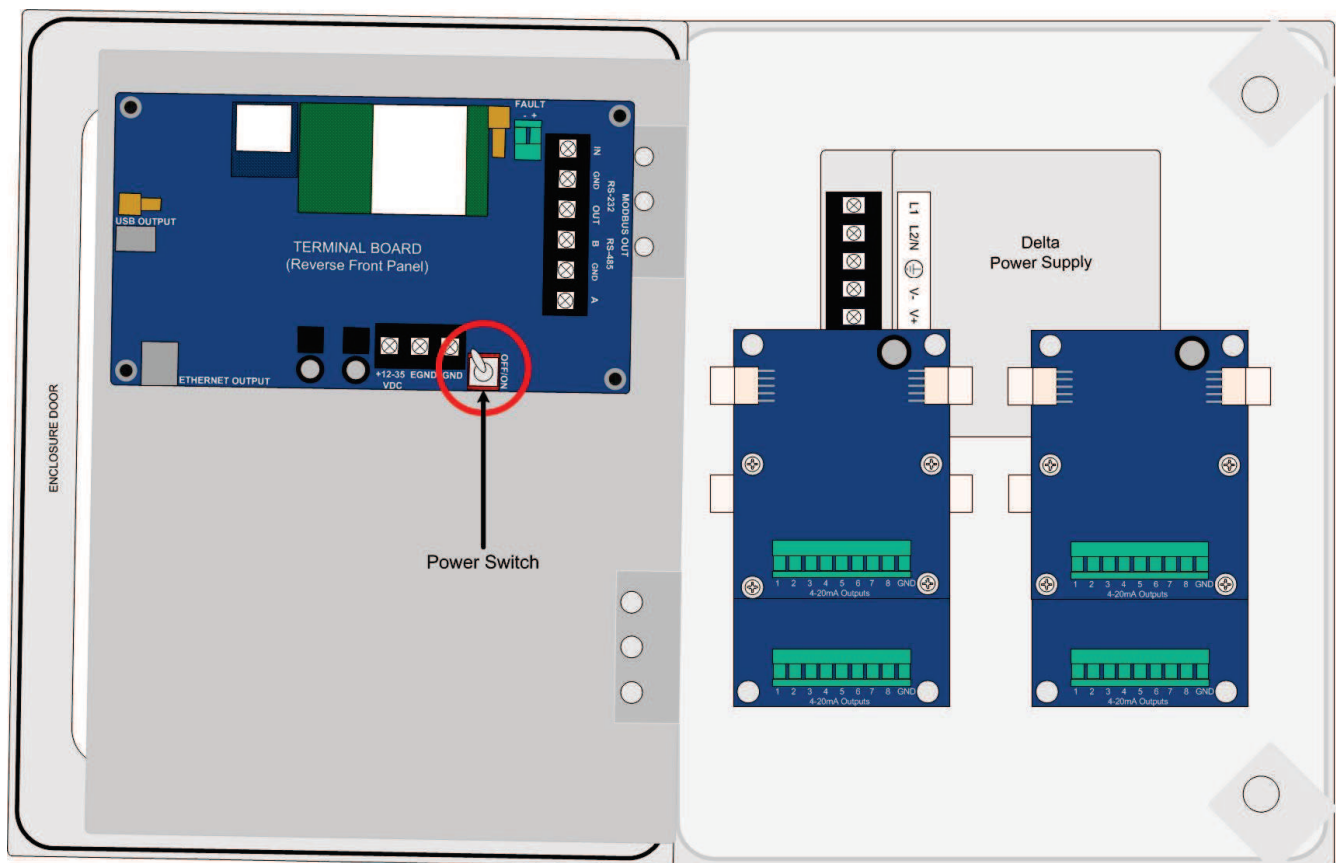
Power On/Off

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



CAUTION: THE INTERNAL COMPONENTS CAN BE STATIC SENSITIVE. USE CAUTION WHEN OPENING THE ENCLOSURE AND HANDLING INTERNAL COMPONENTS.

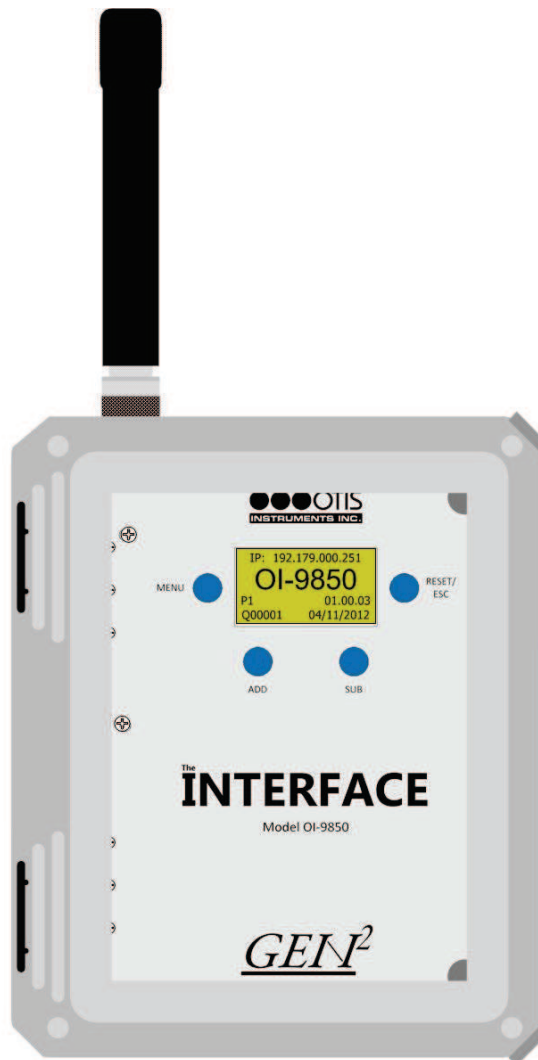
1. Supply AC or DC power to the device according to the Wiring Configurations section of this Operation Manual.
2. Open the enclosure latches.
3. Unscrew the two Front Panel Thumbscrews.
4. Locate the Power Switch on the Terminal Board.



5. Flip the Power Switch to the ON position (switch down).

Power On/Off cont...

6. When Powered On, the device will count down from 20-0, displaying the following:
 - 20-15 – Otis Instruments Logo
 - 15-10 – Gen II Logo
 - 10-5 – WireFree Logo
 - 5-0 – OI-9850, Serial #, Version, and Build
7. The device is now in Normal Operating Mode and fully operational. When in Normal Operating Mode, the OI-9850 should resemble the following illustration:



Basic Menu Mode

The Basic Menu Mode allows the user to configure: Modbus, 4-20mA Output, TCP/IP, and Alarms.

NOTE: To exit the Basic Menu Mode at any time, press RESET/ESC.

Modbus Configuration

1. Locate *MENU* on the Front Panel.



Modbus Configuration cont...

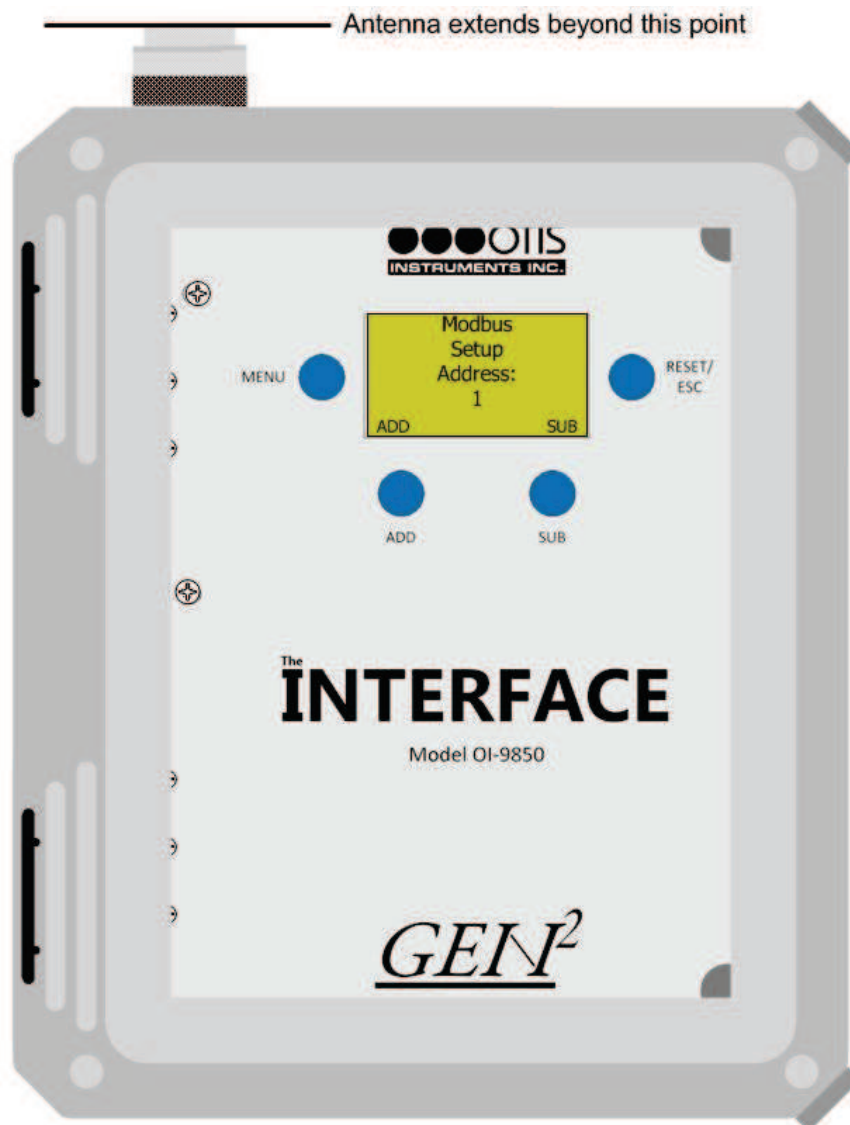
2. Press and hold *MENU* for approximately 6 seconds.
3. The display screen should resemble the following illustration:



4. Press *MENU* to configure the settings for Modbus; press *ADD* to continue to the next mode option: 4-20mA Output Configuration; or, press *SUB* to view the last mode option: Alarm Set Configuration.

Modbus Configuration cont...

5. If *MENU* was pressed, the display screen should resemble the following illustration. If *ADD* was pressed, continue to the next section in the Basic Menu Mode instruction set: 4-20mA Configuration. If *SUB* was pressed, continue to the last section in the Basic Menu Mode instruction set: Alarm Set Configuration.



Modbus Setup Address Setting

1. Press *ADD* (increase) or *SUB* (decrease) to manipulate the Modbus Setup Address.
2. Once the Modbus Setup Address is set, continue to the next step.

Modbus Setup Baud

1. After the Modbus Setup Address has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the Modbus Setup Baud.
4. Once the Modbus Setup Baud is set, continue to the next step.

Modbus Setup Float Swap

1. After the Modbus Setup Baud has been set, press *MENU*.
2. The display screen should resemble the following illustration:

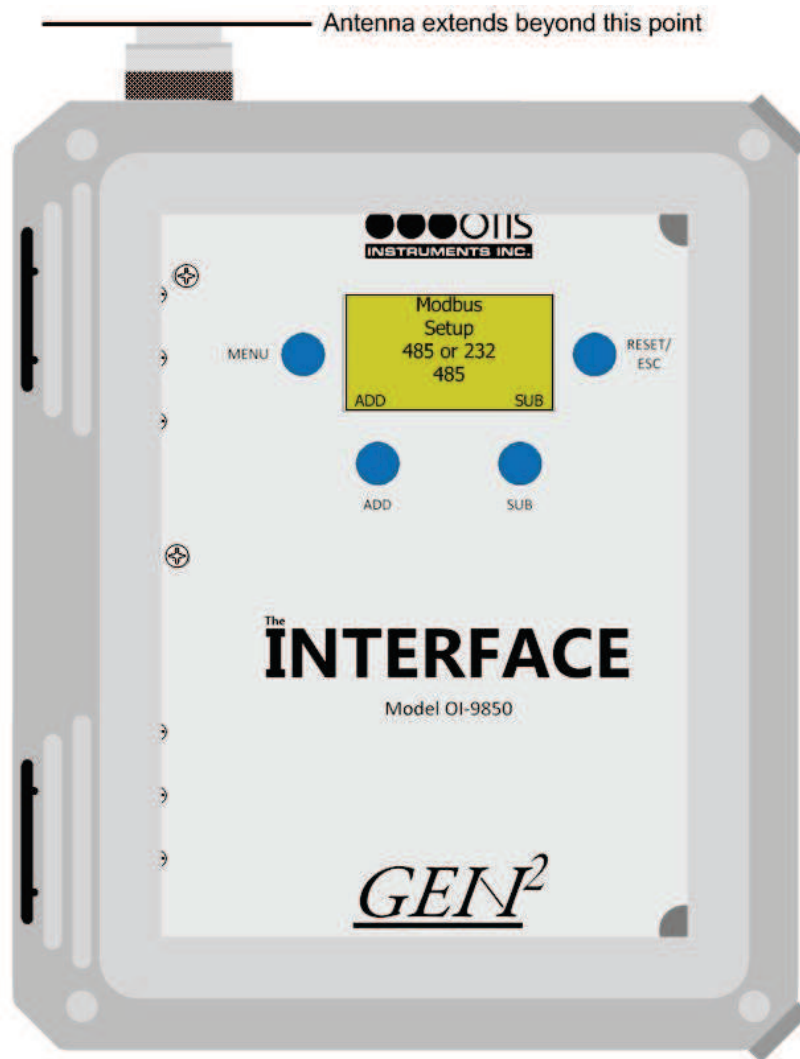


3. Press *ADD* or *SUB* to change the Modbus Setup Float Swap between “Normal” and “Swapped”.
4. Once the Modbus Setup Float Swap is set, continue to the next step.

Modbus Setup 485 or 232

The Modbus Setup 485 or 232 option is used to choose which output is active on the terminal board.

1. After the Modbus Setup Float Swap has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* or *SUB* to change the Modbus Setup Float Swap between “485” and “232”.
4. Once the Modbus Setup 485 or 232 is set, press *MENU*.
5. The Configure Settings for Modbus screen will reappear. Press *ADD* to continue to the next mode option, or press *SUB* to view the last mode option in the Basic Menu Mode.

Modbus Configuration cont...

6. If *ADD* was pressed, continue to the next instruction set: 4-20mA Output Configuration. If *SUB* was pressed, continue to the last section in the Basic Menu Mode instruction set: Alarm Set Configuration.

4-20mA Output Configuration

NOTE: If no 4-20 boards are installed, this setting will be hidden.

1. After the Modbus Configurations are complete—or if the Modbus Configurations were skipped—the display screen should resemble the following illustration:



4-20mA Output Configuration cont...

2. Press *MENU* to configure the settings for 4-20mA Output Configuration; press *ADD* to continue to the next mode option: TCP/IP; or, press *SUB* to return to the previous setup option: Modbus Configuration.
3. If *MENU* was pressed, the display screen should resemble the following illustration. If *ADD* was pressed, continue to the next instruction set: TCP/IP Configuration. If *SUB* was pressed, return to the previous instruction set: Modbus Configuration.



4-20 Port Setup

1. Press *ADD* (increase) or *SUB* (decrease) to manipulate the 4-20 Port Setup.
2. Once the 4-20 Port is set, continue to the next step.

4-20 Port Setup On/Off

1. After the 4-20 Port has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* or *SUB* to change the 4-20 Port between “On” and “Off”.
4. Once the 4-20 Port On/Off option is set, continue to the next step.

4-20 Port Setup Address

NOTE: The 4-20 Port Setup Address option assigns which WireFree radio address is assigned to the port # that is being configured.

1. If the 4-20 Port was set to “On”, press *MENU* and continue to the next step. If the 4-20 Port was set to “Off”, press *MENU* and return to the 4-20mA Output Configuration section.
2. If the 4-20 Port was set to “On”, the display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the 4-20 Port Setup Address.
4. Once the 4-20 Port Setup Address is set, continue to the next step.

4-20 Port Setup Output 1:1/Scaled

1. After the 4-20 Port Setup Address has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* or *SUB* to toggle between “1:1” and “Scaled”.

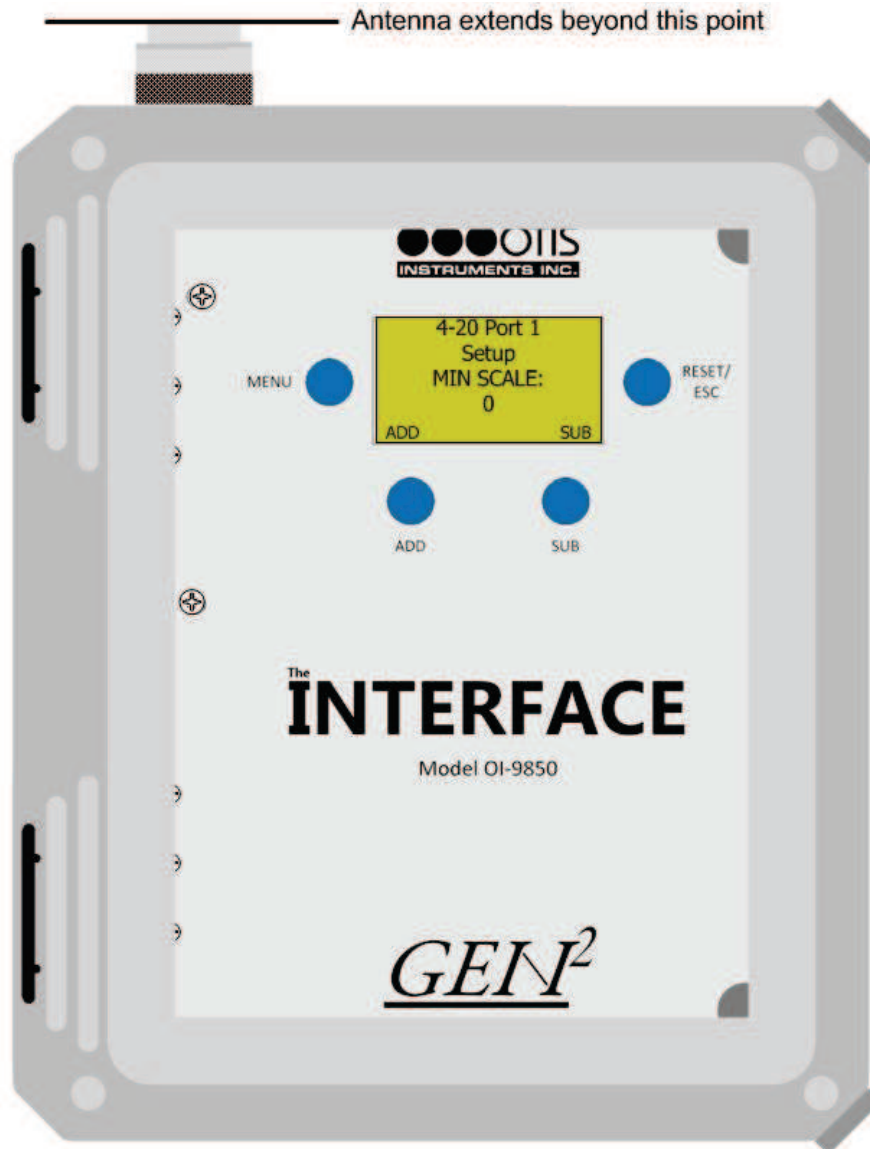
NOTE: If “1:1” is selected, the value that is received will be the value that is output on the selected port. For example: If “4” is received then the OI-9850 output will output 4mA.

NOTE: If “Scaled” is selected, the “Min” and “Max” values will determine the current level output on the selected port. For example: If the “Min” and “Max” are set at 0 and 100 and a “0” is received, the OI-9850 will output 4mA; if a “100” is received, the OI-9850 will output 20mA.

4. Once the 4-20 Port Setup Output 1:1/Scaled option is set, continue to the next step.

4-20 Port Setup Min Scale

1. If the 4-20 Port Setup Output 1:1/Scaled was set to “1:1”, press *MENU* and continue to the 4-20 Offset configuration section. If the 4-20 Port Setup Output 1:1/Scaled was set to “Scaled”, the display screen should resemble the following illustration:



2. Press *ADD* (increase) or *SUB* (decrease) to manipulate the 4-20 Port Setup Min Scale setting.
3. Once the 4-20 Port Setup Min Scale is set, continue to the next step.

4-20 Port Setup Max Scale

1. After the 4-20 Port Setup Min Scale has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the 4-20 Port Setup Max Scale setting.
4. Once the 4-20 Port Setup Max Scale is set, continue to the next step.

4-20 Port Setup 4mA Offset

NOTE: For a proper calibration, the output must be connected to the device (PLC or other monitor) that will be reading the signal.

1. After the 4-20 Port Setup Max Scale has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the 4-20 Port 4mA Offset setting.
4. Once the 4-20 Port 4mA Offset is set, continue to the next step.

4-20 Port Setup 20mA Offset

1. After the 4-20 Port Setup 4mA Offset has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the 4-20 Port 20mA Offset setting.
4. Once the 4-20 Port 20mA Offset is set, press *MENU*.
5. The Configure Settings for 4-20mA Output screen will reappear. Press *MENU* (and repeat all steps in the 4-20mA Output Configuration instruction set) to configure another Port. Press *ADD* to continue to the next mode option: TCP/IP; or, press *SUB* to view the previous mode option: Modbus Configuration.

TCP/IP Configuration

1. After the 4-20mA Configurations are complete—or if the 4-20mA Configurations were skipped—the display screen should resemble the following illustration:



TCP/IP Configuration cont...

2. Press *MENU* to configure the settings for TCP/IP; press *ADD* to continue to the next mode option: Alarm Set; or, press *SUB* to return to the previous setup option: 4-20mA Configuration.
3. If *MENU* was pressed, the display screen should resemble the following illustration. If *ADD* was pressed, continue to the next instruction set: Alarm Set Configuration. If *SUB* was pressed, return to the previous instruction set: 4-20mA Configuration.



IP Address Setup Type

1. Press *ADD* or *SUB* to change the IP Address Setup Type between “DHCP” and “Manual”.

NOTE: Whether DHCP or Manual is chosen will depend on your specific network setup. Please contact your network administrator for more details.

2. If “DHCP” is chosen, the device will return to the Modbus Configuration Setup option. If “Manual” is chosen, the display screen should resemble the following illustration:



TCP/IP Configuration cont...

3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the IP settings. Once the desired number is displayed, press *MENU* to move to the next number set for setup.

NOTE: The number set being modified will be blinking. Pressing MENU will move allow the user to move to the next consecutive number set to be modified. To return to a previous number set, continue pressing MENU until the series repeats.

NOTE: Copy the IP address exactly (do not add leading “0”s).

NOTE: The IP settings will be determined by your network settings. Please contact your network administrator to obtain the proper values.

4. Once the final number set is setup, press *MENU*. The Display Screen should then show the Modbus Settings Configuration screen. Press *ADD* three times to move to the next Basic Menu Mode setup option: Alarm Set Configuration.

Alarm Set Configuration

1. After the TCP/IP Configurations are complete—or if the TCP/IP Configurations were skipped—the display screen should resemble the following illustration:

NOTE: Alarms are only used when looking at the website or getting data through the Modbus. There are no local alarms on the OI-9850.

2. Press *MENU* to configure the settings for Alarm Settings; press *ADD* to return to the first option in the Basic Menu Mode: Modbus Configuration; or, press *SUB* to return to the previous mode option: TCP/IP Configuration.



Alarm Set Configuration cont...

3. If *MENU* was pressed, the display screen should resemble the following illustration. If *ADD* was pressed, return to the first section in the Basic Menu Mode instruction set: Modbus Configuration. If *SUB* was pressed, return to the previous section in the Basic Menu Mode instruction set: TCP/IP Configuration.



Address Selection

1. Press *ADD* (increase) or *SUB* (decrease) to manipulate the Address Selection.
2. Once the Address is selected, continue to the next step.

Address On/Off Setup

1. After the Address has been selected, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* or *SUB* to change the Address between “On” and “Off”.

NOTE: Setting the channel to “Off” turns the channel off. When a channel is turned off, no transmissions will be received for that channel.

4. Once the Address On/Off option is set, continue to the next step.

Address Rise/Fall Low Setup

1. If the Address was set to “On”, press *MENU* and continue to the next step. If the Address was set to “Off”, continue to the instruction set: Address Setup Duplicate.
2. If the Address was set to “On”, the display screen should resemble the following illustration:



3. Press *ADD* or *SUB* to change the Address Rise/Fall Low setting between the “Rise” and “Fall” options.
4. Once the Address Rise/Fall Low is set, continue to the next step.

Low Alarm Setup

1. After the Address Rise/Fall Low has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the Low Alarm value.
4. Once the Low Alarm value is set, continue to the next step.

Address Rise/Fall High Setup

1. After the Low Alarm value has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* or *SUB* to change the Address between the “Rise” and “Fall” options.
4. Once the Address Rise/Fall High is set, continue to the next step.

High Alarm Setup

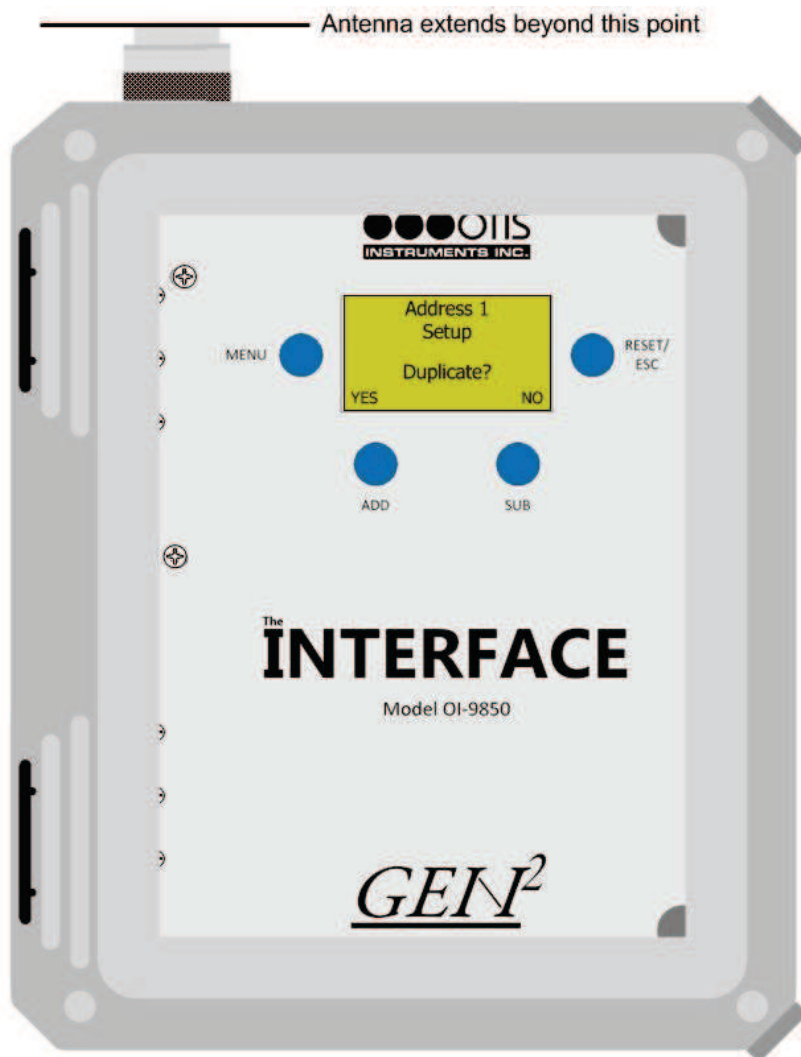
1. After the Address Rise/Fall High has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* (increase) or *SUB* (decrease) to manipulate the High Alarm value.
4. Once the High Alarm value is set, continue to the next step.

Address Setup: Duplicate

1. After the High Alarm value has been set, press *MENU*.
2. The display screen should resemble the following illustration:



3. Press *ADD* for “YES” or *SUB* for “NO”.
4. Once the Duplicate option has been selected, the device will return to the Alarm Set Configuration screen. If “Yes” was selected, all alarms are now setup with the same settings that were just selected. Press *RESET/ESC* to return to Normal Operating Mode. If “No” was selected, the device will return to the Alarm Set Configuration Screen. Press *MENU* to manually setup the next Alarm, starting from the beginning of this instruction set (Alarm Set Configuration); or, press *ADD* or *SUB* to navigate through the Basic Menu Mode setup options.

Advanced Menu Mode

The Advanced Menu Mode allows the user to configure: Contrast, Radio Timeout, Network ID, and Monitor Primary/Secondary.

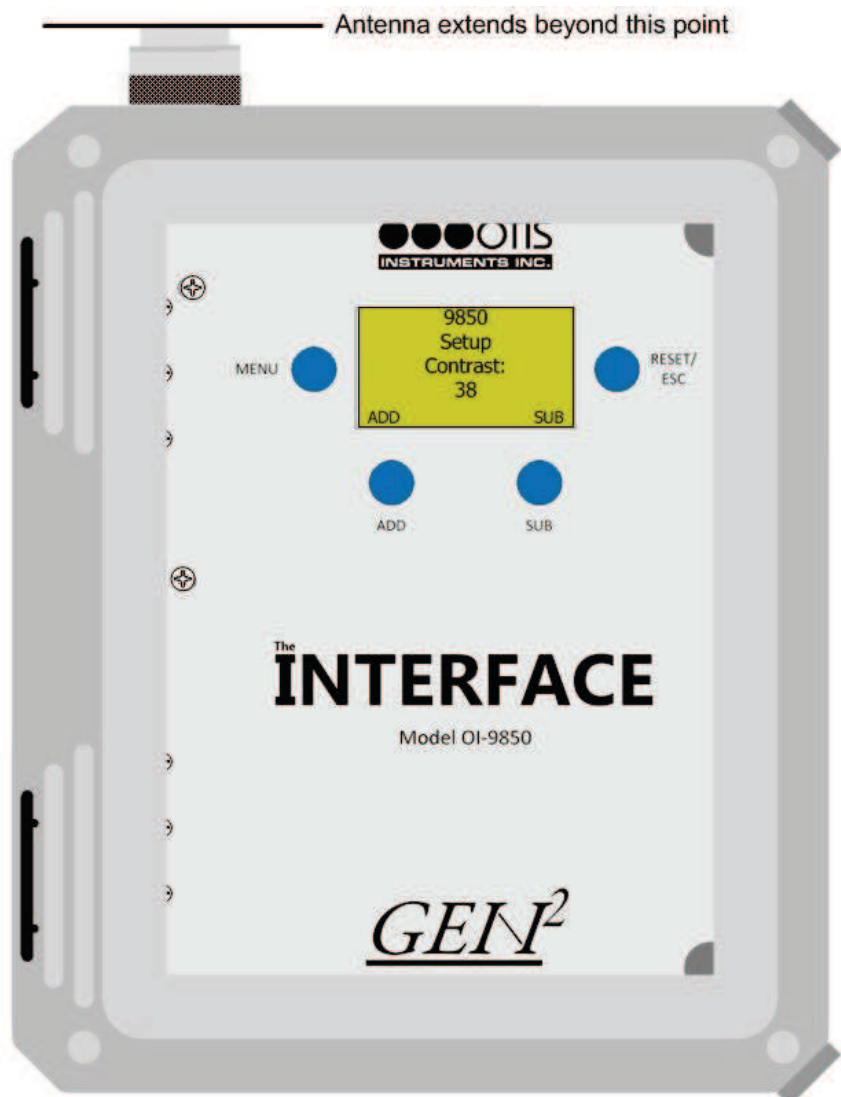
NOTE: To exit the Advanced Menu Mode at any time, press RESET/ESC.

Entering Advanced Configuration Menu

1. Cycle the unit's power (turn OFF, then ON). Power off the device by turning off the voltage supply at the power source (DC power), or by unplugging the unit (AC power). Power on the device by supplying voltage to the unit.
2. Open the enclosure box.
3. When the Otis Logo is shown on the Display Screen, press *MENU*.

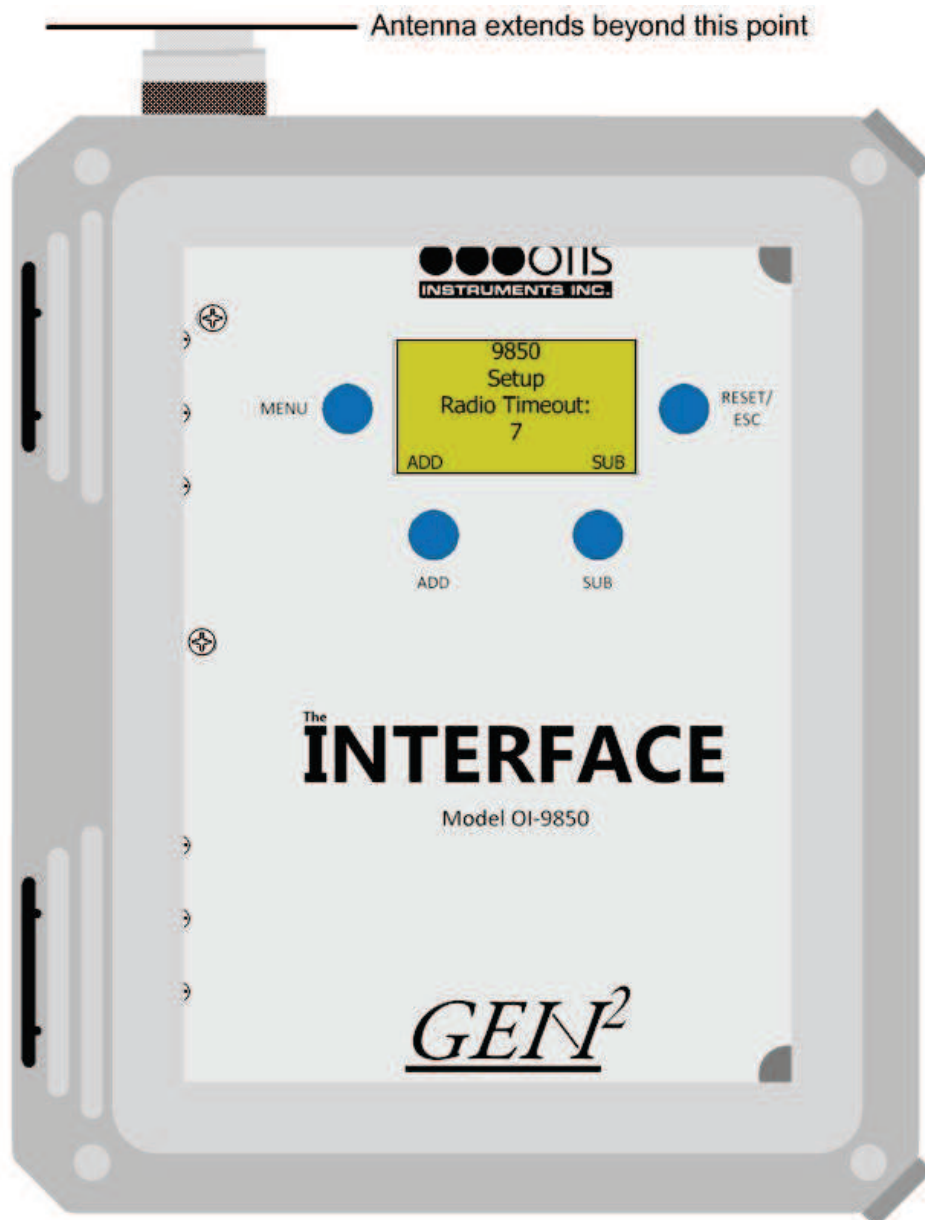
Adjusting LCD Contrast

Press *ADD* (increase) or *SUB* (decrease) to manipulate the LCD contrast. Press *MENU* (Next) to confirm the setting.



Radio Timeout Setting

Press *ADD* (increase) or *SUB* (decrease) to manipulate the Radio Timeout Setting. Press *MENU* (Next) to confirm the setting.



Network ID Setting

Press *ADD* (increase) or *SUB* (decrease) to manipulate the Network ID Setting. Press *MENU* (Next) to confirm the setting.

NOTE: This page only appears if a GEN II radio is installed.



Primary/Secondary Monitor Setting

Touch *ADD* (increase) or *SUB* (decrease) to toggle between “Primary” and “Secondary”.
Touch *MENU* (Next) to confirm the setting and exit the Advanced Configuration Menu.

NOTE: This page only appears if a GEN II radio is installed.

*NOTE: On each GenII network there can be only one “Primary” monitor—
all other monitors must be setup as “Secondary” monitors.*

*NOTE: If the OI-9850 is set as a “Secondary” monitor when there is no
“Primary” monitor, the OI-9850 will go into Fault 15.*



APPENDIX A: Wiring Configurations

Wiring Configurations

The following Wiring Configurations must be completed before initial operation of the product. Depending on the user's preference, either AC or DC power may be used.



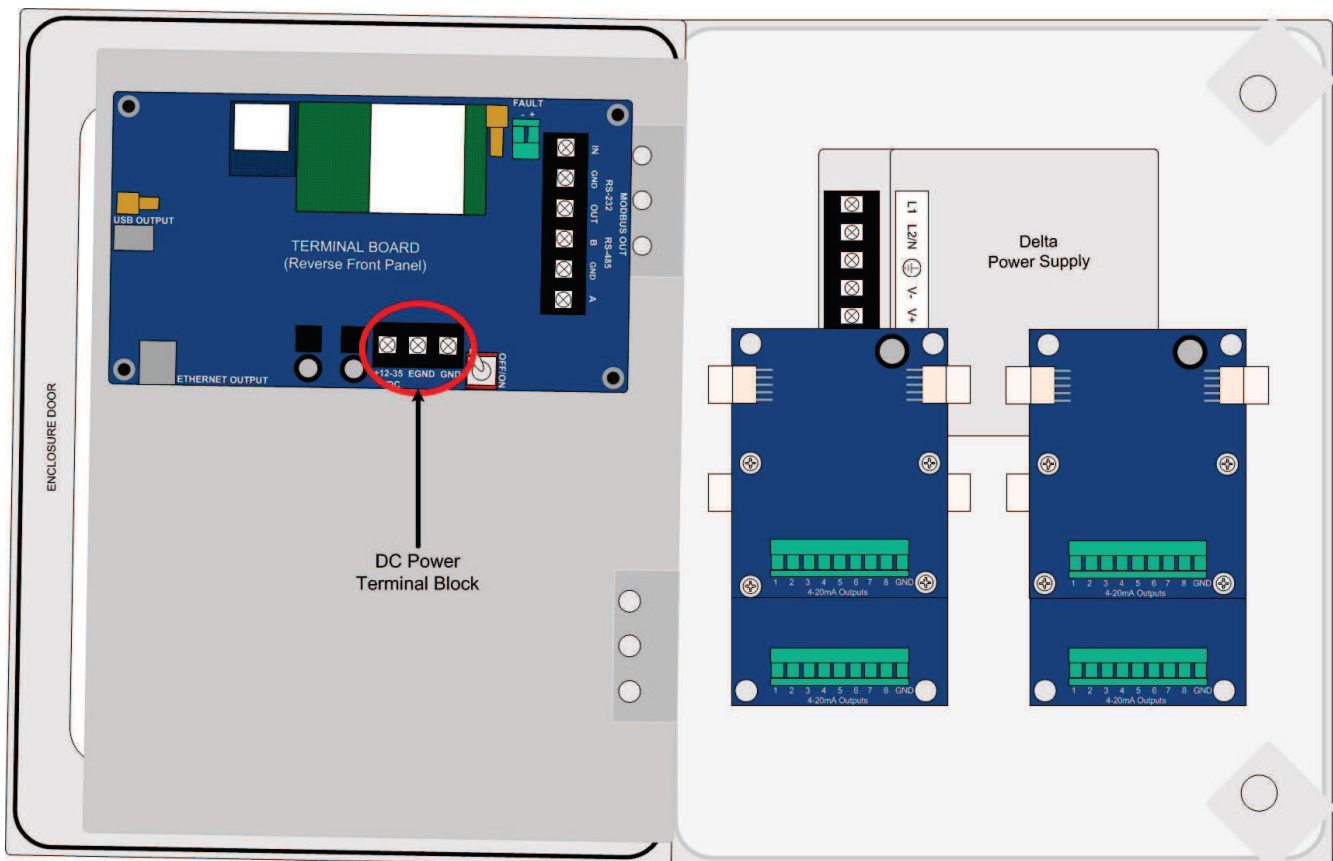
CAUTION: THE INTERNAL COMPONENTS CAN BE STATIC SENSITIVE. USE CAUTION WHEN OPENING THE ENCLOSURE AND HANDLING INTERNAL COMPONENTS.

AC Power Supply Connection

For AC Power applications, the pre-installed Delta Power Supply should be used.

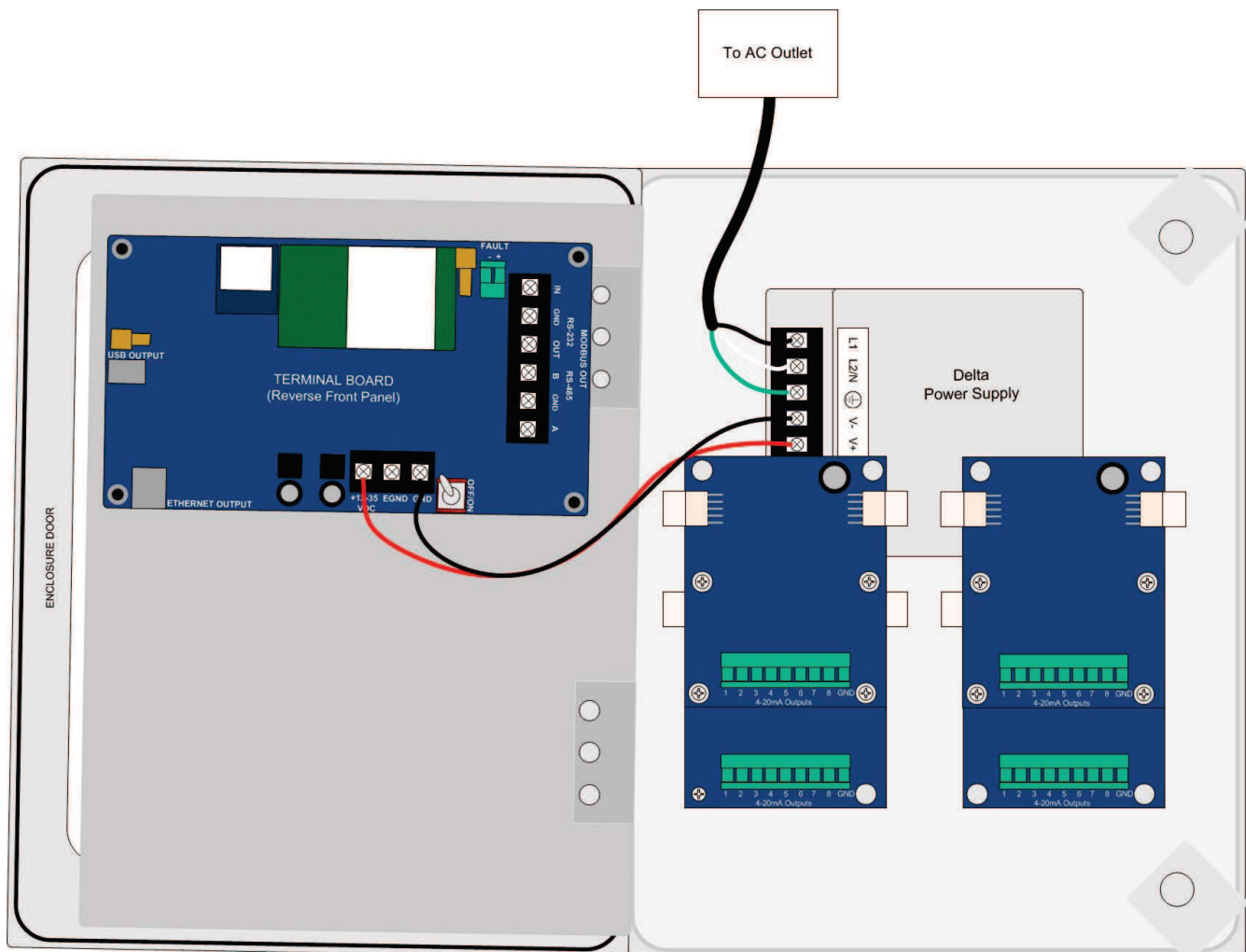
NOTE: The unit will be wired for the power-type that is requested by the purchaser when shipped from Otis Instruments, Inc.

1. Locate the DC Power Terminal Block on the Terminal Board.



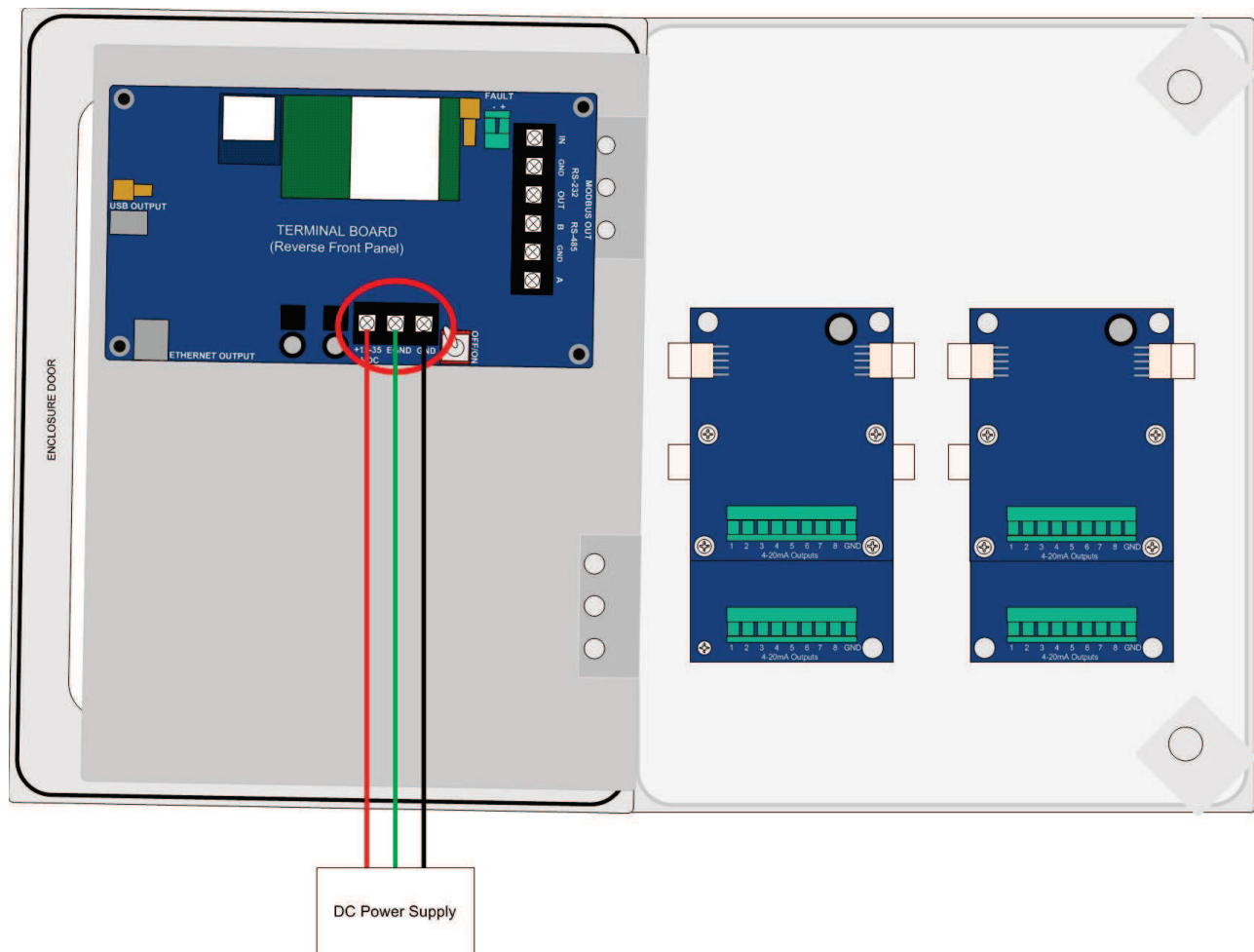
AC Power Supply Connection cont...

2. Connect a positive wire (red) to the terminal labeled “+12-35 VDC” on the DC Power Terminal Block.
3. Connect the other end of that same positive wire (red) from the Terminal Board to the terminal labeled “+V” on the Delta power supply.
4. Connect a negative wire (black) to the terminal labeled “GND” on the DC Power Terminal Block.
5. Connect the other end of that same negative wire (black) from the Terminal Board to the terminal labeled “-V” on the Delta power supply.
6. There will be three wires (black, white and green) pre-wired from the Delta power supply terminals “L1” (AC Load IN), “L2/N” (AC Neutral IN), and Ground (Chassis GND or Earth GND). This set of wires will be used to plug into an AC power outlet ONCE ALL WIRING CONFIGURATIONS ARE COMPLETE.



DC Power Connection

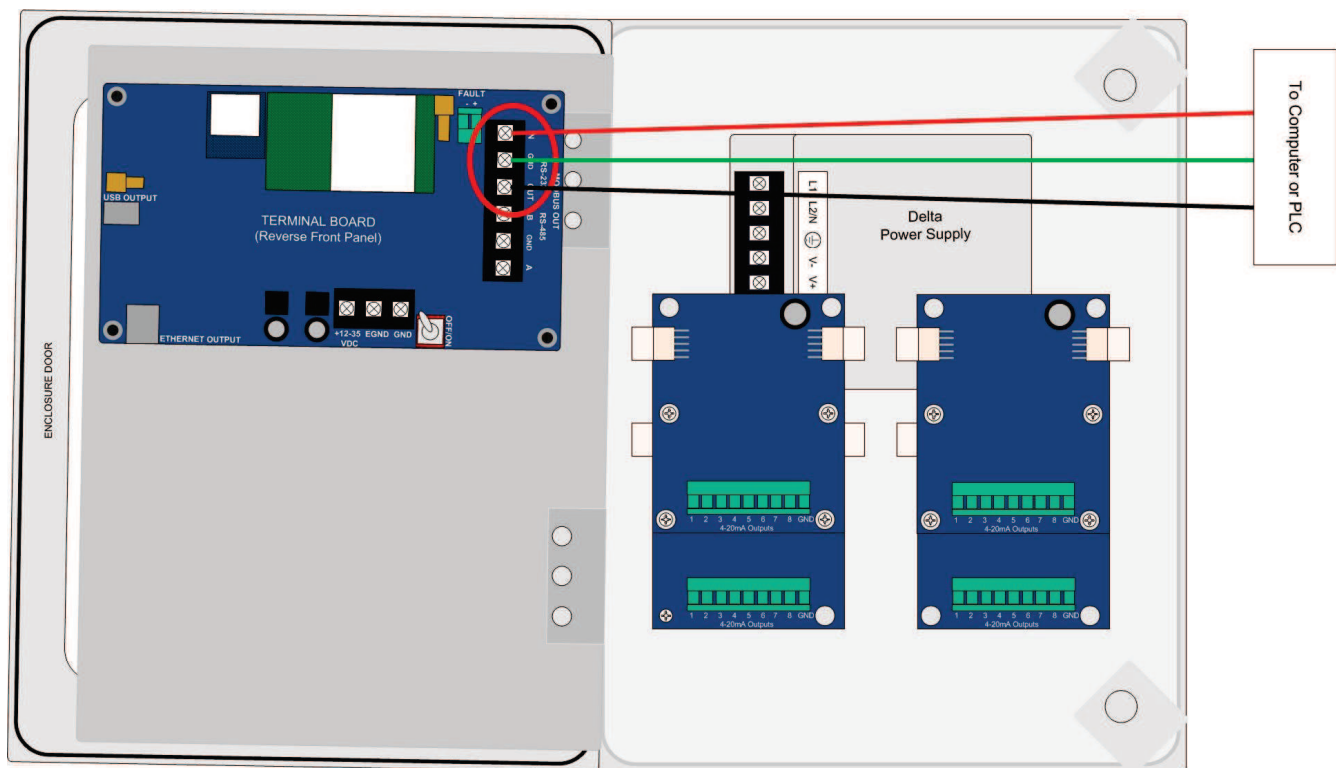
1. Locate the DC Power Terminal Block on the Terminal Board.
2. Connect a positive wire (red) to the terminal labeled +12-35 VDC.
3. Connect an earth ground wire (green) to the terminal labeled EGND.
4. Connect a neutral wire (black) to the terminal labeled GND.



RS-232 Output Wiring Configuration

NOTE: The output that was previously setup in the menu configurations will be the one that needs to be connected.

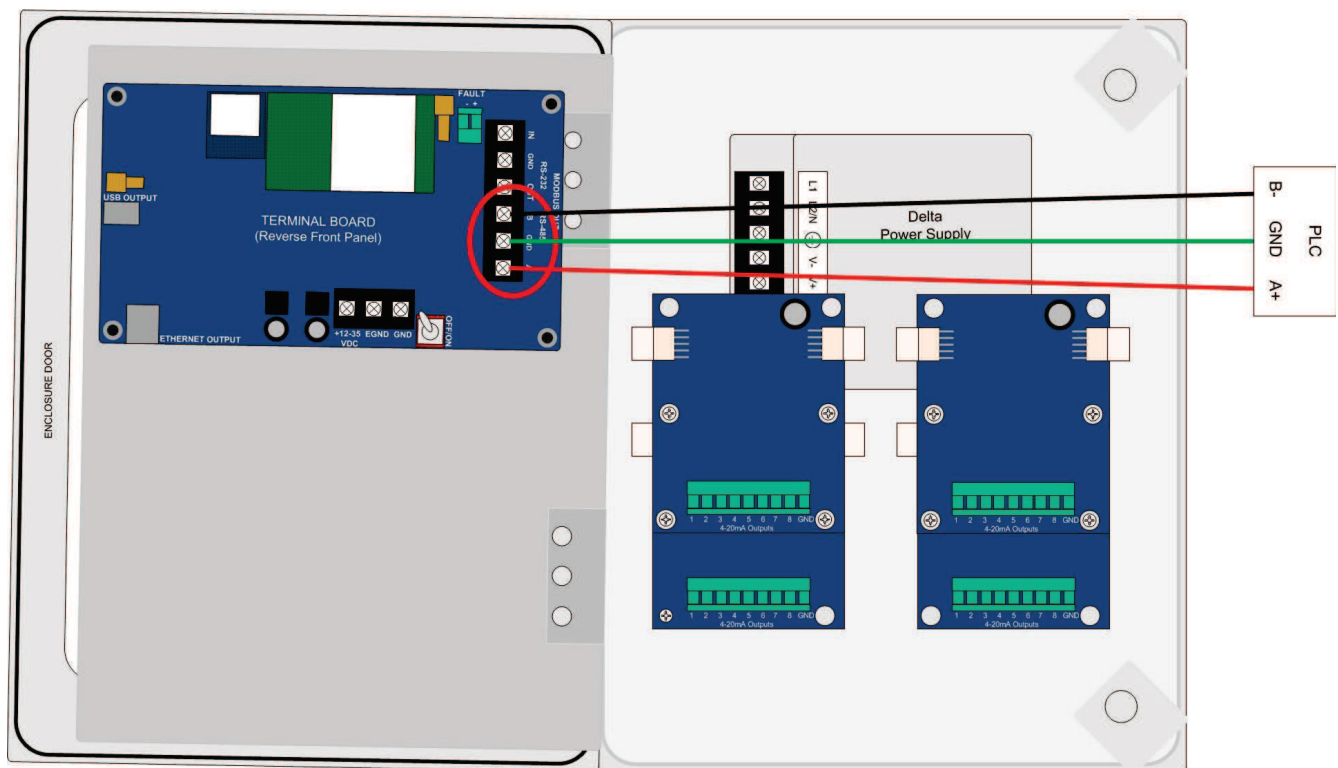
1. Locate the RS-232 Terminal Block on the Terminal Board.
2. Connect a transmit wire (red) from a computer/PLC to terminal labeled “IN” on the RS-232 Terminal Block.
3. Connect a ground wire (green) to the terminal labeled “GND” on the RS-232 Terminal Block.
4. Connect a receive wire (black) from a computer/PLC to the terminal labeled “OUT” on the RS-232 Terminal Block.



RS-485 / Modbus Output Wiring Configuration

NOTE: The output that was previously setup in the menu configurations will be the one that needs to be connected.

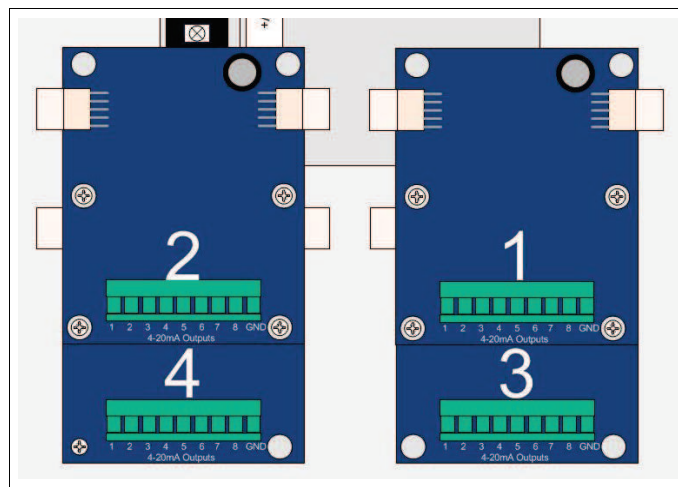
1. Locate the RS-485 Terminal Block on the Terminal Board.
2. Connect a wire (red) from a PLC's RS-485 A (+) terminal to the terminal labeled "A" on the OI-9850's RS-485 Terminal Block.
3. Connect a wire (green) from a PLC's RS-485 Ground terminal to the terminal labeled "GND" on the OI-9850's RS-485 Terminal Block.
4. Connect a wire (black) from a PLC's RS-485 B (-) terminal to the terminal labeled "B" on the OI-9850's RS-485 Terminal Block.



4-20mA Output Wiring Configuration

1. Locate the 4-20mA Output Terminal Boards inside the OI-9850 enclosure.

NOTE: When connecting multiple 4-20mA devices, begin with the upper right 4-20mA Terminal Board, then move to the upper left board when the first 8 terminals are full. This diagram (right) shows the order that 4-20mA devices should be used—filling all 8 of each board's terminals before moving to the next board.



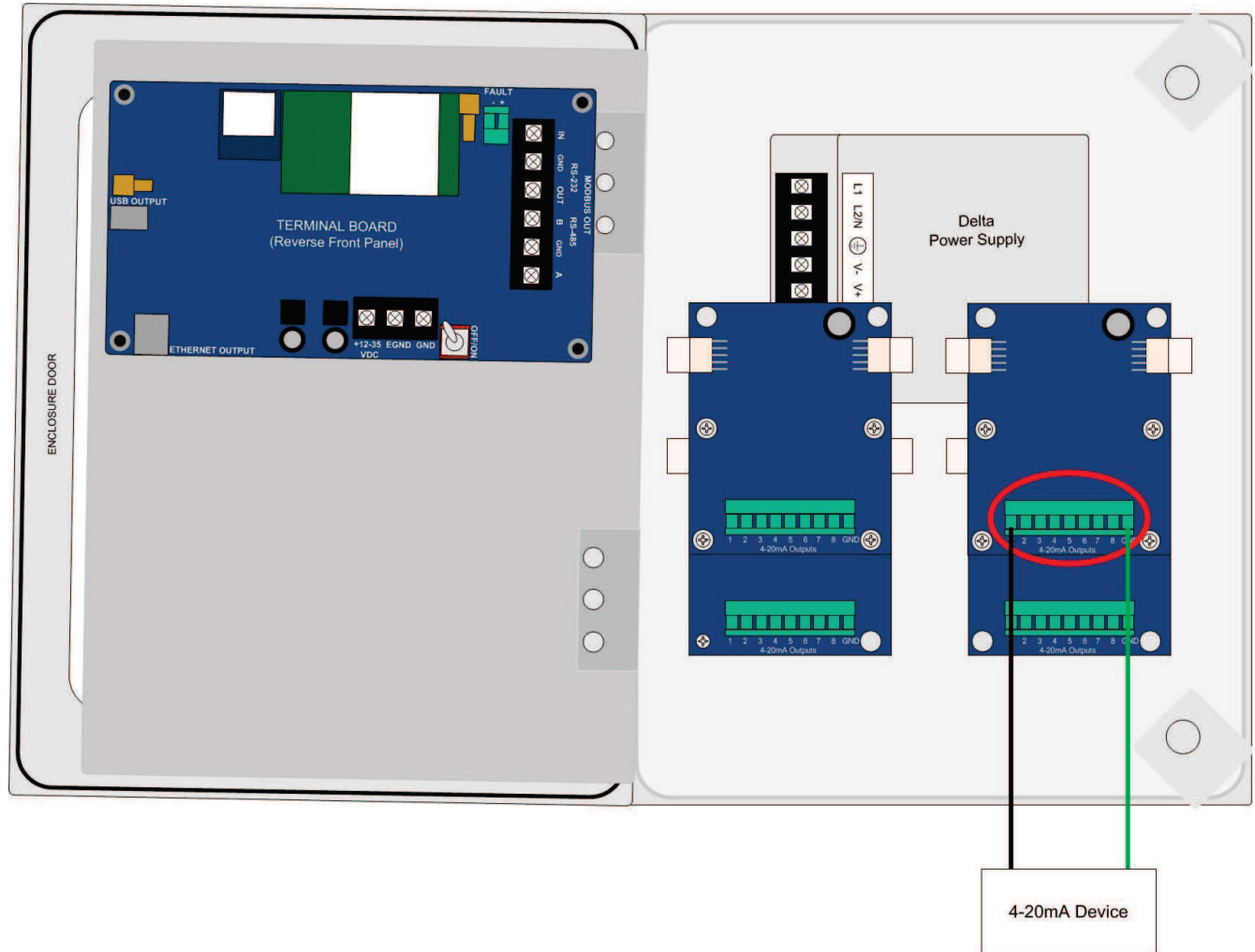
2. Connect up to eight 4-20mA receiving devices (ex: PLC's 4-20mA Input) from terminals 1-8 on each of the OI-9850's four 4-20mA Output Terminal Boards by completing the following:

NOTE: 22 gauge wire is adequate for wiring the 4-20mA Outputs.

- Connect a wire (black) from the terminal labeled “1” on the upper right 4-20mA Terminal Board's 4-20mA Output Terminal Block. Connect the black wire to the 4-20mA input terminal on a receiving 4-20mA device.
- Connect a ground (green) wire from the terminal labeled “GND” on the same 4-20mA Terminal Board's 4-20mA Output Terminal Block. Connect the ground wire to the ground terminal on a receiving 4-20mA device.

See Diagram on Next Page

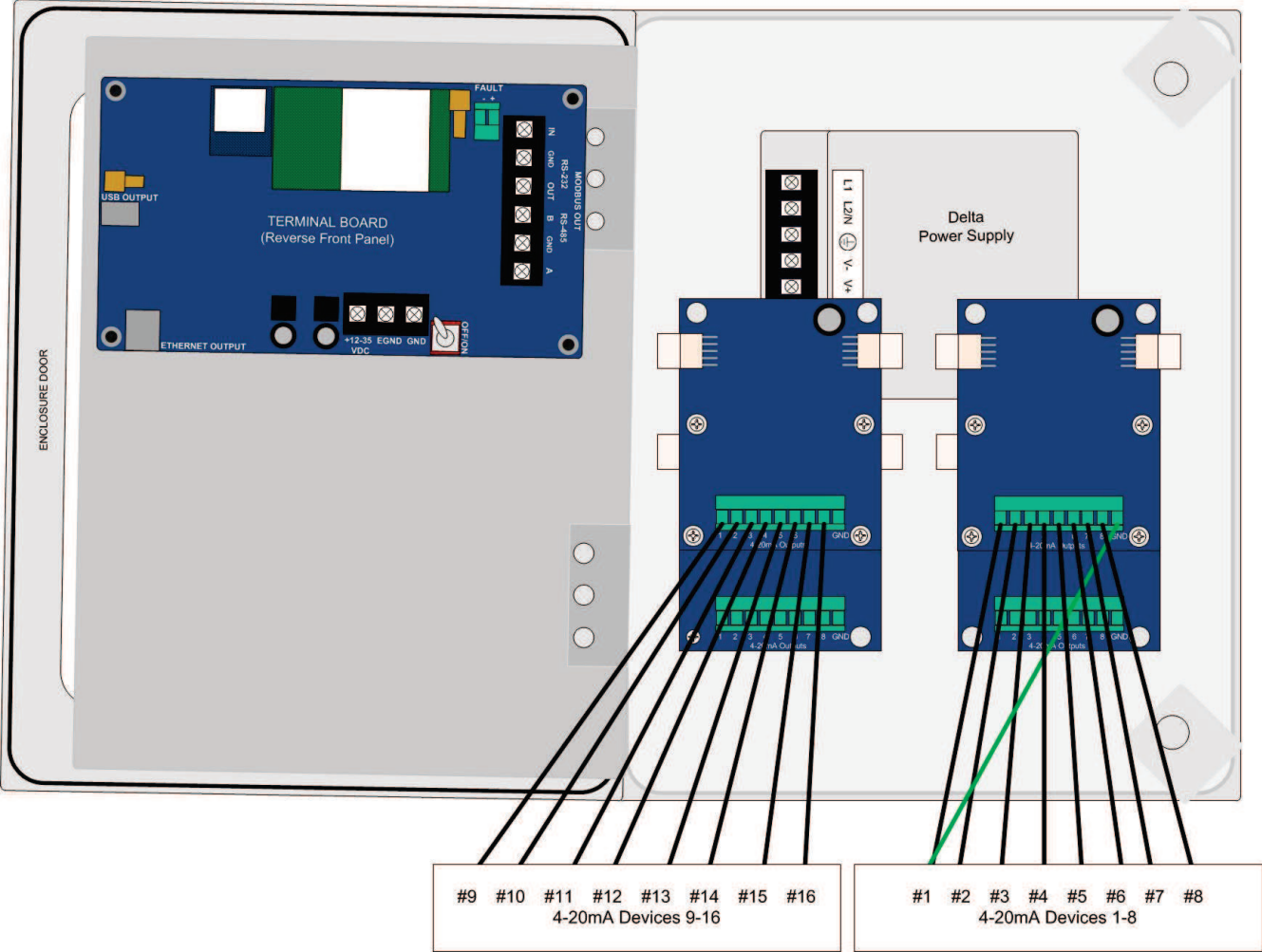
4-20mA Output Wiring Configuration cont...



- Up to 32 4-20mA receiving devices may be connected to the OI-9850. With 16 4-20mA receiving devices connected to the OI-9850, the 4-20mA Terminal Board wiring configurations should look like the diagram on the following page:

NOTE: Consult the instructions for the specific monitoring device being used as to whether the grounds will need to be jumped on each input at the monitoring device.

4-20mA Output Wiring Configuration cont...



APPENDIX B: 4-20mA Information

4-20mA Current Loop Introduction

This is just a brief overview of 4-20mA—this overview 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.

APPENDIX C: USB Driver Configuration

USB Driver Installation

The following instructions are provided for USB Driver installation—for connecting the OI-9850 with a PC.

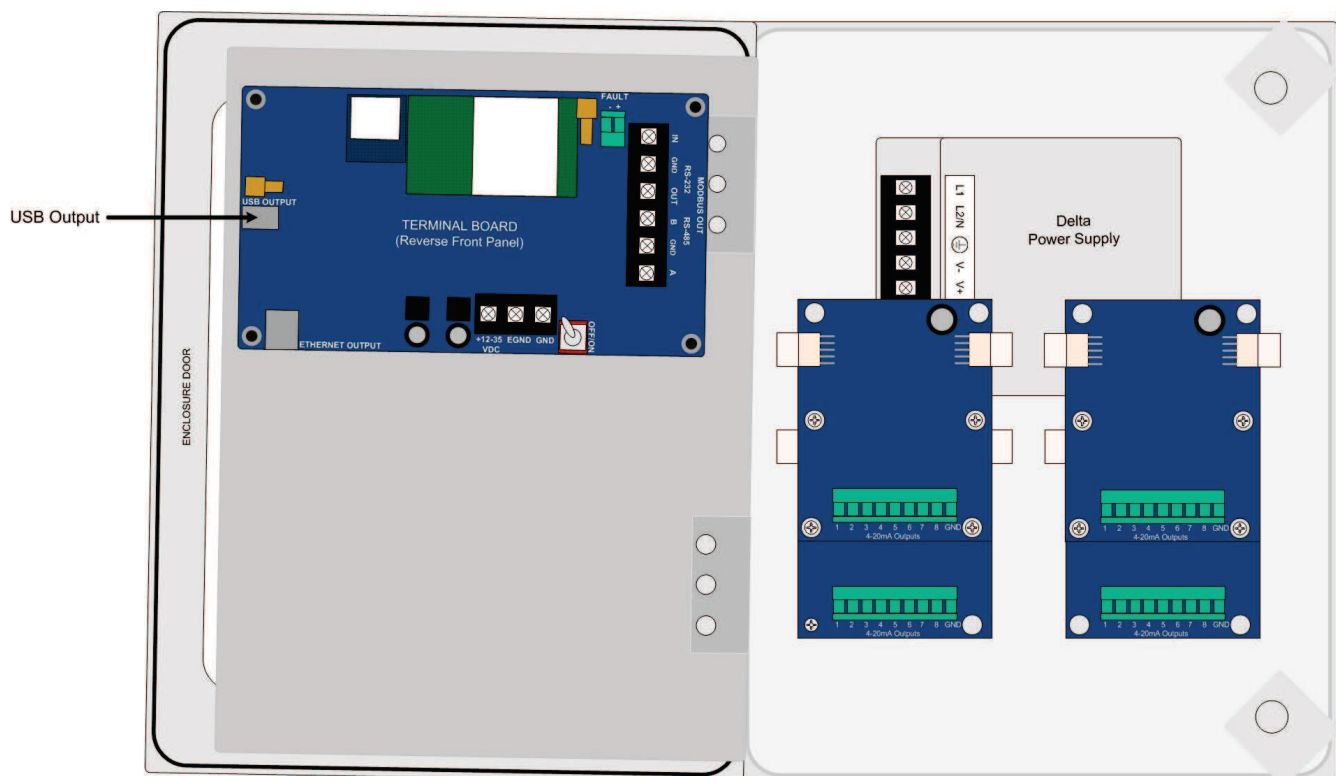


CAUTION: THE INTERNAL COMPONENTS CAN BE STATIC SENSITIVE. USE CAUTION WHEN OPENING THE ENCLOSURE AND HANDLING INTERNAL COMPONENTS.

NOTE: The OI-9850 uses a standard USB cable. A USB cable is not provided with the OI-9850.

NOTE: The USB Driver Software is only compatible with Microsoft Windows.

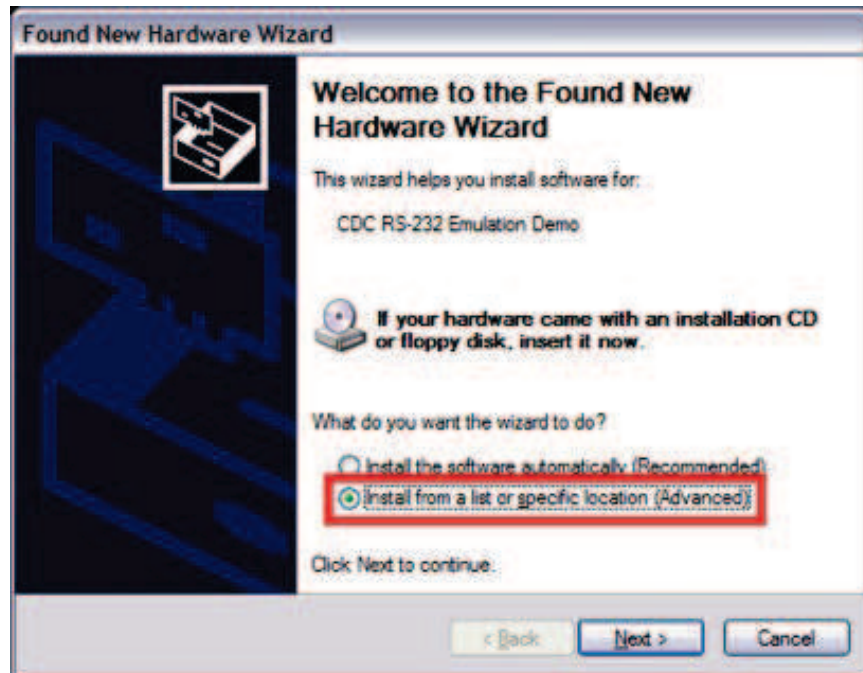
1. Download the OI-9850 driver from the Otis website.
2. Connect a USB cable from the OI-9850 to your PC.



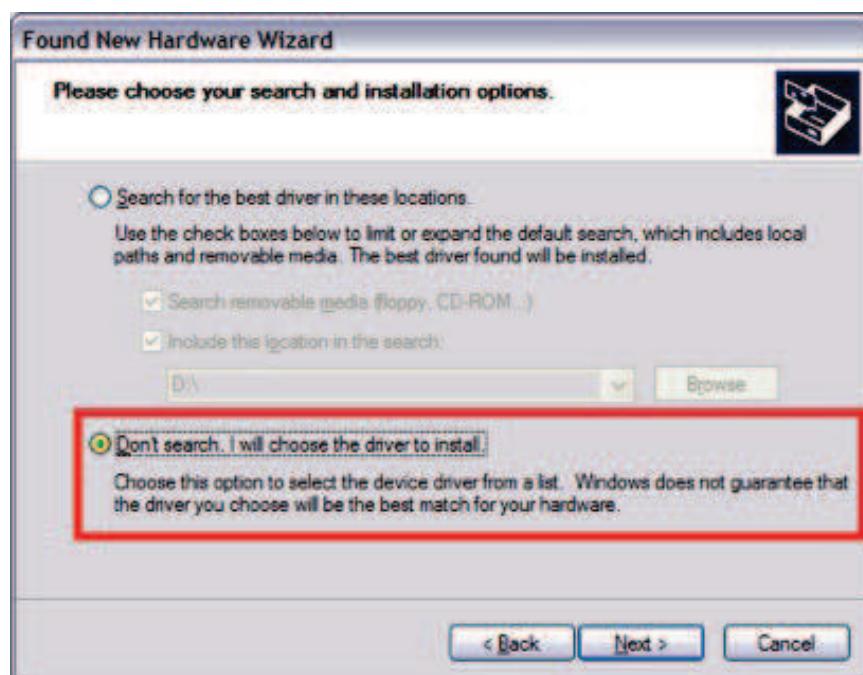
3. The “Found New Hardware” wizard will appear.
4. Select “Install from a list or specific location (Advanced)”.

USB Driver Installation cont...

5. Click “Next” to continue.

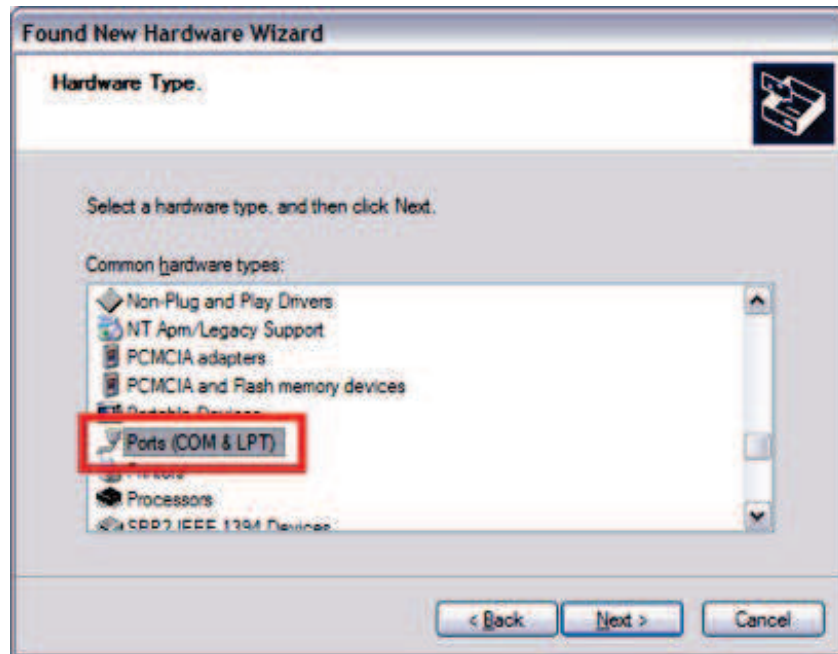


6. When the next window appears, select “Don’t search. I will choose the driver to install.”
7. Click “Next” to continue.

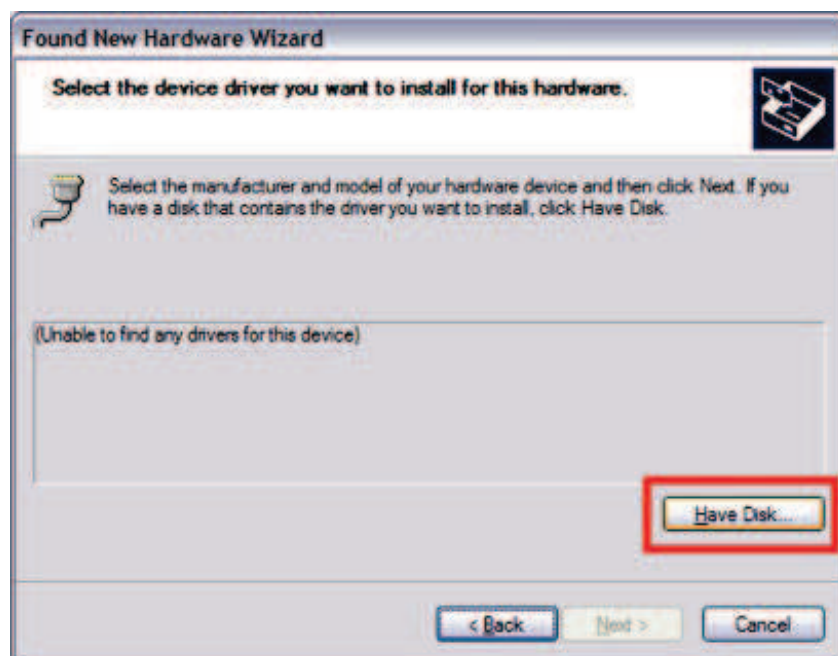


USB Driver Installation cont...

8. Scroll down until you see “Ports (COM & LPT)”.
9. Select “Ports (COM & LPT)”.
10. Click “Next” to continue.

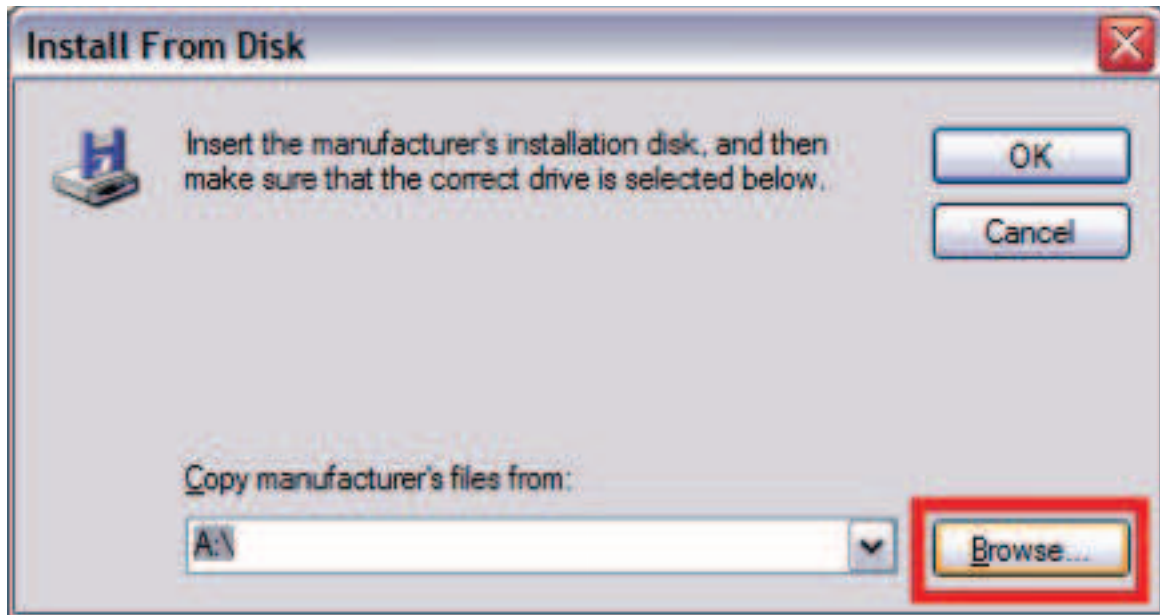


11. The next window should resemble the following illustration. The window will display: “(Unable to find any drivers for this device)”.
12. Click “Have Disk”.

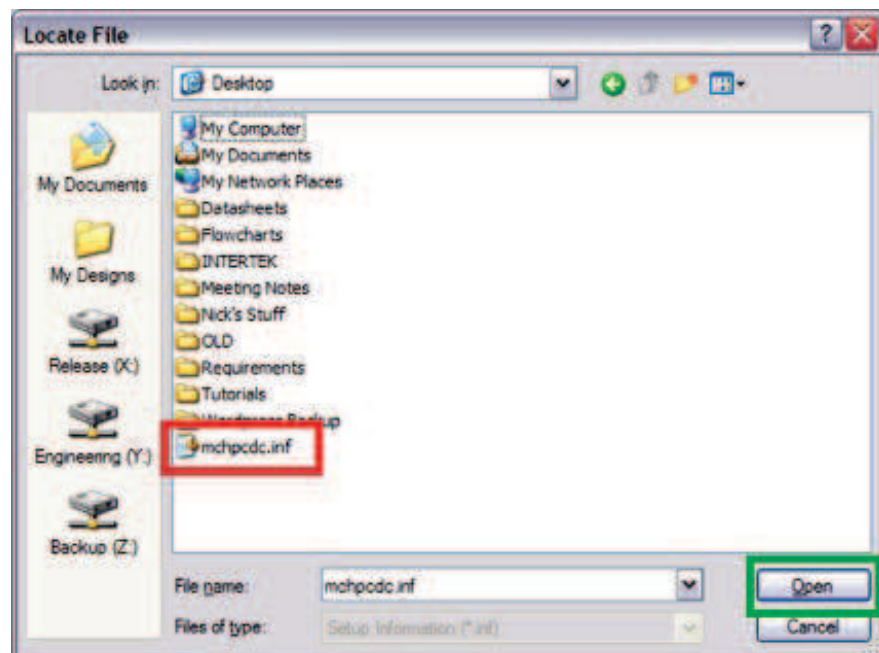


USB Driver Installation cont...

13. When the “Install from Disk” window appears, click “Browse”.

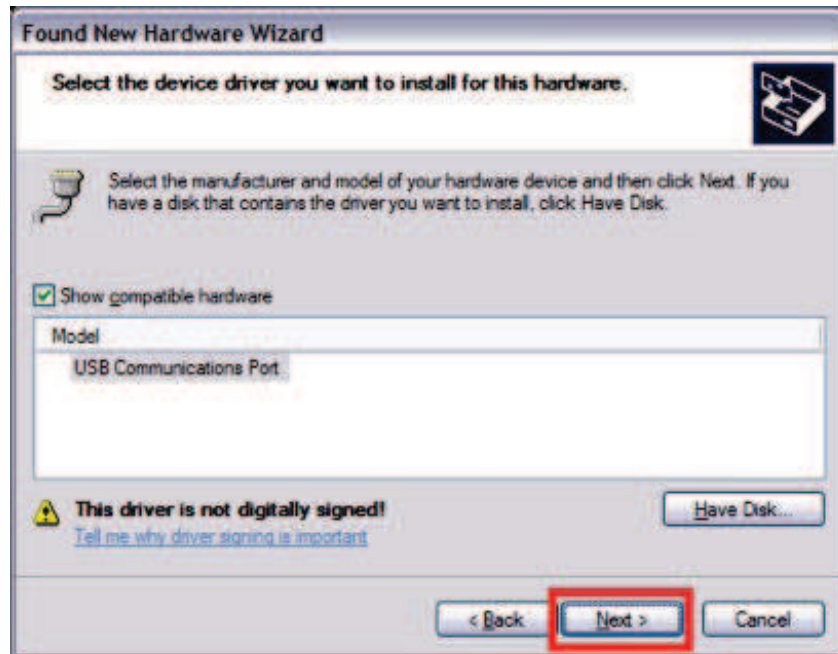


14. In the “Locate File” window, choose “Look in: Desktop” (or where you previously saved the driver file).
15. Select the file named “mchpcdc.inf”.
16. Click “Open”.

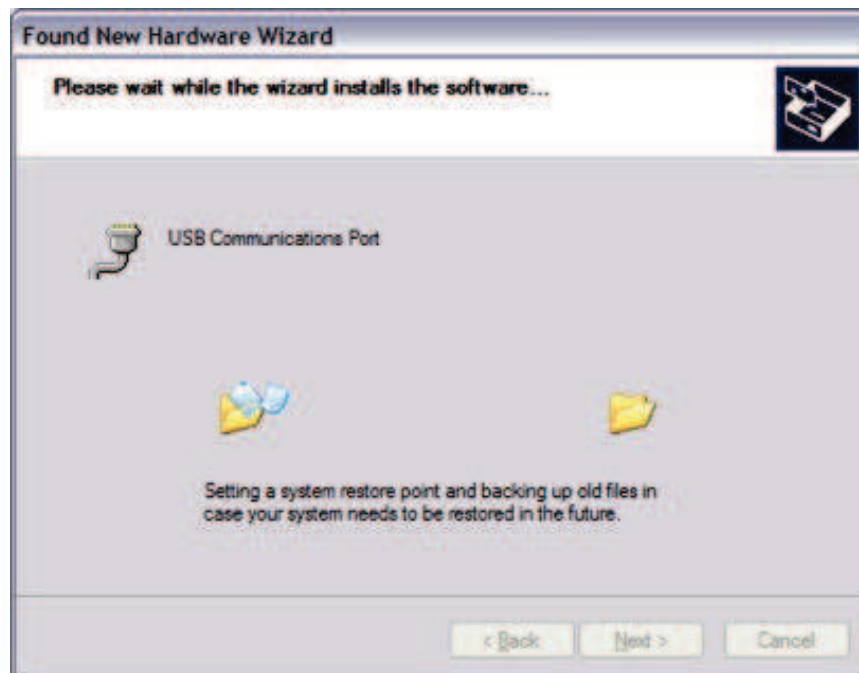


USB Driver Installation cont...

17. The “Found New Hardware Wizard” window will reappear.
18. Click “Next” to continue.

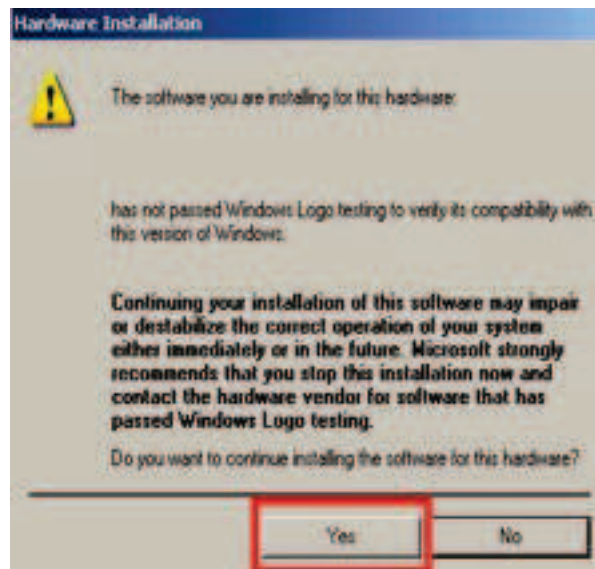


19. The following window should appear:

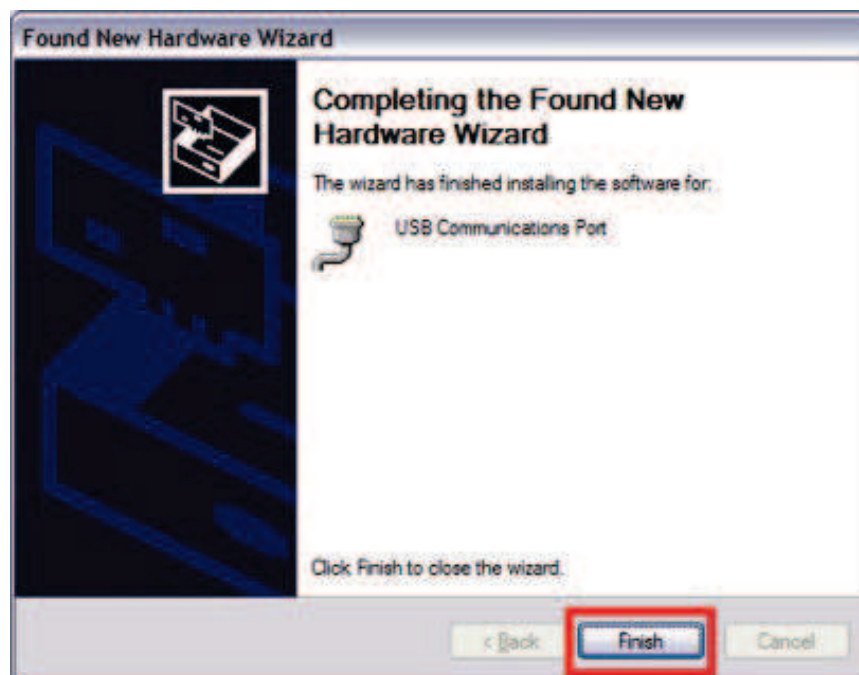


USB Driver Installation cont...

NOTE: Depending on your computer settings, the following window may appear. If this window is displayed on your computer, click “Yes” to continue.

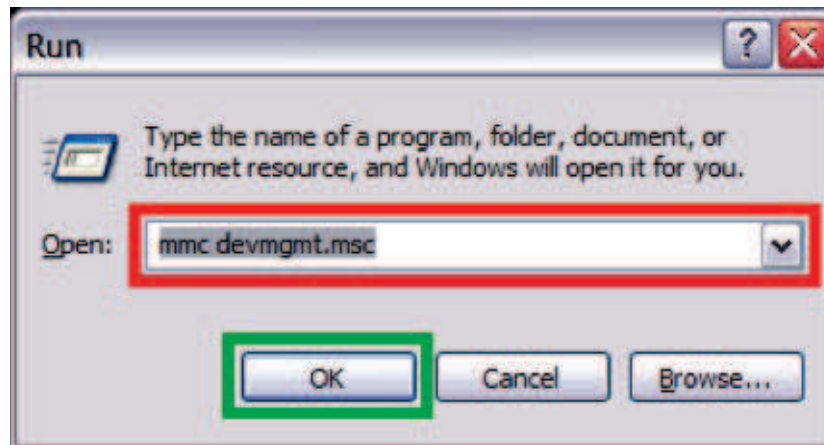


20. The driver is now installed. Click “Finish” to exit installation.

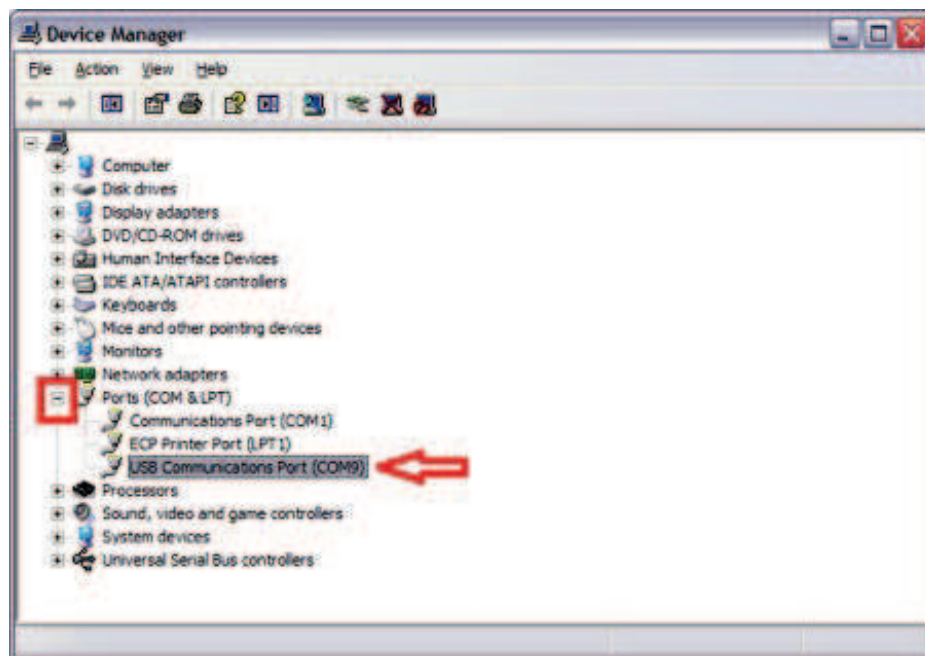


Com Port # Identification

1. On your computer's keyboard, simultaneously press the “Windows Key” and “R” to bring up the “Run” dialog box.
2. Beside “Open:”, type: mmc devmgmt.msc
3. Click “OK” to continue.



4. In the “Device Manager”, click the “+” next to “Ports (COM & LPT)” and look for “USB Communications Port”. In this case, the USB Communication Port is “(COM9)”.



5. The OI-9850 is now installed and ready to be used with any application that speaks MODBUS over a COM port.

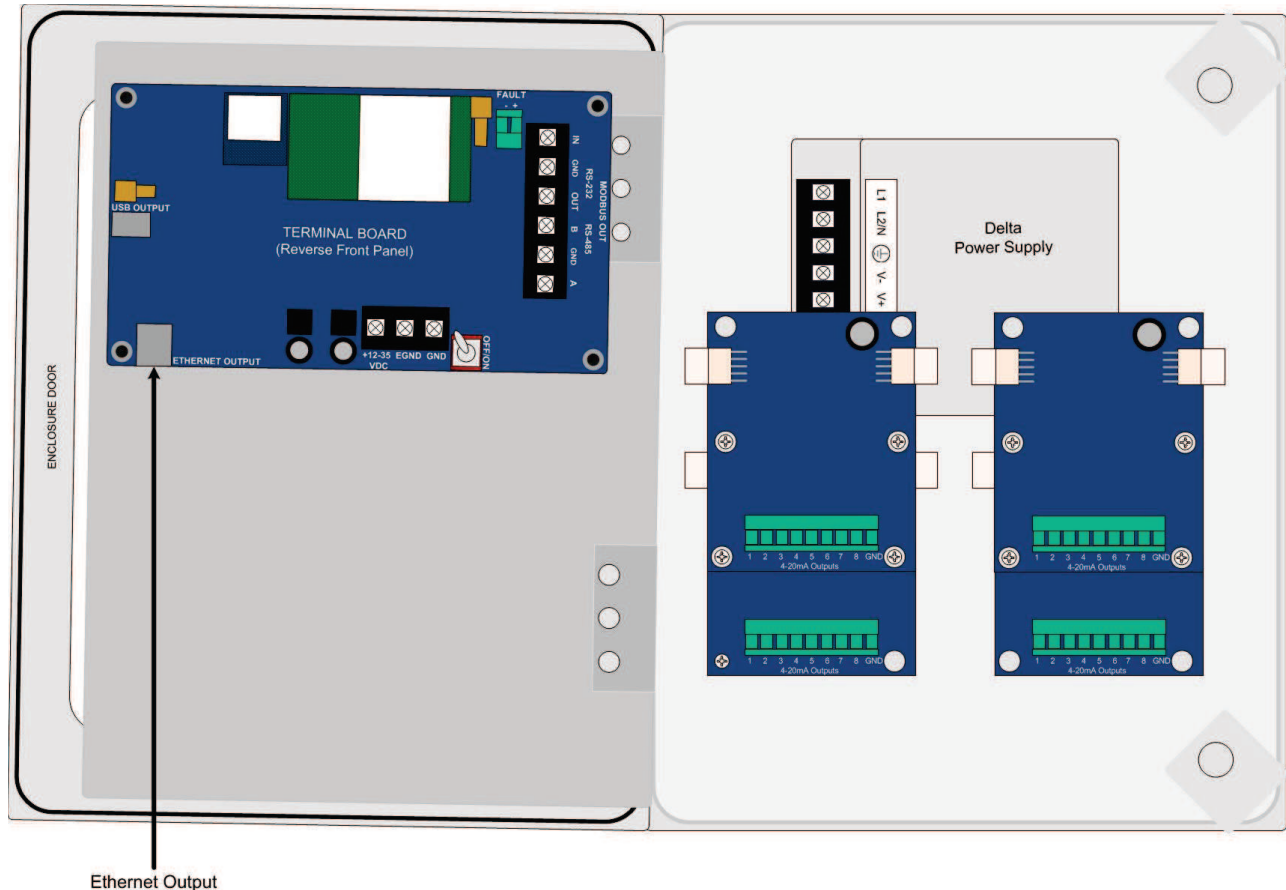
APPENDIX D: Ethernet Configuration and Website Navigation

Ethernet Configuration



CAUTION: THE INTERNAL COMPONENTS CAN BE STATIC SENSITIVE. USE CAUTION WHEN OPENING THE ENCLOSURE AND HANDLING INTERNAL COMPONENTS.

1. Locate the Ethernet Output on the OI-9850 Terminal Board.



2. Connect an ethernet cable to to the Ethernet Output on the OI-9850.
3. Connect the other end of the ethernet cable directly to the ethernet port on a PC or network switch.

NOTE: The OI-9850 uses a standard ethernet cable. An ethernet cable is not provided with the OI-9850.

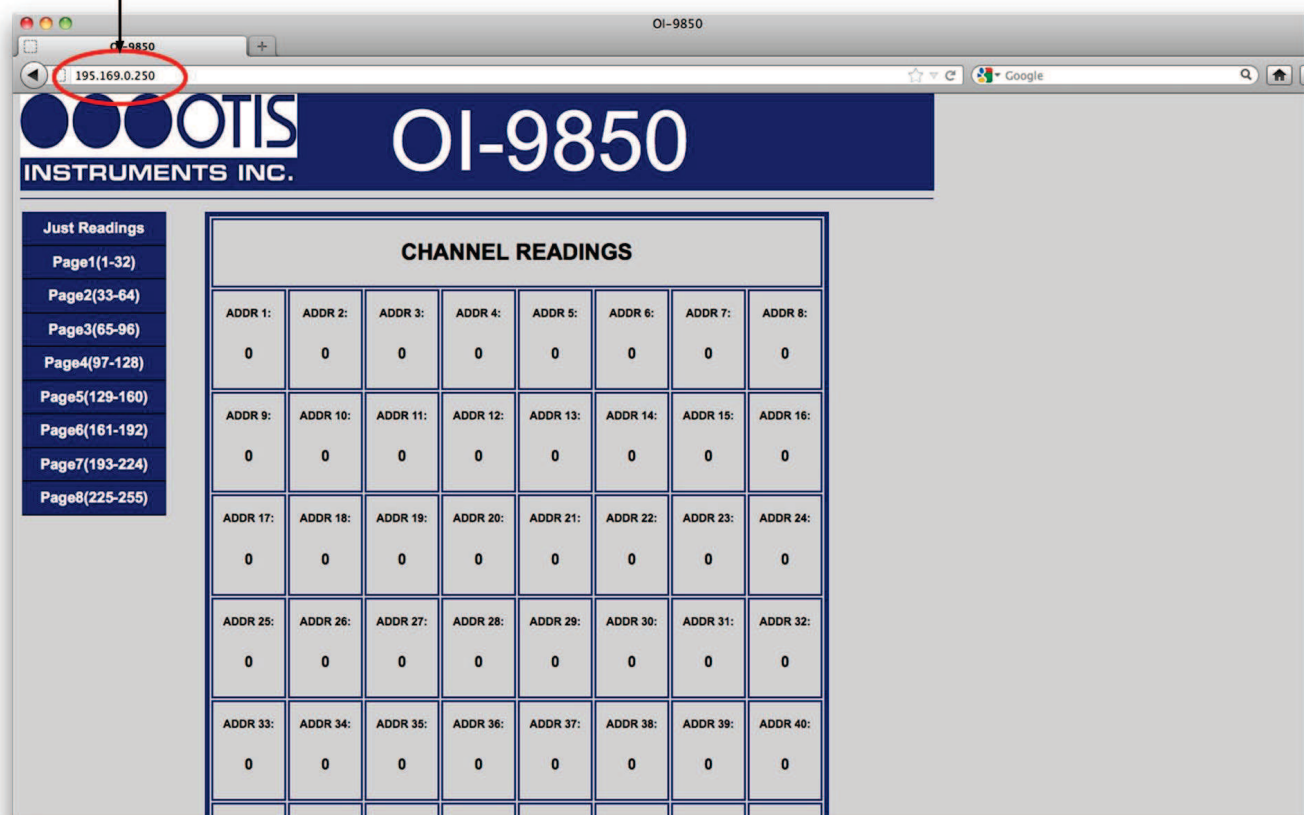
NOTE: WiFi must be turned OFF to complete the OI-9850 ethernet configurations (if connected directly to a computer).

NOTE: The OI-9850 is compatible with: Internet Explorer 10, Firefox, and Google Chrome.

Ethernet Configuration cont...

4. The IP Address will appear on the OI-9850 Display Screen.
5. Type the IP Address that is being displayed into your web browser.
6. Once the ethernet configuration is complete, the PC should resemble the following illustration:

Type IP Address Here



Website Navigation

The following instructions and illustrations should be used as an aid for understanding the OI-9850 website pages and navigation options.

NOTE: The OI-9850 website is to be used for viewing of sensor assemblies only. Configuring data on the website is not allowed.

Main Page: Channel Readings

To view specific sensor assembly and indicator information, click any sensor assembly range on the left sidebar while on the Main Page. This will redirect the webpage to the selected Sensor Page.

Click here to view Page 1
(Sensor Assemblies 1-32)

OTIS
INSTRUMENTS INC.

OI-9850

Just Readings

- Page1(1-32)**
- Page2(33-64)
- Page3(65-96)
- Page4(97-128)
- Page5(129-160)
- Page6(161-192)
- Page7(193-224)
- Page8(225-255)

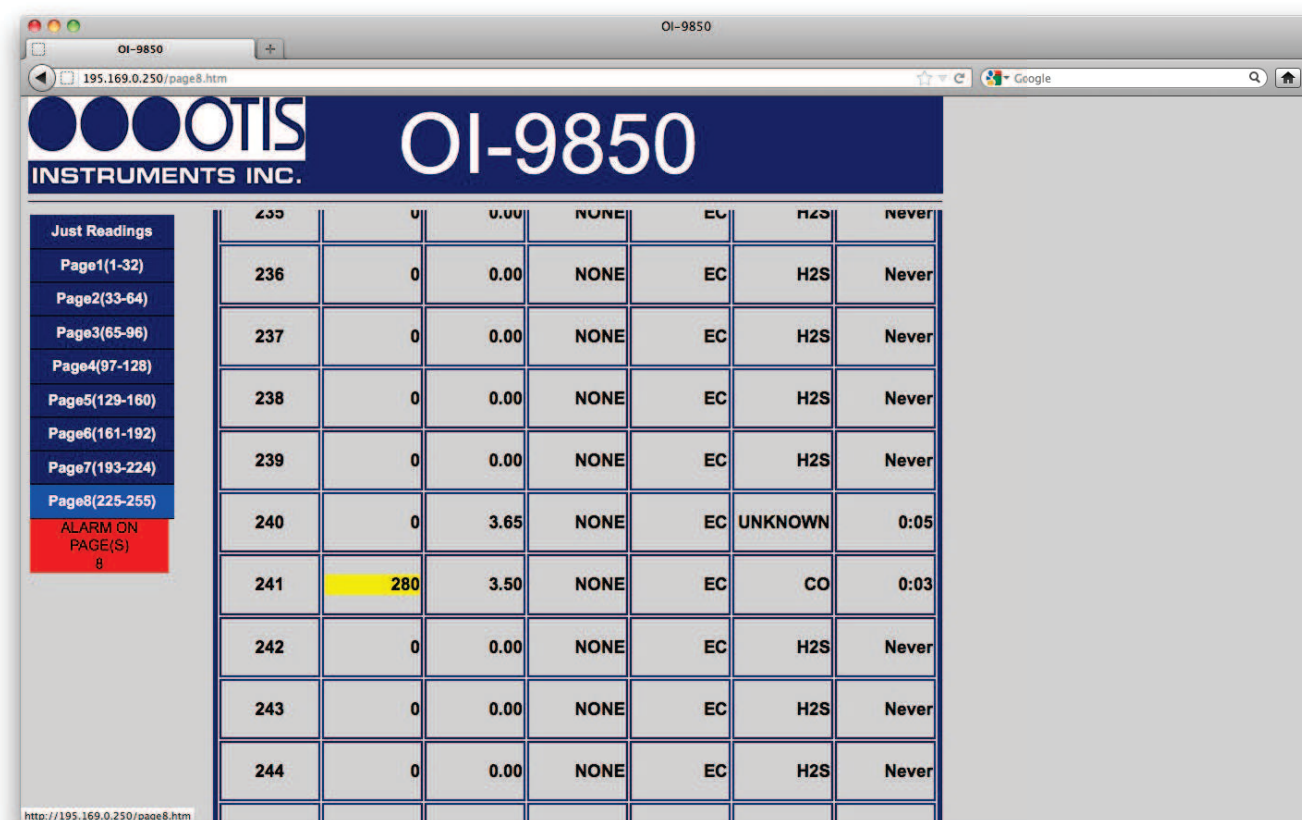
CHANNEL READINGS

ADDR 1: 0	ADDR 2: 0	ADDR 3: 0	ADDR 4: 0	ADDR 5: 0	ADDR 6: 0	ADDR 7: 0	ADDR 8: 0
ADDR 9: 0	ADDR 10: 0	ADDR 11: 0	ADDR 12: 0	ADDR 13: 0	ADDR 14: 0	ADDR 15: 0	ADDR 16: 0
ADDR 17: 0	ADDR 18: 0	ADDR 19: 0	ADDR 20: 0	ADDR 21: 0	ADDR 22: 0	ADDR 23: 0	ADDR 24: 0
ADDR 25: 0	ADDR 26: 0	ADDR 27: 0	ADDR 28: 0	ADDR 29: 0	ADDR 30: 0	ADDR 31: 0	ADDR 32: 0
ADDR 33: 0	ADDR 34: 0	ADDR 35: 0	ADDR 36: 0	ADDR 37: 0	ADDR 38: 0	ADDR 39: 0	ADDR 40: 0

Sensor Page

Sensor Pages should be used for view additional information and indicators corresponding to specific sensor assemblies.

In the illustration below, for example, Sensor Page 8 has been selected and a Low Alarm has been triggered on Sensor Assembly 241 (shown in yellow).



OTIS INSTRUMENTS INC.		OI-9850					
Just Readings	235	0	0.00	NONE	EC	H2S	Never
Page1(1-32)	236	0	0.00	NONE	EC	H2S	Never
Page2(33-64)	237	0	0.00	NONE	EC	H2S	Never
Page3(65-96)	238	0	0.00	NONE	EC	H2S	Never
Page4(97-128)	239	0	0.00	NONE	EC	H2S	Never
Page5(129-160)	240	0	3.65	NONE	EC	UNKNOWN	0:05
Page6(161-192)	241	280	3.50	NONE	EC	CO	0:03
Page7(193-224)	242	0	0.00	NONE	EC	H2S	Never
Page8(225-255)	243	0	0.00	NONE	EC	H2S	Never
ALARM ON PAGE(S) 8	244	0	0.00	NONE	EC	H2S	Never

For additional information regarding Webpage Indicators, view the Troubleshooting section of this Operation Manual.

APPENDIX E: Modbus Information

The complete OI-9850 Modbus Register Map may be downloaded from the “Service” section of our website (www.otisinstruments.com).

Modbus Terms

Modbus: RTU

Setting: Baud Rate = 9600

Data Bits: 8

Parity: None

Stop Bits: 1

Time Out: 1000 ms

Device Address: 1-247

Data Type: Holding Registers

Start Address: The first register the user would like to view (must be between 1-255)

Length: Depends on the number of addresses the user would like to view

Scan Rate: 1000 ms

Data Format: Hex, Decimal, Float

APPENDIX F: Troubleshooting

Webpage Indicator Information

Indicator: Yellow Highlighted Box on Main/Sensor Page

Reason: The sensor assembly assigned to the highlighted box is transmitting a gas reading that is above the pre-set low alarm value.

Indicator: Red Highlighted Box on Main/Sensor Page

Reason: The sensor assembly assigned to the highlighted box is transmitting a gas reading that is above the pre-set high alarm value.

Indicator: Orange Highlighted Box on Main/Sensor Page

Reason: The sensor assembly assigned to the highlighted box is in fault.

Indicator: Orange Highlighted Box on Left Sidebar

Reason: One or more sensor assemblies is in fault. Specific pages containing sensor assemblies with triggered faults will be displayed in the orange box.

Indicator: Red Box Highlighted on Left Sidebar

Reason: One or more sensor assemblies' alarm has been triggered. Specific pages containing sensor assemblies with triggered alarms will be displayed in the red box.

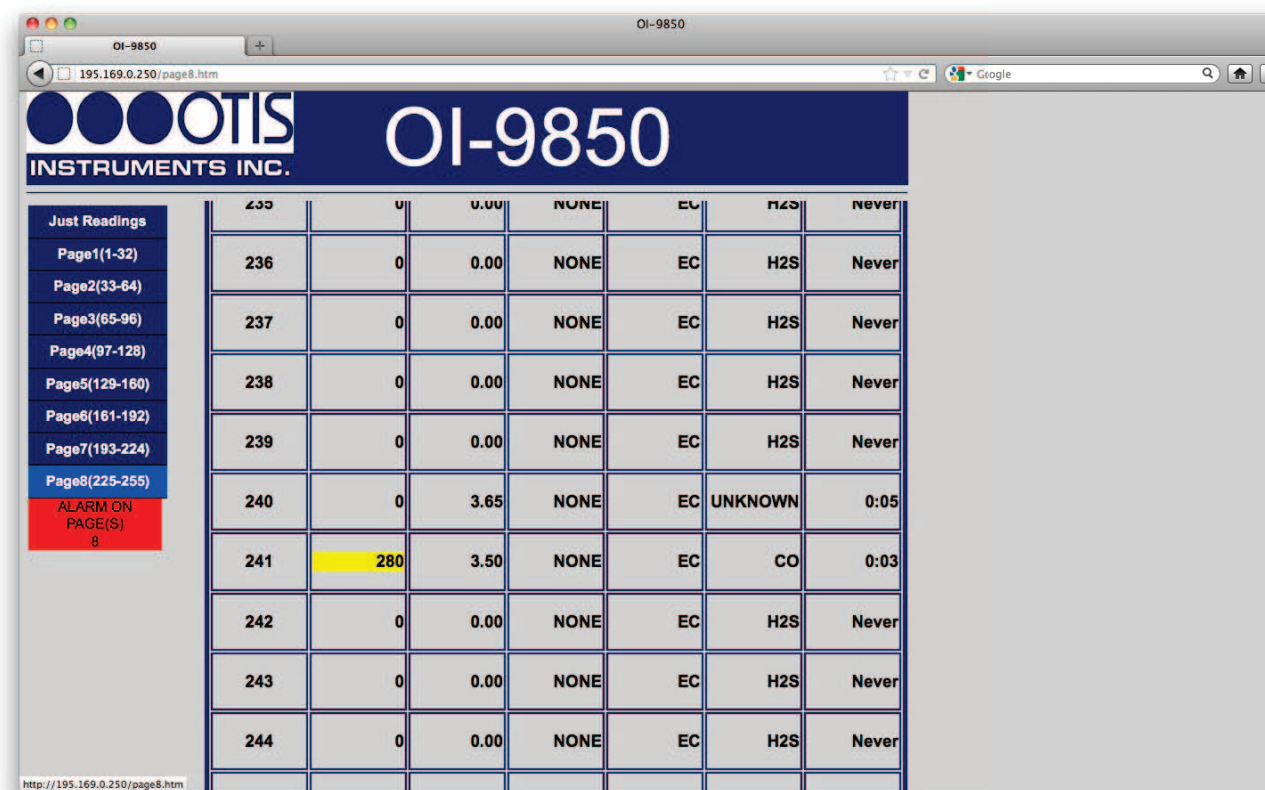
Problem: On the Sensor Page, the Gas Type is being displayed as “Unknown”.

Reason: Gas Type is only displayed for Gen II sensor assemblies. Gen I sensor assemblies will have “Unknown” displayed for the Gas Type (unless the Gen I sensor assembly's gas type is O2).

Webpage Indicator Illustrations

Low Alarm Activated

When a sensor assembly is reading gas above the pre-set Low Alarm Value, the Low Alarm box for that sensor assembly will be activated (highlighted in yellow) and the webpage should resemble the following illustration:



High Alarm Activated

When a sensor assembly is reading gas above the pre-set High Alarm Value, the High Alarm box for that sensor assembly will be activated (highlighted in red) and the webpage should resemble the following illustration:

The screenshot shows a web browser window titled "OI-9850" with the address bar displaying "195.169.0.250/page8.htm". The page header features the "OTIS INSTRUMENTS INC." logo and the title "OI-9850". On the left, a sidebar contains a list of page links: "Just Readings", "Page1(1-32)", "Page2(33-64)", "Page3(65-96)", "Page4(97-128)", "Page5(129-160)", "Page6(161-192)", "Page7(193-224)", "Page8(225-255)", and a red box labeled "ALARM ON PAGE(S) 8". The main content area displays a table with 8 columns: ID, Value, Unit, Gas Type, and Alarm Status. The table lists sensor readings for IDs 235 through 244. Sensor 241 is highlighted in red, indicating an active high alarm. The value for sensor 241 is 280, which is above the pre-set high alarm value of 3.50. The gas type for sensor 241 is CO, and the alarm status is 0:01.

ID	Value	Unit	Gas Type	Alarm Status
235	0.00	NONE	EC	Never
236	0.00	NONE	EC	Never
237	0.00	NONE	EC	Never
238	0.00	NONE	EC	Never
239	0.00	NONE	EC	Never
240	3.65	NONE	EC	UNKNOWN 0:04
241	280	3.50	EC	CO 0:01
242	0.00	NONE	EC	Never
243	0.00	NONE	EC	Never
244	0.00	NONE	EC	Never

When a sensor assembly is in fault, an orange box will be displayed on the left sidebar displaying which page the fault's corresponding sensor assembly is on. On the faulted sensor assembly's Sensor Page, an orange-highlighted box will appear in the sensor assembly's row with an explanation of the specific fault.

OTIS
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OI-9850

Just Readings

Page1(1-32)

Page2(33-64)

Page3(65-96)

Page4(97-128)

Page5(129-160)

Page6(161-192)

Page7(193-224)

Page8(225-255)

ALARM ON

PAGE(S)

8

FAULT ON PAGE(S)

8

235	0	0.00	NONE	EC	H2S	Never
236	0	0.00	NONE	EC	H2S	Never
237	0	0.00	NONE	EC	H2S	Never
238	0	0.00	NONE	EC	H2S	Never
239	0	0.00	NONE	EC	H2S	Never
240	0	3.65	NONE	EC	UNKNOWN	0:04
241	280	3.50	F4: Check Sensor Board	EC	CO	0:02
242	0	0.00	NONE	EC	H2S	Never
243	0	0.00	NONE	EC	H2S	Never
244	0	0.00	NONE	EC	H2S	Never

Fault Information

Fault 1 (F1)

Reason: The top card has lost communication with the digital sensor board (the board potted into the sensor housing).

Solution: Check the connections and/or try new digital sensor board

Applies to: OI-6000-X sensor assemblies

Fault 4 (F4)

Reason: The top card is losing communication to the analog sensor board

Indication: On OI-6000-X units, F4 means that the Analog to Digital Conversion (ADC) on the analog sensor board is not communicating to the digital sensor board.

Solution: Check the orientation of the analog sensor board and/or try a new analog sensor board.

Indication: On the OI-6900-X and OI-6975-X units F4 means the top card is not communicating with the analog sensor board.

Solution: Check the connections from the top card all the way to the analog sensor board. If that does not fix the fault, try replacing the analog sensor board and/or the sensor housing.

Indication: When the sensor element is a Low Power IR sensor the sensor element itself could be the issue. Also, there might not be an issue because sometimes sensor assemblies will show F4 for a few seconds after boot up. This is normal and is due to the boot up of the sensor element itself.

Fault 8 (F8)

Reason: There are two sensors with the same address communicating to the monitor. This could be two different Gen II sensor assemblies, or a Gen I and Gen II sensor assembly. The monitor cannot tell if there are two different Gen I units communicating to the same device with the same address.

Solution: Check all units and make sure they are all using a different addresses.

Fault 9 (F9)

Reason: Radio timeout. This means the monitor has not gotten a communication from the faulting address for over X minutes. X is equal to the radio timeout that is set in the start up menu options. It defaults to 10 minutes.

Solution: Find the sensor assembly and see why it is not communicating. This could be due to a dead battery, broken antenna, bad antenna cable, no antenna, obstacle, weather, etc.

Fault 15 (F15)

This fault is no longer assigned. If “F15” is displayed on a sensor assembly, the firmware should be updated.

Specifications

Operating Voltage:	+12-35 Volts DC or 110/240 Volts AC (50-60 Hz); 800mA max @ 24 Volts DC; 3.125A max @ 110-240 Volts AC
Protection:	Power EMI filter, surge suppression, 4-20mA and RS-485 surge suppression
Output:	RS-485 and RS-232 Modbus 4-20mA (optional) Virtual COM port over USB Website for displaying real-time values
Radio Options:	One Gen I radio: <ul style="list-style-type: none">· 900 MHz, 250mW and/or one Gen II radio: <ul style="list-style-type: none">· 2.4 GHz ISM, 100mW· 900 MHz, 200mW
Channels:	255 WireFree
Operating Temp. (Ambient Rating):	-20 to 60° C
Display:	Graphical LCD (128 x 64), transfective, sunlight readable, LED backlight
Fuses:	9A; 30 Volts DC PTC (automatic resettable) Non end-user replaceable
Enclosure:	NEMA 4 certified Stahlin 10" x 8" x 6" fiberglass with clear window
Certifications:	CAN/CSA-C22.2 No. 61010-1-12; UL Std. No. 61010-1 (3rd Edition) NEMA 4 (enclosure only)
Warranty:	Hardware: One-year (limited)

Warranty Statement for **The *Interface* OI-9850**

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 part’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 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 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 our service department at 903.566.1300 or service@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).



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www.otisinstruments.com