AirLink 9850 Interface
Operator's Manual

Part Number: 71-0562

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RKI Instruments, Inc.
www.rkiinstruments.com

Product Warranty

RKI Instruments, Inc. (Manufacturer) warrants its products to be free of defects in workmanship and materials—under normal use and service—for one year from the date of purchase from the manufacturer or from the product's authorized reseller.

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, lightning, water damage or other hazard, voids liability of the manufacturer.

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

Table of Contents

Chapter 1: Introduction

Overview

This chapter briefly describes the AirLink 9850 Interface. This chapter also describes the *AirLink 9850 Interface Operator's Manual* (this document). Table 1 at the end of this chapter lists the specifications for the AirLink 9850.

About the AirLink 9850 Interface

The AirLink 9850 is a 255 channel receiver that accepts and interprets radio transmissions from up to 255 AirLink sensor assemblies.

The AirLink 9850 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.

About this Manual

The *AirLink 9850 Interface Operator's Manual* uses the following conventions for notes, cautions, and warnings:

NOTE: Describes additional or critical information.

CAUTION: *Describes potential damage to equipment.*

WARNING: ***Describes potential danger that can result in injury or death.***

⚠ CAUTION: Refers to accompanying documentation

~ VAC (AC voltage)

⎓ VDC (DC voltage)

Specifications

Table 1 lists specifications for the AirLink 9850.

Table 1: AirLink 9850 Specifications

Description	Specification
Input Power	110/240V ~ 50 - 60 Hz or 12 - 35 V ⎓ (Class 2)
Current Draw	• 800 mA max at 24 VDC • 3.125 A max at 110/240 VAC
Operating Temperature	-4°F to 140°F (-20°C to 60°C)
Input Signal	Up to 255 AirLink sensor assemblies
Output	• RS-485 Modbus • RS-232 RTU Modbus • Up to 32 4-20 mA outputs • Virtual COM power over USB • Internet interface through Ethernet connection
Construction (housing)	Fiberglass with clear window (NEMA 4)
Dimensions	10 in. H x 8 in. W x 6 in. D (25.4 cm H x 20.3 cm W x 15.2 cm D)
Weight	9 lbs.
Mounting	4 mounting feet (6” W x 12.25” T); 1/4” diameter max mounting bolt/screw size
Environmental Ratings	• Pollution degree 2 • Installation category II • Altitude up to 2,000 meters
User Controls	Program buttons: MENU, ADD, SUB, RESET/ESC
Display	Graphical LCD (128x64), transflective, sunlight readable, LED backlight
Fuses	• 9A, 30 VDC • PTC (automatic reset), not user-replaceable
Radio Options	• 2.4 GHz, ISM, 125 mW OR • 900 MHz, 200 mW
Standard Accessory	Operator’s manual (this document)

Chapter 2: Description

External Description

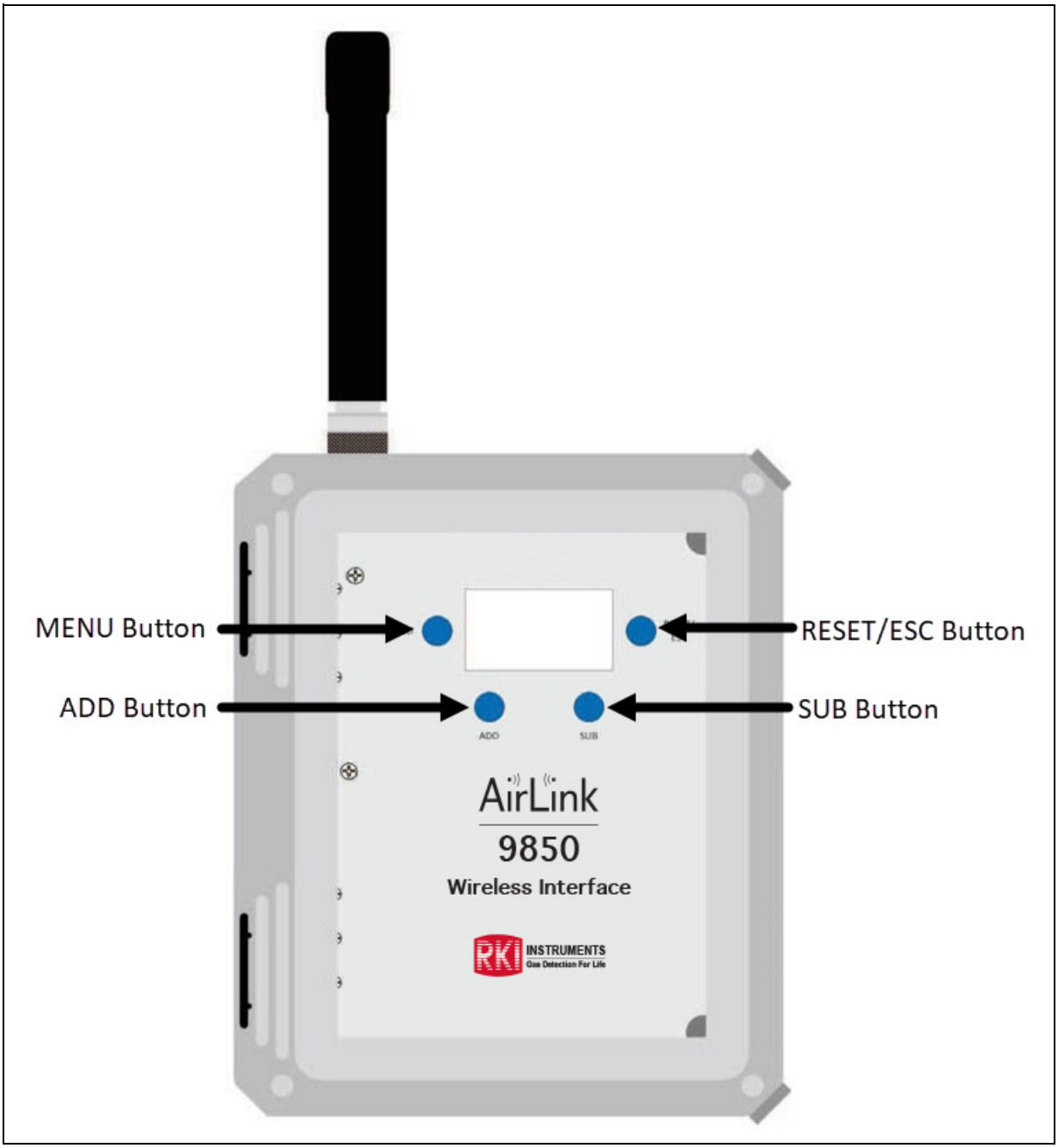


Figure 1: External Description

Internal Description

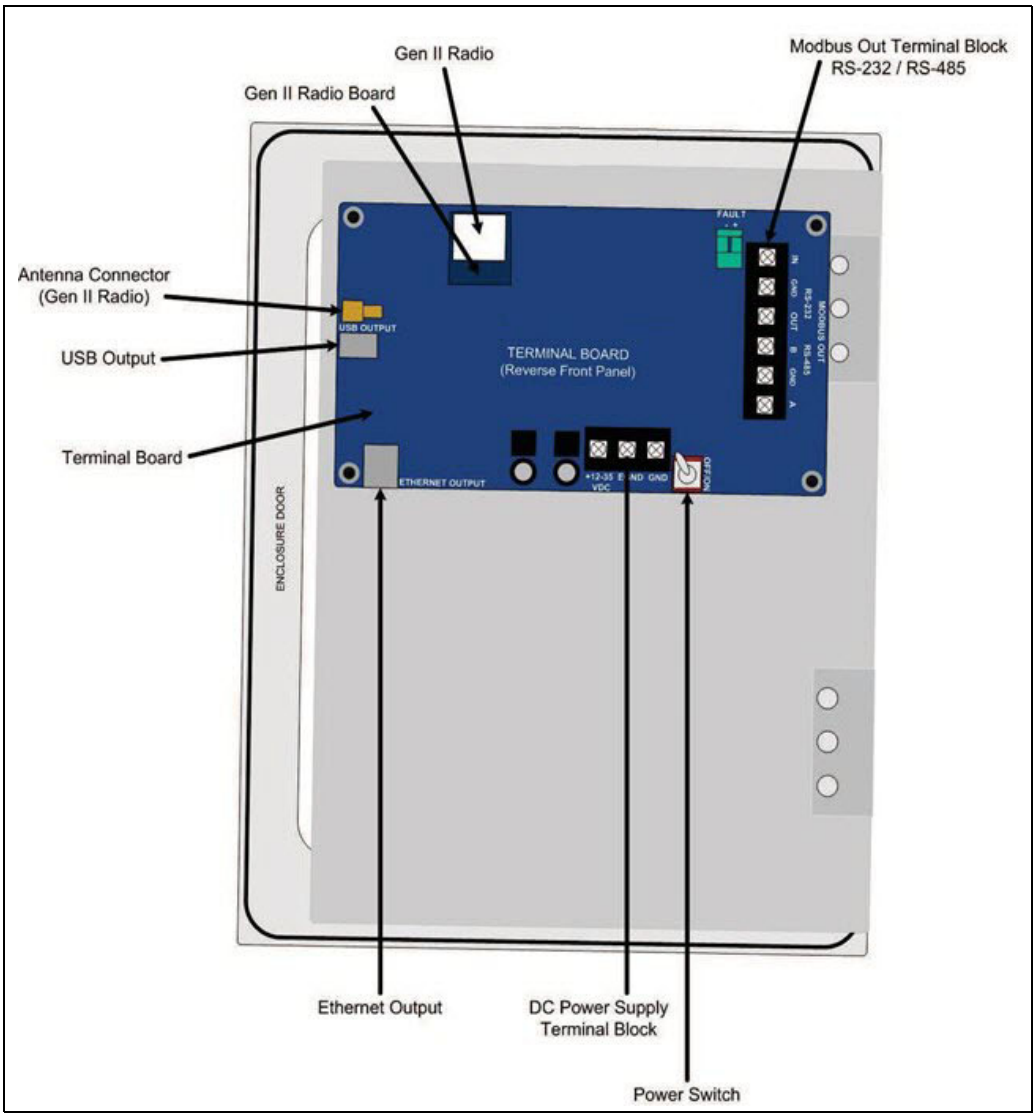


Figure 2: Terminal Board

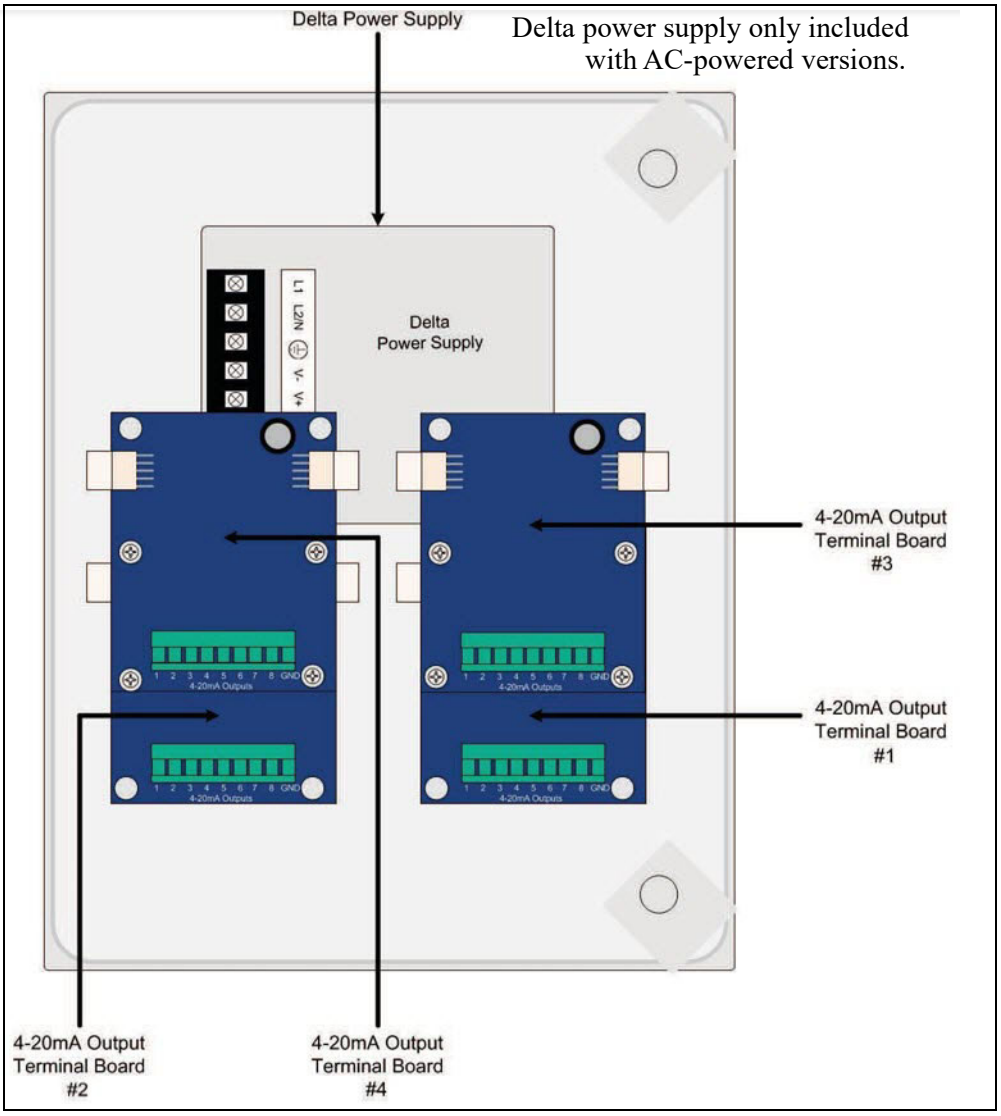


Figure 3: Power Supply and Output Terminal Boards

Chapter 3: Installation

Mounting the AirLink 9850 Interface

1. Select the mounting site. When you select the mounting site, consider the following factors:
   - Is an AC or DC power source available?
   - Is a vertical surface available to mount the AirLink 9850?
   - Is there enough room to open the housing door and make wiring connections?
   - Are the display screen and status lights visible?
2. Close and latch the housing door.
3. Prepare the selected mounting site as required to mount the AirLink 9850. It should be mounted at eye level (4 1/2 to 5 feet from the floor). Refer to Figure 4 for the outline and mounting dimensions.
4. Position the monitor on the vertical mounting surface.
5. Insert 1/4” bolts or screws through the slots in the mounting feet at each corner of the housing to secure the housing to the mounting surface.

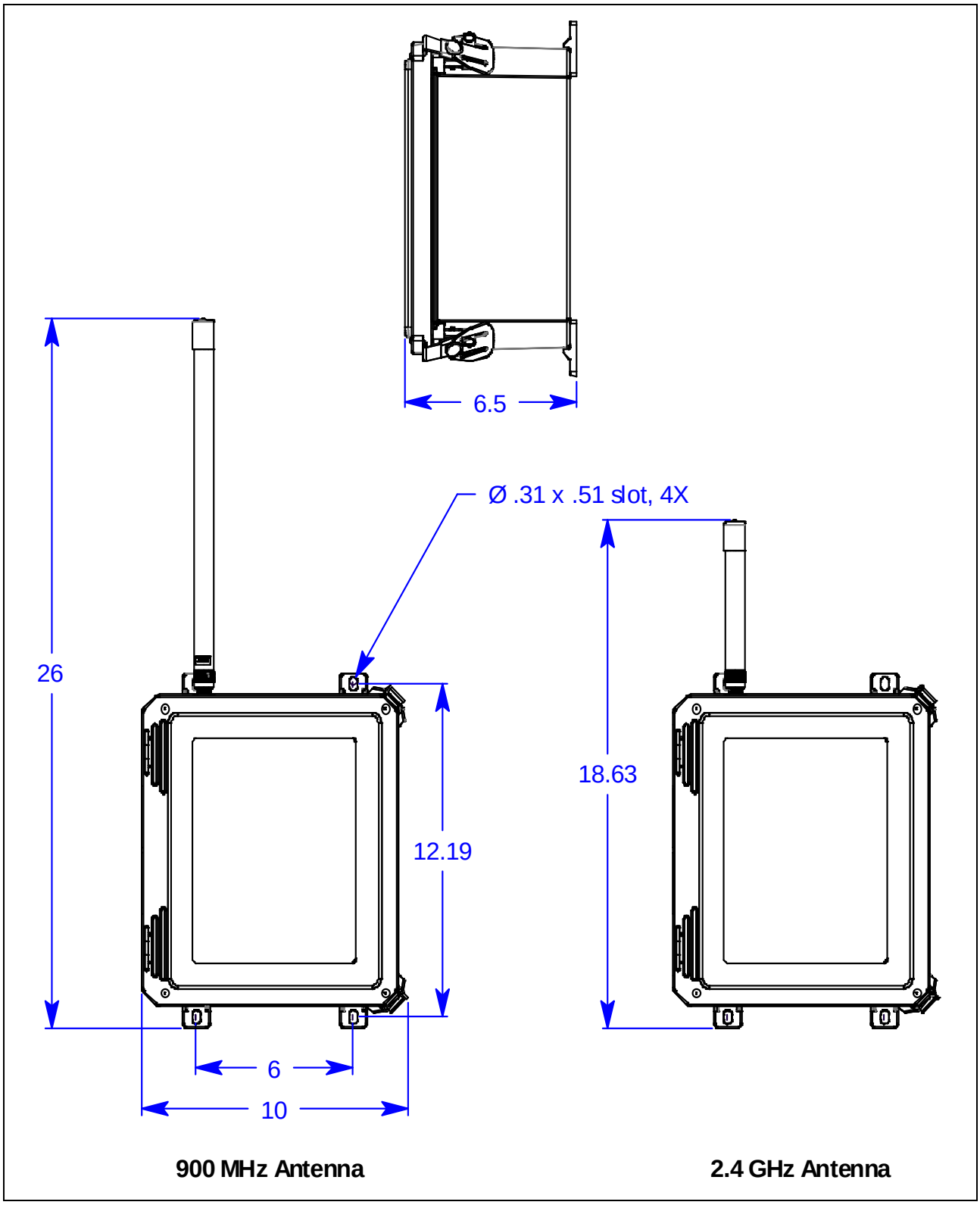


Figure 4: AirLink 9850 Outline and Mounting Dimensions

Wiring the AirLink 9850

This section describes procedures for DC power source wiring, AC power source wiring, Modbus out wiring, USB virtual COM port connection, Ethernet connection, 4-20 mA output wiring, and fault indicator wiring.

The following wiring connections must be made before starting up the AirLink 9850.

CAUTION: *The internal components can be static sensitive. Use caution when opening the enclosure and handling internal components.*

WARNING: ***Make all connections to the AirLink 9850 before you plug in or turn on the AC or DC power source. Before you make any wiring adjustments, always verify that all power sources are not live.***

Connecting a DC Power Source

NOTE: The AirLink 9850 is configured for AC or DC operation, depending on how it is ordered. If you are using AC power as the primary power source, go to the next section, “Connecting an AC Power Source”.

Provide a clean and stable 12-35 VDC. Failure to do so may cause the unit to not operate properly.

Voltage spikes higher than 35 VDC may damage the unit.

1. Open the enclosure box to expose the Front Panel.
2. Unscrew the two thumb screws on the Front Panel.
3. Open the Front Panel so that the Terminal Board is exposed (back of Front Panel).
4. Locate the Power Terminal (on the lower right side of the Back Panel) and connect the + wire (red) to the terminal marked “+12-35 VDC”.
5. Connect the - wire (black) to the terminal marked “GND”.

6. If desired, connect an Earth Ground wire (green) to the terminal marked “EGND” (required for surge suppression).

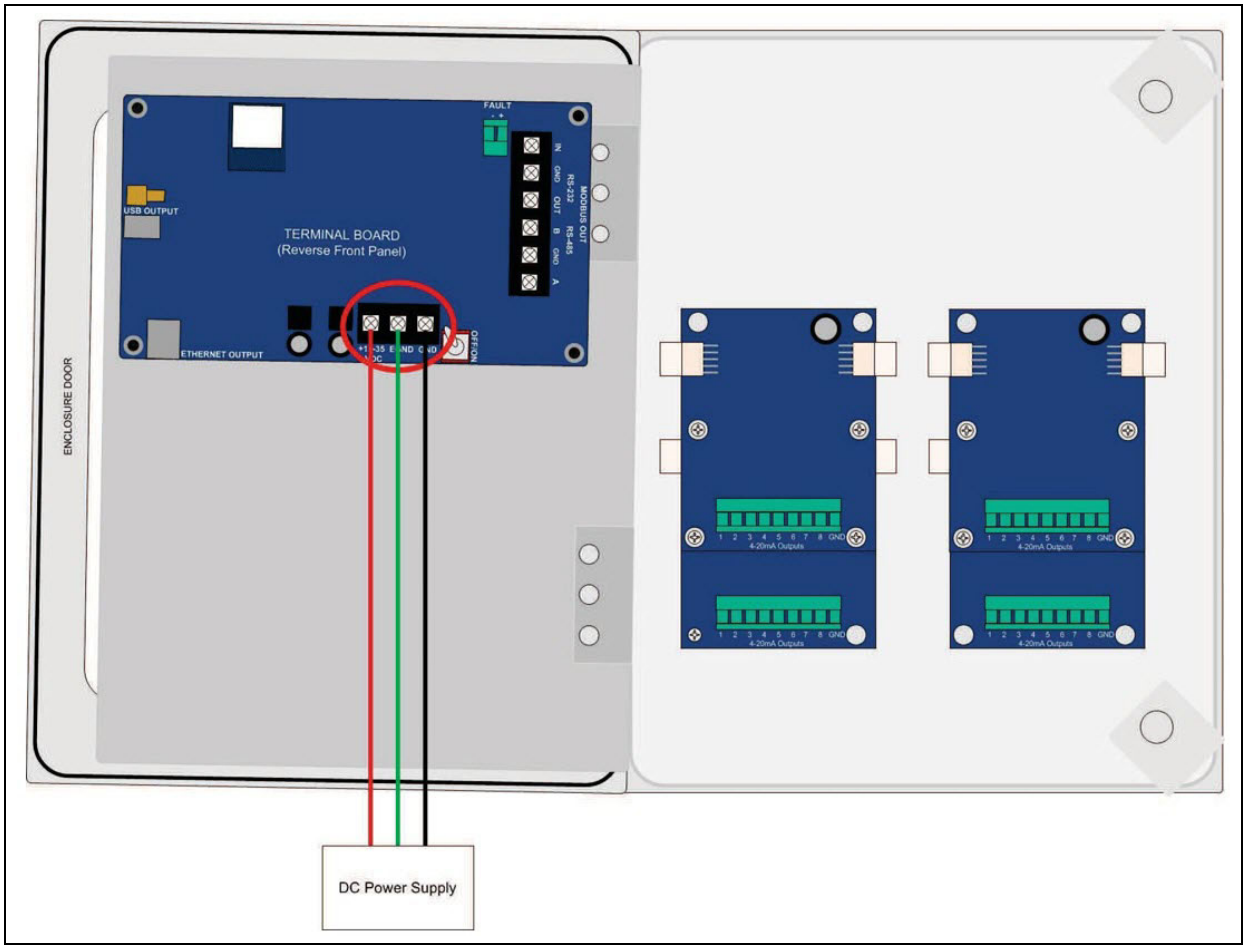


Figure 5: DC Wiring

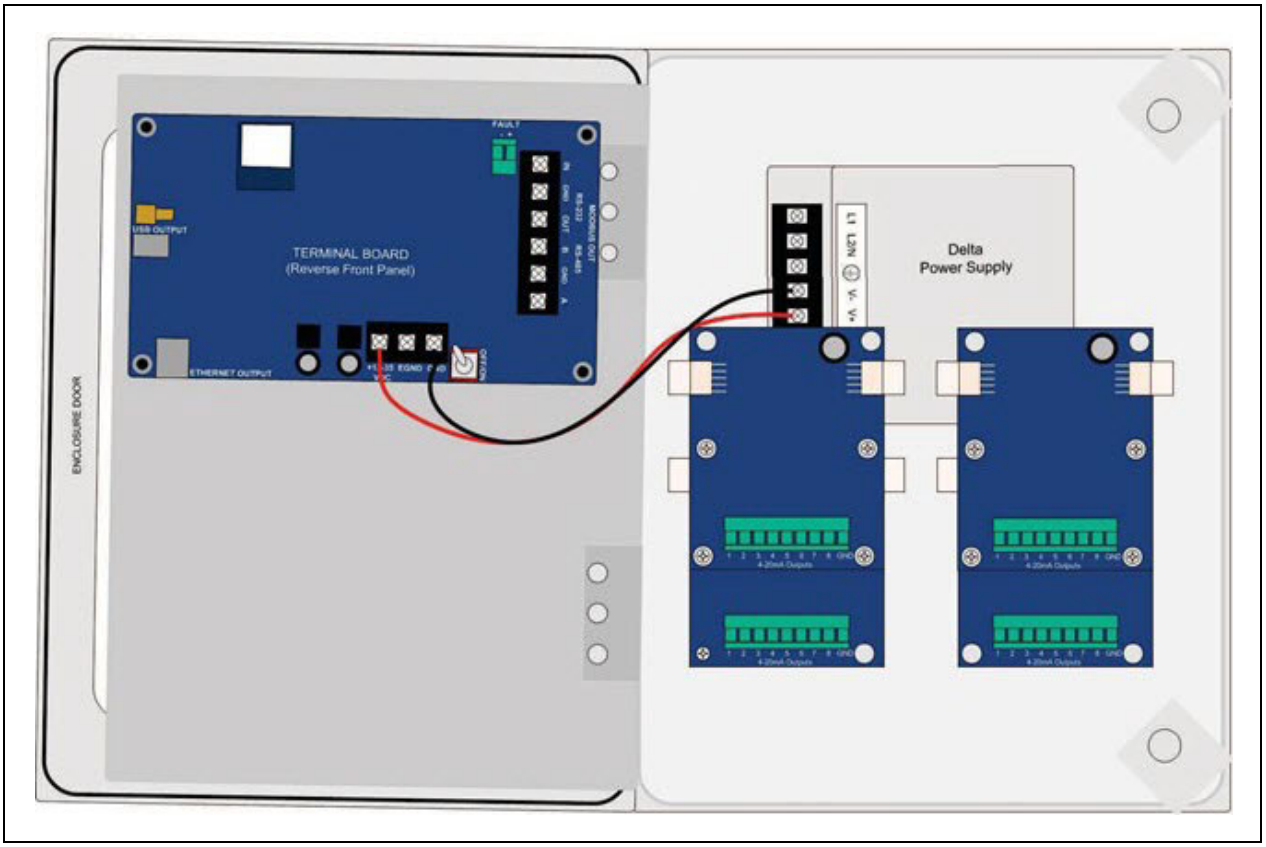
7. Close the Front Panel.
8. Screw in the thumb-screws.
9. Close the enclosure box.
10. Clamp down the enclosure latches.

Connecting an AC Power Source

NOTE: The AirLink 9850 is configured for AC or DC operation, depending on how it is ordered. If you are using DC power as the primary power source, go to the previous section, “Connecting a DC Power Source”.

WARNING: Verify that the power source is unplugged or turned off before you continue with this procedure.

1. Open the enclosure box to expose the Front Panel.
2. Unscrew the two thumb-screws on the Front Panel.
3. Open the Front Panel so that the AC (Delta) Power Supply is exposed.
4. The power supply is factory wired to the Terminal Board.



5. For versions that came with a pre-wired AC line cord: there are three wires (black, white and green) pre-wired from the Delta power supply terminals “L” (AC Load IN), “N” (AC Neutral IN), and “EG” (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.

6. For versions that did not come with a pre-wired AC line cord:
   - Connect a line wire from the AC power source to the power supply's "L" terminal.
   - Connect a neutral wire from the AC power source to the power supply's "N" terminal.
   - Connect a ground wire from the AC power source to the power supply's "EG" terminal.

NOTE: If the AirLink 9850 was not ordered with any housing holes, at least one hole will have to be drilled to bring in AC power.

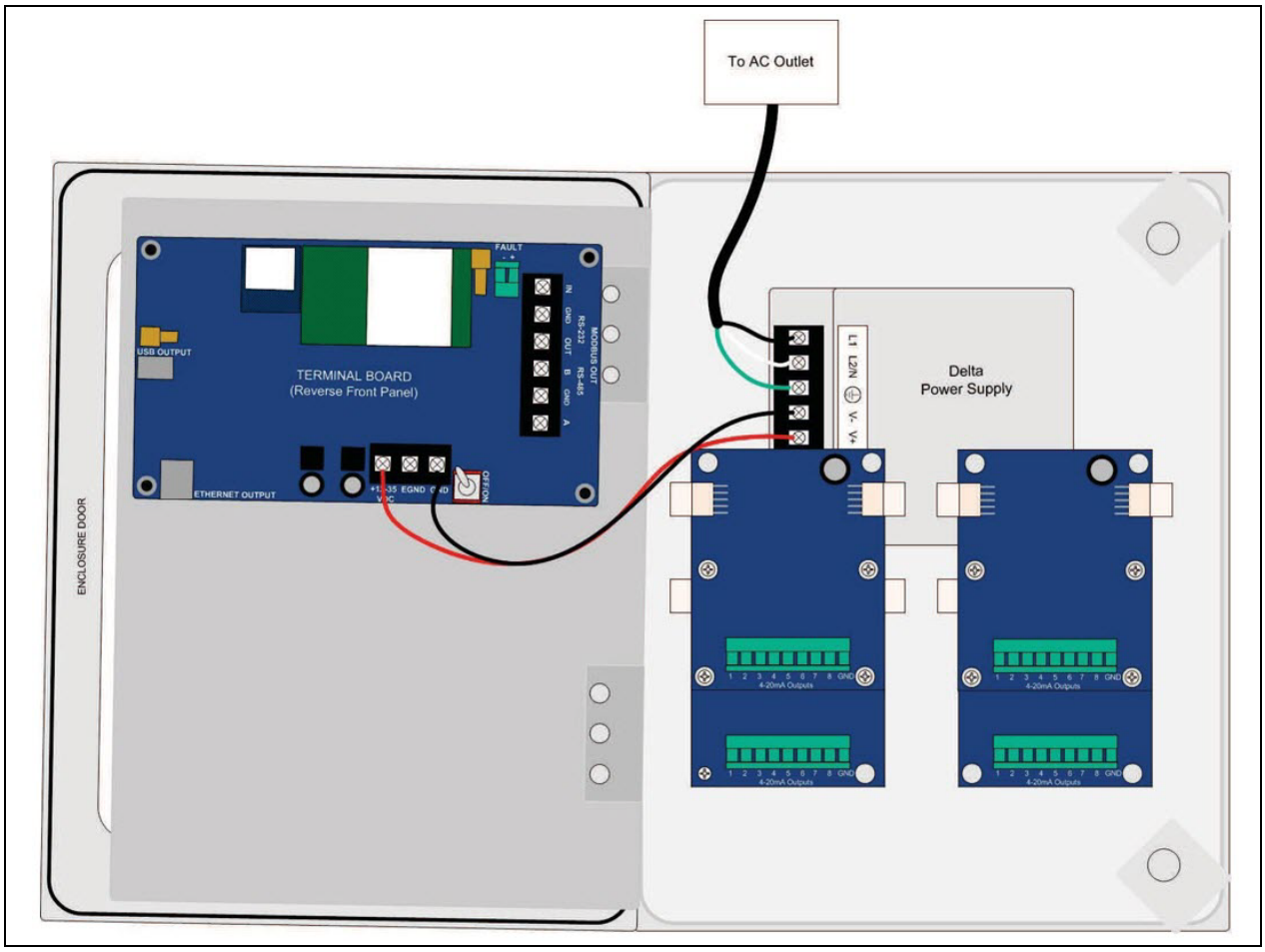


Figure 6: AC Wiring

7. Close the Front Panel.
8. Screw in the thumb-screws.
9. Close the enclosure box.
10. Clamp down the enclosure latches.

RS-485 Modbus Wiring (Modbus Out)

NOTE: The AirLink 9850 outputs RS-485 **OR** RS-232, depending on the “485 or 232” setting in the Modbus settings menu (see page 27). The AirLink 9850 must be set up to generate the desired output.

1. Open the enclosure box to expose the Front Panel.
2. Unscrew the two thumb-screws on the Front Panel.
3. Open the Front Panel so that the back of the Terminal Board is exposed.
4. Locate the Modbus Out Terminal Block.
5. Connect a red wire from a PLC’s RS-485 A (+) terminal to the terminal labeled “A” on the Modbus Out Terminal Block.
6. Connect a green wire from a PLC’s RS-485 Ground terminal to the terminal labeled “GND” on the Modbus Out Terminal Block.
7. Connect a black wire from a PLC’s RS-485 B(-) terminal to the terminal labeled “B” on the Modbus Out Terminal Block.

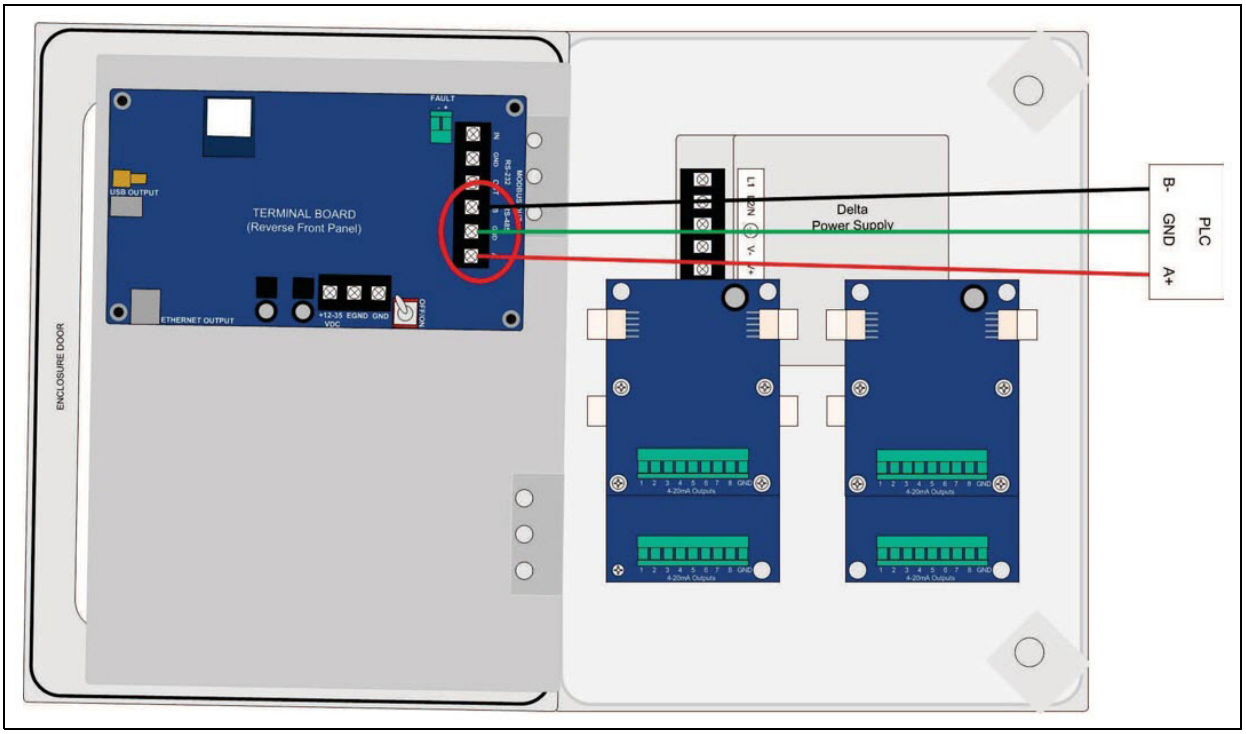


Figure 7: Modbus Out Wiring

8. Close the Front Panel.
9. Screw in the thumb-screws.
10. Close the enclosure box.
11. Clamp down the enclosure latches.

RS-232 Output Wiring

NOTE: The AirLink 9850 outputs RS-485 **OR** RS-232, depending on the “485 or 232” setting in the Modbus settings menu (see page 27). The AirLink 9850 must be set up to generate the desired output.

1. Open the enclosure box to expose the Front Panel.
2. Unscrew the two thumb-screws on the Front Panel.
3. Open the Front Panel so that the back of the Terminal Board is exposed.
4. Locate the RS-232 Terminal Block.
5. Connect a transmit wire (red) from a computer/PLC to the terminal labeled “IN” on the RS-232 terminal block.
6. Connect a ground wire (green) to the terminal labeled “GND” on the RS-232 Terminal Block.
7. Connect a receive wire (black) from a computer/PLC to the terminal labeled “OUT” on the RS-232 Terminal Block.

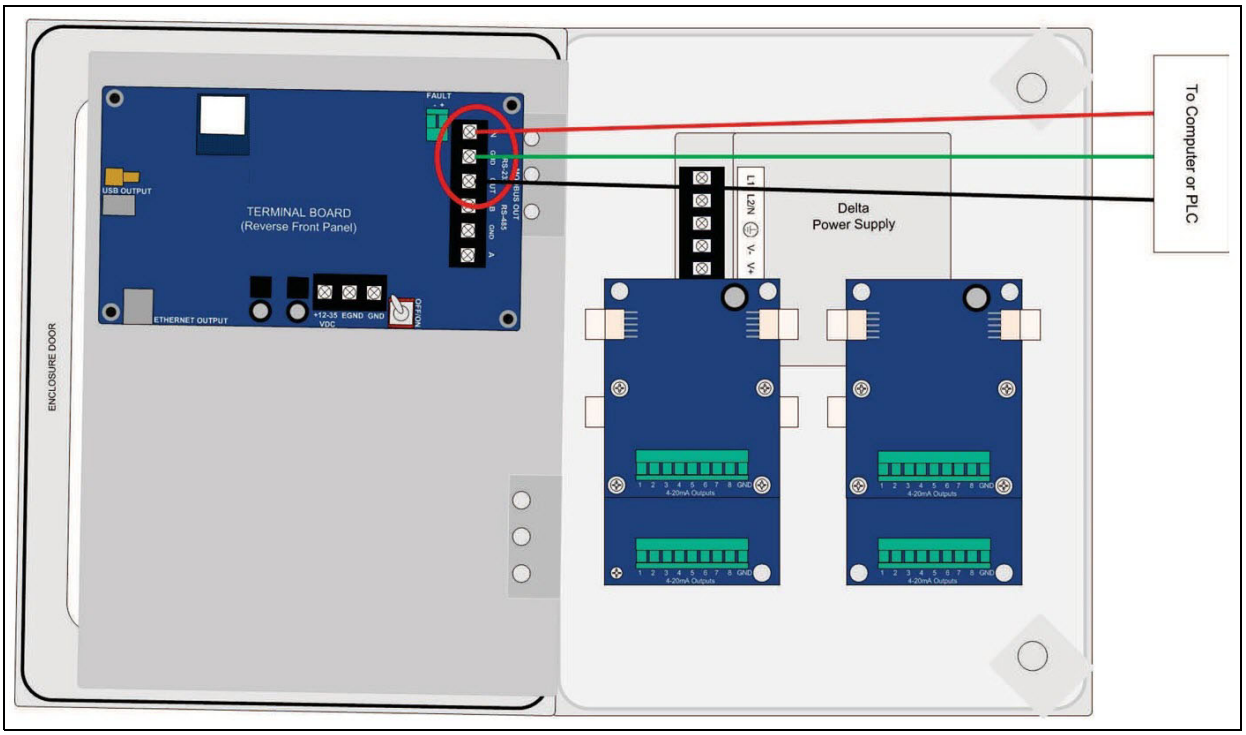


Figure 8: RS-232 Output Wiring

8. Close the Front Panel.
9. Screw in the thumb-screws.
10. Close the enclosure box.
11. Clamp down the enclosure latches.

USB Virtual COM Port Connection

The USB port outputs Modbus data in the format shown on page 41. A USB A male to USB B male cable is required to connect the AirLink 9850 to a Windows PC. A Modbus polling software installed on a Windows PC can be used to read that data.

1. Connect the USB B port on a USB A to USB B cable to the USB port on the AirLink 9850.

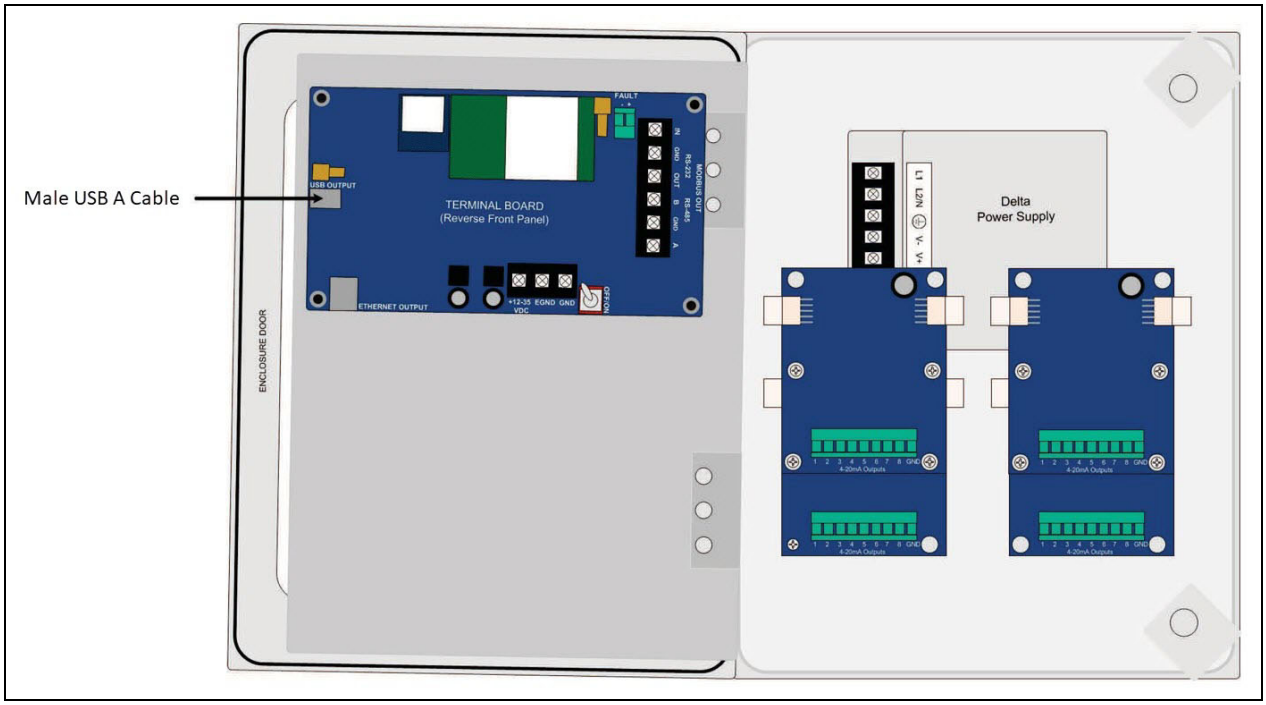


Figure 9: Connecting a USB Cable

2. Connect the USB A port on the cable to an available USB port on the Windows PC.
3. The drivers for the AirLink 9850 will automatically install once the AirLink 9850 is turned on. See page 42 for more information about utilizing the virtual COM port.

Ethernet Connection

The Ethernet port is used to view sensor information through a webpage interface. The AirLink 9850 does not support Modbus TCP/IP.

1. Plug one end of a standard Ethernet cable into the AirLink 9850's Ethernet port.

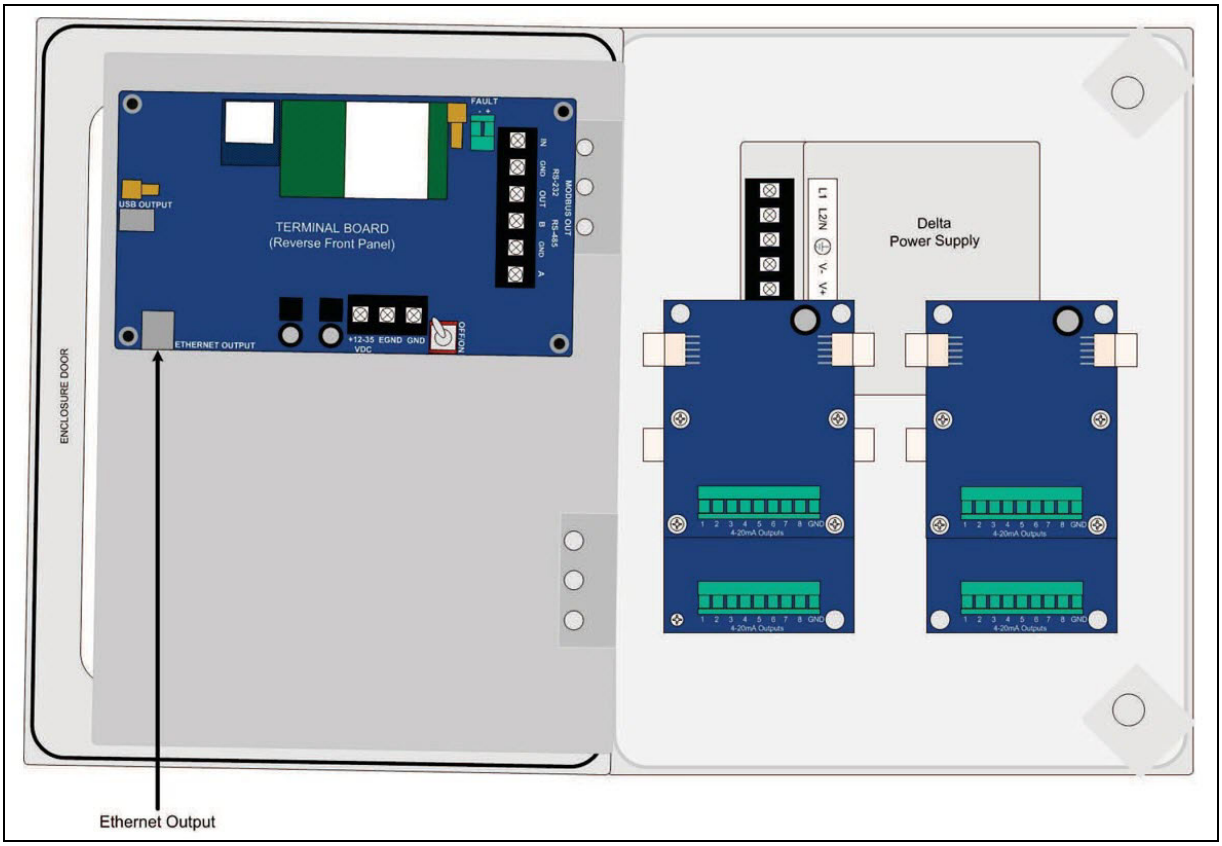


Figure 10: Connecting an Ethernet Cable

2. Plug the other end of the Ethernet cable into a network switch or into the Ethernet port on a Windows PC.

NOTE: If you are plugging the Ethernet cable into an Ethernet port on a Windows PC, the computer's WiFi must be turned off.

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3. See page 43 for instructions to view sensor information.

4-20 mA Output Wiring

The AirLink 9850 outputs up to 32 4-20 mA signals (8 signals per 4-20 mA Output Terminal Board). See page 27 for instructions to set up which channel's readings get output from any given 4-20 mA Output terminal.

1. Open the enclosure box to expose the Front Panel.
2. Unscrew the two thumb-screws on the Front Panel.
3. Open the Front Panel so that the 4-20 mA Output Terminal Boards are exposed.
4. Connect to the 4-20 mA Output Terminal Boards in the order shown below.

NOTE: Each 4-20 mA Output Terminal Board has 4 jumper pin locations: JP1, JP2, JP3, and JP4. The first board will have a jumper installed on JP1. Subsequent boards will have jumpers installed on corresponding JP pins.

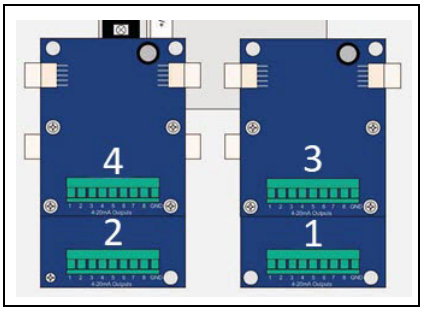
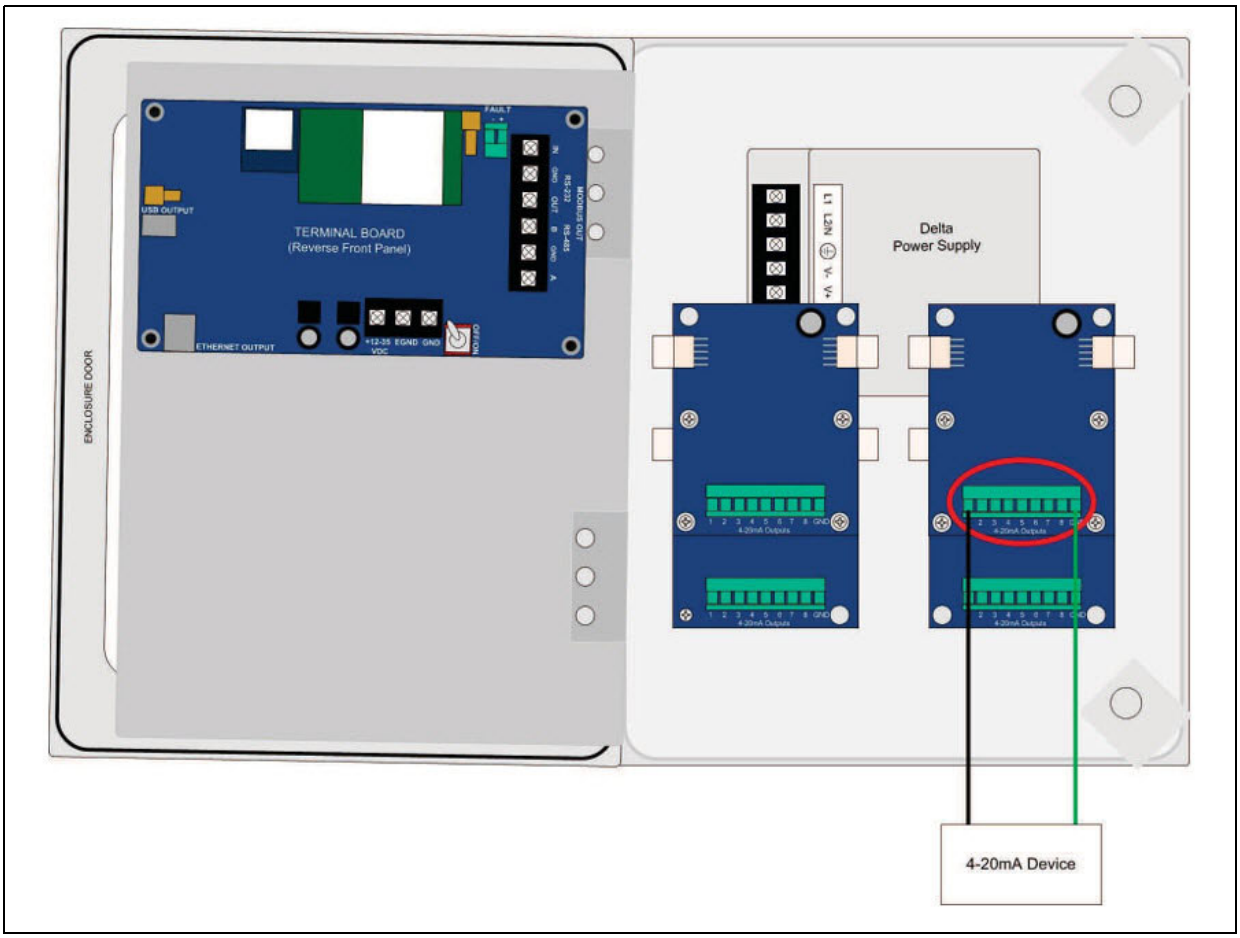


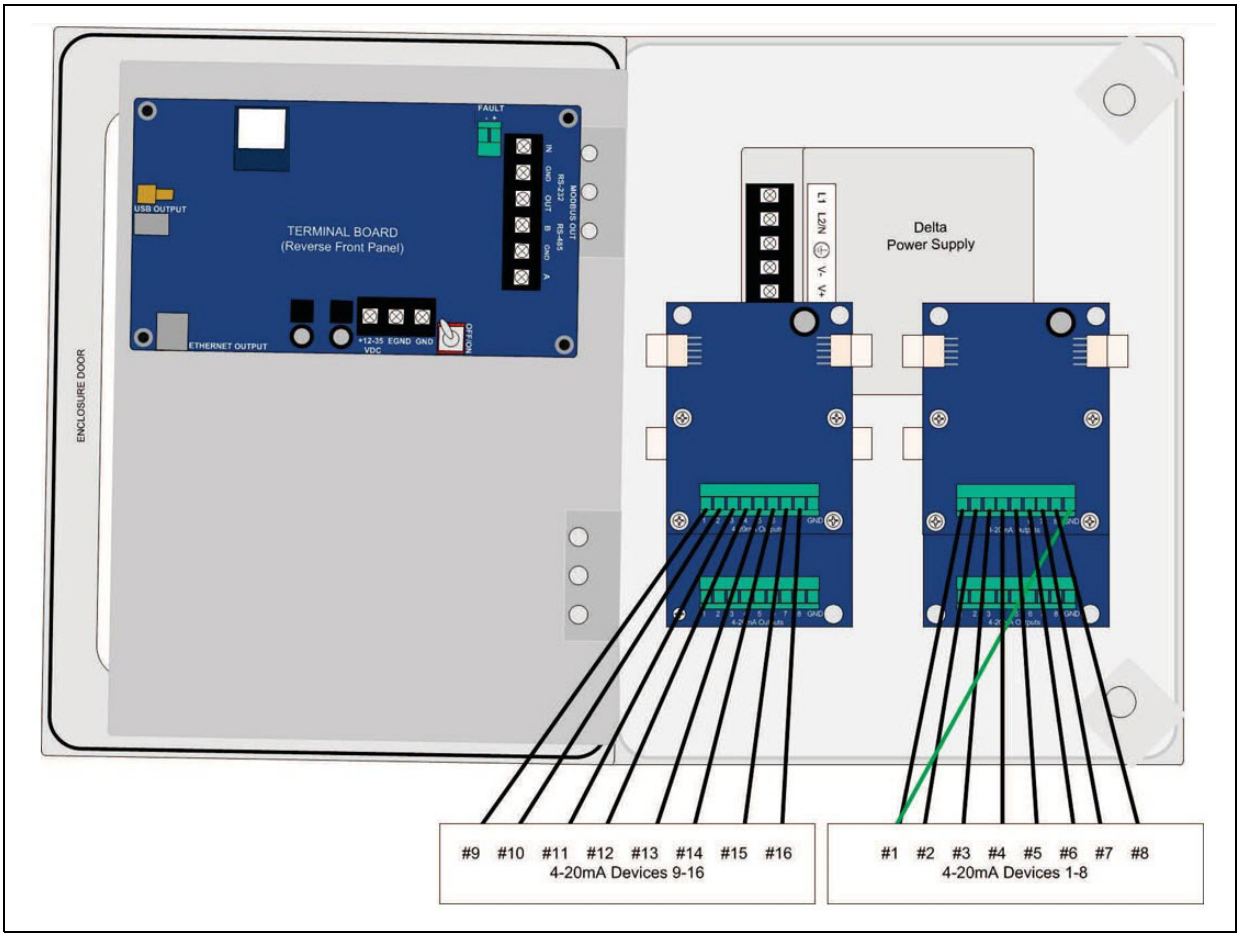
Figure 11: 4-20 mA Output Terminal Board Order

5. Connect a numbered 4-20 mA Output terminal to the 4-20 mA Input terminal on a receiving device. Repeat for up to 8 outputs per 4-20 mA Output Terminal Board.



6. For each 4-20 mA Output Terminal Board, connect the GND terminal on the 4-20 mA Output Terminal Board to the ground terminal on a receiving device. If multiple receiving devices are monitoring signals from the same 4-20 mA Output Terminal Board, then a ground wire must be run to each device.

NOTE: Consult the monitoring device's manual to determine whether the grounds will need to be jumped on each input at the monitoring device.



7. Close the Front Panel.
8. Screw in the thumb-screws.
9. Close the enclosure box.
10. Clamp down the enclosure latches.

Fault Indicator Connection

The Fault terminal provides an output to power some form of Fault indicator. The Fault terminal is a wet contact, uses the same supply voltage that is fed into the board, provides 500 mA maximum, and is a DC-only output.

The fault terminal is factory set as failsafe (normally open) and can be changed as described on page 33.

1. Open the enclosure box to expose the Front Panel.
2. Unscrew the two thumb-screws on the Front Panel.
3. Open the Front Panel so that the back of the Terminal Board is exposed.
4. Locate the Fault Terminal Block on the terminal board.
5. Connect a positive (red) wire to the terminal labeled “+”.
6. Connect a negative (black) wire to the terminal labeled “-”.

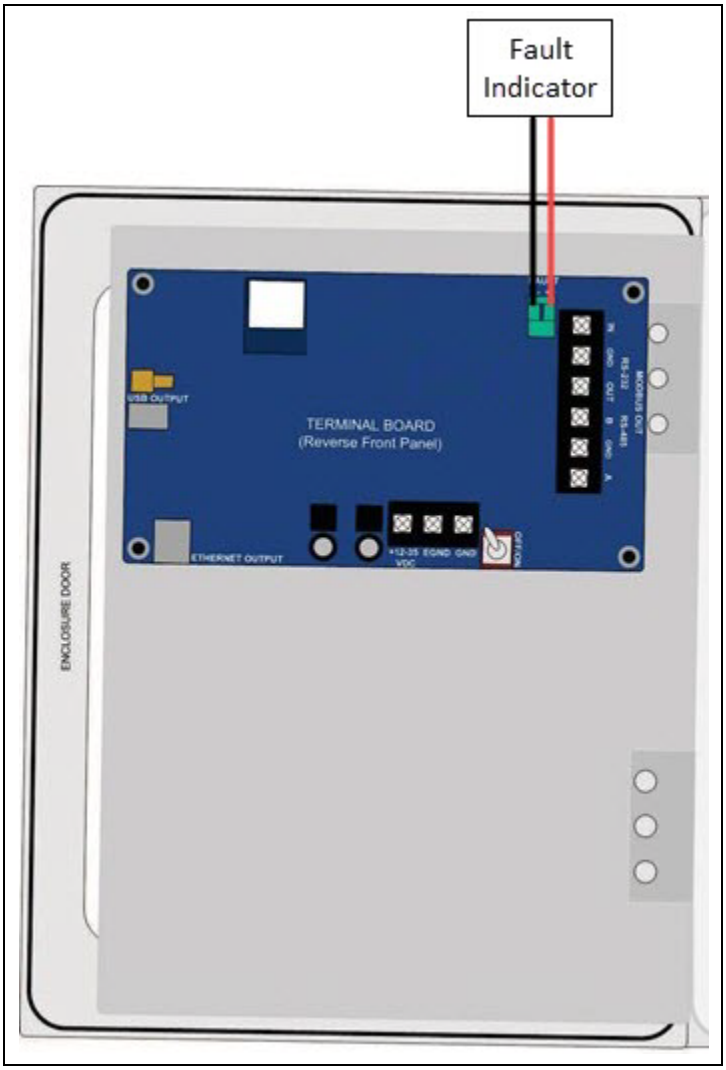


Figure 12: Fault Indicator Wiring

Chapter 4: Startup and Operation

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.*

To cycle the Terminal Board power, flip the Power Switch (located on the lower right side of the Terminal Board) to the OFF (and then ON) position.

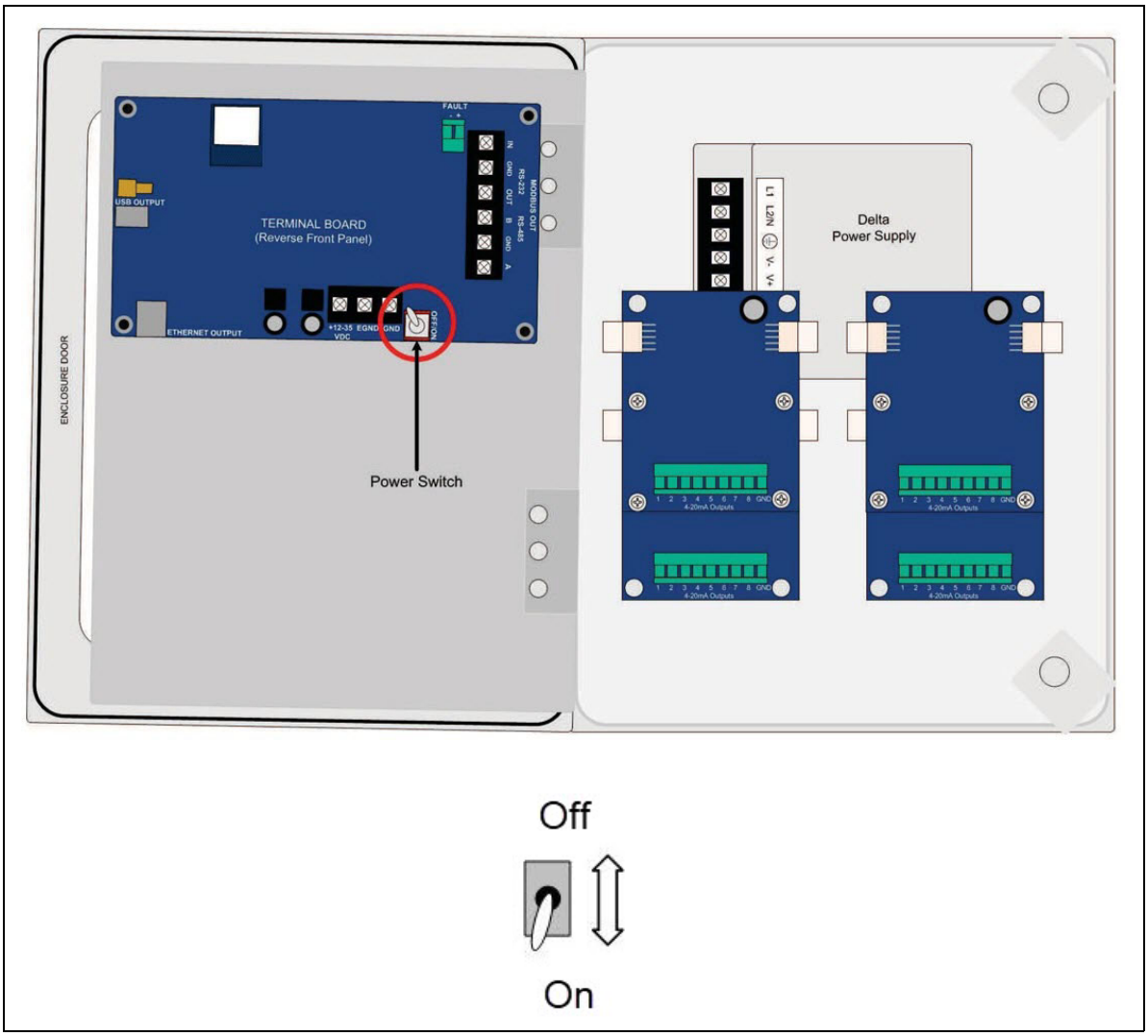


Figure 13: Power Switch Location

Normal Operating Mode

Since the AirLink 9850 is an interface, no gas readings are available on the Normal Operating Mode screen.

The AirLink 9850's Normal Operating Mode screen shows the:

- IP address (if the AirLink 9850 is connected to a network using an Ethernet cable)
- Primary/Secondary controller status and Network ID (Primary 1 in the above example)
- Program version (01.00.03 in the above example)
- Serial number (Q00001 in the above example)
- Build date (04/11/2012) in the above example

Chapter 5: Setup Mode

Overview

This mode is used for: Modbus Settings, 4-20 mA Output Settings, TCP/IP Settings, Alarm Settings, and Fault Terminal Setup.

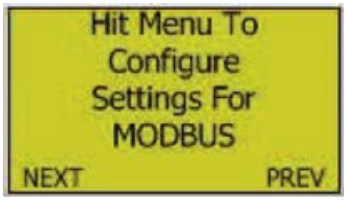
NOTE: To save any changes and exit Setup Mode at any time, press *RESET/ESC*. The AirLink 9850 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Entering Setup Mode

1. Open the enclosure box.
2. From Normal Operating Mode, press and hold *MENU* for 6 seconds to enter Setup Mode.

Modbus Settings

1. Press and release *MENU* to enter the Modbus settings menu.

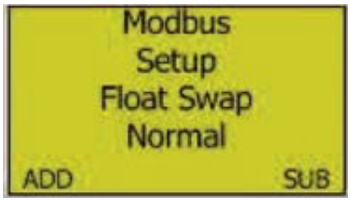


2. Address Selection: Press *ADD* (increase) or *SUB* (decrease) to select the address for the AirLink 9850's Modbus output.

3. Press *MENU*.
4. Baud Rate: Press *ADD* or *SUB* to change the baud rate for the AirLink 9850's Modbus output.

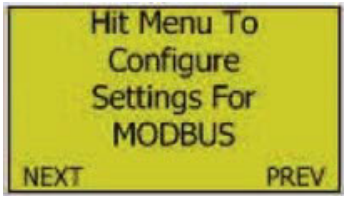
5. Press *MENU*.

6. Float Swap: Press *ADD* or *SUB* to toggle between “Normal” and “Swapped”.



7. Press *MENU*.
8. 485 or 232: The AirLink 9850 can output either RS-485 OR RS-232. Press *ADD* or *SUB* to toggle between “485” and “232”.

9. Press *MENU*.
10. The AirLink 9850 returns to the Modbus settings menu screen.



11. Press *ADD* to continue to the 4-20 mA Output Settings screen or press *RESET/ESC* to return to Normal Operating Mode.

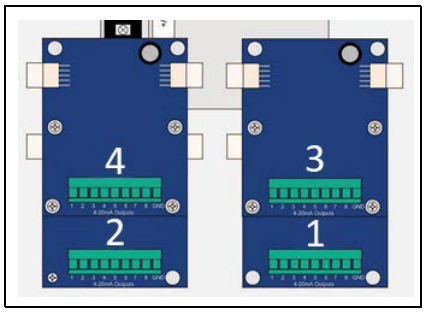
4-20 mA Output Settings

NOTE: If there aren’t any 4-20 mA Output Terminal Boards installed, this menu does not appear.

1. If necessary, press and hold *MENU* for 6 seconds to enter Setup Mode and then press *ADD* until the 4-20 mA Output Settings menu screen appears.

2. Press and release *MENU* to enter the 4-20 mA Output Settings menu.

3. Port Selection: Press *ADD* or *SUB* to select the 4-20 mA port that you want to manipulate. There are 8 ports on each 4-20 mA Output Terminal Board and they are each labeled 1-8. If you want to manipulate the settings for the 8th port on the 4th card, you need to select Port 32 in this sceen.



4. Press *MENU*.

5. On/Off: Press *ADD* or *SUB* to turn the port on or off.

6. Press *MENU*.

NOTE: The following screens only appear if the port was set to On.

7. Setup Address: The Setup Address assigns which AirLink sensor assembly's radio address is assigned to the selected 4-20 mA port. Press *ADD* (increase) or *SUB* (decrease) to manipulate the setup address (1-255).

NOTE: If a repeater is used to connect any AirLink sensors to the monitor, then all AirLink sensor connections must be routed through the repeater; there cannot be a combination of AirLink sensors making direct radio connection to a monitor while other AirLink sensors make radio connection to the monitor through a repeater.

8. Press *MENU*.

9. Output: Press *ADD* or *SUB* to toggle between “1:1” and “Scaled”. If “1:1” is selected, the value received by the AirLink 9850 is the value output (if “4” is received, then “4 mA” is output). If “Scaled” is selected, the “Min” and “Max” values selected in the next screens determine the port’s output (if the “Min” is 0 and the “Max” is 100, a 0 reading outputs 4 mA and a 100 reading outputs 20 mA).

10. Press *MENU*.

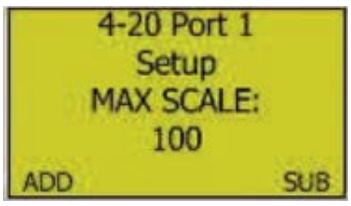
11. Min Scale: Press *ADD* or *SUB* to manipulate the minimum scale setting. This is the value that 4 mA out from the 4-20 mA port will represent.

NOTE: This item only appears if “Scaled” was selected in the Output screen.

12. Press *MENU*.

13. Max Scale: Press *ADD* or *SUB* to manipulate the maximum scale setting. This is the value that 20 mA out from the 4-20 mA port will represent.

NOTE: This item only appears if “Scaled” was selected in the Output screen.



14. Press *MENU*.

15. 4 mA Offset: Press *ADD* or *SUB* until the device that is monitoring the 4-20 mA output reads 4 mA.

NOTE: For a proper calibration, the 4-20 mA output must be connected to the device that is monitoring the selected port’s 4-20 mA output.

16. Press *MENU*.

17. 20 mA Offset: Press *ADD* or *SUB* until the device that is monitoring the 4-20 mA output reads 20 mA.

NOTE: For a proper calibration, the 4-20 mA output must be connected to the device that is monitoring the selected port's 4-20 mA output.

18. Press *MENU*.

19. The AirLink 9850 returns to the 4-20 mA Output Settings menu screen.

20. Press *ADD* to continue to the TCP/IP Settings screen or press *RESET/ESC* to return to Normal Operating Mode.

TCP/IP Settings

1. If necessary, press and hold *MENU* for 6 seconds to enter Setup Mode and then press *ADD* until the TCP/IP Settings menu screen appears.

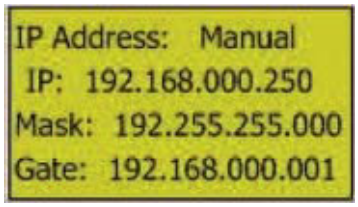
2. Press and release *MENU* to enter the TCP/IP Settings menu.

3. IP Address Type: Press *ADD* or *SUB* to toggle between "DHCP" and "Manual". Contact your network administrator to determine which option is appropriate.

4. Press *MENU*.

5. Manual IP Address Settings: Use *ADD* or *SUB* to manipulate the flashing value. Press *MENU* to accept the value and move on to the next one.

NOTE: This item only appears if "Manual" was selected as the IP Address Type. Contact your network administrator to obtain the proper values. Enter the provided values exactly (without any leading 0's).



6. Press *MENU*.
7. The AirLink 9850 returns to the TCP/IP Settings menu screen.

8. Press *ADD* to continue to the Alarm Settings screen or press *RESET/ESC* to return to Normal Operating Mode.

Alarm Settings (and Channel On/Off)

NOTE: Alarms are only indicated on the website and on the Modbus output. There are no local alarms at the AirLink 9850.

1. If necessary, press and hold *MENU* for 6 seconds to enter Setup Mode and then press *ADD* until the Alarm Settings menu screen appears.

2. Press and release *MENU* to enter the Alarm Settings menu.
3. Address: Use *ADD* or *SUB* to display the AirLink sensor assembly radio address (1-255) that you'd like to set alarms for.

4. Press *MENU*.
5. Channel On/Off: Use *ADD* or *SUB* to toggle 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.

6. Press *MENU*.

NOTE: The following screens only appear if the address was set to “On”.

7. Low Alarm Increasing/Decreasing: Use *ADD* or *SUB* to toggle between “INC” and “DEC”.

8. Press *MENU*.
9. Low Alarm Value: Use *ADD* or *SUB* to adjust the low alarm value. The displayed value is in the appropriate units for each channel. If the selected channel is a %LEL sensor, then the alarm point values will be in %LEL.

10. Press *MENU*.
11. High Alarm Increasing/Decreasing: Use *ADD* or *SUB* to toggle between “INC” and “DEC”.

12. Press *MENU*.

13. High Alarm Value: Use *ADD* or *SUB* to adjust the high alarm value. The displayed value is in the appropriate units for each channel. If the selected channel is a %LEL sensor, then the alarm point values will be in %LEL.

14. Press *MENU*.

15. Duplicate: The AirLink 9850 will ask if you want to duplicate the settings for the remaining addresses.

- Press *SUB* (No) to set up the next channel (repeat Step 2 - Step 15)
- Press *ADD* (Yes) to duplicate the settings to all consecutive channels. The instrument returns to the Alarm Settings menu screen. Press *RESET/ESC* to return to Normal Operating Mode.
- Press *RESET/ESC* to exit Setup Mode

Fault Terminal Setup

1. If necessary, press and hold *MENU* for 6 seconds to enter Setup Mode and then press *ADD* until the Fault Terminal Setup menu screen appears.

2. Press and release *MENU* to enter the Fault Terminal Setup menu.

3. Failsafe: Press *ADD* or *SUB* to toggle between “Yes” and “No”. When set to “Yes”, the fault terminals are activated during normal operation and deactivated during a fault. When set to “No”, the fault terminals are deactivated during normal operation and activated during a fault.

4. Press *MENU*.

5. The AirLink 9850 returns to the Fault Terminal Setup menu screen.

6. Press *ADD* to continue to the Modbus Settings screen or press *RESET/ESC* to return to Normal Operating Mode.

Exiting Setup Mode

Complete the following steps to exit Setup Mode at any time.

1. Press *RESET/ESC* at any time to exit Setup Mode.
2. Close the enclosure box.
3. Clamp down the enclosure latches.

NOTE: The AirLink 9850 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Chapter 6: Advanced Configuration Menu

Overview

This mode is used to: adjust LCD contrast, set the radio timeout, set the network ID, and change the primary/secondary setting.

Entering the Advanced Configuration Menu

1. Open the enclosure box to expose the Front Panel.
2. Cycle the unit's power (turn OFF, then ON). For instructions on how to cycle the unit's power, see page 24.
3. When the RKI Logo is shown on the Display Screen, press *MENU*.

NOTE: To save any changes and exit Setup Mode at any time, press *RESET/ESC*. The AirLink 9850 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Adjusting the Screen's LCD Contrast

1. Press *ADD* (increase) or *SUB* (decrease) to manipulate the screen's LCD contrast.

2. Press *MENU*.

Setting the Radio Timeout

1. Press *ADD* or *SUB* to change the radio timeout.

2. Press *MENU*.

Setting the Network ID

1. Press *ADD* or *SUB* to change the network ID.

NOTE: All monitors and sensor assemblies must have the same Network Channel in order to communicate.

2. Press *MENU*.

Adjusting the Primary/Secondary Status

1. Press *ADD* or *SUB* to switch the monitor to “Primary” or “Secondary”.

NOTE: There can only be one Primary monitor on a network. All other monitors must be set up as Secondary monitors.

If an AirLink 9850 is set as a Secondary monitor when there is no Primary monitor, the AirLink 9850 will go into a Fault 15 status.

2. Press *MENU* to return to Normal Operating Mode.

Exiting the Advanced Configuration Menu

1. Press *RESET/ESC* at any time to exit the Advanced Configuration Menu.
2. Close the enclosure box.
3. Clamp down the enclosure latches.

NOTE: The AirLink 9850 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Chapter 7: Troubleshooting

Table 2 describes symptoms, probable causes, and recommended actions for the most common problems you may encounter with the AirLink 9850.

NOTE: This troubleshooting guide describes AirLink 9850 problems only. See the detector head operator's manuals for preventive maintenance procedures that apply to the detector heads communicating with your AirLink 9850.

Table 2: Troubleshooting the AirLink 9850

Condition	Probable Causes	Recommended Action
F1 (Only for AirLink T3A/ AirLink VOC Pro)	The top card has lost communication with the digital sensor board (the board potted into the sensor housing).	1. Check the connections and/or try new digital sensor board.
F3 (battery powered detector only)	The Low Power IR sensor is beyond repair.	1. Replace the IR sensor.
F4	• The top card is losing communication to the analog sensor board • On AirLinkT3A/AirLink VOC Pro units, F4 means that the Analog to Digital Conversion (ADC) on the analog sensor board is not communicating to the digital sensor board. • On the AirLink 6900, F4 means the top card is not communicating with the analog sensor board. • For IR sensors, 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.	1. Check the orientation of the analog sensor board and/or try a new analog sensor board. 2. 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.
F8	• There are 2 sensor assemblies with the same address trying to communicate with the monitor. • There is a combination of AirLink sensors making direct radio connection to the monitor and AirLink sensors with radio connection routed through a repeater.	1. Make sure all sensor assemblies have unique addresses. 2. If a repeater is part of the AirLink system, all AirLink sensor radio connections to the monitor must be routed through the repeater.

Table 2: Troubleshooting the AirLink 9850 (Continued)

Condition	Probable Causes	Recommended Action
F9	The monitor has not received a communication from the faulting sensor assembly address for the timeout period set on page 35.	1. Check the sensor assembly for a dead battery, broken antenna, bad antenna cable, missing antenna, obstacle, weather, etc.
F11 (battery powered detector only)	The IR sensor is changing temperature too quickly.	1. The sensor will clear once the temperature stops changing too quickly.

Chapter 8: Parts List

Table 3 lists the part numbers and descriptions for replacement parts and accessories offered for the AirLink 9850.

Table 3: Parts List, AirLink 9850

Part No.	Description
18-0107RK	Conduit hub (3/4 in.)
71-0562	AirLink 9850 Interface Operator's Manual (this document)

Appendix A: Introduction to 4-20 mA Current Loop Signals

This appendix is only an introduction. The information should serve as a brief overview of 4-20 mA current loop signal ranges and should not be considered a complete reference for proper implementation or use.

Industry standards pertaining to 4-20 mA current loop signals and other aspects of electronics are assumed to be known by the technician. For proper connection to a controller or Programmable Logic Controller (PLC), refer to the manufacturer's specific manual or instructions for that device.

Overview

When using 4-20 mA wired output signal devices, the 4-20 mA defines the current loop analog signal range, with 4 mA representing the lowest end of the range and 20 mA the highest. The relationship between the current loop and the gas value is linear. In addition, the AirLink 9850 uses values below 4 mA to indicate special status conditions, as shown below:

4-20 mA Ranges	
Current	Detector Status
2.5 mA	Sensor Fault
3 mA	Sensor in Menu Mode
3.5 mA	Sensor in Calibration Mode

The 4 mA allows the receiving controller/PLC to distinguish between a zero signal, a broken wire, or an unresponsive instrument. Benefits of 4-20 mA 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 opposed to voltage). The key advantage of the current loop is that the accuracy of the signal is not affected by a potential voltage drop in the interconnected wiring. Even with significant resistance in the line, the AirLink 9850 will maintain the proper current for the device, up to its maximum voltage capability.

Calculations

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

I(4-20) = Current of loop, measured in mA
value = ppm (or %) of gas concentration
scale = full scale of sensor

Measuring Current

If the value measured is 0 mA, then: the loop wires are broken, the sensor assembly is not powered up, the sensor assembly is malfunctioning, or the controller is malfunctioning. A digital multi-meter (DMM), or current meter, may be used in conjunction with the controller and/or to test the 4-20 mA current loop signal. To measure the current, place the meter probes in line with the current loop.

Appendix B: RS-485 Modbus Output

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

Register Map

The Modbus register map (applicable to RS-232, RS-485, and USB outputs) for the AirLink 9850 is available at the link below.

https://www.rkiinstruments.com/pdf/AirLink_9850-RegMap.pdf

Appendix C: USB Virtual COM Port for Modbus

The USB port on the AirLink 9850 outputs Modbus data in the register format outlined at https://www.rkiinstruments.com/pdf/AirLink_9850-RegMap.pdf

The drivers for the AirLink 9850 automatically install when you connect the AirLink 9850 to a Windows PC and turn the AirLink 9850 on. The AirLink 9850 appears as a “USB Serial Device” in the device manager.

A computer program that reads Modbus, like Modbus Poll, can be used to poll the Modbus registers and view information from the AirLink 9850.

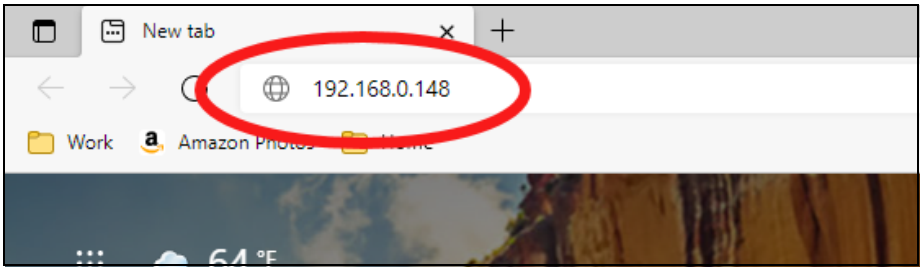
Appendix D: Viewing Sensor Information Over Ethernet

Information for connected transmitters can be viewed in an internet interface by utilizing the AirLink 9850's Ethernet connection port and a building's network.

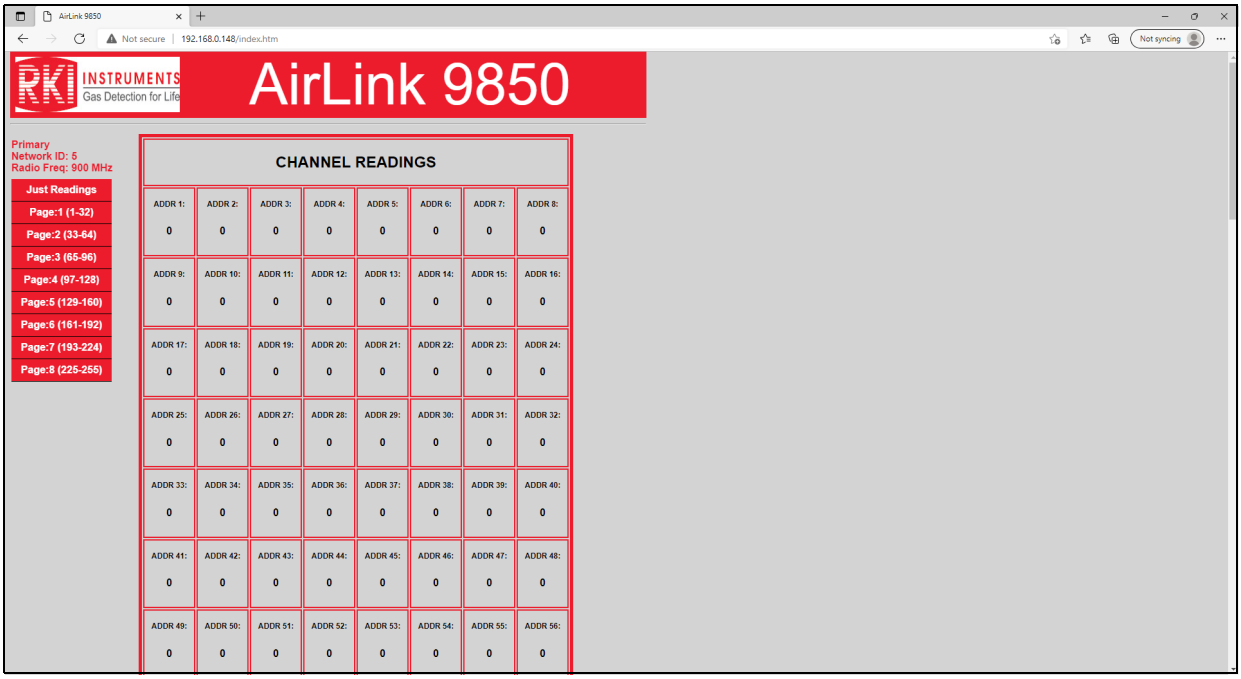
NOTE: You can also connect the AirLink 9850 directly to a computer's Ethernet port but the computer's WiFi must be turned off.

The AirLink 9850's Ethernet interface does not allow for any editing of the AirLink 9850 or any connected transmitters.

1. Connect an Ethernet cable to the Ethernet output port on the AirLink 9850 as described on page 19.
2. Launch a web browser on a computer connected to the same network as the AirLink 9850.
3. Type the IP address shown at the top of the AirLink 9850's screen into the web browser.

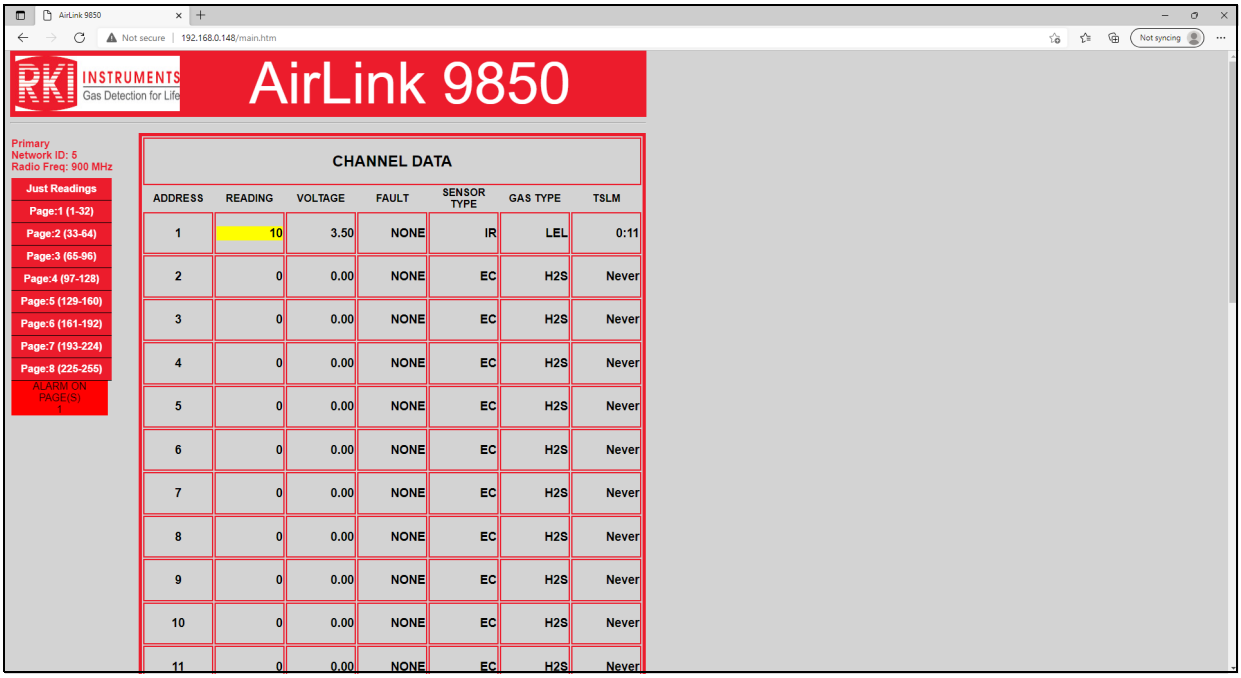


4. The Channel Readings screen appears.



5. To view more detailed information about connected transmitters, click any of the Page links on the left side of the screen.

6. The Channel Data screen appears.



ADDRESS	READING	VOLTAGE	FAULT	SENSOR TYPE	GAS TYPE	TSLM
1	10	3.50	NONE	IR	LEL	0:11
2	0	0.00	NONE	EC	H2S	Never
3	0	0.00	NONE	EC	H2S	Never
4	0	0.00	NONE	EC	H2S	Never
5	0	0.00	NONE	EC	H2S	Never
6	0	0.00	NONE	EC	H2S	Never
7	0	0.00	NONE	EC	H2S	Never
8	0	0.00	NONE	EC	H2S	Never
9	0	0.00	NONE	EC	H2S	Never
10	0	0.00	NONE	EC	H2S	Never
11	0	0.00	NONE	EC	H2S	Never

7. Any alarms or faults are shown on the left side of the screen and are highlighted at the appropriate channel.