AirLink 7010 Gas Monitor
Operator's Manual

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RKI Instruments, Inc.
www.rkiinstruments.com

Product Warranty

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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.

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Chapter 1: Introduction

Overview

This chapter briefly describes the AirLink 7010 Gas Monitor. This chapter also describes the *AirLink 7010 Gas Monitor Operator's Manual* (this document). Table 1 at the end of this chapter lists the specifications for the AirLink 7010.

About the AirLink 7010 Gas Monitor

The AirLink 7010 is sold as either a 32 or 64-channel receiver. The 32-channel version receives up to either 32 WireFree sensors (depending on the radio's configurations) or up to 28 WireFree sensors and up to four 4-20mA wired sensor assemblies. The 64-channel version receives up to either 64 WireFree sensors (depending on the radio's configurations) or up to 60 WireFree sensors and up to four 4-20mA wired sensor assemblies.

All configured channels are displayed every three seconds (scanned). When one channel indicates a gas reading, the monitor locks to that channel. If two or more channels are indicating a gas reading, the monitor scans those channels every three seconds. The user can manually scan channels by pressing *SCAN* or *ADD* to move forward through channels or *SUB* to move backward through channels. The scanned channel will stay at that channel for one minute and then go back to normal scanning.

All channels can be configured to detect WireFree gas sensor assemblies, or up to four wired (4-20mA) sensor assemblies. The last four channels (either 29-32 or 61-64) can be configured to accept a 4-20mA signal. By default, both the 32 and 64-channel systems comes with the first 28 or 60 channels configured for WireFree sensor assemblies and the last four channels configured for wired sensor assemblies. Any channel can be turned "off", and any channel can be configured to any valid WireFree address, 1-255.

There are four 5 Amp relays with 4 Amp fuses. The fourth relay may be configured as a Fault relay. This Fault relay will activate if any Fault is generated by the monitor or if any sensor that the monitor is configured to monitor goes into Fault. The Fault relay is removed from any further configurable options from Channel Setup—leaving only three relays for each channel. All relays can be configured to be either latching or auto resetting. The relays can be configured with different set points for alarm conditions for each channel, allowing each channel to have their own gas level set points.

An optional strobe and/or horn can be ordered. The strobe is installed on the top of the housing and is wired into the first relay. The horn is installed on the bottom of the housing and is wired into the second relay.

All relays have a 10% of value of hysteresis on the set points. This prevents the relays from rapidly switching on and off during a potentially jumpy gas sensor reading. Once the threshold value of a relay is reached, the relay is activated. However, the AirLink 7010 screen will not lock on the channel with a triggered relay while the reading is below the Relay Set Point (the user must scroll through the channels to find the channel with a triggered relay). When the gas reading decreases below the threshold value, the relay must be 90% of the initial threshold value to deactivate.

About this Manual

The *AirLink 7010 Gas Monitor 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 7010.

Table 1: AirLink 7010 Specifications

Input Power	110/240V ~ or 12 - 35 V ⎓
Current Draw	175 mA max at 24 VDC (monitor without sensor assemblies); 6.6 Watts max
Operating Temperature	-22°F to 158°F (-30°C to 70°C)

Table 1: AirLink 7010 Specifications

Input Signal	32-channel AirLink 7010 • Up to 32 WireFree sensor assemblies OR • Up to 28 WireFree sensor assemblies and up to 4 4-20 mA input sensor assemblies 64-channel AirLink 7010 • Up to 64 WireFree sensor assemblies OR • Up to 60 WireFree sensor assemblies and up to 4 4-20 mA input sensor assemblies
Output	RS-485 Modbus
Construction (housing)	Fiberglass with clear window (NEMA 4)
Dimensions	27.8 in. H x 10 in. W x 6.5 in. D (70.6 cm H x 25.4 cm W x 16.5 cm D)
Weight	10 lbs.
Mounting	4 mounting feet (6” W x 12.25” T); 1/4” diameter max mounting bolt/screw size
User Controls	Program buttons: RESET/ESC, SCAN/HOLD, MENU, ADD, SUB
Display	Graphical LCD (128x64), transflective, sunlight readable, LED backlight
Relays	• 4 relays with 4A fuses • SPDT, Form C (common, normally open, and normally closed contacts)
Radio Options	• 2.4 GHz, ISM, 125 mW OR • 900 MHz, 200 mW
Standard Accessory	Operator’s manual (this document)
Optional Accessories	• Strobe • Horn

Chapter 2: Description

Front Panel

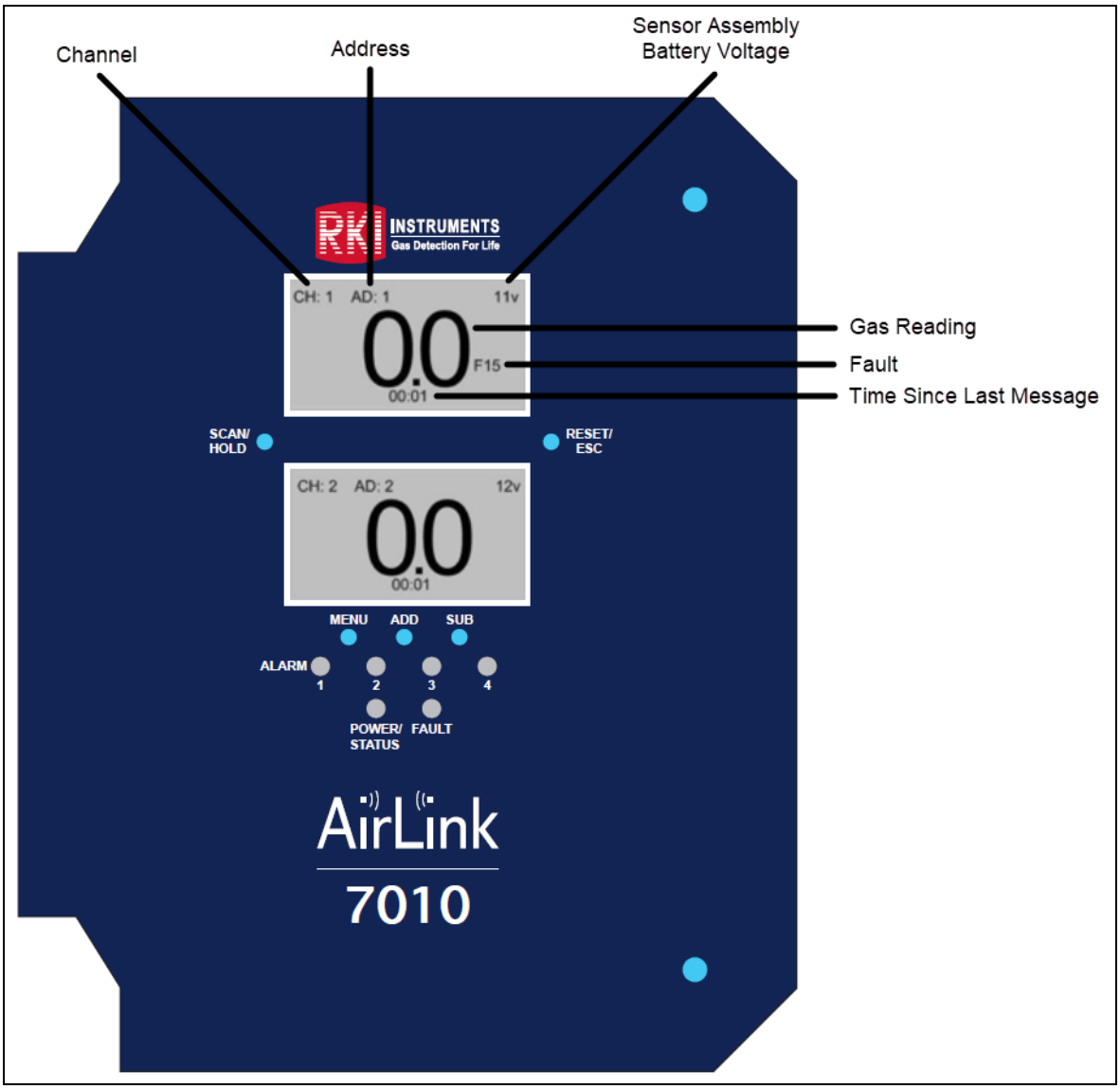


Figure 1: Front Panel

Terminal Board

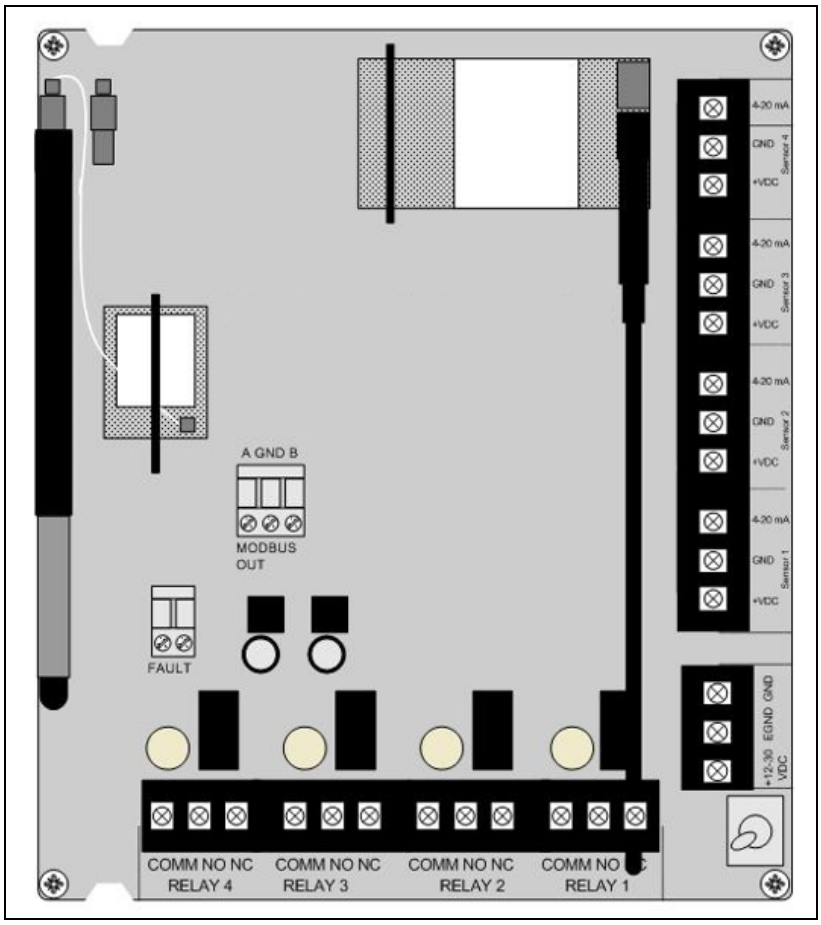


Figure 2: Terminal Board

Internal Components

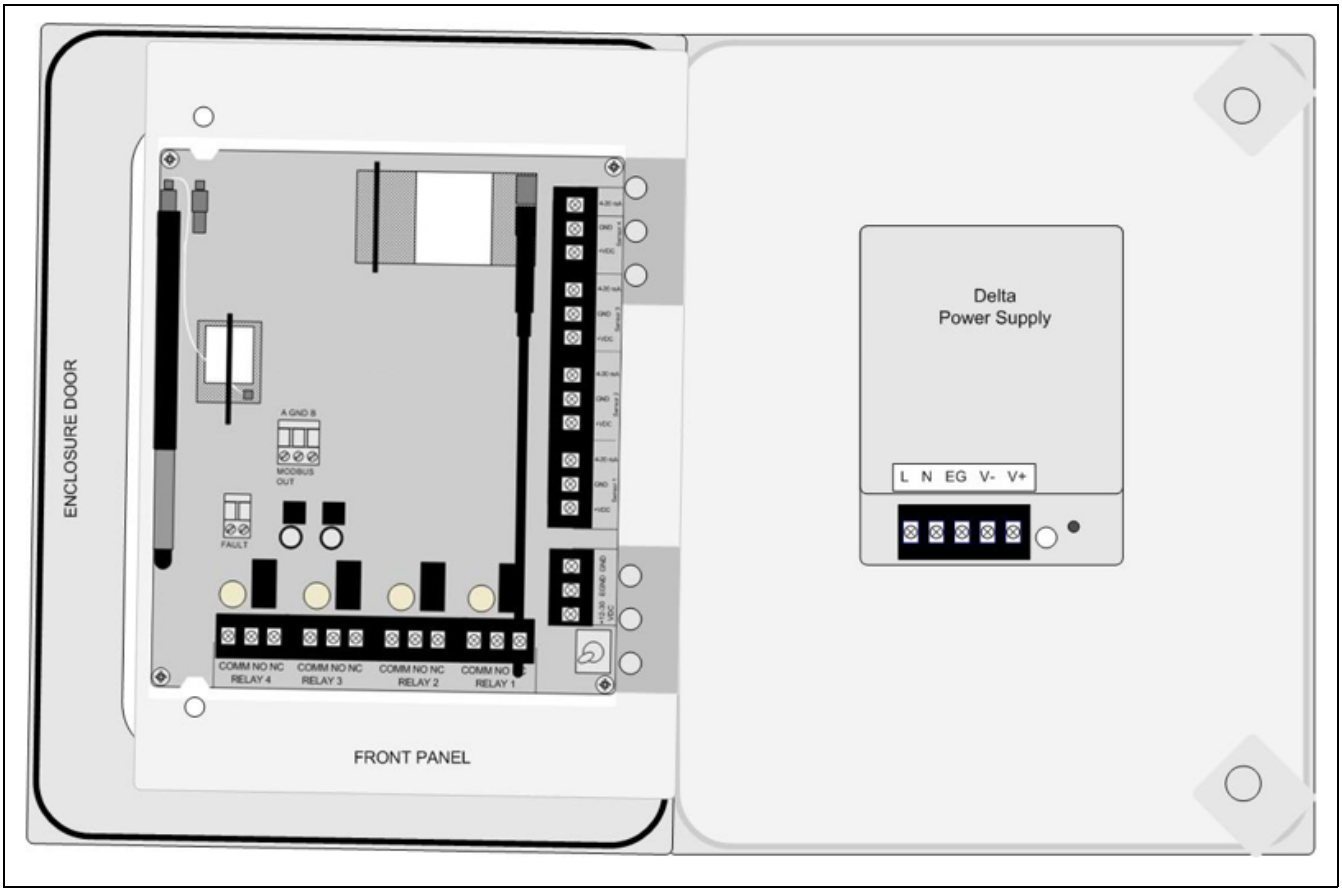


Figure 3: Internal Components

Chapter 3: Installation

Mounting the AirLink 7010 Gas Monitor

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 7010?
   - 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 7010. 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 maximum 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.

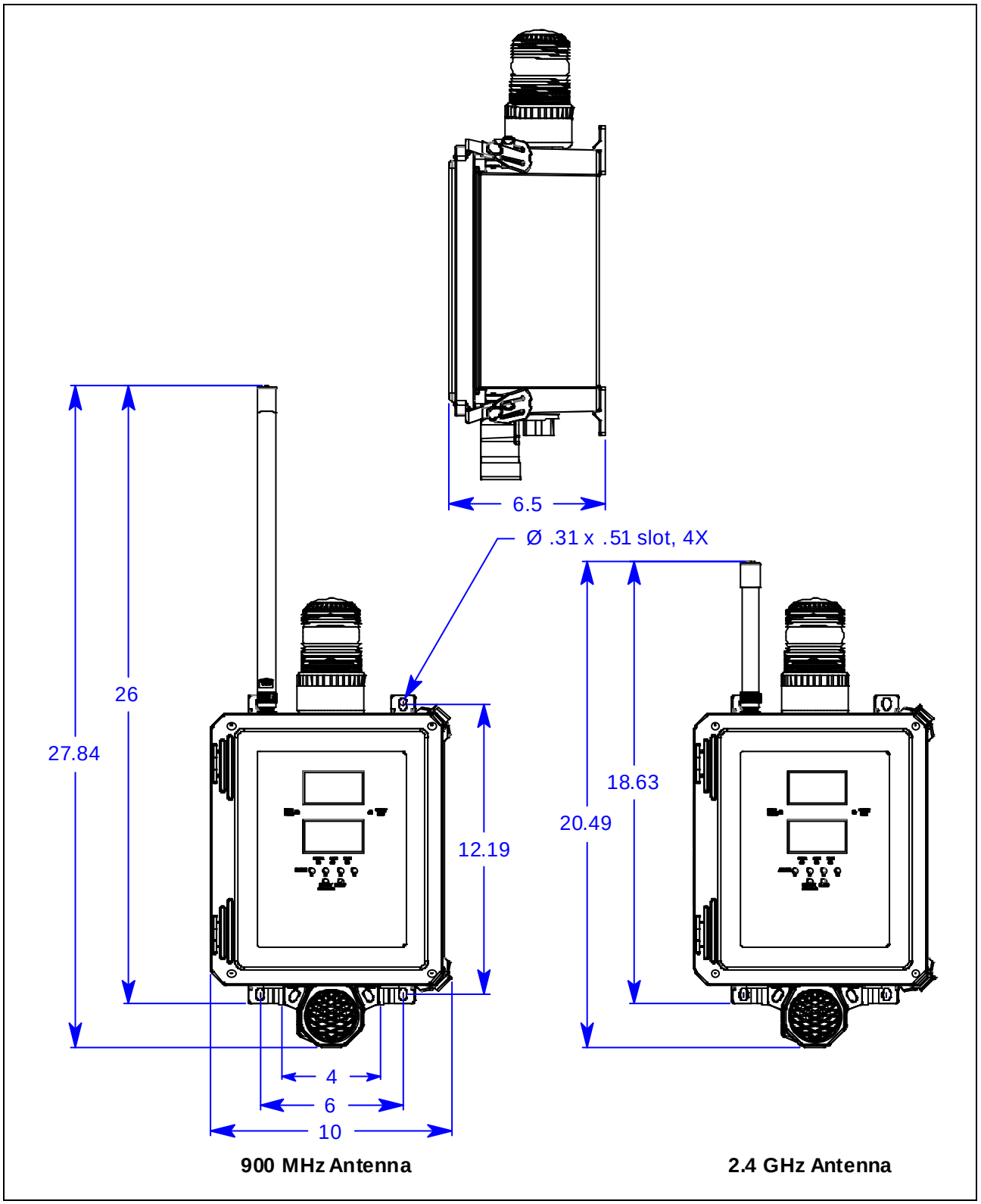


Figure 4: Outline and Mounting Dimensions

Wiring the AirLink 7010 Gas Monitor

This section describes procedures for DC power source wiring, AC power source wiring, Modbus out wiring, fault indicator wiring, sensor connection, and relay wiring.

The following wiring connections must be made before starting up the AirLink 7010.

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 7010 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: AC or DC power can be used to power the AirLink 7010. 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 (and any wired sensors that are connected to 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 remove the factory-installed wiring from the power supply.
5. Install an appropriately rate cable bushing or conduit in one of the conduit hubs and route a 2 or 3 conductor cable through the conduit hub.

CAUTION: *Do not route power and detector head wiring through the same conduit hub. The power wiring may disrupt the transmission of the detector head signal to the monitor.*

- Connect the DC-live wire (red) to the terminal marked "+12-35 VDC".
- Connect the DC-ground wire (black) to the terminal marked "GND".
- If desired, connect an Earth Ground wire (green) to the terminal marked "EGND" (required for surge suppression).

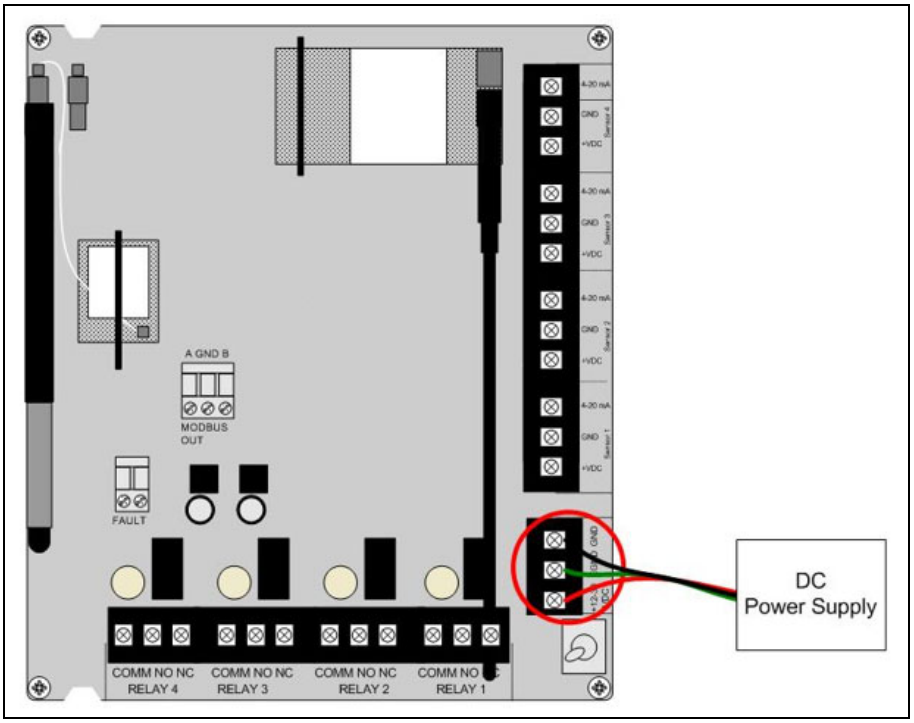


Figure 5: DC Wiring

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

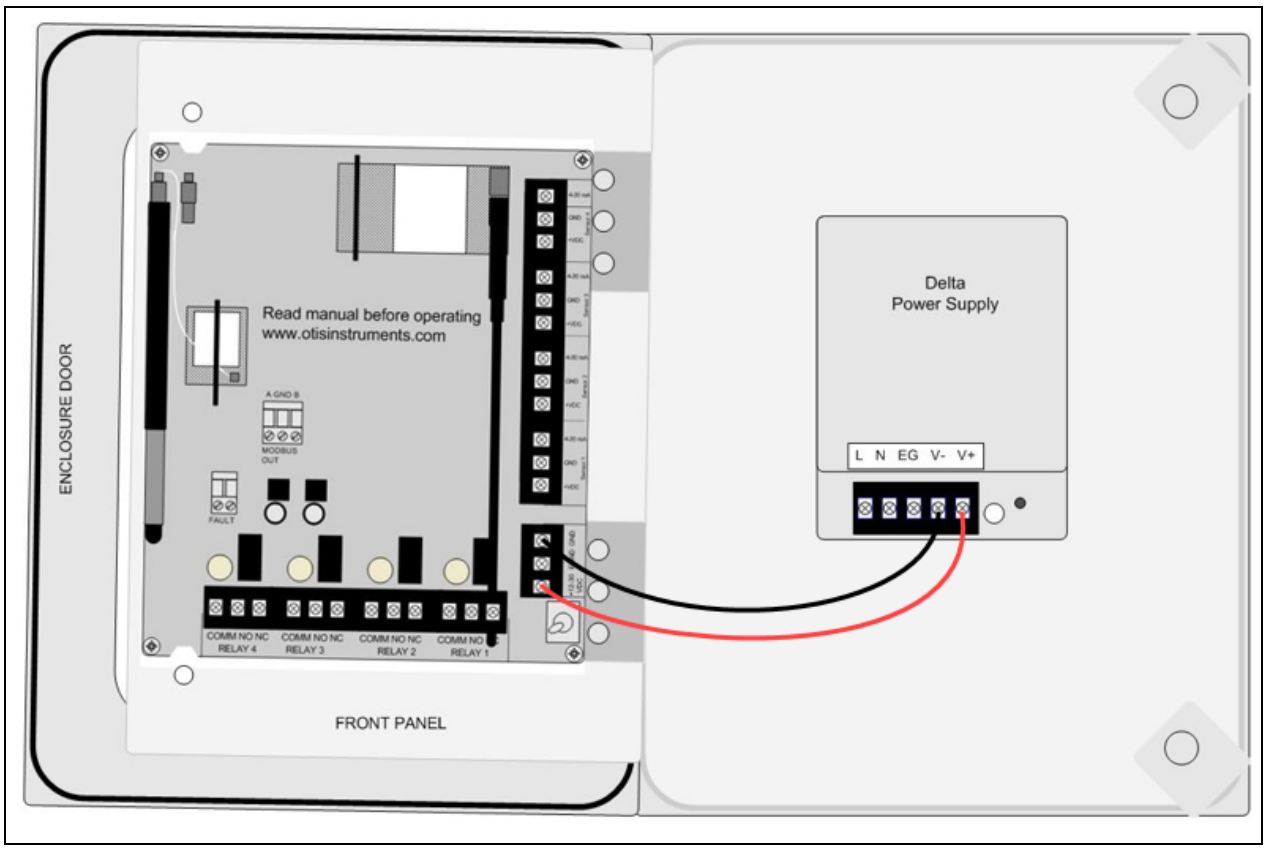
Connecting an AC Power Source

NOTE: AC or DC power can be used to power the AirLink 7010. 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. Install an appropriately rate cable bushing or conduit in one of the conduit hubs and route a 3 conductor cable through the conduit hub.

CAUTION: *Do not route power and detector head wiring through the same conduit hub. The power wiring may disrupt the transmission of the detector head signal to the monitor.*

- 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.

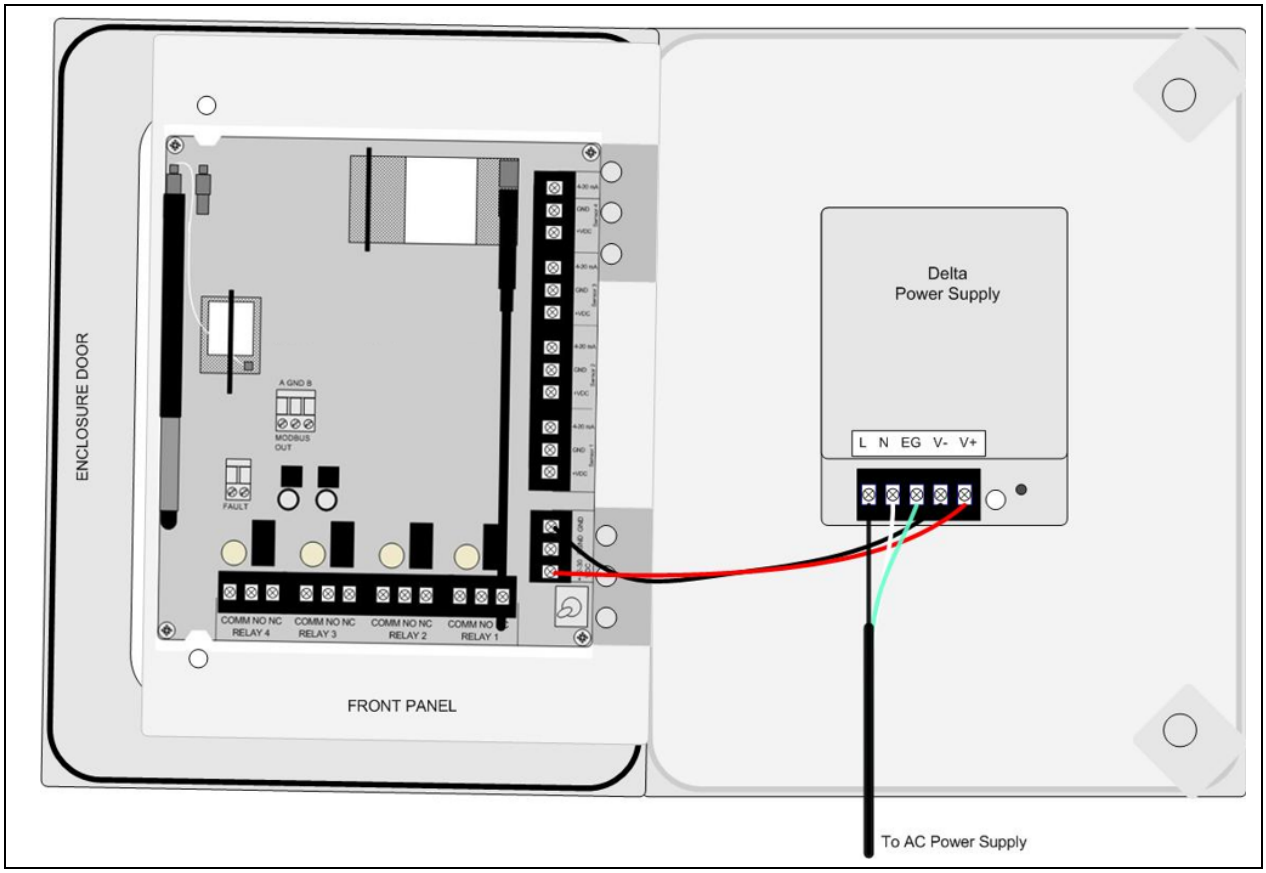


Figure 6: AC Wiring

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

RS-485 Modbus Wiring (Modbus Out)

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 the yellow wire from a DB-9 connector (or the connector-type that best suits your application) to the terminal labeled “A” on the Modbus Out Terminal Block.
6. Connect the white wire from a DB-9 connector to the terminal labeled “GND” on the Modbus Out Terminal Block.
7. Connect the brown wire from a DB-9 connector to the terminal labeled “B” on the Modbus Out Terminal Block.
8. Plug the DB-9 connector into a PLC.

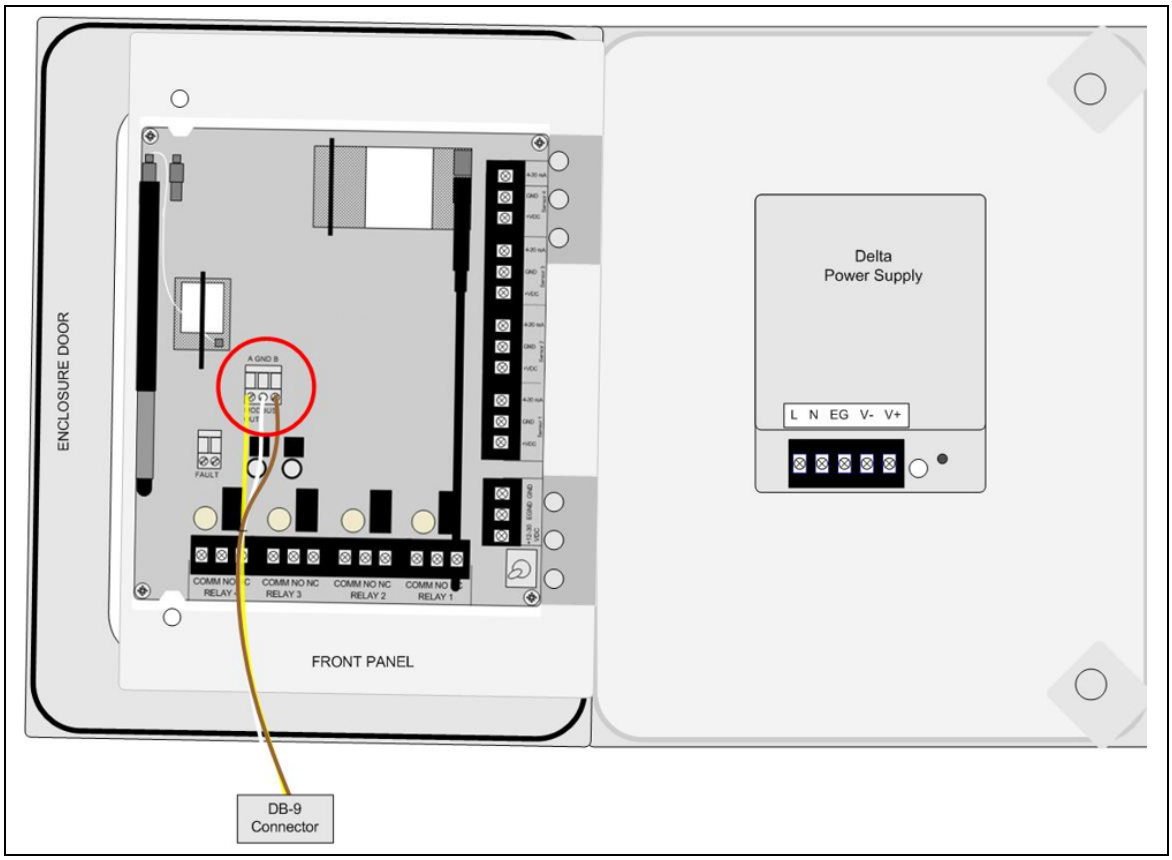


Figure 7: Modbus Out Wiring

9. Close the Front Panel.
10. Screw in the thumb-screws.
11. Close the enclosure box.
12. 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 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's failsafe operation can be configured as described in Step 4 on page 36.

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 "-".

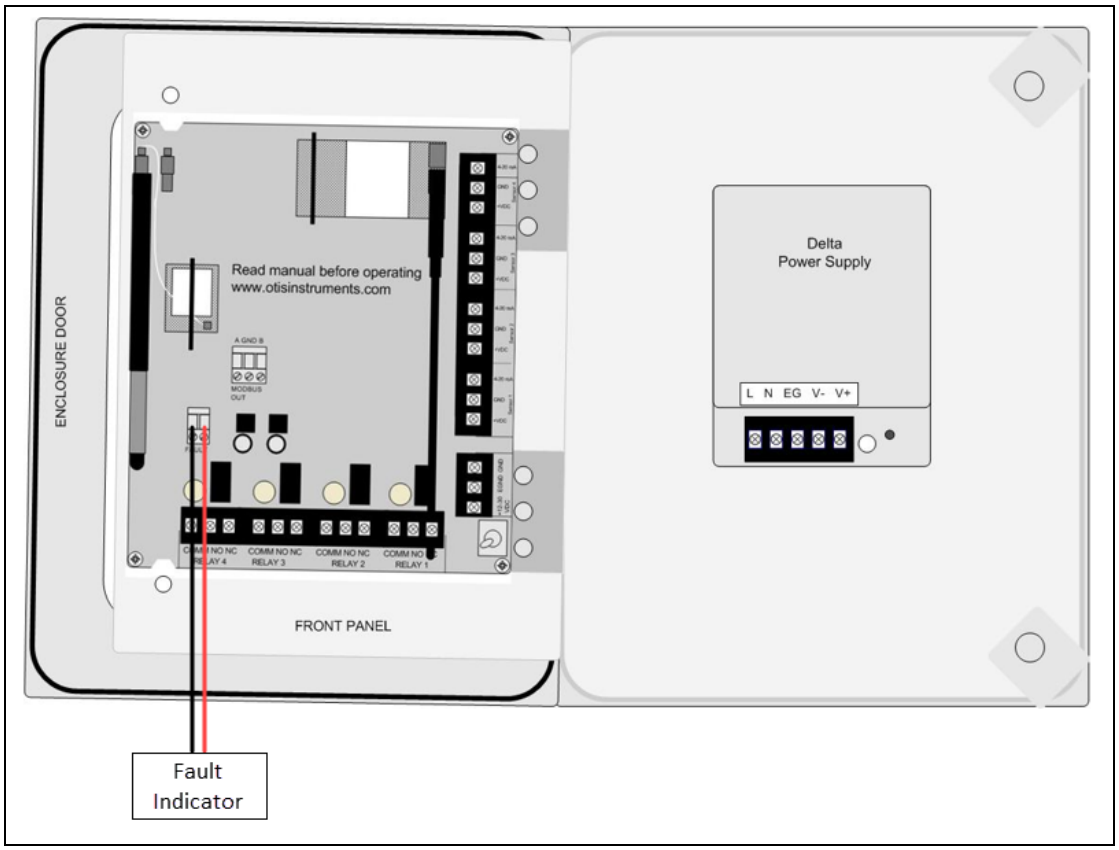


Figure 8: Fault Indicator Wiring

Connecting 4-20 mA Sensors

The AirLink 7010 allows up to 32 or 64 WireFree sensor assemblies or up to 28 or 60 WireFree sensor assemblies and 4 wired 4-20 mA type sensor assemblies to be monitored (depending on the configuration ordered).

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 Sensor Terminal Blocks on the Terminal Board.
5. For each of up to 4 wired 4-20 mA type sensor assemblies:
   - Connect the sensor assembly's positive (red) wire to the terminal labeled "+VDC".
   - Connect the sensor assembly's signal (green) wire to the terminal labeled "4-20 mA".
   - Connect the sensor assembly's neutral (black) wire to the terminal labeled "GND".

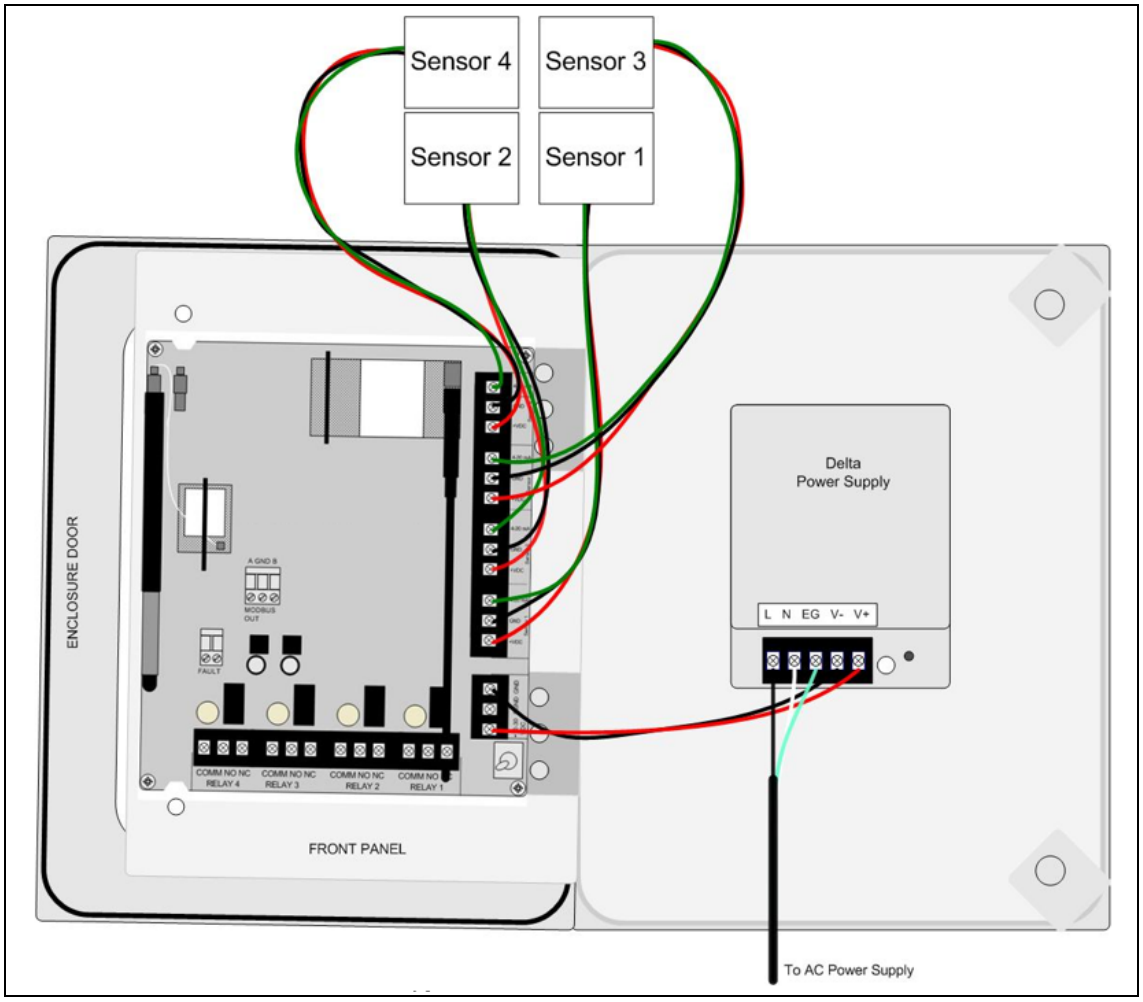


Figure 9: Sensor Wiring

Relay Wiring

The AirLink 7010 has four relays. Each of the four relays may be setup as Normally Open (NO) or Normally Closed (NC). See page 44 for more explanation about relay actuation.

NOTE: If installed, the strobe is factory wired to the Relay 1 terminals and the horn is factory wired to the Relay 2 terminals.

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 Relay Terminal Blocks on the Terminal Board.
5. Connect the alarm device's "+ (H)" terminal to the **NO** or **NC** terminal on the relay terminal block.

   NOTE: It is recommended that the relay connections are wired as normally-open (NO). However, normally-closed (NC) wiring configurations provide an inherent fail-safe and may be preferred.

6. Connect the alarm device's "- (N)" terminal to an external power source's "- (N)" terminal.
7. Connect the external power source's "+ (H)" terminal to the COM terminal on the relay terminal block.

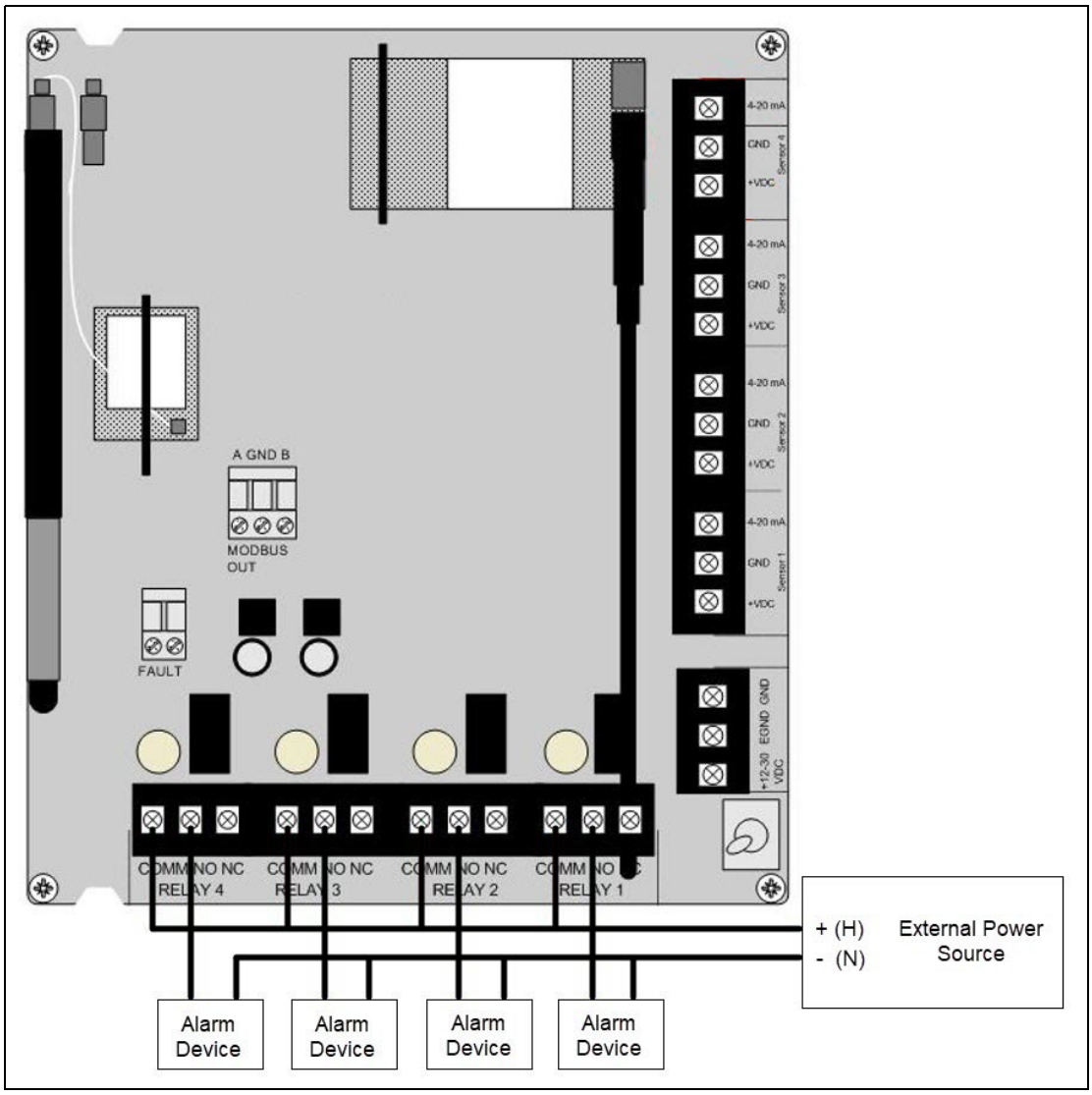


Figure 10: Relay Wiring

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.*

Once power is supplied to the AirLink 7010—by being plugged into an AC outlet or by being wired to a DC power supply—the display screen and LEDs will illuminate.

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.

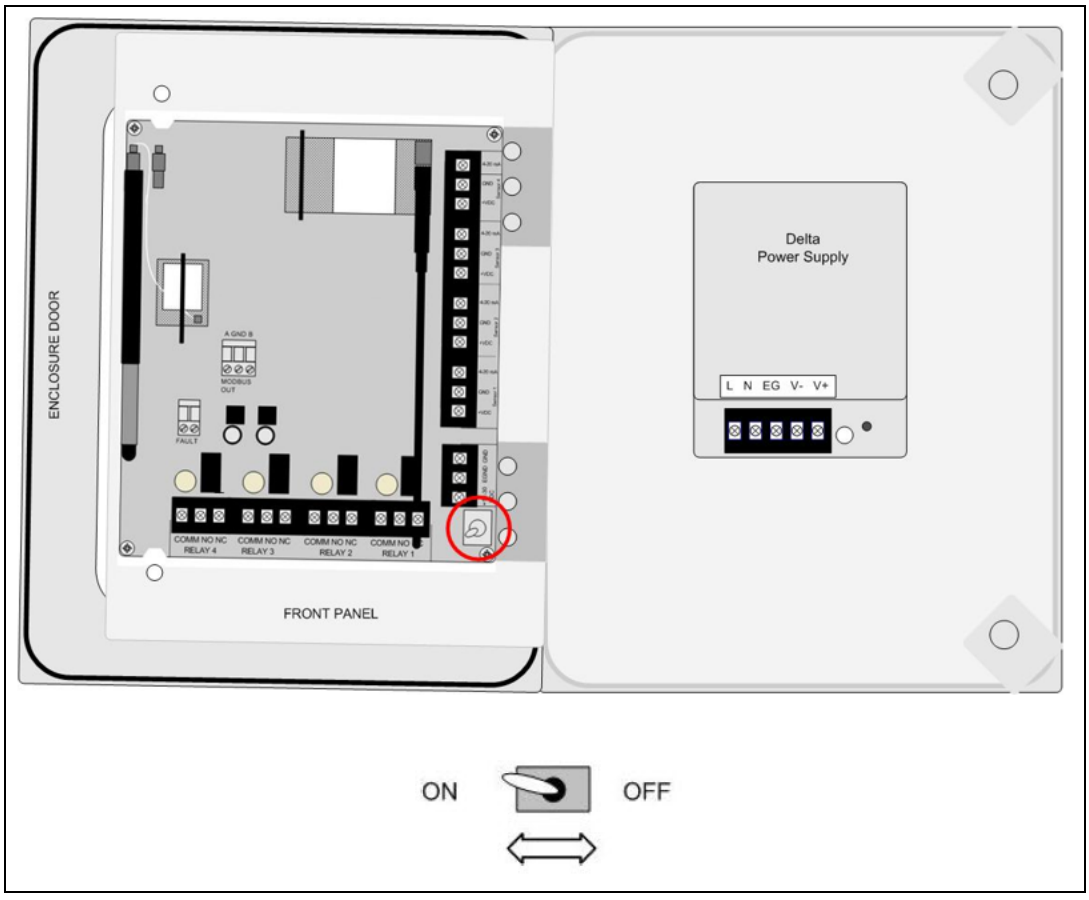
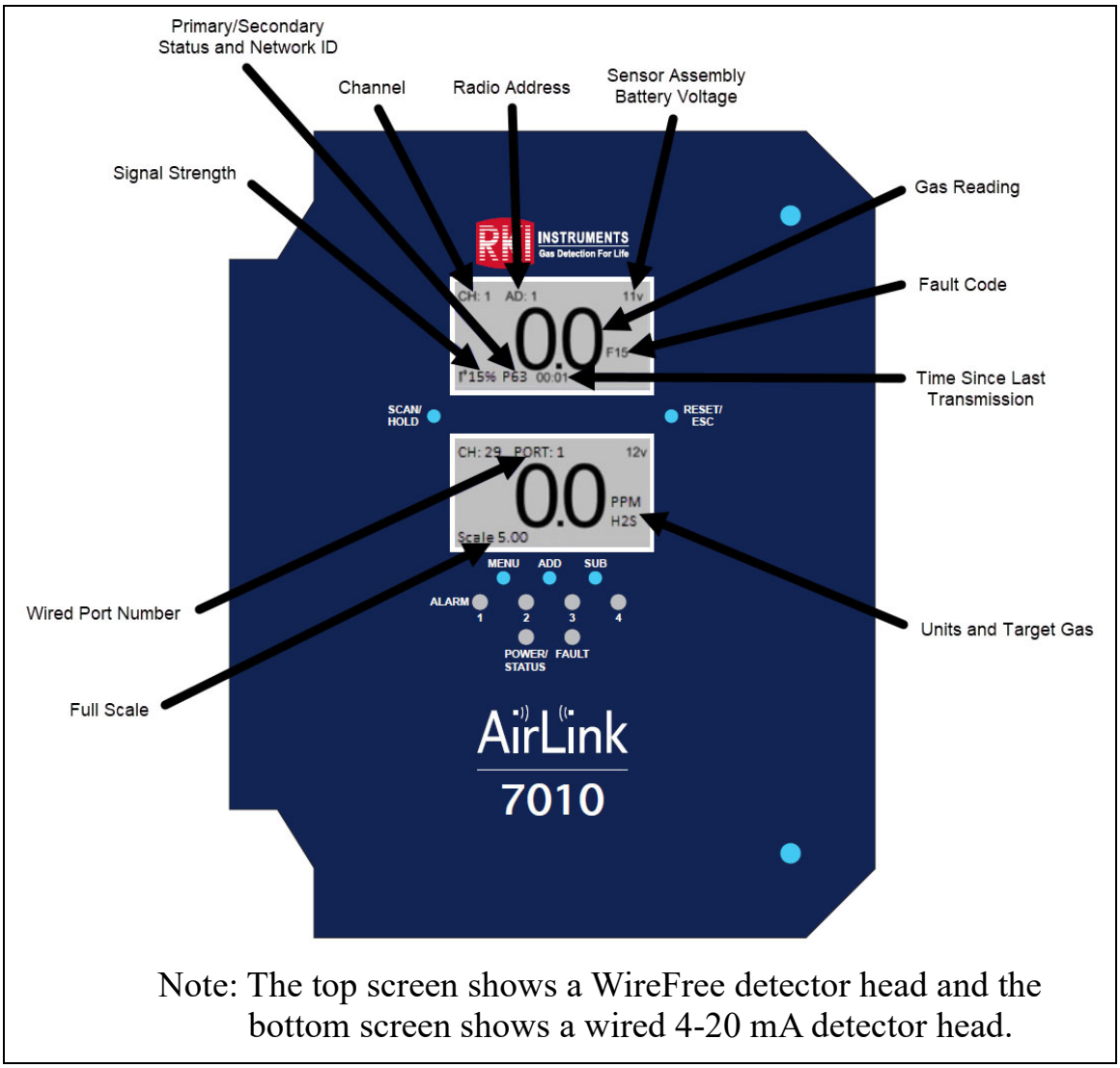


Figure 11: Power Switch Location

Normal Operation

The AirLink 7010 can monitor up to 32 or 64 WireFree sensor assemblies or up to 28 or 60 WireFree sensor assemblies and up to 4 wired sensor assemblies (depending on the configuration ordered).

When in Normal Operating Mode, configured channels are scanned through, 2 channels at a time, every 3 seconds.



Note: The top screen shows a WireFree detector head and the bottom screen shows a wired 4-20 mA detector head.

Figure 12: Normal Operating Mode

Holding Channels

This feature can be used to monitor a select channel, rather than the continuous scanning of channels while in Normal Operating Mode.

1. Open the enclosure box.
2. Locate *SCAN/HOLD* on the Front Panel.
3. Press *SCAN/HOLD* once to “freeze” the channel scan sequence.
4. Press *ESC* to return to Normal Operating Mode.

NOTE: The device will automatically return to Normal Operating Mode after five minutes of inactivity.

5. Close the enclosure box.
6. Clamp down the enclosure latches.

LED Functionality

LED	Color / Status	Description
ALARM 1	off	No alarm condition has occurred on relay 1 since the last reset or power up
	solid red	An alarm condition is currently happening on relay 1
	blinking red	An alarm condition has occurred on relay 1, but condition has now gone
ALARM 2	off	No alarm condition has occurred on relay 2 since the last reset or power up
	solid red	An alarm condition is currently happening on relay 2
	blinking red	An alarm condition has occurred on relay 2, but condition has now gone
ALARM 3	off	No alarm condition has occurred on relay 3 since the last reset or power up
	solid red	An alarm condition is currently happening on relay 3
	blinking red	An alarm condition has occurred on relay 3, but condition has now gone
ALARM 4	off	No alarm condition has occurred on relay 4 since the last reset or power up
	solid red	An alarm condition is currently happening on relay 4
	blinking red	An alarm condition has occurred on relay 4, but condition has now gone
Fault	off	No Fault condition has occurred on any sensor unit since the last reset or power up
	solid orange	A Fault condition is currently happening on at least one sensor unit
POWER/ STATUS	red	A Fault condition is occurring on the monitor
	blue	Normal Operating Mode

1. Press and release *RESET/ESC* to clear an alarm indication once the alarm condition has cleared.

Chapter 5: Setup Mode

Overview

This mode is used for: Channel Settings (On/Off, Wired/WireFree, gas, range, decimals, radio address), Relay Settings (On/Off, Decreasing/Increasing, Value, Latching/Auto Resetting), and System Information.

NOTE: Each channel must be set up individually.

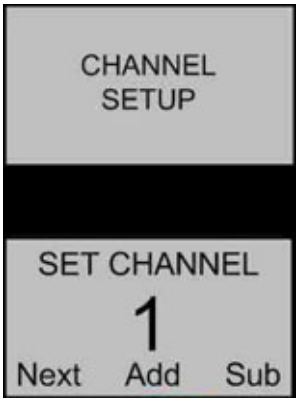
NOTE: To save any changes and exit Setup Mode at any time, press ESC. The AirLink 7010 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Entering Setup Mode

1. Open the enclosure box.
2. From Normal Operating Mode, press and hold *MENU, ADD*, and *SUB* for 5 seconds to enter Setup Mode.

Channel Settings

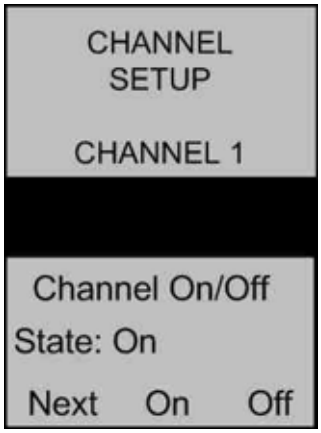
1. Channel Selection: Once in Setup Mode, press *ADD* (increase) or *SUB* (decrease) to select the channel you want to set up (1-32 or 1-64, depending on the configuration ordered).



NOTE: To view system information, scroll up from the last channel (32 or 64, depending on the configuration ordered) or down from channel 1.

2. Press *MENU* (Next).

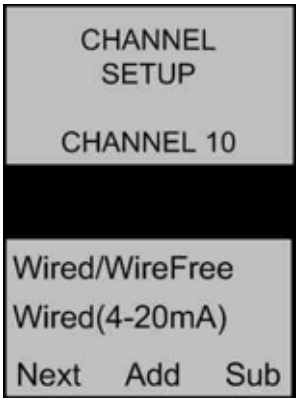
3. Channel On/Off: Press *ADD* or *SUB* to change the state of the channel to On or Off.



4. Press *MENU* (Next).
5. Wired/WireFree (for channels 29-32 or 61-64 only): Press *ADD* or *SUB* to change the channel type to Wired or WireFree.

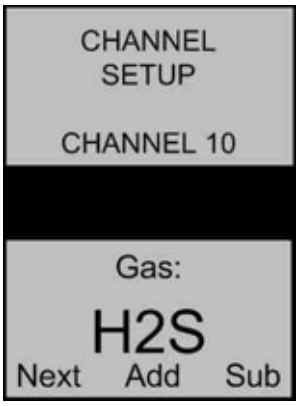
NOTE: Any sensors wired directly to a 32-channel AirLink 7010 must be set up on channels 29-32 (for 32-channel versions) or 61-64 (for 64-channel versions).

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.

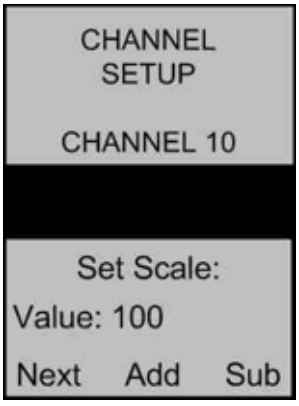


6. Press *MENU* (Next).

7. Sensor Type (wired only): Press *ADD* or *SUB* to select a sensor type. The choices are: H2S, SO2, O2, CO, Cl2, CO2, LEL,VOC, FEET, HCl, NH3, H2, CLO2, HCN, F2, HF, CH2O, NO2, O3, INCHES, 4-20, None, Degrees C, Degrees F, CH4, NO, PH3, HBr, Eto, CH3SH, AsH3, R410A, R1234, R32, SF6, SiH4, B2H6, BF3.

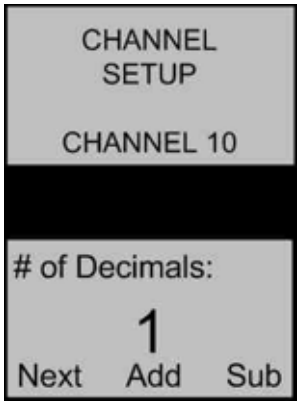


8. Press *MENU* (Next).
9. Sensor Scale (wired only): Press *ADD* (increase) or *SUB* (decrease) to select a sensor scale (1-65,000).

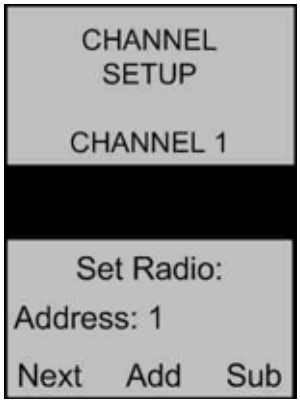


10. Press *MENU* (Next).

11. Decimals (wired only): Press *ADD* (increase) or *SUB* (decrease) to set the number of decimals. The number of decimals available depends on the sensor scale.
    - 3 decimals: Scale 1 or less
    - 2 decimals: Scale 10 or less
    - 1 decimal: Scale 100 or less
    - 0 decimals: Scale greater than 100 (decimal screen does not appear in this case)



12. Press *MENU* (Next).
13. Radio Address (wirefree only): Press *ADD* (increase) or *SUB* (decrease) to set to radio address (1-255).

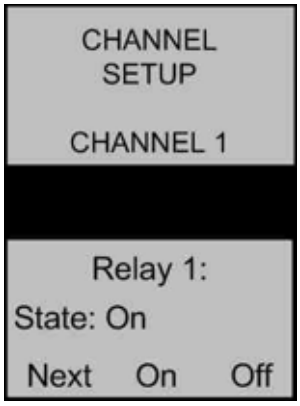


14. Press *MENU* (Next).

Relay Settings

See page 44 for more explanation about relay actuation.

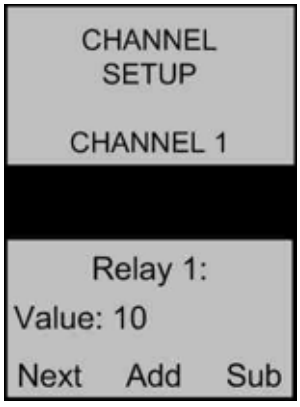
1. Relay On/Off: Press *ADD* or *SUB* to manipulate the relay's On/Off status. The On/Off status affects whether a relay is active on the selected channel or not.



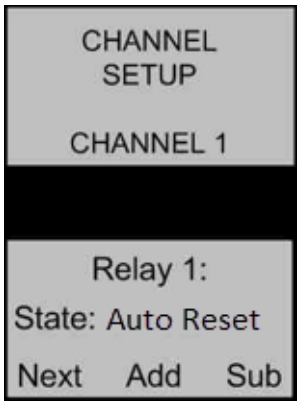
2. Press *MENU* (Next).
3. Relay Increasing/Decreasing: Press *ADD* or *SUB* to manipulate the relay's Increasing/ Decreasing status.



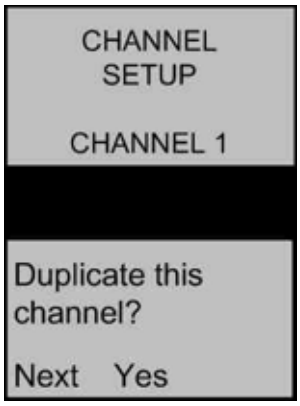
4. Press *MENU* (next).
5. Relay Threshold: Press *ADD* (increase) or *SUB* (decrease) to manipulate the threshold value (1-65,000).



6. Press *MENU* (Next).
7. Relay Latch/Auto Reset: Press *ADD* or *SUB* to manipulate the relay's Latching/Auto Reset status.



8. Press *MENU* (Next).
9. Repeat Step 1 through Step 8 for the remaining relays.
10. Once all four relays have been setup, the display screen will show the following:



11. Based on the specific application, choose one of the following steps to complete:
    - Press *MENU* (Next) to setup the next channel (or continue to system information)
    - Press *ADD* (Yes) to duplicate the settings to all consecutive channels—and *ADD* (Yes) again to confirm the operation
    - Press *ESC* to exit Setup Mode

View System Information

After the last channel is set, press *MENU* to view the system's information, including the:

- Build Date (Example: 01/01/2011)
- Serial # (Example: H00001)
- Radio (type)
- Radio error

Exiting Setup Mode

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

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

NOTE: The AirLink 7010 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, restore factory default settings, set up the fault relay, set up global Modbus parameters, and set up WireFree parameters.

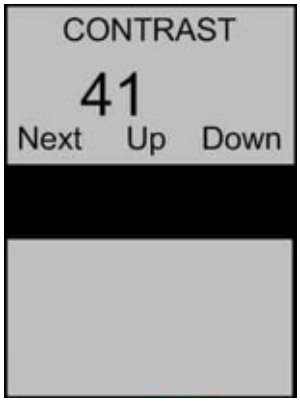
Entering the Advanced Configuration Menu

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 22.
3. When the RKI Logo is shown on the Display Screen, press *MENU*.

NOTE: The AirLink 7010 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Adjusting Contrast

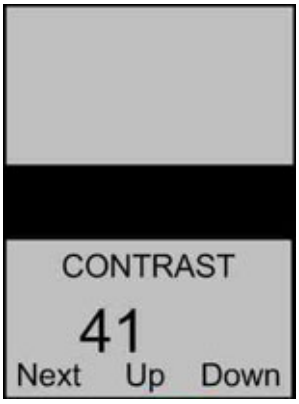
1. Press *ADD* (increase) or *SUB* (decrease) to manipulate the screen's LCD contrast.



2. Press *MENU*.

Adjusting the Lower Screen's LCD Contrast

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



2. Press *MENU*.

Restore Factory Default Settings

1. Press *ADD* or *SUB* (Yes/No—as indicated on the display screen) to set the unit back to the factory's default settings. To leave the settings as they are, press *MENU* (Next).

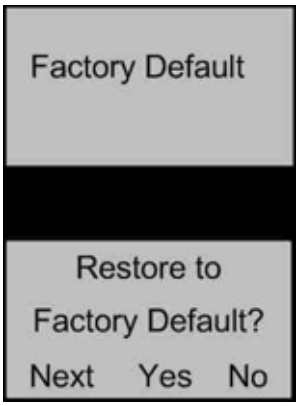
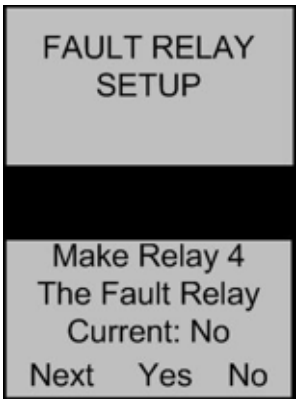


Table 2: AirLink 7010 Factory Default Settings

Channel Setup	• 32-channel versions have 1-28 set to WireFree. 64-channel versions have 1-60 set to WireFree. • 32-channel versions have 29-32 set to Wired. 64-channel versions have 61-64 set to Wired.
Relay Settings	10, 15, 20 and 25
Relay Setup	"Auto Reset" / "Increasing"
Modbus Baud	9600
Radio Timeout	10 minutes
Network ID	5
Monitor	Secondary

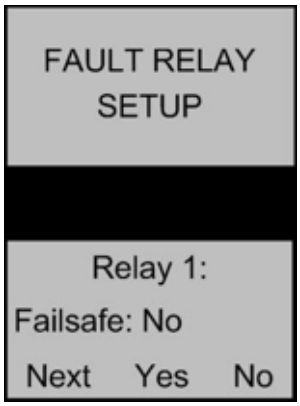
Relay Setup

1. Set Fault Relay: Press *ADD* or *SUB* (Yes/No—as indicated on the display screen) to setup Relay 4 as the Fault Relay. To leave the setting as it is, press *MENU* (Next).



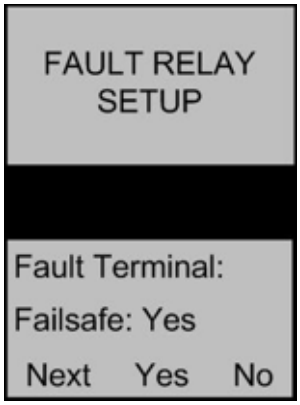
NOTE: With this feature enabled, if any Fault occurs (on any channel) the Fault Relay is engaged. In addition, Relay 4 is removed from all setup options.

2. Failsafe: Press *ADD* or *SUB* (Yes/No—as indicated on the display screen) to setup Relay 1 as failsafe (or not failsafe). To leave the setting as it is, press *MENU* (Next).



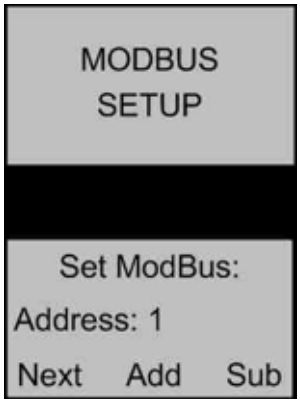
3. Repeat Step 2 for Relays 2, 3, and 4.

4. Fault Terminal Failsafe: Press *ADD* or *SUB* (Yes/No—as indicated on the display screen) to setup the Fault terminal as failsafe (or not failsafe). To leave the setting as it is, press *MENU* (Next).



Modbus Setup

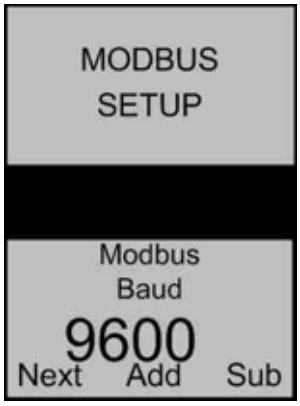
1. Global Modbus Address: Press *ADD* (increase) or *SUB* (decrease) to manipulate the global Modbus Address setting (between 1 and 247).



2. Press *MENU* (Next).

3. Global Baud: Press *ADD* (increase) or *SUB* (decrease) to manipulate the global Baud setting to: 4800, 9600, or 19200.

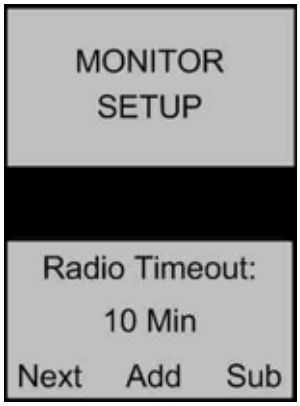
NOTE: Baud default is 9600.



4. Press *MENU* (Next).

WireFree Setup

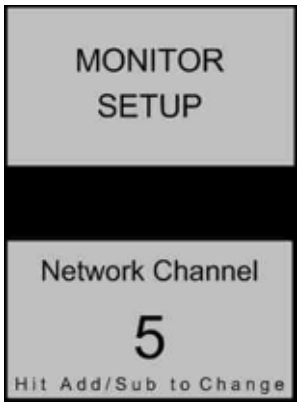
1. Radio Timeout: Press *ADD* (increase) or *SUB* (decrease) to manipulate the Radio Timeout setting (between 6 and 255 minutes).



2. Press *MENU* (Next).

3. Network Channel: Press *ADD* (increase) or *SUB* (decrease) to manipulate the Network Channel setting (between 1 and 52 for 900 MHz networks; between 1 and 78 for 2.4 GHz networks).

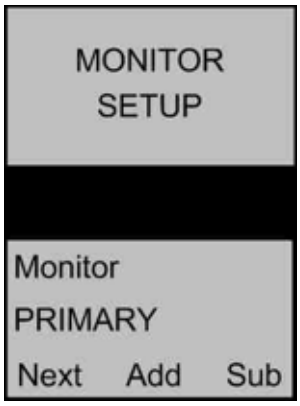
NOTE: All monitors and sensor assemblies must have the same Network Channel in order to communicate.



4. Press *MENU* (Next).
5. Primary/Secondary: 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 7010 is set as a Secondary monitor when there is no Primary monitor, the AirLink 7010 will go into a Fault 15 status. The POWER/STATUS LED will be green if the monitor becomes the Primary monitor; otherwise the POWER/STATUS LED will be blue.



6. Press *MENU* (Next) to return to Normal Operating Mode.

Exiting the Advanced Configuration Menu

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

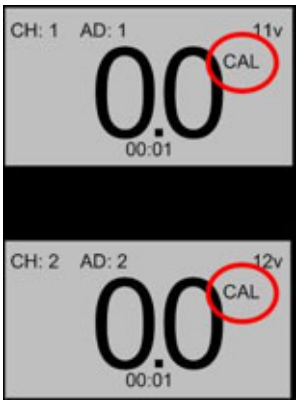
NOTE: The AirLink 7010 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

Chapter 7: Maintenance

Calibration Mode

Entering Calibration Mode disables the relays and allows the sensors to be calibrated without triggering alarms. Once in Calibration Mode, the unit will remain in this state for two hours—unless *RESET/ESC* is pressed.

1. Open the enclosure box to expose the Front Panel.
2. To enter Calibration Mode, from Normal Operating Mode, press and hold *MENU* for 5 seconds.
3. Once in Calibration Mode, the display screen will show “CAL” on the upper right side.



4. To return to Normal Operating Mode, press *RESET/ESC*.

> **NOTE:** If RESET/ESC is not pressed, the unit will remain in Calibration Mode for two hours.

5. Close the enclosure box.
6. Clamp down the enclosure latches.

Relay Test Mode

Relay Test Mode activates each relay and can be used to determine whether or not the relays and attached alarms are functioning properly.

1. Open the enclosure box to expose the Front Panel.
2. To enter Relay Test Mode, from Normal Operating Mode, press and hold *RESET/ESC*.
3. Starting with Relay 1, the relays will activate in 5-second intervals.
4. To return to Normal Operating Mode, release and press *RESET/ESC*.
5. Close the enclosure box.

6. Clamp down the enclosure latches.

Troubleshooting

Table 3 describes symptoms, probable causes, and recommended actions for the most common problems you may encounter with the AirLink 7010.

NOTE: This troubleshooting guide describes AirLink 7010 problems only. See the detector head operator's manuals for preventive maintenance procedures that apply to the detector heads installed on your AirLink 7010.

Table 3: Troubleshooting the AirLink 7010

Condition	Probable Causes	Recommended Action
F1 (Only for T3A/VOC Pro with Radio)	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 T3A/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.
F5	The sensor assembly did not zero correctly.	1. Confirm that no gas is present. 2. Replace the sensor.

Table 3: Troubleshooting the AirLink 7010 (Continued)

Condition	Probable Causes	Recommended Action
F6	The sensor assembly did not auto cal correctly.	1. Confirm the gas concentration is correct and that it is flowing to the sensor. 2. Replace the sensor.
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.
F9	The monitor has not received a communication from the faulting sensor assembly address for the timeout period set on page 37.	1. Check the sensor assembly for a dead battery, broken antenna, bad antenna cable, missing antenna, obstacle, weather, etc.
F10 (4-20 mA wired detector only)	When using a monitor with wired sensor assemblies attached, the sensor is not communicating with the monitor. The problem could be that the sensor assembly is not connected properly, or there may be board issues with the sensor or monitor.	1. Check all connections. Use a current meter inline to see if the current is correct.
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.
F13 (4-20 mA wired detector only)	When using a monitor with a 4-20mA wired connection, F13 may appear when the sensor assembly is in a fault condition.	1. Since it is 4-20mA, the monitor does not know the exact fault condition. Therefore, check the sensor assembly to see what the fault is and then consult other items in this chart for a solution.

Chapter 8: Parts List

Table 4 lists the part numbers and descriptions for replacement parts and accessories offered for the AirLink 7010 Gas Monitor.

Table 4: Parts List, AirLink 7010 Gas Monitor

Part No.	Description
18-0107RK	Conduit hub (3/4 in.)
51-0040-RED	Strobe/horn, 20 - 28 VDC, Cl. I Div. 1 Zone 1
71-0537	AirLink 7010 Gas Monitor Operator's Manual (this document)

Appendix A: Relay Operation

Relays are offered in certain RKI devices for the purpose of activating alarms, horns, and other equipment upon the detection of gas.

There are two key terms to remember when using relays.

- Deactivated: refers to a relay in its normal state
- Activated: refers to a relay in an alarm state

“Dry” Contact and “Wet” Contact Relays

In regard to power, there are two types of relays.

1. Dry Contact Relays: This type of relay does not provide power to the equipment attached to it (i.e. if there is a light hooked up to this type of relay, it must be powered by another source).
2. Wet Contact Relays: This type of relay does provide power to the equipment attached to it (i.e. if a light was hooked up to this type of relay, it would be powered by the relay). When using a Wet Contact Relay, power should run through the “COMM” terminal to the end equipment.

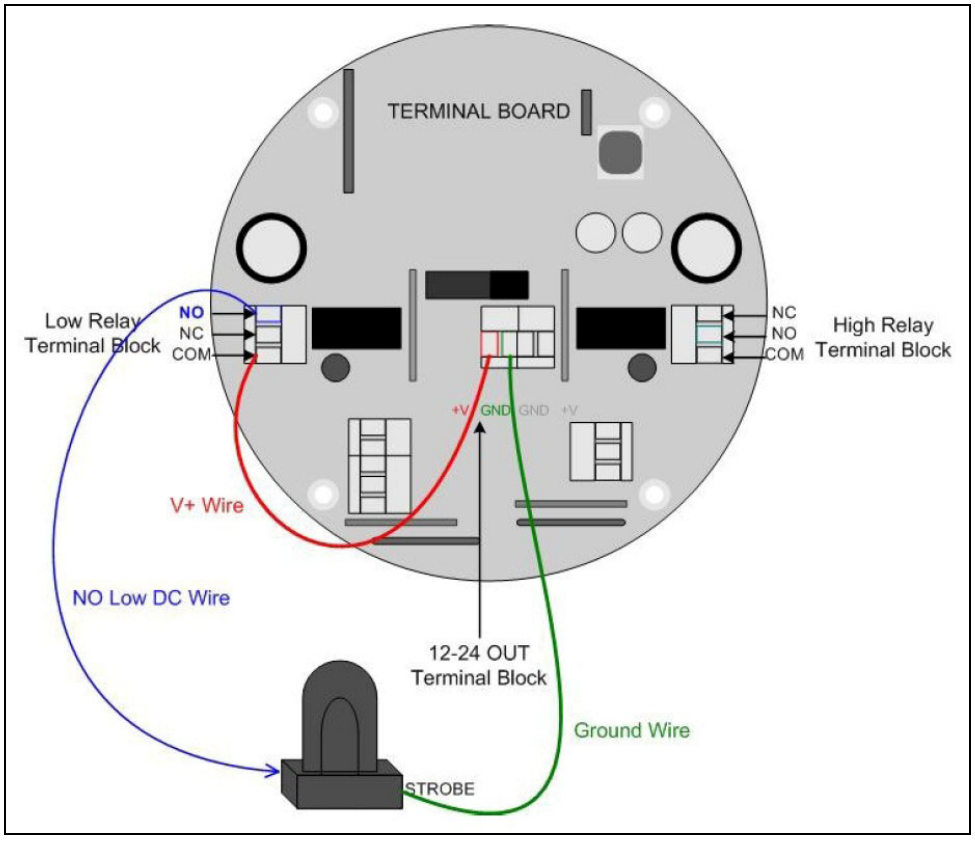


Figure 13: “Dry” Contact Relay Configured as a “Wet” Contact

Failsafe Setting's Effect on Normally-Open/Normally-Closed Contacts

If Failsafe is set to No, the relays are de-energized in normal operation and energize when the appropriate alarm circuit is activated. The NO (normally open) relay contacts are open during non-alarm operation and close when the appropriate alarm condition occurs. The NC (normally closed) relay contacts are closed during non-alarm operation and open when the appropriate alarm condition occurs.

If Failsafe is set to Yes, the relays are energized in normal operation and de-energize when the appropriate alarm circuit is activated. The NO (normally open) relay contacts are closed during non-alarm operation and open when the appropriate alarm condition occurs. The NC (normally closed) relay contacts are open during non-alarm operation and close when the appropriate alarm condition occurs.

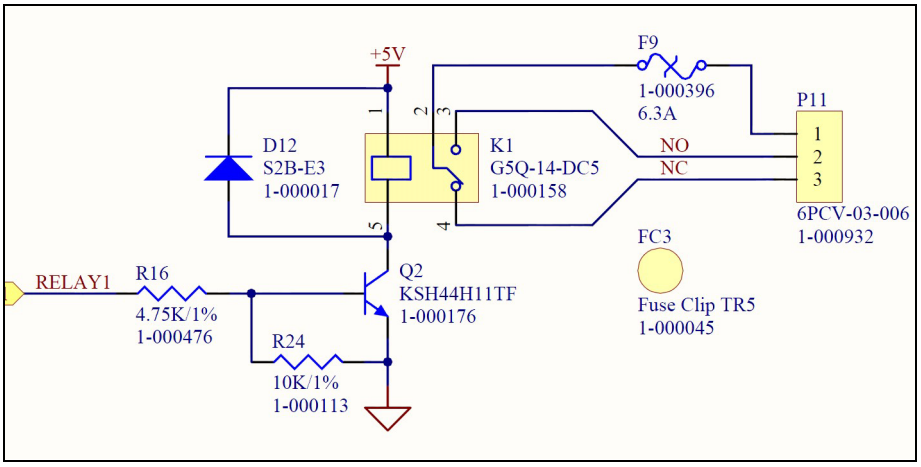


Figure 14: Relay Circuit Schematic

Appendix B: 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 VOC Pro uses values below 4 mA to indicate special status conditions, as shown below:

Table 5: 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 current loop VOC Pro will maintain the proper current for the device, up to its maximum voltage capability.

Only one current level can be present at any time. Each device that operates via a 4-20 mA current loop signal must be wired directly to the controller. Units that are wired in a daisy chain configuration for the 4-20 mA current loop signal will not properly transmit data communications to the controller.

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 C: 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 maps for 32 and 64-channel versions (applicable to RS-232, RS-485, and USB outputs) of the AirLink 7010 are accessible from the following URLs:

- 32-channel version: https://www.rkiinstruments.com/pdf/airlink_7010-32-regmap.pdf
- 64-channel version: https://www.rkiinstruments.com/pdf/airlink_7010-64-regmap.pdf