



INSTRUMENTS

AirLink 5900 Operator's Manual

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**RKI Instruments, Inc.
www.rkiinstruments.com**

Product Warranty

RKI Instruments, Inc. warrants gas alarm equipment sold by us to be free from defects in materials, workmanship, and performance for a period of one year from date of shipment from RKI Instruments, Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired, or replaced on a routine basis. The following are examples of such items:

- Absorbent cartridges
- Pump diaphragms and valves
- Fuses
- Batteries
- Filter elements

Warranty is voided by abuse including mechanical damage, alteration, rough handling, or repair procedures not in accordance with the operator's manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF RKI INSTRUMENTS, INC. INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RKI INSTRUMENTS, INC. BE LIABLE FOR INDIRECT, INCIDENTAL, OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold to users by authorized distributors, dealers, and representatives as appointed by RKI Instruments, Inc.

We do not assume indemnification for any accident or damage caused by the operation of this gas monitor, and our warranty is limited to the replacement of parts or our complete goods.

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Overview

The AirLink 5900 converts a single 4-20 mA signal into a wireless signal (900 MHz or 2.4 GHz) that can be used with other AirLink products.

This document should be read before initial operation of the product.

About this Manual

The *AirLink 5900 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: *Refer to accompanying documentation.*

VDC (DC voltage)

Specifications

Input Power	12 - 35 VDC
Current Draw	<175 mA maximum (depends on connected 4-20 mA device)
Operating Temperature	-40°F to 129°F (-40°C to 54°C)
Input Signal	1-52 Networks (1-78 for 2.4 GHz) 1-255 Addresses per Network
Output	Wireless radio
Construction	Explosion/flame-proof housing
Hazardous Location Rating	Class I, Division 1, Groups B, C, D Ex db IIB Gb Class I, Zone 1, AEx db IIB Gb
Dimensions (without antenna)	4.5 in. H x 5.5 in. W x 5.4 in. D (11.4 cm H x 13.9 cm W x 13.2 cm D)
Weight	6 lbs.
User Buttons and Magnetic Switches	MENU, ADD, SUB
Radio Options	2.4 GHz, ISM, 100 mW OR 900 MHz, 200 mW
Standard Accessory	AirLink 5900 Operator's Manual (this document)

External Components

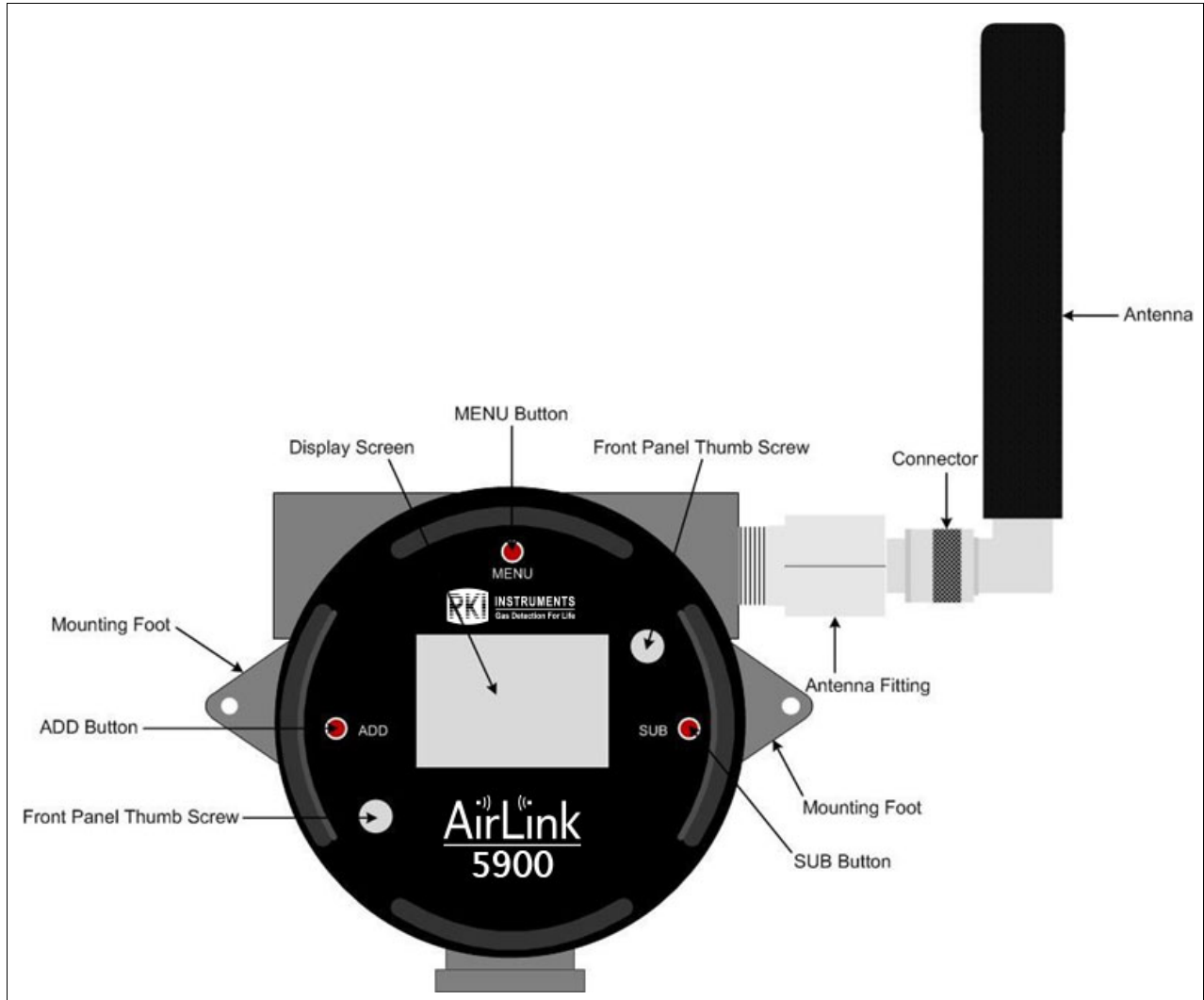


Figure 1: Component Location

Control Board

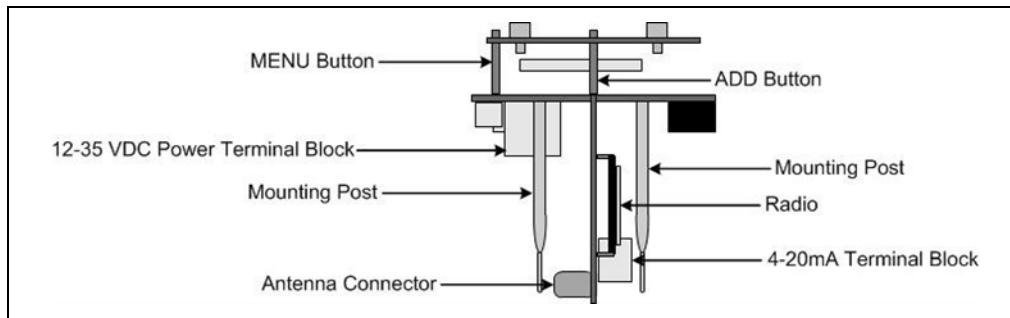


Figure 2: Control Board

Installation

Mounting the AirLink 5900

1. Select the mounting site. When you select the mounting site, consider the following factors:
 - Is a DC power source available?
 - Is a vertical surface available to mount the AirLink 5900?
 - Is there enough room to remove the enclosure lid and to make wiring connections?
 - Is the display screen visible?
2. Install the enclosure lid.
3. Prepare the selected mounting site as required to mount the AirLink 5900. It should be mounted at eye level (4 1/2 to 5 feet from the floor). Refer to Figure 3 for the outline and mounting dimensions.
4. Position the monitor on the vertical mounting surface.
5. Insert bolts or screws through the slots in the mounting feet to secure the device to the mounting surface. Use a maximum 1/4" - 20 bolt or 1/4" diameter screw, flat washers, Grade 5 material, and corrosion protection like paint, galvanization, or zinc plating.

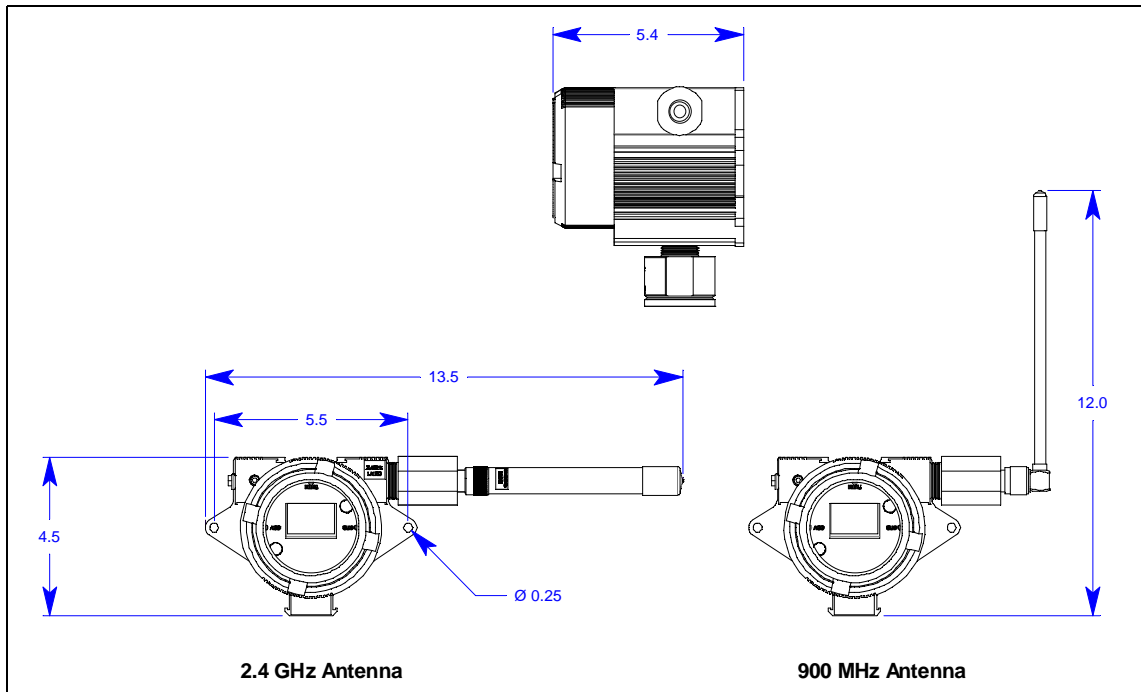


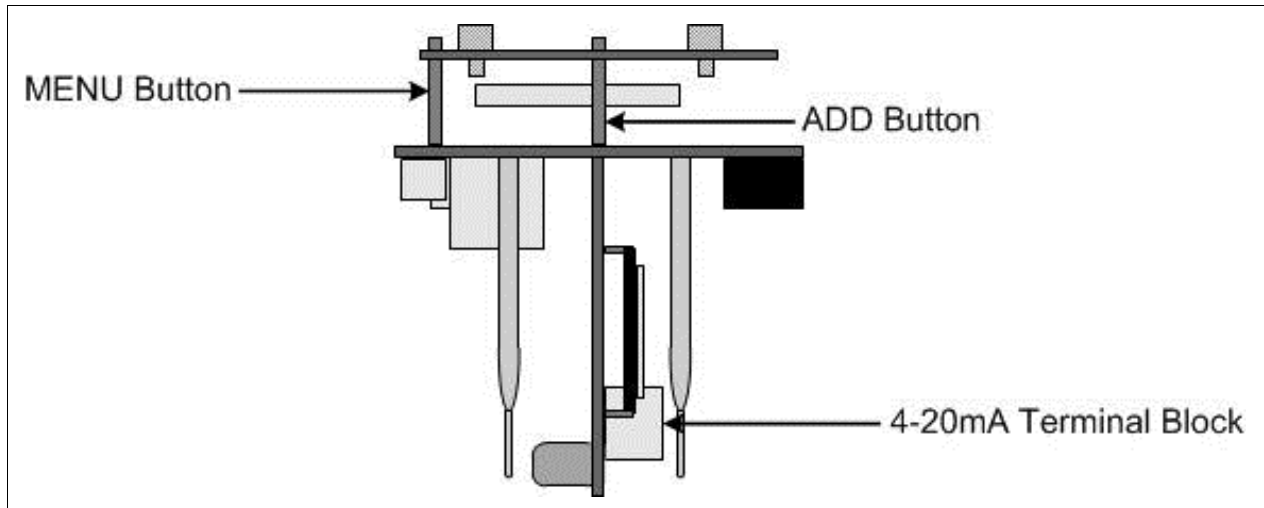
Figure 3: Outline and Mounting Dimensions

Wiring Setup

Wiring the 4 - 20 mA Signal

The AirLink 5900 is a wired transmitter that uses an external 4 - 20 mA sensor provided by the user. Refer to the following procedure when wiring a sensor to the transmitter.

1. Unscrew and remove the enclosure lid.
2. Grip the front panel thumbscrews and pull the front panel out of the enclosure.



3. Locate the 4 - 20 mA terminal block on the control board and rotate the board so that the terminal block is accessible for wiring.

CAUTION: Use appropriate construction technique to maintain the explosion proof classification of the assembly.

4. Connect the 4 - 20 mA (GREEN) wire to the 4 - 20 mA terminal block.
5. Connect the ground (BLACK) wire to the GND terminal.

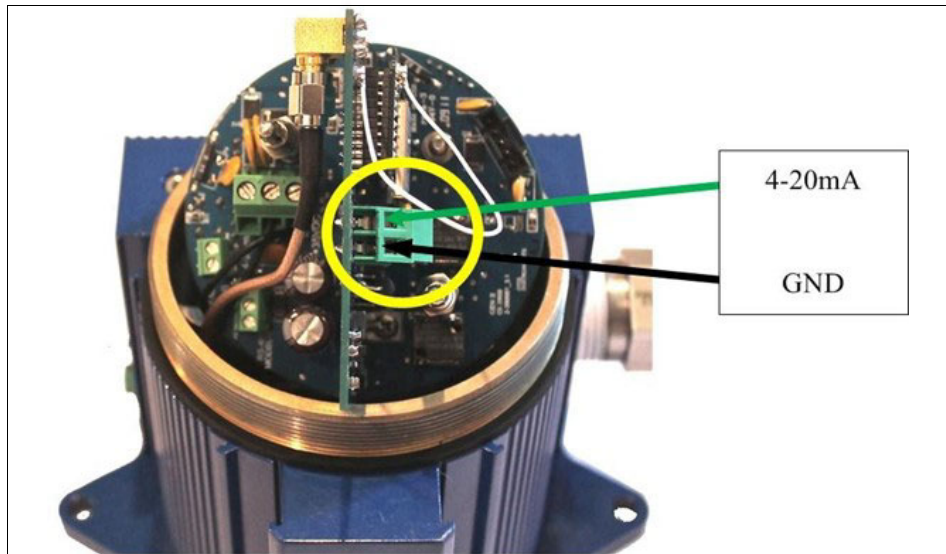


Figure 4: 4 - 20 mA Wiring

NOTE: The AirLink 5900 and 4 - 20 mA device must share a common ground (return) for proper operation.

6. After both wires are connected, the unit can be connected to a power supply.

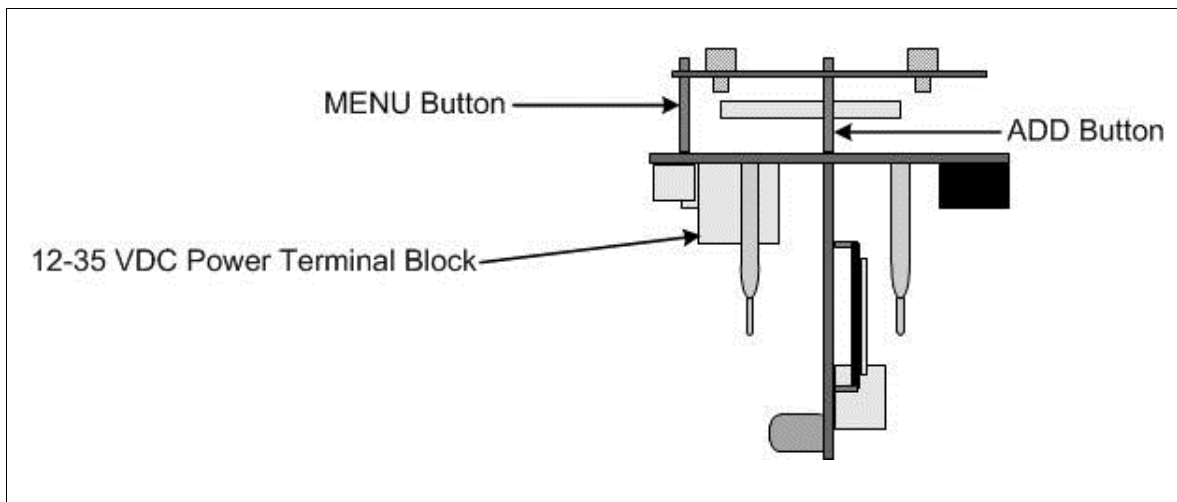
Wiring the Power Source

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 5900 before you plug in or turn on the DC power source. Before you make any wiring adjustments, always verify that all power sources are not live.*

WARNING: *Use appropriate construction technique to maintain the explosion proof classification of the assembly.*

1. After wiring the 4 - 20 mA sensor to the AirLink 5900, locate the 12-35 VDC terminal block on the internal board.



2. Route the 12-35 VDC wiring through the bushing on the left side of the housing.

3. Connect a negative (BLACK) wire from the DC power source to the “V-” terminal on the DC terminal strip.
4. Connect the positive (RED) wire from the DC power source to the “V+” terminal on the DC terminal strip.

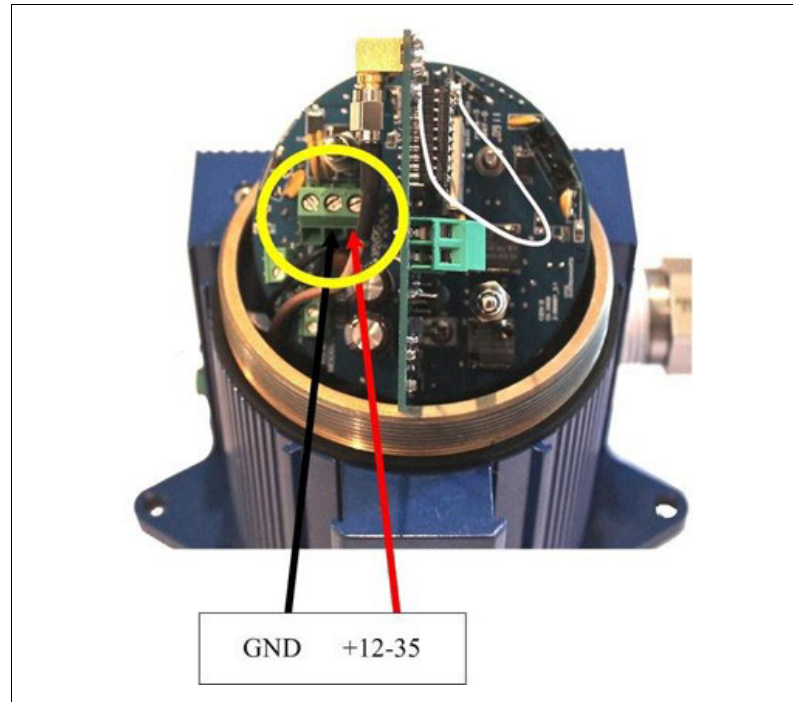


Figure 5: DC Wiring

5. Verify the 4 - 20 mA wiring is secure.
6. Place the control board back in the enclosure. Verify that each control board mounting post is properly fitted in its corresponding eyelet inside the enclosure.
7. Verify that the sealing ring on the enclosure base is still in place.
8. Place the enclosure lid back onto the control board and rotate the lid until it is tightly screwed in place.
9. Reinstall the control board, matching each mounting post to its corresponding eyelet anchored within the base of the enclosure, being careful not to disturb the wiring connections.
10. Reinstall the enclosure lid.

Fault Terminal Wiring

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 5900 before you plug in or turn on the DC power source. Before you make any wiring adjustments, always verify that all power sources are not live.*

The fault terminal is used to provide indication of a device failure (for reasons listed on page 29 or for a power failure). The fault terminal is shipped configured as a normally-closed (NC), or fail-safe, configuration, terminating power to the external fault device when prompted.

The fault terminal is a wet-contact, requiring only the power and ground wires of the external fault device to be wired during installation. During normal operation, the fault terminal provides a maximum of 500 mA at the same DC voltage that is powering the device.

1. Unscrew and remove the enclosure lid.
2. Pull the control board away from the enclosure to expose the fault terminal strip.
3. Bring cable through the conduit hub on the right side of the housing.

WARNING: *Use appropriate construction technique to maintain the explosion proof classification of the assembly.*

4. Connect the external fault device power (RED) wire to the + terminal.
5. Connect the external fault device ground (BLACK) wire to the - terminal.

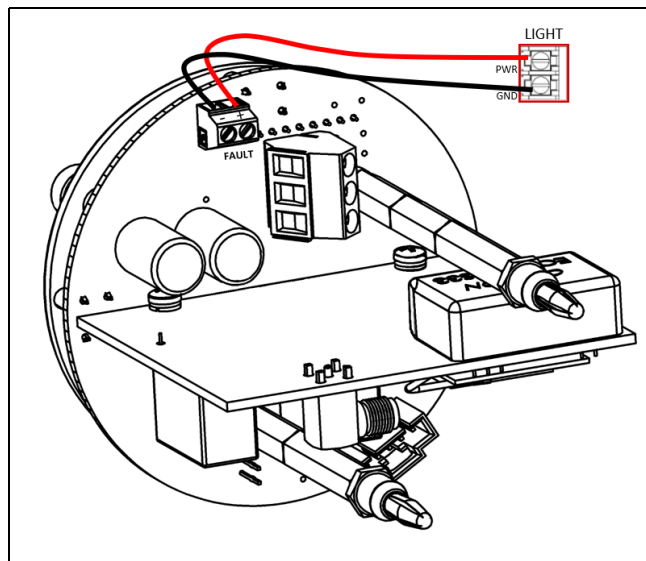


Figure 6: Fault Terminal Wiring

6. Reinstall the control board, matching each mounting post to its corresponding eyelet anchored within the base of the enclosure, being careful not to disturb the wiring connections.
7. Reinstall the enclosure lid.

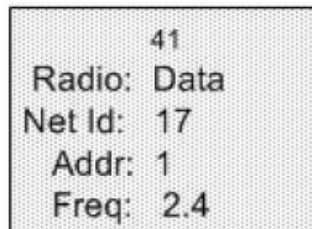
Operation

WARNING: *Do not remove the enclosure lid while the circuits are energized unless the area is determined to be non-hazardous. Keep the enclosure lid tightly closed during operation.*

Start Up

This section describes procedures to start up the AirLink 5900 and place it into normal operation.

1. Complete the installation procedures described earlier in this manual.
2. Verify that the power wiring is correct and secure.
3. Turn on the power source. When the unit is first plugged in, “OFF” appears on the display. The directions below describe how to power on and power off the AirLink 5900 once power has been applied.
4. Press **ADD** to turn the AirLink 5900 on. The RKI Instruments Inc. logo and a 60-second countdown appear on the display.
 - After five seconds, the following screen appears:

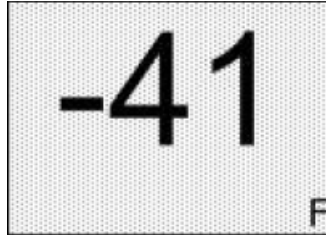


41
Radio: Data
Net Id: 17
Addr: 1
Freq: 2.4

- After 35 seconds, the display will show the Model Number, Manufacture Date, Serial Number, Version, and Build.

- When the sensor's reading appears on the display, the AirLink 5900 is in Normal Operating Mode.

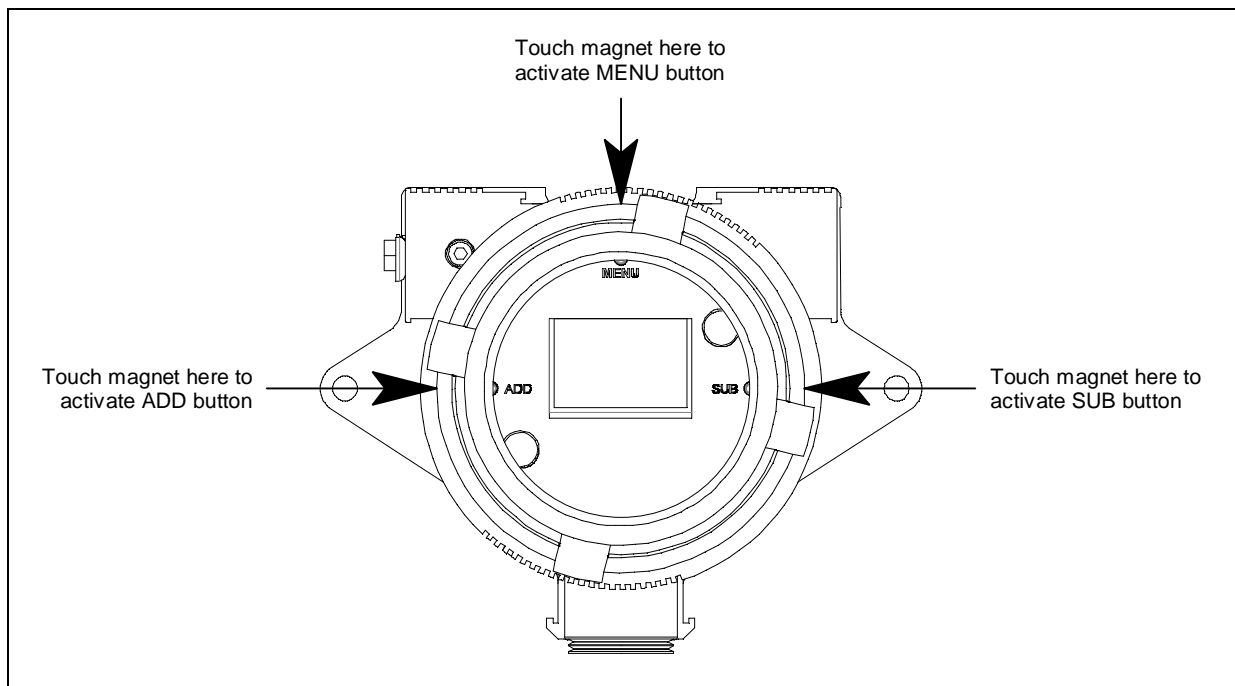
NOTE: The type of sensor that the device is set up to read will affect the Normal Operating Mode screen. In the image below, the device is setup to read a temperature sensor.



During Normal Operation, the screen displays the 4 - 20 mA channel's reading.

Magnetic Buttons

Use the provided magnet to operate the AirLink 5900 without having to remove the junction box's lid. Touch the magnet to the outer edge of the junction box lid near the button you want to actuate. Tapping the junction box is the same as pressing and releasing the button. Holding the magnet against the junction box is the same as pressing and holding the button.



Turning Off the Device

- Press and hold **SUB** for approximately 6 seconds to turn the AirLink 5900 off.

The AirLink 5900's display will continue to read "OFF" until power is no longer supplied to the unit.

Faults

In the event of a failure, the device will show a fault code until the fault has been cleared or is corrected.

For a list of the fault codes, and their associated meaning, see page 29.

Using the Basic Configuration Menu

WARNING: *Do not remove the enclosure lid while the circuits are energized unless the area is determined to be non-hazardous. Keep the enclosure lid tightly closed during operation.*

The AirLink 5900 has two menus for configuring the device and adjusting system settings: the Basic and Advanced Configuration Menus.

The Basic Configuration Menu allows access to the following features:

- 4 mA Configuration (pg 16)
- 20 mA Configuration (pg 17)
- Setting the Radio Address (pg 18)

NOTE: The AirLink 5900 automatically saves any changes and returns to Normal Operating Mode 15 minutes after the last button press.

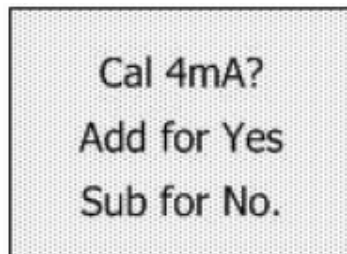
To enter the Basic Configuration Menu from Normal Operating Mode, press **MENU**.

4 mA Configuration

Configuration should be performed to set the 4 - 20 mA circuitry sensitivity. Configuration recommendations may vary depending on the type of sensor being used with this device.

To configure the 4 mA circuitry, perform the following:

1. Press **MENU** while in Normal Operating Mode to enter the Basic Configuration Menu. The following screen appears.



- a. To begin 4 mA calibration, press **ADD**.
- b. If 4 mA calibration is already complete, press **SUB** to proceed to the next menu item: 20 mA Configuration. Proceed to the next section.

2. To calibrate the AirLink 5900 according to the 4 - 20 mA signal being sent by the connected sensor, press **ADD** or **SUB** to begin the calibration.

The reading will automatically change in accordance with the connected sensor. Press **MENU** to move to the next menu item: 20 mA calibration.

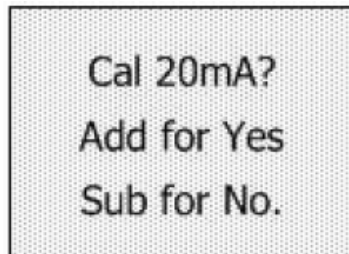


NOTE: The AirLink 5900 must be connected to a sensor and the sensor must be putting out a 4 mA signal for configuration to be performed properly.

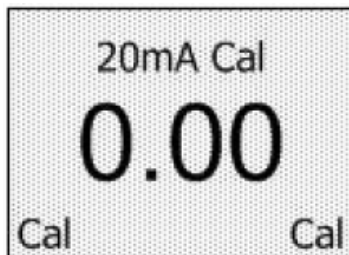
20 mA Configuration

To configure the 20 mA circuitry, perform the following:

1. After the 4 mA calibration is complete, press **MENU** to enter the Basic Configuration Menu.



- a. To begin 20 mA calibration, press **ADD**.
 - b. If 20 mA calibration is already complete, press **SUB** to proceed to the next menu item: Radio Address. Proceed to the next section.
2. To calibrate the AirLink 5900 according to the 4 - 20 mA signal being sent by the connected sensor, press **ADD** or **SUB** to begin the calibration.
 3. The reading will automatically change in accordance with the connected sensor. Press **MENU** to move to the next menu item: Radio Address.



NOTE: The AirLink 5900 must be connected to a sensor and the sensor must be putting out a 20 mA signal for configuration to be performed properly.

Setting the Radio Address

To ensure proper communication with the receiving monitor, set the Radio Address to match the one assigned to the sensor assembly.

To set the Radio Address, perform the following:

1. After the device has been calibrated, press **MENU** while in Normal Operating Mode to enter the Basic Configuration Menu. The following screen appears:



- a. To begin setting the Radio Address, press **ADD**.
 - b. If the Radio Address has already been set, press **SUB** to return to Normal Operating Mode and skip the next step.
2. Press **ADD** or **SUB** to increase or decrease the Radio Address setting. Press **MENU** to save the Radio Address setting.
 3. Configuration is now complete. Continue to “Using the Advanced Configuration Menu” on page 19 for procedures on adjusting and viewing system settings.

Using the Advanced Configuration Menu

The AirLink 5900 has two menus for configuring the device and adjusting system settings: the Basic and Advanced Configuration Menus.

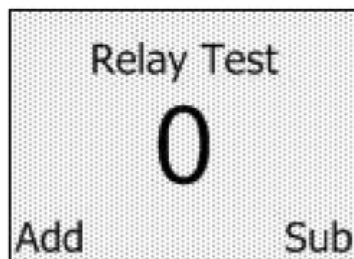
The Advanced Configuration Menu allows access to the following features:

- Testing the Relay/Alarms (pg 19)
- Setting the Network I.D. (pg 20)
- Viewing the System Info (pg 20)
- Viewing the Unit Info (pg 21)
- Selecting the Sensor Type (pg 21)
- Setting the Min Scale (pg 22)
- Setting the Max Scale (pg 22)
- Turning Tx Change On and Off (pg 23)
- Setting the Tx Change Value (pg 23)
- Turning BackgroundL On and Off (pg 24)
- Setting the BackgroundL Value (pg 24)
- Turning BackgroundH On and Off (pg 25)
- Setting the BackgroundH Value (pg 25)
- Setting the LCD Contrast (pg 26)
- Restoring the Factory Default (pg 26)

Testing the Relay/Alarms

Use the Relay/Alarms screen to test the controller's alarm configuration and the detector's connection to the AirLink 5900.

1. Enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode. The following screen appears.



2. Press **ADD** to increase the on-screen reading by 1mA. Continue pressing **ADD** until the number reaches the preset level and relay/alarms are triggered.
3. Press **SUB** to decrease the on-screen reading until the triggered relay/alarms are deactivated.
4. After the relay/alarms have been tested, press **MENU** to move to the next menu item: Network I.D.

Setting the Network I.D.

To ensure proper communication with the receiving monitor, set the Network ID to match the one assigned to the monitor.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

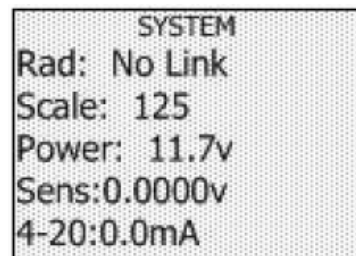


3. Press **ADD** or **SUB** to change the on-screen Network I.D. to the desired value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: System Info.

Viewing the System Info

Use the System Info screen to view the radio, scales, power (voltage), sensor (voltage), and 4-20 reading.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. After setting the Network I.D., press **MENU** to enter the Advanced Configuration Menu. The following screen appears.



3. After viewing the System Info, press **MENU** to move to the next menu item: Unit Info.

Viewing the Unit Info

Use the Unit Info screen to view the unit's radio miss, manufacture date, and serial number.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. After the viewing the System Info, press **MENU** to enter the Advanced Configuration Menu. The following screen appears.

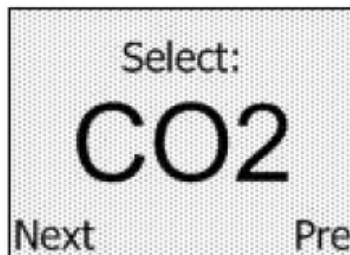


3. After viewing the Unit Info, press **MENU** to move to the next menu item: Sensor Type.

Selecting the Sensor Type

Use the Sensor Type screen to set the AirLink 5900 for the 4 - 20 mA sensor that will be connected to the device. The options include the following: F, C, NONE, 4-20, INCH, O3, NO2, NO, PH3, CH4, CH20, HF, F2, HCN, ClO2, H2, NH3, HCl, FEET, VOC, LEL, CO2, Cl2, CO, O2, SO2, or H2S.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

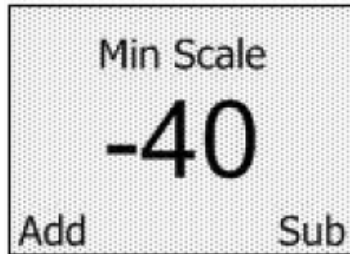


3. Press **ADD** or **SUB** to change the on-screen sensor type to the desired type.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: Min Scale.

Setting the Min Scale

Use the Min Scale screen to set the AirLink 5900's Min Scale value.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

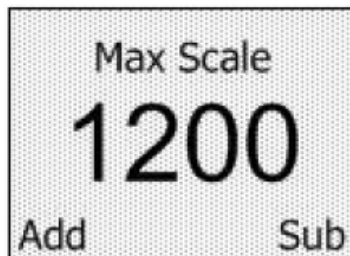


3. Press **ADD** or **SUB** to increase or decrease the Min Scale value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: Max Scale.

Setting the Max Scale

Use the Max Scale screen to set the AirLink 5900's Max Scale value.

1. If necessary, enter the Advanced Configuration menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

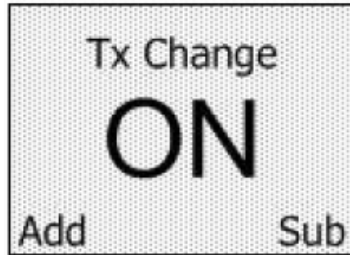


3. Press **ADD** or **SUB** to increase or decrease the Max Scale value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: Tx Change.

Turning Tx Change On and Off

Use this menu item to turn Tx Change on and off. When enabled, the AirLink 5900 sends one transmission only after the reading has met or exceeded the Tx Change value (see the following section on setting the Tx Change value).

1. If necessary, enter the Advanced Configuration menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

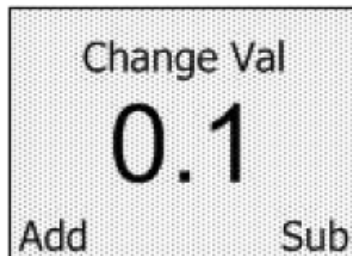


3. Press **ADD** or **SUB** to toggle the Tx Change feature “ON” and “OFF”.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: Change Val.

Setting the Tx Change Value

Use this menu item to adjust how much the reading must increase or decrease before the AirLink 5900 transmits the Tx Change reading to the controller.

1. If necessary, enter the Advanced Configuration menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

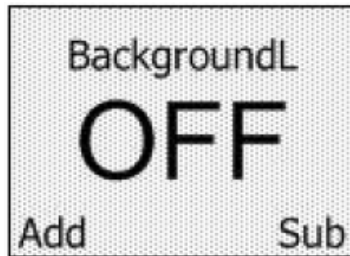


3. Press **ADD** or **SUB** to change the on-screen value to the desired value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: BackgroundL.

Turning BackgroundL On and Off

Use this menu item to enable or disable the BackgroundL feature.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

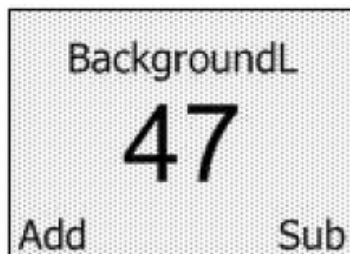


3. Press **ADD** or **SUB** to toggle BackgroundL "ON" and "OFF".
4. After the desired setting is displayed, press **MENU** to move to the next menu item: BackgroundL value.

Setting the BackgroundL Value

Use this menu item to set the BackgroundL value.

1. If necessary, enter the Advanced Configuration menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.



3. Press **ADD** or **SUB** to change the on-screen value to the desired BackgroundL value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: BackgroundH.

Turning BackgroundH On and Off

Use this menu item to enable or disable the BackgroundH feature.

1. If necessary, enter the Advanced Configuration menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.



3. Press **ADD** or **SUB** to toggle BackgroundH “ON” and “OFF”.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: BackgroundH value.

Setting the BackgroundH Value

Use this menu item to set the BackgroundH value.

1. If necessary, enter the Advanced Configuration menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.

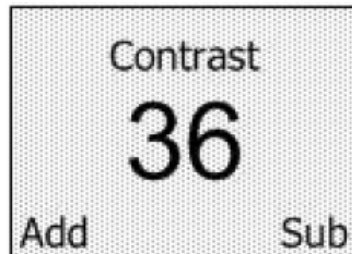


3. Press **ADD** or **SUB** to change the on-screen value to the desired BackgroundH value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: Contrast.

Setting the LCD Contrast

Use this menu item to set the Contrast value.

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.



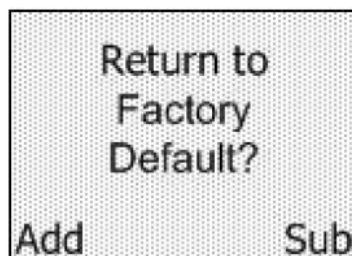
3. Press **ADD** or **SUB** to change the on-screen value to the desired Contrast value.
4. After the desired setting is displayed, press **MENU** to move to the next menu item: Return to Factory Default.

Restoring the Factory Default

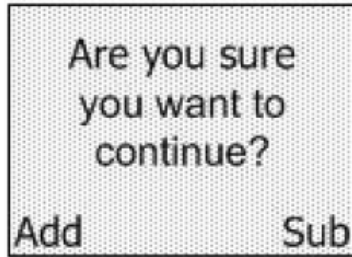
Use this menu item to restore the AirLink 5900 to the following factory default settings:

- Radio Address set at 1
- Network ID set at 5
- Scale set at 20
- Sensor Type set to 4-20
- Tx Change set to "ON"
- Change Val set to 0.1
- BackgroundL set to OFF
- Background H set to ON
- Background H setting at 4.5
- Contrast is set at 36

1. If necessary, enter the Advanced Configuration Menu by pressing and holding **MENU** for 5 seconds while in Normal Operating Mode.
2. Press and release **MENU** until the following screen appears.



3. Press **ADD** to proceed with restoring the factory default settings or **SUB** to return to Normal Operating Mode.
4. If **ADD** was pressed, the following screen appears:



Press **ADD** to proceed with restoring the factory default settings or **SUB** to return to Normal Operating Mode.

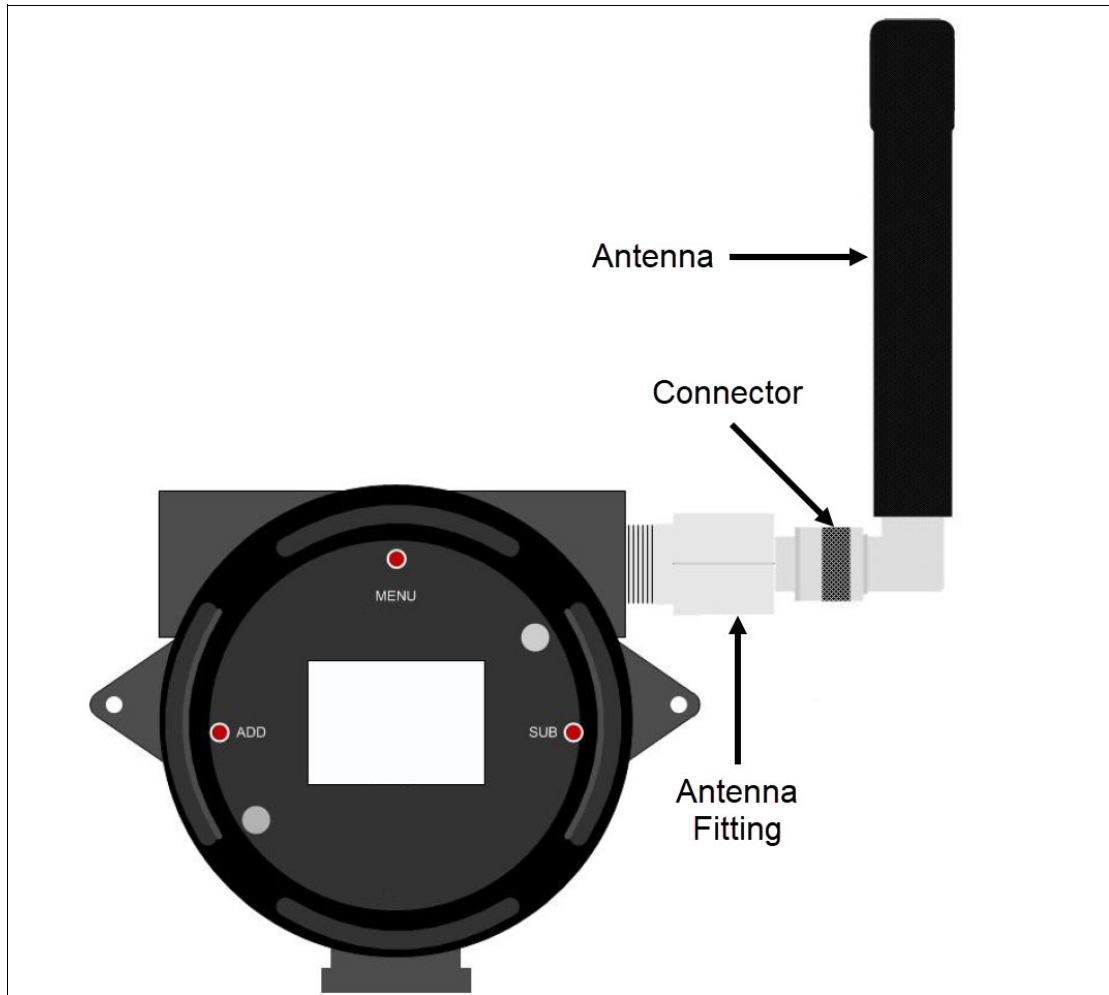
Maintenance

Antenna Replacement

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

To replace the antenna, perform the following:

1. Power off the device by pressing and holding **SUB** for 4 seconds.



2. Unscrew the antenna's connector from its fitting.
3. Screw the replacement antenna onto the fitting.
4. Power on the device by pressing **ADD**.

Troubleshooting

The troubleshooting guide describes symptoms, probable causes, and recommended action for problems you may encounter with the AirLink 5900.

NOTE: This troubleshooting guide describes AirLink 5900 problems only. See the controller operator's manual for problems you may encounter with the controller.

AirLink 5900 Fault Codes		
Problem	Cause(s)	Solution(s)
F1	The control board has lost communication with the 4-20mA device.	1. Check the connection between the 4-20 mA device and the AirLink 5900.
F14	The AirLink 5900 cannot identify a primary controller.	1. Ensure the AirLink 5900's Radio Address matches the sensor assembly's address is correct and unique. 2. Ensure the AirLink 5900's Network ID matches the primary controller's Network ID.
* System faults will activate the fault terminal.		

Parts List

Table 1 lists replacement parts and accessories for the AirLink 5900.

Table 1: Parts List

Part Number	Description
47-5111-XX	Cable with connectors for remote-mounted antenna (specify length in 1-foot increment when ordering; maximum length is 100 feet)
71-0594	AirLink 5900 Operator's Manual (this document)
82-0101RK	Magnetic wand