WR-90 Point to Multi-Point Wireless
Instruction Manual

Wireless System

- Point to Multi-Point Signal Wire Replacement
- Simple to Configure Using *WR Manager* Programming Software and Onboard USB
- Range: 1 Mile Line-of-Sight, 500 Ft Indoor
- Analog, Digital, and RS-485 Inputs and Outputs
- Remote or Attached, Directional and Omnidirectional Antennas Available
- Field Units Feature Flanges for Wall or Pipe Mounting
- Base Station Housed in Plastic NEMA 4X Field Enclosure
- Field Units Housed in IP68, NEMA 4X Enclosure

BINMASTER®

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Disclaimer

The information contained in this document is subject to change without notice. BinMaster makes no representations or warranties with respect to the contents hereof and specifically disclaims any implied warranties of merchantability or fitness for a particular purpose.

Caution: *Read complete instructions prior to installation and operation of the device.*	**Warning**: ***Risk of electric shock or personal injury.***
Warning!	***This product is not recommended for life support applications or applications where malfunctioning could result in personal injury or property loss. Anyone using this product for such applications does so at their own risk. BinMaster shall not be held liable for damages resulting from such improper use.***

Limited Warranty

BinMaster warrants this product against defects in material or workmanship for the specified period under "Specifications" from the date of shipment from the factory. BinMaster's liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit.

Registered Trademarks

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Table of Contents

Table of Figures

Introduction

The BinMaster WR-90 is a rugged, customizable, point-to-multipoint wireless bridge. It offers a highly-flexible means of getting analog, digital, and Modbus® signals from where you have them to where you need them. Modular input/output cards and expandable field units mean that the WR-90 can be customized to meet the needs of any wireless application.

The WR-90 is simple to order, simple to configure, and easy to trust with your application. It can be ordered as either preassembled kits or as individual, modular components. Guaranteed ranges assure it will work with your application or you can send it back - no questions asked. A wireless survey tool is available for those installations that require a site survey for longer distances, making it easy to verify the setup will work the first time.

Field units accept analog, discrete, and Modbus® inputs and wirelessly broadcast them to the WR-90 base station. The base station can recreate these signals with its onboard RS-485 or analog and digital I/O cards. It can also be programmed to activate relays or output analog/digital signals to the field units. Just put the field units wherever there are process signals and the base station in the control room.

Fixed or remote antenna modules as well as a wide range of accessories are available, including mounting kits, antenna-related accessories, and repeaters. The antenna may be directly attached or remotely located. High gain directional antennas are also offered.

Ordering Information

WR-90 Wireless Components

Model Number	Description
WR-90-BA	WR-90 Point-to-Multipoint Wireless Process Signal Base Station
WR-90-TR	WR-90 Point-to-Multipoint Wireless Process Signal Field Unit

Base Station Modules

Model Number	Description
WR-90-CA	WR-90 Dual Analog Input Base Station Module
WR-90-CT	WR-90 Dual Analog Output Base Station Module
WR-90-CR	WR-90 Dual Relay Output Base Station Module
WR-90-CD	WR-90 Dual Digital I/O Base Station Module

Accessories

Model Number	Description
WR-30-RP	Wireless Repeater Kit
PDA3120-S-BM	RP-SMA M/F Antenna Cable 20ft
PDA3140-S-BM	RP-SMA M/F Antenna Cable 40ft
PDA3120-N-BM	RP-SMA F to N Male Antenna Cable 20ft
PDA3140-N-BM	RP-SMA F to N Male Antenna Cable 40ft
PDA3900-12-N-BM	PDW 900 MHz Antenna, 1/2" NPT
PDA3900-6Y-N-BM	Yagi Antenna 6dB
PDA3900-9Y-N-BM	Yagi Antenna 9dB
PDA6963-BM	Stainless Steel Field Unit Mounting Kit

Specifications

Except where noted all specifications apply to operation at +25°C.

WR-90 Base Station Specifications

General

Maximum Connected Field Units	32 field units
Network ID	Programmable: 0 - 99
Programming Methods	Via PC with WR Manager software
Power	24 VDC ±10%, 36 W max, 2.4 W min; Power consumption is dependent on type and number of modules installed
Non-Volatile Memory	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
Environmental	Operating temp. range: -40 to 65°C Storage temp. range: -40 to 85°C Relative humidity: 0 to 90% non-condensing
Connections	Removable screw terminal blocks accept 12 to 22 AWG wire.
Peak Antenna Gain	2.15 dBi ± 1.0
Enclosure	15.75" x 11.81" x 7.03" (40 cm x 30 cm x 17.9 cm) (W x H x D); NEMA 4X; Thermoplastic Polyester; Color: Gray
Tightening Torque	Screw terminal connectors: 5 lb-in (0.56 Nm)
Shipping Dimensions	17" x 14" x 9" (43.2 cm x 35.6 cm x 22.9 cm) (W x H X D)
Shipping Weight	6.5 lbs (2.95 kg)
Warranty	3 years parts & labor

Dual Analog Inputs Module

Inputs	Field selectable: 4-20 mA, 0-10 V, 0-5 V, 1-5 V
Accuracy	±0.03% of calibrated span ±1 count
Isolation	500 V
Recalibration	All ranges are calibrated at the factory. Recalibration is recommended at least every 12 months.
Temperature Drift	0.005% of calibrated span/°C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient
Signal Loss	Inputs will remain off (open circuit) until wireless units are reconnected.
Input Impedance	Voltage ranges: greater than 110 kΩ Current ranges: less than 220 Ω

HART Transparency	Analog input will not interfere with existing HART communications on the wired 4-20 mA signal

Dual 4-20 mA Outputs Module

Output Source	Analog input from connected wireless unit		
Calibration	Factory calibrated: 4.000 to 20.000 = 4-20 mA output		
Accuracy	± 0.1% of span ± 0.004 mA		
Isolation	500 V		
Temperature Drift	0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°C max from -40 to 0°C ambient.		
Loop Power Supply	Internally powered; no external supply needed		
Output Loop Resistance	Power supply	Minimum	Maximum
	24 VDC	10 Ω	900 Ω
Signal Loss	After approximately 25 seconds of trying to reconnect, mA output will become 3.2 mA		

Digital Input / Output Module

Channels	Four (4) digital connections, independently field selectable as either inputs or outputs
DI Logic High	3 to 5 VDC
DI Logic Low	0 to 1.1 VDC
DI Contact	Dry contact to ground can be used to activate the input
DO Logic High	3 to 5 VDC
DO Logic Low	0 to 0.4 VDC
Source Current	10 mA maximum output current
Sink Current	1.5 mA minimum input current
Signal Loss	Digital output goes to logic high

Dual Relays Module

Rating	2 SPDT (Form C); rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP (≈ 50 W) @ 125/250 VAC for inductive loads
Noise Suppression	Noise suppression is recommended for each relay contact switching inductive loads; see page 12 for details.
Initialization	After power failure, relays will initialize to default state before reconnecting to wireless units.
Signal Loss	If mapped to digital input channel, the relay energizes.

WR-90 Field Unit Specifications
General

Display	32-character dual-line alphanumeric dot matrix LCD display with backlight (4.68mm x 2.21mm characters)
Display Orientation	Display may be mounted at 180° from default orientation
Network ID	Field selectable: 0 - 99
Programming Methods	Four programming buttons (behind glass) or PC with WR Manager software.
Recalibration	All inputs and outputs are calibrated at the factory. Recalibration is recommended at least every 12 months.
Process/ Digital I/O Display	Press the *display* button once to display the present analog input and output. Press the *display* button again to display digital I/O states.
Password	A programmable password restricts modification of programmed settings.
Power	12-28 VDC, 5 W max
Non-Volatile Memory	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
Isolation	500 V
Environmental	Operating temp. range: -40 to 65°C (display inoperable < -20 °C) Storage temp. range: -40 to 85°C Relative humidity: 0 to 90% non-condensing
Connections	Removable screw terminal blocks accept 16 to 30 AWG wire.
Enclosure	Cast aluminum with glass window, 0.3% max copper content, corrosion resistant powder coating, color: blue. IP68. Two ½" NPT threaded conduit openings. One ½" NPT stainless steel conduit plug with 10 mm hex key fitting installed.
Mounting	May be mounted directly to conduit. Two mounting holes for 1.5" pipe or wall mounting. See Mounting Dimensions on page 40 for mounting space requirements.
Signal Connector Tightening Torque	2.2 lb-in (0.25 Nm)
Shipping Dimensions	17" x 14" x 9" (43.2 cm x 35.6 cm x 22.9 cm) (L x W X H)
Shipping Weight	5 lbs. (2.27 kg)
Warranty	3 years parts & labor

Analog Input

Inputs	Field selectable: 4-20 mA, 0-10 V, 0-5 V, 1-5 V
Accuracy	±0.03% of calibrated span ±1 count
Temperature Drift	0.005% of calibrated span/°C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient
Input Impedance	Voltage ranges: greater than 110 kΩ Current ranges: less than 220 Ω
Signal Loss	Inputs will remain off (open circuit) until wireless units are reconnected.
HART Transparency	Analog input will not interfere with existing HART communications on the wired 4-20 mA signal

Isolated 4-20 mA Transmitter Output

Output Source	Analog input from connected wireless unit
Calibration	Factory calibrated: 4.000 to 20.000 = 4-20 mA output
Accuracy	± 0.1% of span ± 0.004 mA
Loop Power Supply	Internally powered; no external supply needed
Temperature Drift	0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°C max from -40 to 0°C ambient
Output Loop Resistance	Power supply Minimum Maximum 24 VDC 10 Ω 900 Ω
Signal Loss	After approximately 25 seconds of trying to reconnect, mA output will become 3.2 mA

Digital Input / Output Terminal

Channels	Four (4) digital connections, independently field selectable as either inputs or outputs
DI Logic High	3 to 5 VDC
DI Logic Low	0 to 1.1 VDC
DI Contact	Dry contact to ground can be used to activate the input
DO Logic High	3 to 5 VDC
DO Logic Low	0 to 0.4 VDC
Source Current	10 mA maximum output current
Sink Current	1.5 mA minimum input current
Signal Loss	Digital output goes to logic high

General Specifications

Wireless Radio

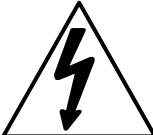|	
Frequency	900 MHz
Range	500 ft (152.4 m) indoor, 1 mi (1.61 km) outdoor (line-of-sight)
Encryption	AES 128-bit encryption available using WR Manager software
Interference Reduction	Frequency Hopping Spread Spectrum (FHSS)
Power Output	24 dBm (250 mW)
Sensitivity	-101 dBm

WR Manager Software

System Requirements	Microsoft® Windows® XP/Vista/7/8/10
Communications	USB 2.0 (Standard USB A to Micro USB B)
Configuration	Configure devices one at a time

RS-485 Modbus® RTU Serial Comms

Compatibility	EIA-485
Connectors	Removable screw terminal connector
Max Distance	3,937' (1,200 m) max
Baud Rate	1200 – 57,600 bps
Data	8 bit (1 start bit, 1 or 2 stop bits)
Parity	Even, Odd, or None with 2 stop bits
Modbus Timeout	0.5, 1, 2, 3, 4, 5 seconds; user selectable

Safety Information

Caution: *Read complete instructions prior to installation and operation of the device.*

Warning: *Read all product labels completely and follow all instructions and requirements listed on the labels for installation or service.*

Warning!

Installation and service should be performed only by trained service personnel. Service requiring replacement of internal components must be performed at the factory.

Installation

Base Station: All wiring connectors are accessed by opening the enclosure. To access electrical connectors, unclasp enclosure and open.

Field Units: All pushbuttons and wiring connectors are accessed by opening the enclosure. To access electrical connectors, remove the 2 captive screws and remove the display assembly.

Unpacking

Remove both units from box. Inspect the packaging and contents for damage. Report damages, if any, to the carrier. If any part is missing or the units malfunction, please contact your supplier or the factory for assistance.

Pre-Installed Conduit Plug

The WR-90 field units are supplied with one pre-installed optional conduit plug for installations that do not require the use of both conduit entries. The conduit plug includes an internal hexagonal socket recess for removal.

Base Station Conduit Holes

No predrilled conduit holes are provided in the base station enclosure from the factory. Drilling of conduit holes is left to the end user so that they may be placed wherever appropriate for the application. Be sure to use suitable hardware (cable glands, plugs, etc.) in order to maintain NEMA 4X/IP66 rating on the enclosure.

Mounting Instructions

The base station can be wall mounted using the included mounting hardware. Securely screw the four brackets into the threaded holes provided at the rear of the enclosure with the bend facing toward the wall in order to provide the necessary clearance. Then, secure exposed mounting holes to wall.

The field units have two mounting holes that may be used for a 1.5" pipe mounting or wall mounting. Alternatively, the unit may be supported by the conduit using the conduit holes provided. The antenna is threaded into one of the three conduit holes and may be moved as appropriate for the installation.

It can also be mounted by using the PDA6963-BM mounting bracket in order to orient the device antenna away from the pipe. Refer to Mounting Dimensions on page 40 for details on space requirements.

Cover Jam Screw

The cover jam screw should be properly installed once the field units have been wired and tested in a safe environment. The cover jam screw is intended to prevent the removal of the units' cover while in operation without the use of tools. Using a M2 hex wrench, turn the screw clockwise until the screw contacts the unit. Turn the screw an additional 1/4 to 1/2 turn to secure the cover.

Caution: Excess torque may damage the threads and/or wrench.

FCC Notice

Contains FCC ID: MCQ-XB900HP

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT

The RF module has been certified for remote and base radio applications. If the module will be used for portable applications, the device must undergo SAR testing. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Re-orient or relocate the receiving antenna, Increase the separation between the equipment and receiver. Connect equipment and receiver to outlets on different circuits, or consult the dealer or an experienced radio/TV technician for help.

Canada (IC) Notice

Contains Model: XB900HP, IC: 1846A-XB900HP

Integrator is responsible for its product to comply with IC ICES-003 & FCC Part 15, Sub. B - Unintentional Radiators. ICES-003 is the same as FCC Part 15 Sub. B and Industry Canada accepts FCC test report or CISPR 22 test report for compliance with ICES-003.

Base Station Connections

To access the connectors for the base station, open the enclosure door. Signal connections are made to removable screw terminal connectors.

> ⚠ **Warning!**
> - *The WR-90 base station must be powered down completely prior to installing or removing any modules. Failure to do so could result in damage to the electronics.*
> - *Static electricity can damage sensitive components.*
> - *Observe safe handling precautions for static-sensitive components.*
> - *Use proper grounding procedures/codes.*

Figure 1 below shows the locations of screw terminal blocks on a fully loaded WR-90 base station electronics board. This diagram shows the board loaded with four relay modules, four digital I/O modules, four analog input modules, and four analog output modules. Actual module locations may differ.
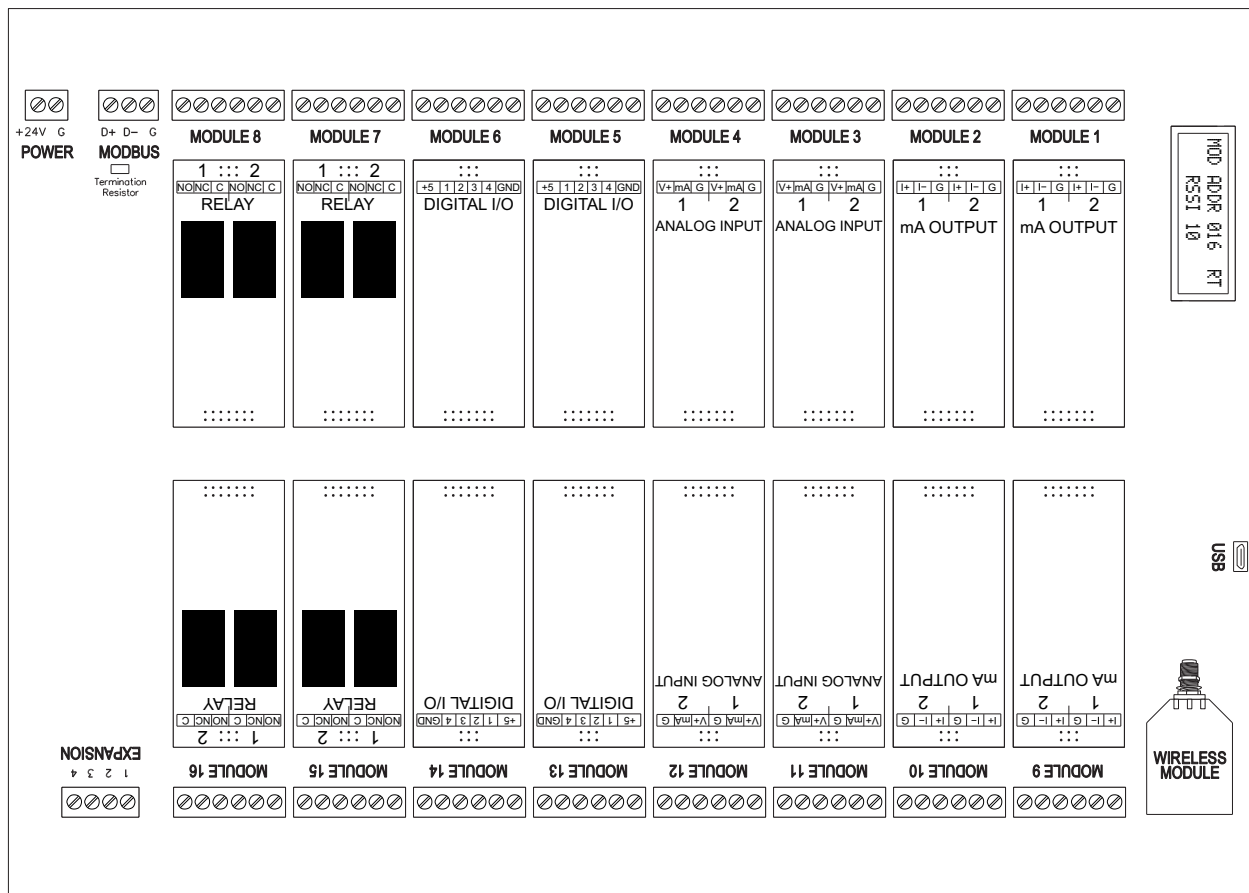
Figure 1. Fully Loaded Base Station Main Board

Power Connector

Power connections are made to a two-terminal connector labeled POWER in Figure 1.

Make sure that the power supply can provide 24 VDC to the wireless base station.

Power

24 VDC
POWER
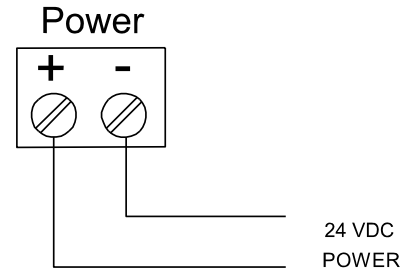
Figure 2. Base Station Power Connection

Analog Input Connector

The analog input module can accept either 4-20 mA, 0-10 V, 0-5 V, or 1-5 V. The appropriate input type must be independently programmed for each input channel.

The analog input will not interfere with any existing HART signal on a 4-20 mA current loop. However, the HART signal **will not** be transmitted wirelessly.
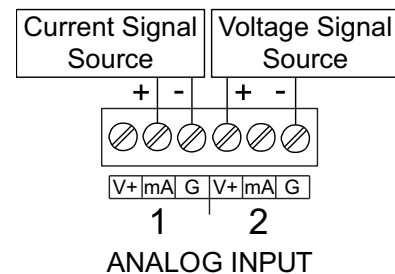
ANALOG INPUT

Figure 3. Base Station Analog Input Connection

Analog Output Connector

The mA output module can be programmed to output a 4-20mA analog signal associated with a remote field unit's analog input or Modbus register.

The signal can be transmitted to any device scaled to read a 4-20 mA signal as shown at right. The analog output is internally powered; no external power supply is required.
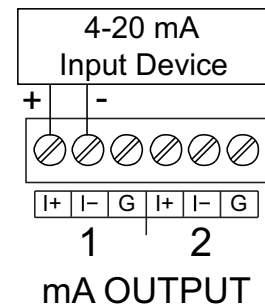
mA OUTPUT

Figure 5. Base Station Analog Output Connection

Digital I/O Connector

The digital input module includes four independently programmable I/O channels. All digital connections are referenced to ground; digital input connections have an internal pull-up resistor. Each connection may be set as either an input or an output.

In the diagram to the right, D3 is a digital input and D4 is a digital output.
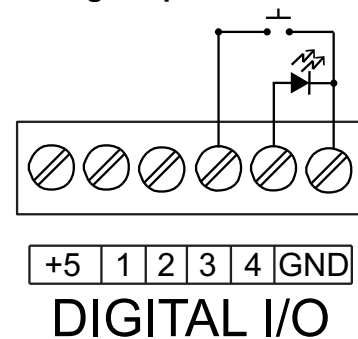
DIGITAL I/O

Figure 4. Base Station Digital I/O Connection

11

Relays Connector

The relays module includes two mechanical relays. Relay connections are made to the six-terminal connector shown to the right.

Each relay's C terminal is common only to the normally open (NO) and normally closed (NC) contacts of the corresponding relay.

If a field unit's digital input channel is mapped to a relay module channel on the base station, the effect may be opposite of what is expected. An open connection at the digital input will result in the relay going into an active state. This is because the digital input channels are active low. This can be changed by swapping the NO and NC connections to the relay channel.
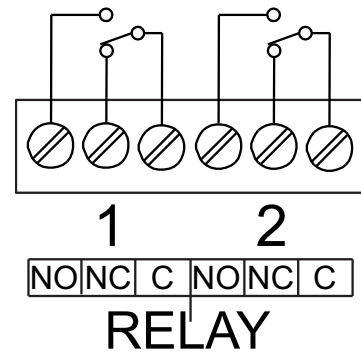
Figure 6. Base Station Relays Connection

Switching Inductive Loads

The use of suppressors (snubbers) is strongly recommended when switching inductive loads to prevent disrupting the microprocessor's operation. The suppressors also prolong the life of the relay contacts. Suppression can be obtained with resistor-capacitor (RC) networks assembled by the user or purchased as complete assemblies. Refer to the following circuits for RC network assembly and installation:
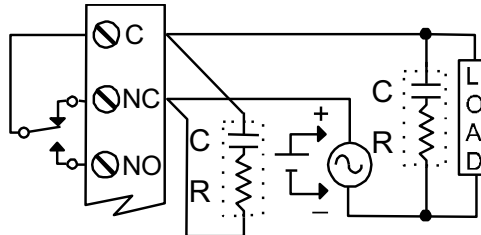
Figure 7. AC and DC Loads Protection

Choose R and C as follows:

R: 0.5 to 1 Ω for each volt across the contacts

C: 0.5 to 1 µF for each amp through closed contacts

Notes:

1. Use capacitors rated for 250 VAC.
2. RC networks may affect load release time of solenoid loads. Check to confirm proper operation.
3. Install the RC network at the device's relay screw terminals. An RC network may also be installed across the load. Experiment for best results.
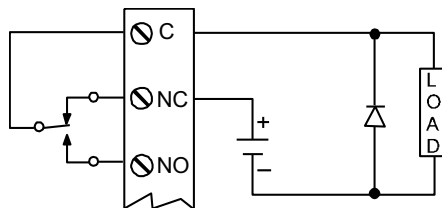
Use a diode with a reverse breakdown voltage two to three times the circuit voltage and forward current at least as large as the load current.

Figure 8. Low Voltage DC Loads Protection

RC Networks

RC networks should be applied to each relay contact switching an inductive load.

Note: Relays are de-rated to 1/14th HP (50 watts) with an inductive load.

Modbus RTU Serial Communications

The WR-90 base station acts as a simple pass-through for Modbus communications. As such, multiple Modbus enabled devices may transmit and receive wirelessly using the base station.
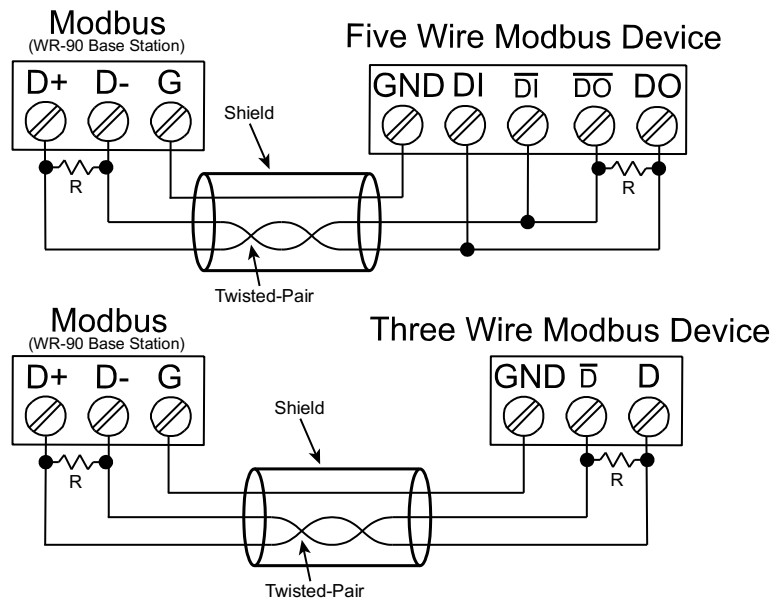

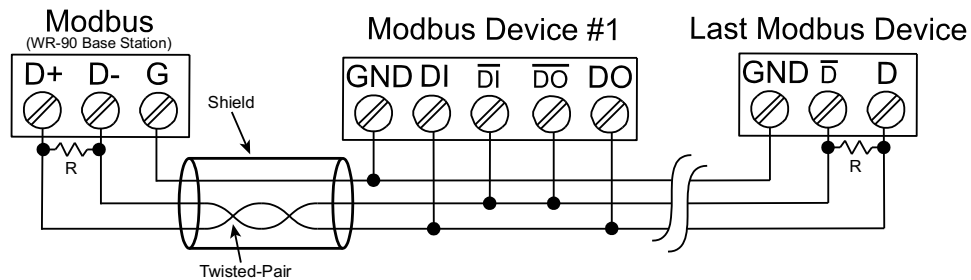**Figure 9. Base Station Three- and Five-Wire RS-485 Modbus Connection**

Figure 10. Base Station Multiple Device RS-485 Modbus Connection

Notes:
1. *Termination resistors are optional and values depend on the cable length and characteristic impedance. Consult the cable manufacturer for recommendations.*
2. *Use shielded cable, twisted-pairs plus ground. Connect ground shield only at one location.*

Field Unit Connections

To access the connectors, remove the enclosure cover and unscrew the two captive stainless steel screws. Remove the electronics assembly from the enclosure. Signal connections are made to removable terminal blocks on the back of the electronics assembly. Grounding connections are made to the two ground screws provided on the base – one internal and one external.

⚠ **Warning!**	• *Static electricity can damage sensitive components.* • *Observe safe handling precautions for static-sensitive components.* • *Use proper grounding procedures/codes.* • *Observe all safety regulations. Electrical wiring should be performed in accordance with all agency requirements and applicable national, state, and local codes to prevent damage to the device and ensure personnel safety.*

Figure 11 below shows the locations of screw terminal blocks on the rear of the wireless field unit assembly.
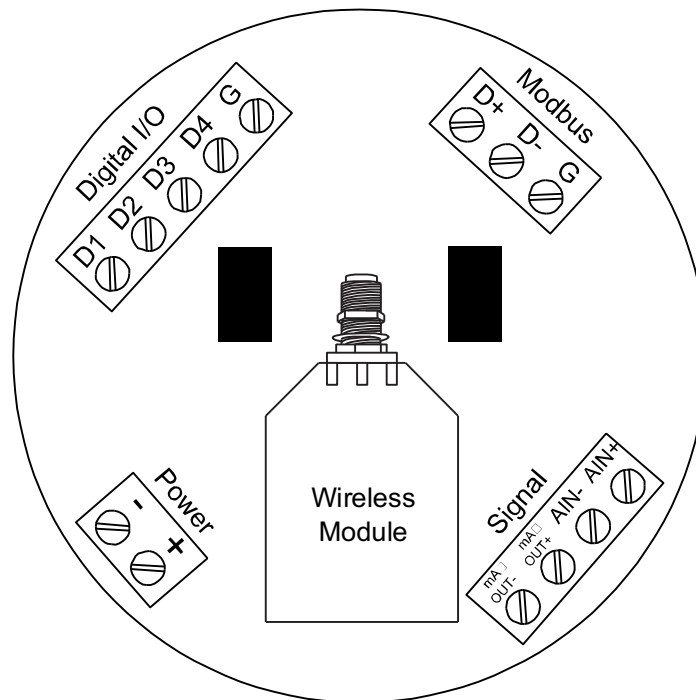
Figure 11. Field Unit Device Assembly, Rear View

Power Connector

Power connections are made to a two-terminal connector labeled POWER in Figure 11. The WR-90 is reverse polarity protected; it will not be damaged if wired backward.

Make sure that the power supply can provide between 12 and 24 VDC to the wireless device.
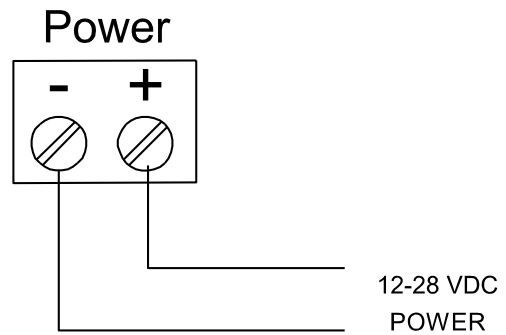
Figure 12. Field Unit Power Connection

Power WR-90 Field Unit and 2-Wire Transmitter from Same Power Supply

The WR-90 wireless units may be powered from the same power supply that powers the 2-wire (loop-powered) transmitter, assuming that the supply provides enough voltage for both units. To power both devices from the same supply, wire the devices to the supply as shown below.
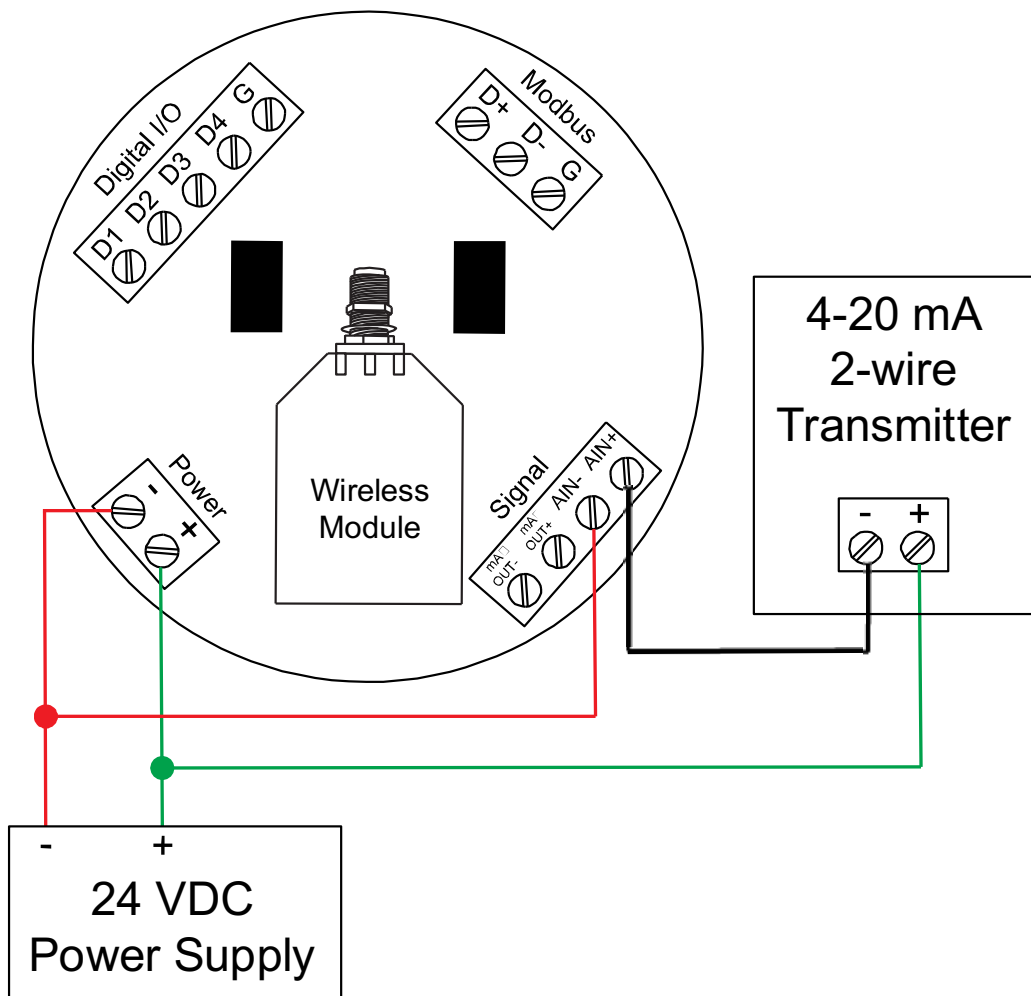
Figure 13. WR-90 Field Unit and 2-Wire Transmitter Powered from Same Supply

Signal Connector

The analog input may be either 4-20 mA, 0-10 V, 0-5 V, or 1-5 V. The appropriate input type must be programmed for each unit.

Once the appropriate input type has been programmed, wire the analog signal source to the device as shown in the diagram at right.

The analog input will not interfere with any existing HART signal on a 4-20 mA current loop. However, the HART signal **will not** be transmitted wirelessly.
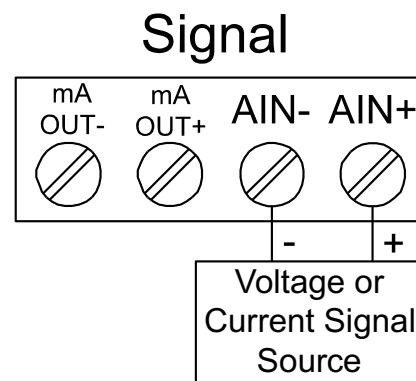
Signal

Figure 14. Field Unit Analog Input Connection

4-20 mA Output Connector

The 4-20 mA output corresponds with the analog input signal on the paired wireless device. The analog output signal is always 4-20 mA, regardless of the input type on the other wireless module.

For instance, if the analog input type on the first device was 0-10 V and the input value was 5 V, the second device would output 12 mA.

Connect the *mA OUT* terminals to a device scaled to read a 4-20 mA signal.

The analog output is internally powered; no external power supply is required.

Signal
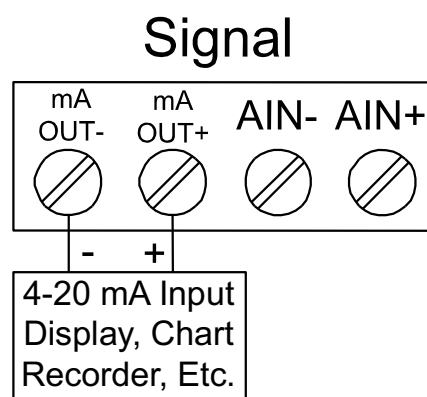
Figure 15. Field Unit 4-20 mA Output Connection

Digital I/O Connector

All digital connections are referenced to ground. The base station I/O settings determine the I/O settings of the field units (e.g. if D1 of the base station is an input then it can only be mapped to a digital output of a field unit).

Note: Each connection may be set independently in the device settings as either an input or an output. In the diagram to the right, D4 & D3 are digital inputs and D2 is a digital output.
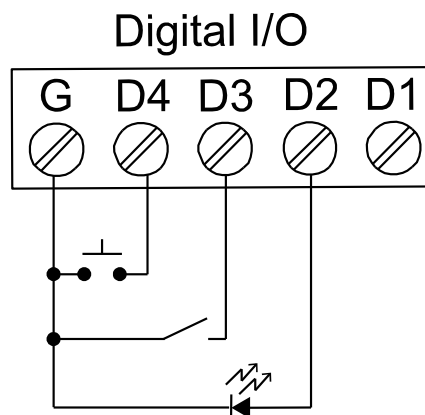
Digital I/O

Figure 16. Field Unit Digital I/O Connection

Modbus RTU Serial Communications

The WR-90 field units act as simple pass-throughs for Modbus communications. As such, multiple Modbus enabled devices may be transmitted wirelessly using a wireless field unit.

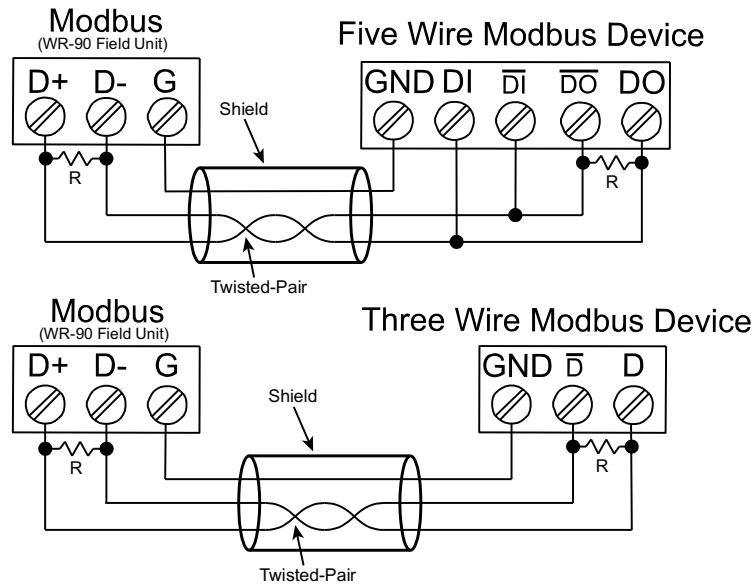*Note: Modbus Master must be connected to Base Station.*

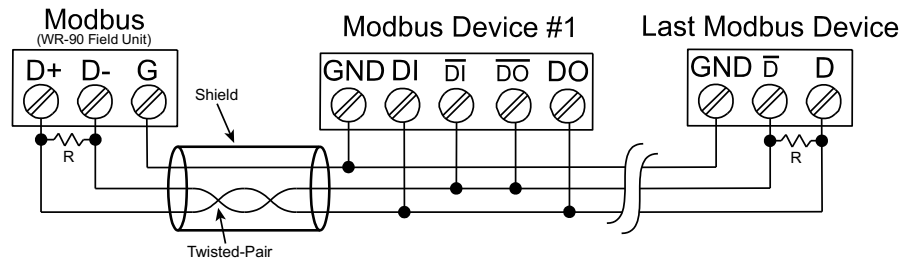**Figure 17. Field Unit Three- and Five-Wire RS-485 Modbus Connection**

Figure 18. Field Unit Multiple Device RS-485 Modbus Connection

Notes:

1. *Termination resistors are optional and values depend on the cable length and characteristic impedance. Consult the cable manufacturer for recommendations.*
2. *Use shielded cable, twisted-pairs plus ground. Connect ground shield only at one location.*

Setup and Programming

> ***The base station and field units are factory calibrated prior to shipment to read analog inputs in milliamps or volts depending on the input selection. The calibration equipment is certified to NIST standards.***

Overview

There are no jumpers to set for wireless device input selection. Setup and programming of the base station is done using *WR Manager* programming software. Setup of the wireless field units is done either wirelessly through the base station using *WR Manager* programming software or via direct USB programming with *WR Manager*. The field units' programming buttons located underneath the enclosure cover are for very limited programming options, such as network ID and Modbus address.

Programming the Base Station

The base station is programmed using *WR Manager* programming software. *WR Manager* can be found on the included CD.

Once the software is running, power the unit using a 24 VDC power supply and connect the base station's micro USB port to a PC using the provided USB cable.
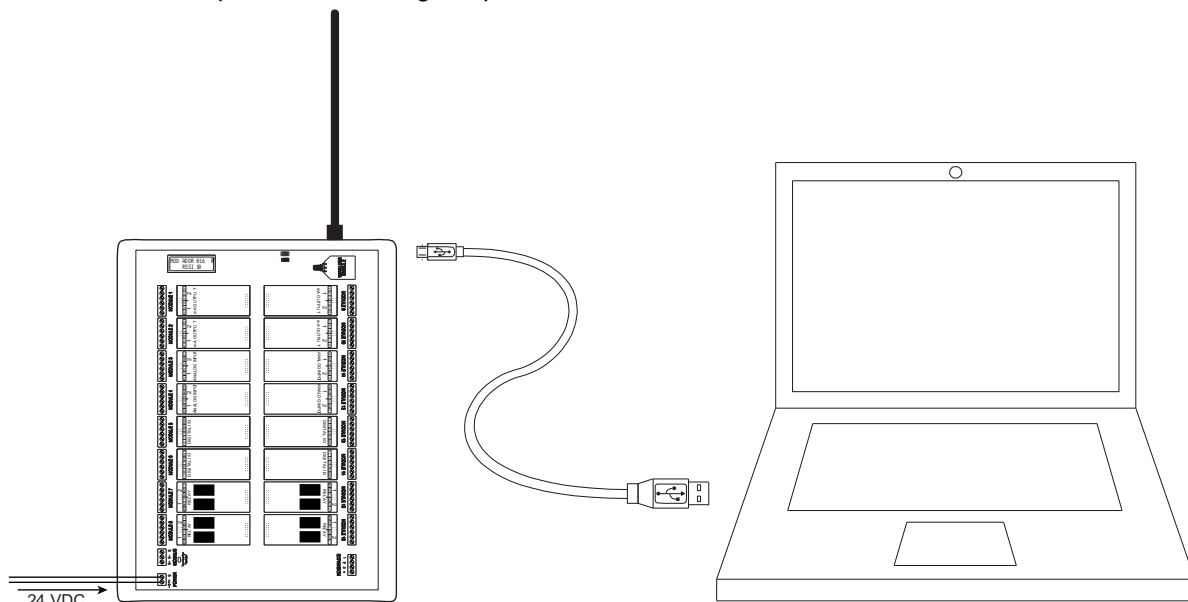
Note: *Base station must be powered externally prior to programming via USB.*

The PC will automatically install the appropriate device drivers. Once this has completed, the device will appear in the *Device* list at the top of the WR Manager window. Click *Connect*.
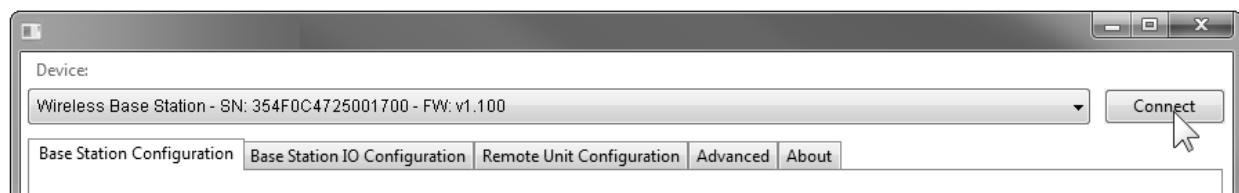
Connecting Field Units to Base Station

The first thing that must be done when programming the WR-90 is connect all of the wireless field units to the base station. Configuration of the base station is accomplished using the *WR Manager* software, while the individual field units may be programmed using the device buttons which are accessed by unscrewing the enclosure cover. See Programming the Field Units on page 30 for details on field unit programming.

After the base station has been connected to WR Manager (see page 18), field units can be connected to it from the *Remote Unit Configuration* tab. Select each unit from the *Unassociated Remote Units* list and click the *Add to Client List* button.

Field units must have the same network ID and encryption settings as the base station in order to connect. Each field unit must be programmed to have its own unique Modbus address.
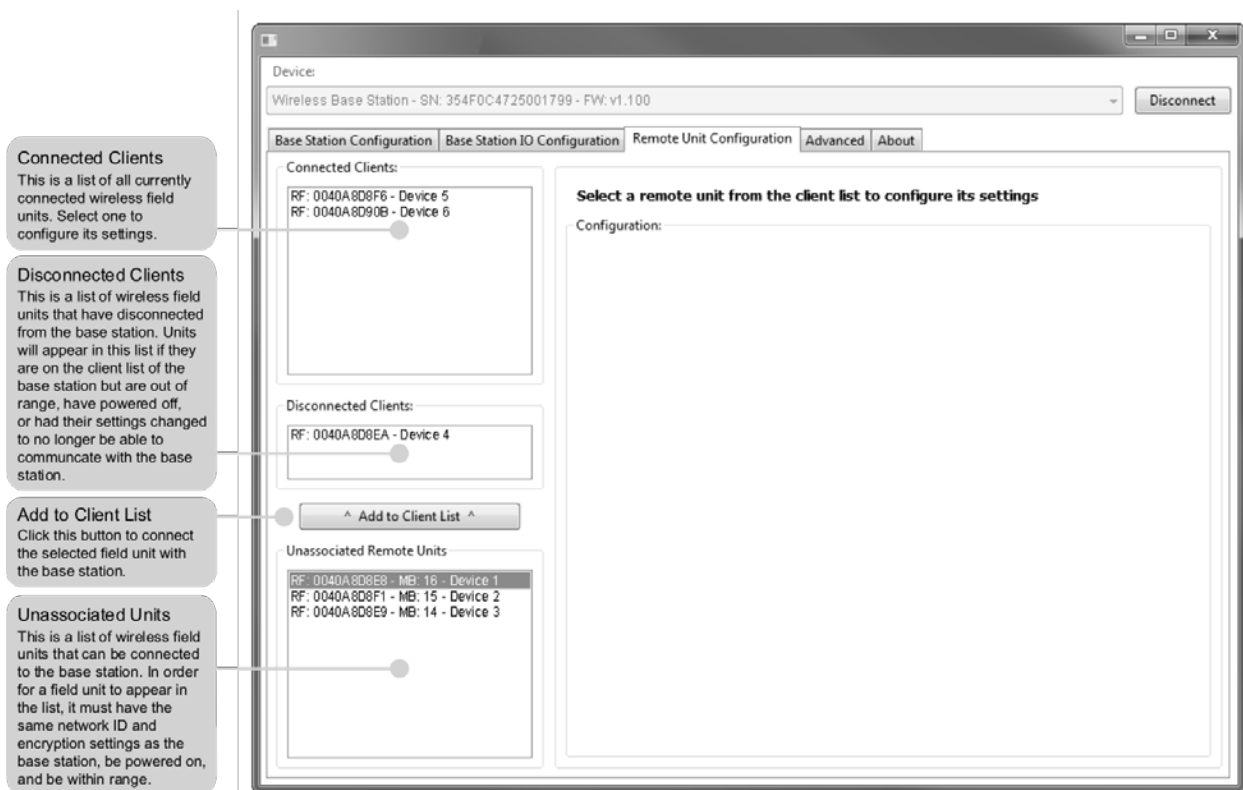
Note: All units must be powered on in order to connect them to the base station.

Base Station Configuration

The *Base Station Configuration* tab is where the base station name, network ID, password, and Modbus settings may be modified. Once you are finished modifying any of these settings, click the *Save Settings* button to write your changes to the device.

If you have made changes that have not yet been saved and would like to load the saved settings from the base station, click the *Read Settings* button.

Base Station Name
Click Change Name to enter a new human readable name for the base station.

Network ID
Enter a unique network ID for each base station in the facility.

Modbus Settings
Change these settings to match those of the Modbus® network with which this unit is communicating. Modbus address must be unique among other connected Modbus devices, including wireless field units.

Read Settings
Click this button to load settings from the base station hardware and display them here. This will overwrite any changes you have made in the software.

Save Settings
Click this button to write all of the changes you have made in the above fields to the base station hardware.

Change Password
Click this button to change the password needed to change device settings. Enter 0000 to disable.

Disconnect
Click this button to disconnect from the PDW90 base station and prepare it to be unplugged from the computer.

Note: *Do not click Save Settings button after changing the password. Click Disconnect to confirm the password has been changed.*

Input / Output Module Configuration

The *Base Station IO Configuration* tab is where individual I/O modules connected to the base station may be programmed. Click on one of the installed modules in the *IO Modules* list to the left of the screen in order to begin programming that module.

Analog Inputs Module

Each *Analog Inputs* module has two input channels. Each channel may be independently programmed to accept either a 4-20 mA, 0-10 V, 0-5 V, or 1-5 V analog input. These channels may also be mapped to remote analog outputs or Modbus registers. Once you have modified the module's settings, click the *Save Module Configuration* button to save these settings to the base station.

If you have made changes to the module that have not been saved and would like to load the saved settings from the base station, click the *Read Settings from Hardware* button. If you would like to reset the selected module to its default settings, click the *Load Default Settings* button.

The Monitoring area at the bottom may be used to view the current analog input reading or manually test analog input operation.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

21

4-20 mA Analog Outputs Module

Each *Analog Outputs* module has two 4-20 mA output channels. Each channel may be independently programmed and mapped to remote analog inputs or Modbus registers. Once you have modified the module's settings, click the *Save Module Configuration* button to save these settings to the base station.

If you have made changes to the module that have not been saved and would like to load the saved settings from the base station, click the *Read Settings from Hardware* button. If you would like to reset the selected module to its default settings, click the *Load Default Settings* button.

The Monitoring area at the bottom may be used to view the current analog input reading or manually test analog input operation.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

Digital I/O Module

Each *Digital I/O* module has four I/O channels. Each channel may be independently programmed as either an input or an output. These channels may also be mapped to a remote digital I/O or Modbus register. Once you have modified the module's settings, click the *Save Module Configuration* button to save these settings to the base station.

If you have made changes to the module that have not been saved and would like to load the saved settings from the base station, click the *Read Settings from Hardware* button. If you would like to reset the selected module to its default settings, click the *Load Default Settings* button.

The Monitoring area at the bottom may be used to view the current digital I/O state or manually test digital I/O operation.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

Relays Module

Each *Relays* module has two channels. Each channel may be independently programmed and mapped to remote digital I/O or Modbus registers. Once you have modified the module's settings, click the *Save Module Configuration* button to save these settings to the base station.

If you have made changes to the module that have not been saved and would like to load the saved settings from the base station, click the *Read Settings from Hardware* button. If you would like to reset the selected module to its default settings, click the *Load Default Settings* button.

The Monitoring area at the bottom may be used to view the current relay state or manually test relay operation.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

Remote Unit Configuration

The *Remote Unit Configuration* tab is where connected field units may be programmed to communicate with the base station. Select a connected field unit from the *Connected Clients* list in order to begin programming that unit.

A field unit's human readable name may be changed by clicking the *Change Name* button. Be sure to give each field unit a descriptive name, such as the location of the unit in your facility or the devices connected to it, in order to make future programming easier.

Analog Input

Each field unit's analog input may be programmed to accept a 4-20 mA, 0-10 V, 0-5 V, or 1-5 V signal. Once you have modified the settings, click the *Save Configuration* button to save these settings to the field unit.

The *IO Mapping* section will show to what (if any) device the analog input has been mapped. The *Monitoring* section at the bottom may be used to view the current analog input reading or manually test analog input operation.

Field Unit Name
Click *Change Name* to enter a new human readable name for the base station.

Analog Input Mode
Select the analog input mode (4-20mA, 0-10V, 0-5V, 1-5V) or disable the analog input.

Modbus Access
Use this information to access the output from a Modbus enabled device.

Format and Scaling
Set data type and scaling for Modbus communications.

Monitor and Testing
Use this to monitor the current input state or to manually test analog input operation.

IO Mapping
Set the wireless field unit's analog input to send to the base station. Typically set from the *Base Station IO Configuration* tab.

Save Configuration
Click this button to save all changes you have made to the selected field unit. This will not save changes to other modules.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

4-20 mA Analog Output

The *4/20mA Output* tab is used to program the selected field unit's analog output. Once you have modified the settings, click the *Save Configuration* button to save these settings to the field unit.

The *IO Mapping* section will show to what (if any) device the analog input has been mapped. The *Monitoring* section at the bottom may be used to view the current analog output reading or manually test analog output operation.

Field Unit Name
Click *Change Name* to enter a new human readable name for the base station.

Analog Output Mode
Disable or enable the 4-20mA analog output.

Modbus Access
Use this information to access the output from a Modbus enabled device.

Format and Scaling
Set data type and scaling for Modbus communications.

Device:

Wireless Base Station - SN: 354F0C4725001799 - FW: v1.100   Disconnect

Base Station Configuration | Base Station IO Configuration | Remote Unit Configuration | Advanced | About

Connected Clients:

RF: 0040A8D8E8 - Device 1
RF: 0040A8D8F1 - Device 2
RF: 0040A8D8E9 - Device 3

Remote Unit – Device 1 – RF: 0040A8D8E8   Change Name   Save Configuration

Configuration:

Modbus | Digital IO | Analog Input | 4/20mA Output

Analog Output Mode: Disable ▼

Modbus Access :
　　　Slave Address: 8　　Registers:　　Integer: 256　　Long Int: 320　　Float: 384

Disconnected Clients:

Format and Scaling :

Data Format: Unsigned Short ▼   Word Order: High word first ▼

Scaling Range Min: Scaling Range Max:

v Remove from Client List v

Unassociated Remote Units

IO Mapping :
　　　Mapped to: **None**　　Module: **None**　　Channel: **None**
　　　(edit using the base station IO configuration tab)

Monitor and Testing :

Current Setpoint

Mode: Normal Operation ▼   **3.2000** mA:

Monitor and Testing
Use this to monitor the current output state or to manually test analog output operation.

IO Mapping
Set the wireless field unit's analog output to receive from the base station. Typically set from the *Base Station IO Configuration* tab.

Save Configuration
Click this button to save all changes you have made to the selected field unit. This will not save changes to other modules.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

Digital I/O

Each field unit has four digital I/O channels. Each channel may be independently programmed as either an input or an output. Once you have modified the settings, click the *Save Configuration* button to save these settings to the field unit.

The *IO Mapping* section will show to what (if any) device the digital I/O has been mapped. The *Monitoring* section at the bottom may be used to view the current digital I/O state or manually test digital I/O operation.

Field Unit Name
Click *Change Name* to enter a new human readable name for the base station.

I/O Channel
Select which digital I/O channel to modify.

Digital I/O Mode
Select the digital I/O mode (input or output) or disable the selected digital I/O channel.

Modbus Access
Use this information to access this channel from a Modbus enabled device.

Monitor and Testing
Use this to monitor the current digital I/O state or to manually test digital I/O operation.

IO Mapping
Set the wireless field unit's digital I/O to send/receive to the base station. Typically set from the *Base Station IO Configuration* tab.

Save Configuration
Click this button to save all changes you have made to the selected field unit. This will not save changes to other modules.

Note: *For information about* Modbus Access*, please see* Modbus Register Address vs Modbus Register Number *on page 28.*

Modbus RTU

Each field unit is capable of transmitting Modbus® RTU serial communications. Enter the Modbus network settings on the Modbus tab in order to communicate with the Modbus network. The Modbus address must be unique in order to ensure field unit/base station connectivity.

Once you have modified the settings, click the *Save Configuration* button to save these settings to the field unit.

Field Unit Name
Click *Change Name* to enter a new human readable name for the base station.

Remove from Client List
Click this button to remove the selected field unit from the base station.

Modbus Settings
Change these settings to match those of the Modbus network with which this unit is communicating. The Modbus address must be unique for each wireless field unit.

Save Configuration
Click this button to save all changes you have made to the selected field unit. This will not save changes to other modules.

Modbus Register Address vs Modbus Register Number

In order to address the wireless units' Modbus registers, depending on the type of Modbus device, it may be necessary to provide either the *register address* or the *register number*. WR Manager shows the *register address* of input and output devices in the section labeled *Modbus Access*, as shown below:

Modbus Access :
Slave Address: 1   Registers: Integer: 2048   Long Int: 2112   Float: 2176

In this example, if the Modbus device requires a *register address*, use the value 2112 to access the long int value.

If the Modbus device requires a *register number*, add 40,001 to the *register address* (in this case: 42,113) to access the long int value. The table at right shows additional *register address* to *register number* conversions

Register Address	Register Number
0	40,001
256	40,257
2048	42,049
3328	43,329

Advanced Configuration

Device communication can be secured by enabling 128-bit AES encryption. A channel mask may also be set for interference immunity. The encryption key and channel mask may be entered on the *Advanced* tab. Once you have entered the encryption information, click *Save Settings*. If you have made changes that have not been saved and would like to load the saved settings from the base station, click the *Read Settings* button.

The wireless field units must share identical encryption keys in order to communicate with the base station, so be sure to enter the same information for all of the field units. See Programming the Field Units with WR Manager on page 34 for information on programming the field units.

If you would like to reset the base station to factory default settings, click the *Reset all system parameters to Factory Defaults* button. All field units may be cleared from the client database by clicking the *Clear Client Database* button.

Channel Mask
Set a channel mask for interference immunity.

AES Encryption
Devices can be programmed to communicate securely using 128-bit AES encryption. Enable encryption using the drop-down at the top and enter an encryption key. The two key fields must start with "0x" followed by 16 hexadecimal characters (for example: 0x46D34C5666542D06).

Device:
Wireless Base Station - SN: 354F0C4725001799 - FW: v1.100   Disconnect

Base Station Configuration | Base Station IO Configuration | Remote Unit Configuration | Advanced | About

Network Settings:

Channel Mask: 0xFFFFFFFFFFFFFFFF

AES Encryption: Enabled

Encryption Key Bytes 15 - 8: 0x46D34C5666542D06

Encryption Key Bytes 7 - 0: 0xE04027A119DF1396

AES Encryption keys must be created by a password generator

Read Settings   Save Settings

Management:

Clear Client Database

Reset all system parameters to Factory Defaults

Show Debug Log

Read Settings
Click this button to load settings from the base station hardware and display them here. This will overwrite any changes you have made in the software.

Base Station Management
Click these buttons to perform administrative tasks such as clearing the list of connected field units and resetting the base station to factory default settings.

Save Settings
Click this button to write all of the changes you have made in the above fields to the base station hardware.

29

Programming the Field Units

The field units can be programmed using the buttons located behind the enclosure cover or using WR Manager. Because of the limited number of options available for the field units, it is easier in most cases to use the programming buttons.

When programming the field units using the programming buttons, use the *menu* button to enter or exit *programming mode*, the *next* button to cycle forward through menu options, the *previous* button to cycle backward through menu options, and the *enter* button to select the menu item or option you want. During number entry, use the *next* button to select a digit and the *previous* button to increment the selected digit.

Press the *display* button while in *run mode* to show the current analog and digital inputs and outputs.

Button	Description
MENU	**Menu** Enter or exit the device menu
ENTER	**Enter** Select a menu item of option
PREV	**Previous** Cycle backward through menus or increment digit
DISP/NEXT	**Next** Cycle forward through menus or select next digit
	Display Show current inputs and outputs

Display	Status
RSSI	**Received Signal Strength Indicator** Indicates the wireless signal strength between wireless devices on a scale of 1 to 10.
RT	**Receiving/Transmitting** Flashes while the devices are sending and/or receiving data
001-247	**Modbus Address** Indicates the Modbus address of the field unit. This is the unique identifier that the base station uses to communicate with the field unit.
LINK OK / CONNECTING	**Link Status** Displays whether or not the units are currently connected
AIN / AOUT	**Analog Input/Analog Output** Labels for the current analog input and analog output (Shown when the *display* button is pressed)
DI / DO	**Digital Input/Digital Output** Labels for each of the current digital inputs or outputs (Shown when the *display* button is pressed twice)

30

Field Unit Setup Menu

The setup menu consists of analog, digital (discrete), and Modbus® input/output settings, network ID, password, and factory defaults restoration.
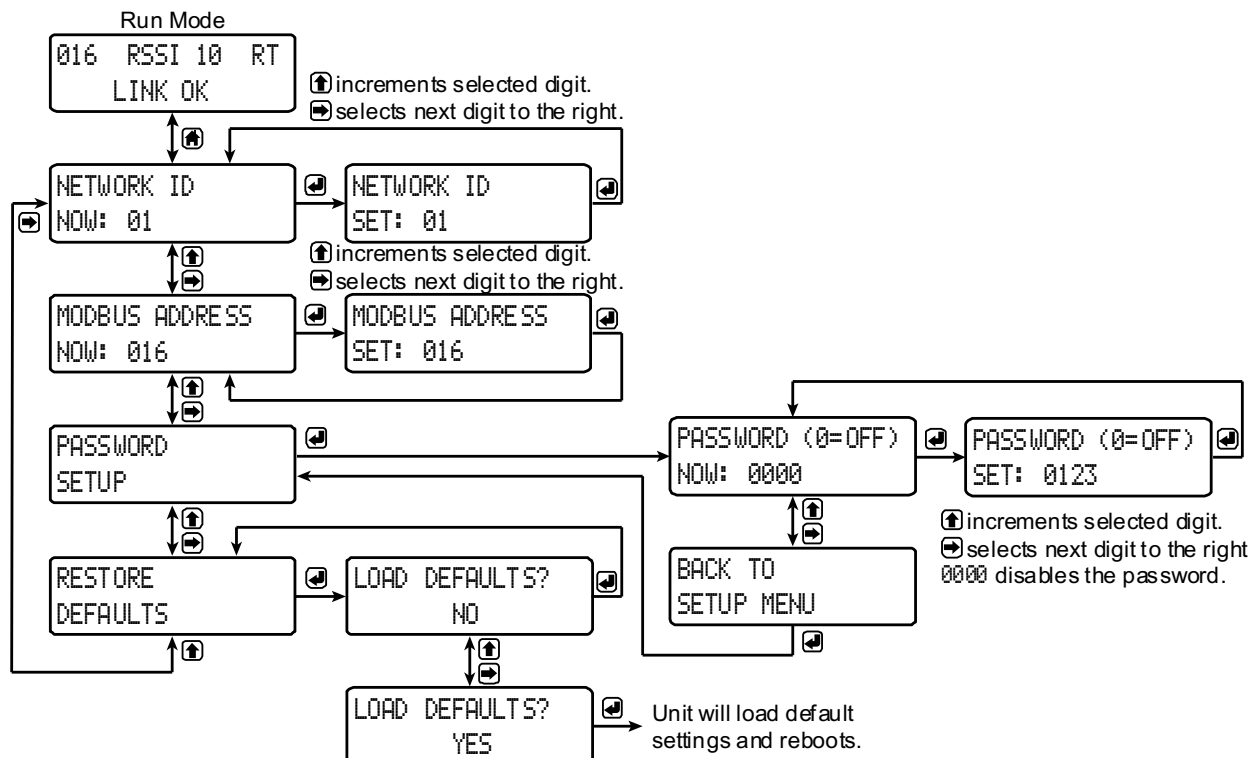
Display Functions & Messages

Shown below is a list of all display messaged in each field unit's setup menu. This list is in order of appearance when pressing the *next* button. An indented line indicates a sub-menu or item.

Display	Action/Setting Description
NETWORK ID	Displays the point-to-multipoint wireless network ID (press *enter* to change)
01-99	The network ID can be any number between 01 and 99
MODBUS ADDRESS	The unique ID used by the base station to differentiate between field units
001-247	The Modbus address can be any number between 001 and 247
PASSWORD SETUP	Change the device password
PASSWORD (0=OFF)	Displays the current device password (press *enter* to change)
0000-9999	Password can be any number from 0001 to 9999 (0000 disables)
BACK TO SETUP MENU	Return to the setup menu
RESTORE DEFAULTS	Restore the unit to factory default settings
LOAD DEFAULTS?	Factory restoration confirmation prompt
NO	No, do not restore the device to factory defaults (press *enter*)
YES	Yes. restore the device to factory defaults (press *enter*)

Entering Numeric Values

Numeric values are set using the *next* and *previous* buttons. Press *next* to select next digit and *previous* to increment digit value.

The selected digit will flash.

Press the *enter* button, at any time, to accept the value or the *menu* button to exit without saving.
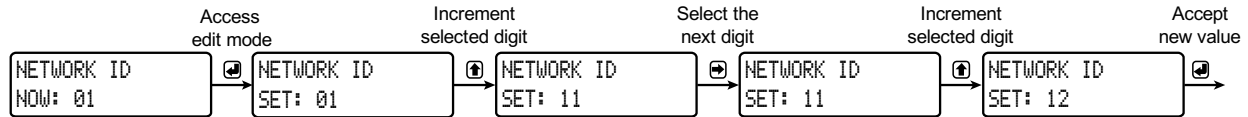
Network ID

The *Network ID* is the unique network identifier that allows all field units to connect to the base station. The ID can be set to any number between *01* and *99*. All field units must be set to the same *Network ID* as the base station in order to communicate. Multiple field unit/base station pairs may be installed within range of each other by setting unique *Network ID*s.

Modbus Address

The *Modbus Address* is used to identify each individual field unit connected to the point-to-multipoint wireless network. The Modbus address can be any number between *001* and *247*. This address must be unique among all field units on the same *Network ID*. This address must also be unique among all other Modbus devices connected to the network.

Password Setup

The wireless field units may be protected with a four-digit numeric password in order to prevent unauthorized tampering. When a password has been set, you will be prompted to enter that password in order to access the device menu.

To disable password protection, simply set 0000 as the password.

increments selected digit.
selects next digit to the right.
0000 disables the password.
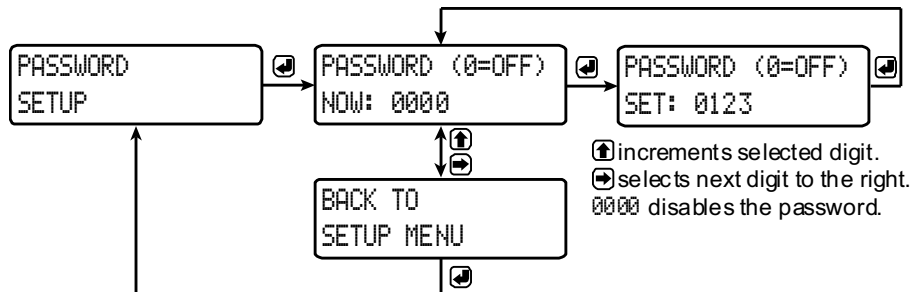
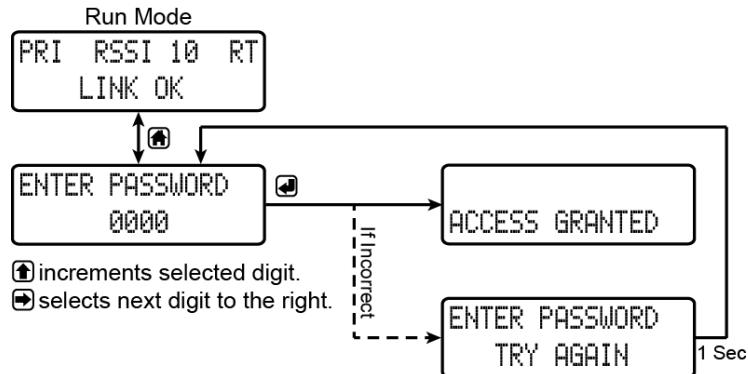## Making Changes to a Password Protected Field Unit

Once a password has been set on the device, you will be required to enter that password before being allowed to access the device menu.
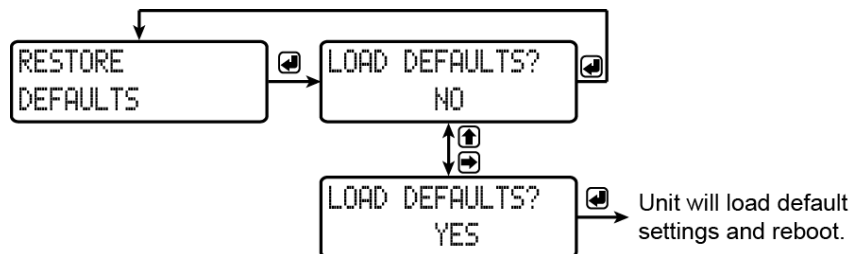
```
               Run Mode
        ┌─────────────────────┐
        │PRI  RSSI 10   RT    │
        │     LINK OK         │
        └─────────────────────┘
              ⇵ 🏠        ↑
        ┌─────────────────────┐  ⏎
        │ENTER PASSWORD       │ ──┐
        │      0000           │   │        ┌─────────────────────┐
        └─────────────────────┘   └──────▶ │ACCESS GRANTED       │
                                           └─────────────────────┘
    ⬆ increments selected digit.      If Incorrect
    ➡ selects next digit to the right.     ┊         ┌─────────────────────┐
                                           └ ─ ─ ─ ▶ │ENTER PASSWORD       │
                                                     │      TRY AGAIN      │  1 Sec
                                                     └─────────────────────┘
```

Note: *Setting a password will require you to enter the password to access the device settings via the PC software as well.*

> **Did you forget the password?**
>
> The password may be disabled by entering a master password. If you are authorized to make changes, enter the master password 7300 to unlock the device.
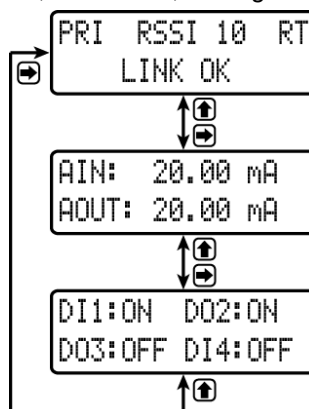
Restore Defaults

If a mistake has been made while programming the field unit and it is unclear where the error occurred, the best option may be to perform a factory reset of the device and begin again.

```
        ┌─────────────────────┐  ⏎   ┌─────────────────────┐  ⏎
    ┌─▶ │RESTORE              │ ───▶ │LOAD DEFAULTS?       │ ──┐
    │   │DEFAULTS             │      │         NO          │   │
    │   └─────────────────────┘      └─────────────────────┘   │
    │                                      ⬆⇵ ➡                 │
    │                                ┌─────────────────────┐  ⏎
    │                                │LOAD DEFAULTS?       │ ───▶  Unit will load default
    └────────────────────────────── │         YES         │       settings and reboot.
                                     └─────────────────────┘
```

Display Signal I/O and Digital I/O Status

Pressing either the *previous* or *display* buttons while the device is in run mode will cycle through the display modes. These modes are, in order, *link status*, *analog I/O*, and *digital I/O*.

```
              ┌─────────────────────┐
         ➡    │PRI  RSSI 10   RT    │
        ┌──── │     LINK OK         │
        │     └─────────────────────┘
        │           ⬆⇵ ➡
        │     ┌─────────────────────┐
        │     │AIN:   20.00 mA      │
        │     │AOUT:  20.00 mA      │
        │     └─────────────────────┘
        │           ⬆⇵ ➡
        │     ┌─────────────────────┐
        │     │DI1:ON   DO2:ON      │
        └──── │DO3:OFF DI4:OFF      │
              └─────────────────────┘
                    ⬆
```

33

Programming the Field Units with WR Manager

The field units may also be programmed using the PC based *WR Manager*. Field units connect to a PC via the micro USB connection on their face, underneath the enclosure cover. Use of *WR Manager* is required for programming advanced settings such as wireless encryption and analog signal calibration.

WR Manager can be found on the included CD. Once the software is running, power the unit using a 24 VDC power supply and connect the device to the PC using the provided USB cable.
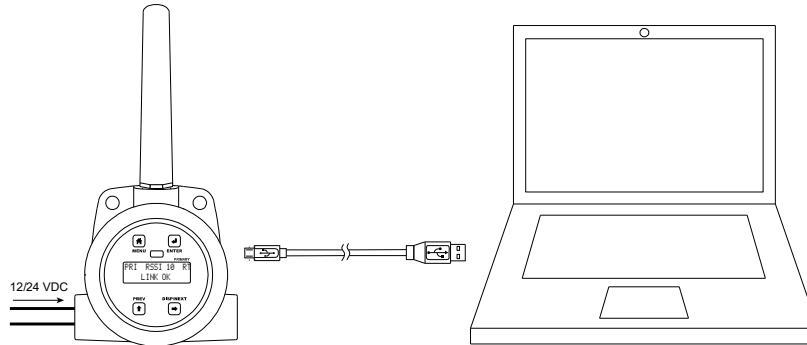
Note: Units must be powered externally prior to programming via USB.

The PC will automatically install the appropriate device drivers. Once this has completed, the device will appear in the *Device* list at the top of the *WR Manager* window. Click *Connect*.
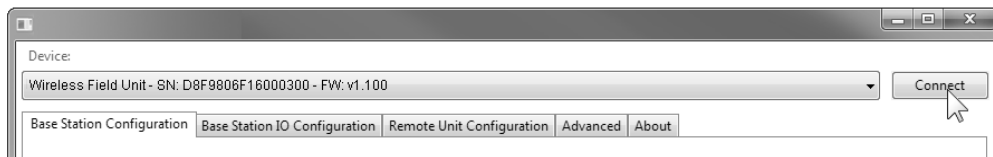
The image below shows the available options on the *Configuration* tab while the field unit is connected. The network ID, Modbus settings, and password may be configured from this tab.

Device Name
Click Change Name to enter a new human readable name for the wireless device.

Network ID
Enter the same Network ID as the base station for each PDW90 field unit .

Analog Input Mode
Select what type of analog input the device is receiving. (4-20mA, 0-10V, 0-5V, 1-5V)

Modbus Settings
Change the Modbus timeout to match that of the Modbus® network with which this unit is communicating. The Modbus address must be unique among other Modbus devices, including other wireless field units.

Read Settings
Click this button to load settings from the wireless hardware and display them here. This will overwrite any changes you have made in the software.

Save Settings
Click this button to write all of the changes you have made in the above fields to the wireless hardware.

Change Password
Click this button to change the password needed to change device settings. Enter 0000 to disable.

Disconnect
Click this button to disconnect from the PDW30 wireless unit and prepare it to be unplugged from the computer.

The field unit's analog inputs and outputs can be calibrated using the Calibration tabs. The IO Testing tab allows you to perform diagnostics and testing on the units.

Note: The field units are factory calibrated prior to shipment to read analog inputs in milliamps and volts depending on the input selection. The calibration equipment is certified to NIST standards.

Analog Input Calibration Mode
Change analog input calibration mode to either current or voltage. This will change the active analog input mode on the device and allow for calibration.

Input Calibration
Record the high and low analog input range from a calibration device and apply calibration to the wireless unit.

Test 4-20 mA Output
Force the unit to output 4 mA, 12 mA, 20 mA, or a custom value in order to test the output and any devices that are receiving from it.

Output Calibration
Record the high and low 4-20mA output range from a calibration device and apply calibration to the wireless unit.

Digital I/O Testing
Use the radio buttons at the top to either monitor digital I/O activity or override programmed settings in order to test I/O configuration

Analog Input Monitoring
Displays the current analog input reading. Use the radio buttons to change mode.

Output Monitoring
Displays the current 4-20mA analog output measurement.

Device Logs
Technical information for testing and debugging purposes.

Device communication can be secured by enabling 128-bit AES encryption. A channel mask may also be set for interference immunity. The encryption key and channel mask may be entered on the *Advanced* tab. Once you have entered the encryption information, click *Save Settings*. If you have made changes that have not been saved and would like to load the saved settings from the base station, click the *Read Settings* button.

The base station and field units must share identical encryption keys in order to communicate, so be sure to enter the same information for the base station and all of the field units. See Programming the Base Station on page 18 for information on programming the base station.

Channel Mask
Set a channel mask for interference immunity.

AES Encryption
Devices can be programmed to communicate securely using 128-bit AES encryption. Enable encryption using the drop-down at the top and enter an encryption key. The two key fields must start with "0x" followed by 16 hexadecimal characters (for example: 0x46D34C5666542D06).
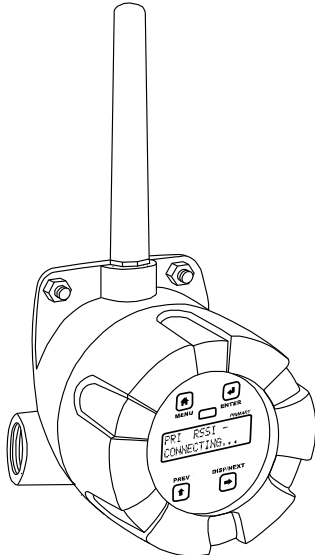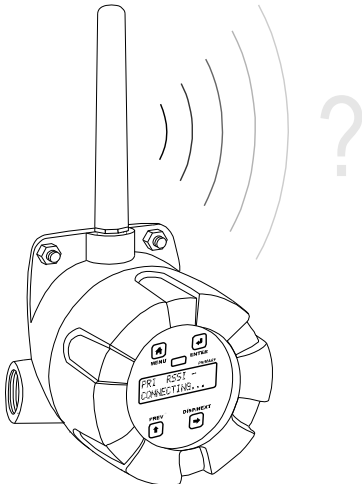
Network Settings:

Channel Mask: 0xFFFFFFFFFFFFFFFF

AES Encryption: Disabled

Encryption Key Bytes 15 - 8: 0x0000000000000000

Encryption Key Bytes 7 - 0: 0x0000000000000000

AES Encryption keys must be created by a password generator

Read Settings   Save Settings

Reset all device parameters to Factory Defaults

Read Settings
Click this button to load settings from the wireless unit hardware and display them here. This will overwrite any changes you have made in the software.
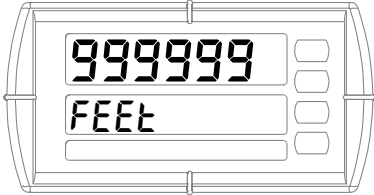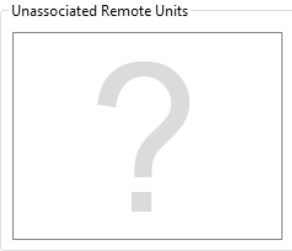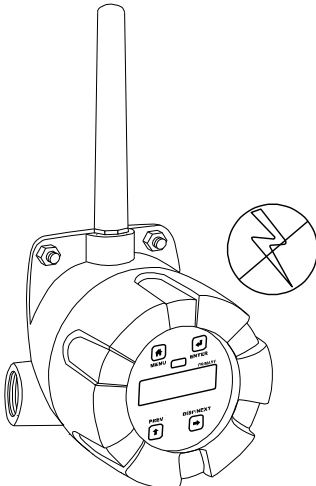
Reset to Factory Defaults
Click this button to permanently reset all setting on the device to their factory defaults. This will overwrite all changes you have made to the device.
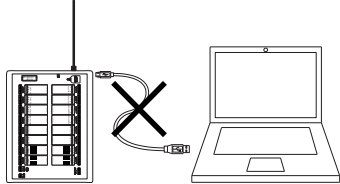
Save Settings
Click this button to write all of the changes you have made in the above fields to the wireless unit hardware.

Troubleshooting

If you are experiencing difficulties with your wireless installation, consult the troubleshooting steps listed below. For best results, identify the symptoms of the problem you are having and attempt all of the corrective actions listed for the particular symptom.

Symptom	Possible Cause	Corrective Action
Devices will not connect.	Devices have mismatched network IDs.	• Devices will not connect if they do not have the same network ID. Verify that both devices share the same network ID.
	Devices are out of range or there are obstacles blocking the wireless path.	• Bring devices closer together to see if it alleviates the issue. Units will display LINK OK if they are connected. If devices connect, consider placing closer together permanently, removing any obstacles, or mounting higher. • Ensure antennas are on parallel plane. Devices that are vertically separated will not have as strong of a connection. • If communicating over distance of miles, consider installing WR-30-RP repeaters or a high gain directional antenna.
	Multiple wireless devices in the area with the same ID.	• If there are multiple WR-90 wireless systems or WR-30 wireless signal bridges, verify that each system has its own unique network ID. All units intended to communicate with each other should share a unique network ID.
	Encryption keys do not match	• If using encryption, ensure that the encryption keys on both devices match exactly.
Intermittent signal issues.	Signal is too poor.	• Check RSSI. If signal is too low, consider moving devices closer together, clearing obstacles in wireless path, or mounting devices higher. • Ensure devices are on parallel plane. • If communicating over distance of miles, consider installing high gain directional antenna.
	Temporary obstacles are blocking the wireless path.	• Temporary obstacles, such as large trucks or heavy equipment, can interfere with wireless path. Consider moving wireless units higher or to an area with less traffic.

Symptom	Possible Cause	Corrective Action
Destination device reads out of range, zero, or incorrect.	Wireless device has mismatched input type.	• Make sure that input type on the device is correct for the analog input being used. Options are 4-20 mA, 0-10 V, 0-5 V, or 1-5 V.
	Destination device is not scaled properly.	• Destination device must accept 4-20 mA signal and be scaled to properly display the signal. Check the manufacturer's instruction manual for how to do this.
	Signal connections are improperly wired.	• Double check to make sure all of the signal connections are properly wired to all devices. Check wiring diagrams starting on page 10.
While trying to connect field units using WR Manager, none appear in the Unassociated Remote Units list.	Devices have mismatched network IDs.	• Devices will not connect if they do not have the same network ID. Verify that all devices share the same network ID.
	Multiple field units have same Modbus address.	• If multiple field units share the same Modbus address it will cause a conflict. Verify that all field units have unique Modbus addresses.
	Devices have differing encryption settings.	• Encryption settings must be the same on all devices. Use WR Manager to verify the encryption settings on all devices.
Device will not power on.	Not enough voltage is coming from the power supply.	• Devices require at least 12 VDC each in order to power on. Check that the power supply is providing enough voltage to the device and that there are not too many devices drawing from the supply.
	Devices are improperly wired.	• Check to make sure all power connections are properly wired to all devices. Check wiring diagrams starting on page 10.

38

Symptom	Possible Cause	Corrective Action
Device will not connect to PC via USB	Wireless device is not powered.	• The base station must be powered by a 24 VDC power supply in order for the PC to recognize it. Field units must be powered by a 12-28 VDC power supply. Power the wireless device and try again.
	Software version is outdated.	• Check that you are running the latest software version. The latest version of WR Manager can be downloaded at **www.binmaster.com**.
	USB cable is faulty	• Try connecting the wireless device using a known good micro USB cable. Any standard USB A to micro USB B cable, such as the one used to charge a smartphone, should work.
Other Issue **?**	If you are experiencing a symptom not listed here, or the suggested troubleshooting steps do not alleviate your problem, please attempt to restore the wireless devices to system defaults by following the instructions on page 29 or page 33. If you require technical support, please contact us at: **Phone:** (402) 434-9102 **Fax:** (402) 434-9133 **Email:** info@binmaster.com **Web:** www.binmaster.com	

Mounting Dimensions

Note: all units are in inches (mm).

6.73 (171)

15.04 (382)

15.75 (400)

7.08 (180)
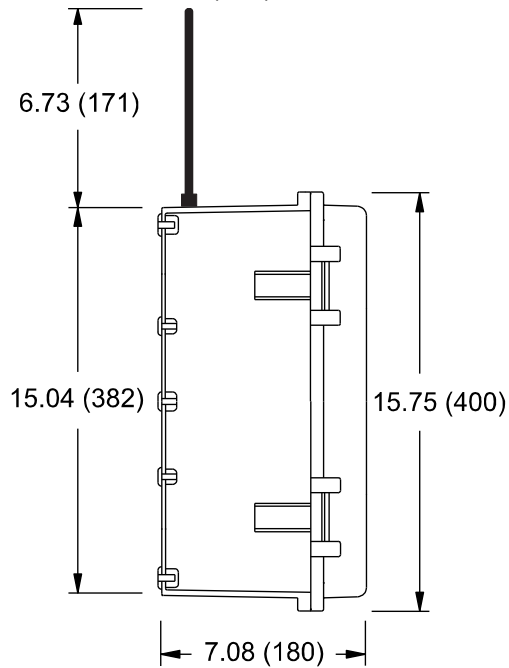
Figure 19. Base Station Dimensions – Front View

15.75 (400)

11.81 (300)
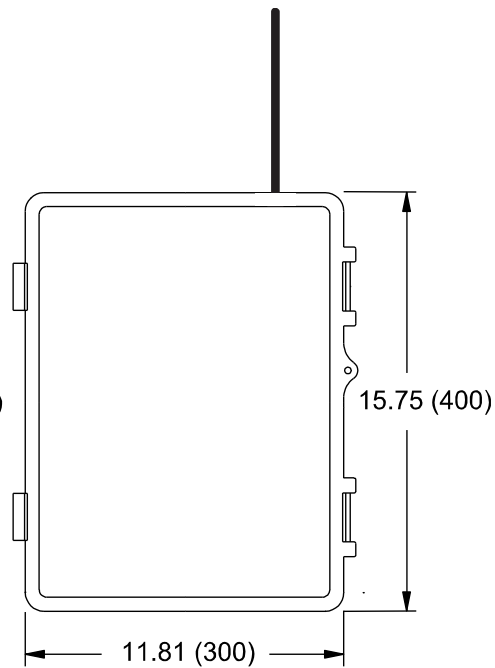
Figure 20. Base Station Dimensions – Side View

2.31 (58.6)

4.00 (101.6)

Ø 0.35 (Ø 9.0)

4.27 (108.4)

4.30 (109.2)
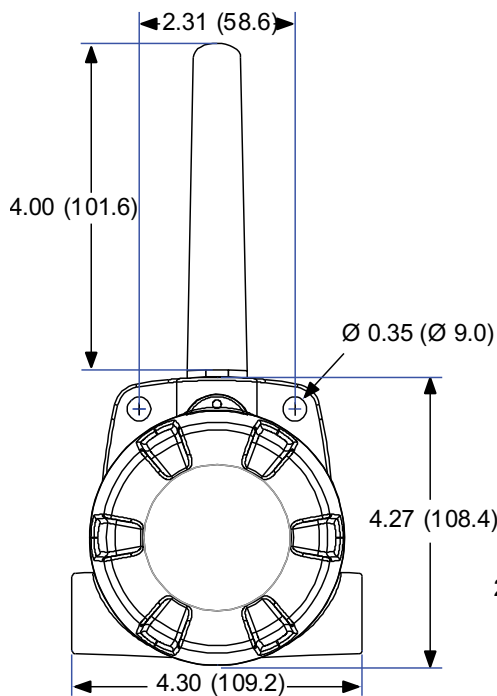
Figure 21. Field Unit Dimensions – Front View

2.17 (55.0)

2.74 (69.7)

2.44 (61.9)

3.62 (92.0)

½" NPT
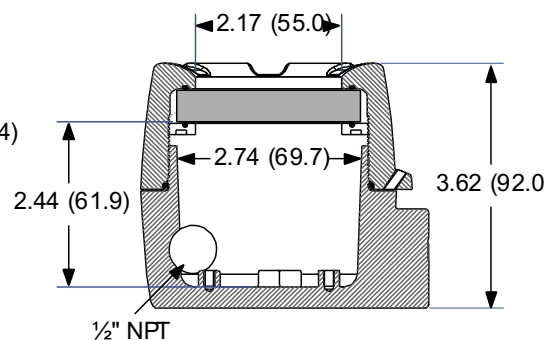
Figure 22. Field Unit Dimensions – Side Cross Section View

Note: The supplied conduit plug may extend up to 0.6 in [15 mm] from the conduit opening when installed.

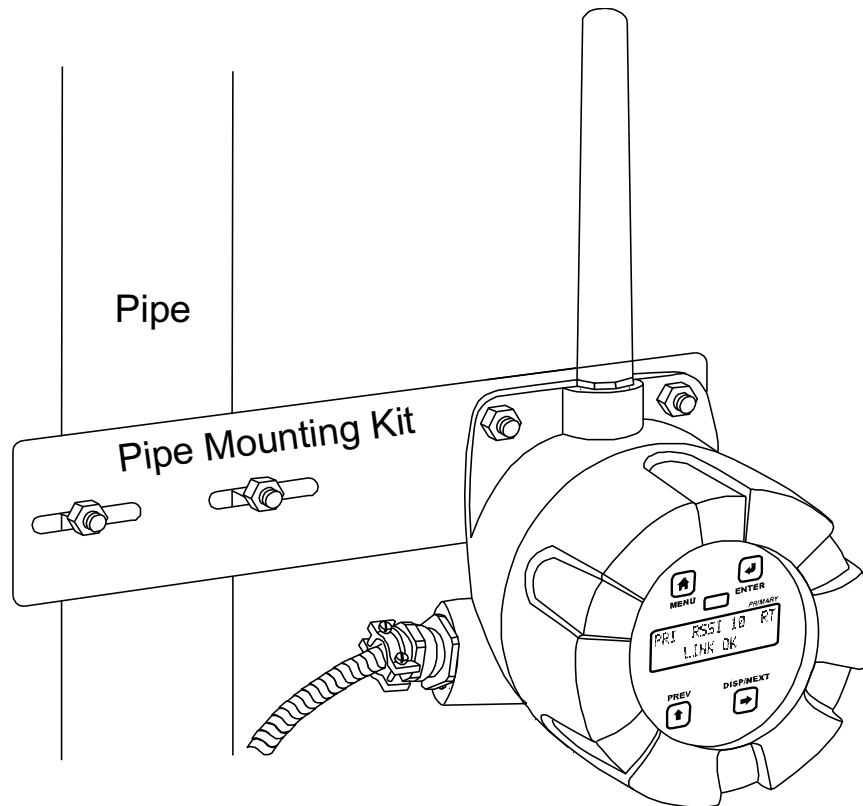## PDA6963-BM Stainless Steel Pipe Mounting Kit for Field Units

Figure 23. PDA6963-BM Stainless Steel Pipe Mounting Kit for Field Units