

PDW30 Point-to-Point Wireless Bridge

Instruction Manual



**PRECISION
DIGITAL**
WIRELESS



Available in
Stainless Steel

- Signal Wire Replacement Bridge Consisting of a Matched Pair of Wireless Field Units
- Virtually Plug and Play Right out of Box
- Range: 1 Mile Line-of-Sight Outdoor, 500 Feet Indoor; Repeaters Available to Extend Range
- Wireless Transmission Between Primary and Secondary Unit of
 - 4-20 mA (Separate Signals Going Both Ways)
 - Discrete (4 digital I/O Signals Going Both Ways)
 - RS-485 Modbus
- Inputs: (Wired to Units) 4-20 mA or 0-10 V (1), Discrete/Digital (up to 4), Modbus
- Outputs: (Wired to Units) 4-20 mA (1), Discrete/Digital (up to 4), Relays (2, optional), Modbus
- Loss of Signal (LoS) Digital Output
- PDA10 Signal Strength Survey Tool to "Try Before You Buy"
- Field Installable Relay Module with Two Form A (SPST) 5A Relays (Available for Both Units)
- Simple to Configure Using PDW Manager Programming Software and On-Board USB
- Backlit Display Provides Helpful Input & Output Information
- CapTouch Through-Glass Button Programming for Non-Advanced Settings
- Device Communication Secured by Enabling 128-bit AES Encryption
- Password Protection
- Remote Yagi Directional Antennas Available
- IP68, NEMA 4X Aluminum & Stainless Steel Enclosures With Plenty of Room for Field Wiring
- Operating Temperature Range: -55 to 75°C (-67 to 167°F)
- Conformal Coated PCBs for Dust & Humidity Protection
- Flange for Wall or Pipe Mounting; Loop for Stainless Steel Tag; Holes for Tamper-Proof Seal
- 9-30 VDC Power
- 3-Year Warranty

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Disclaimer

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CAUTION

- Read complete instructions prior to installation and operation of the meter.

WARNINGS

- Risk of electric shock or personal injury.
- 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. Precision Digital Corporation shall not be held liable for damages resulting from such improper use.

IMPORTANT

- The term “discrete” is sometimes used in this document to refer to digital inputs and outputs, where the value is either 0 or 1 (Logic Low or High).
- When referencing Modbus, this manual uses the terms “Client” to refer to what was previously called “Master” and “Server” to refer to what was previously called “Slave”.

WARNING

Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Limited Warranty

Precision Digital Corporation warrants this product against defects in material or workmanship for the specified period under “Specifications” from the date of shipment from the factory. Precision Digital’s liability under this limited warranty shall not exceed the purchase value, repair, or replacement of the defective unit. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

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Introduction

The Precision Digital PDW30 provides a simple, straightforward way to get an analog, discrete (digital) or Modbus signal from where you have it to where you need it – without having to run wires! It’s a point-to-point wireless bridge that is virtually plug and play right out of the box.

The PDW30 consists of a primary and a secondary unit and communication between the two is by-directional. That means you can send 4-20 mA, discrete and Modbus signals from the primary unit to the secondary unit and also send completely different 4-20 mA, discrete and Modbus signals from the secondary unit to the primary unit. For instance, the primary unit could send a 4-20 mA signal to the secondary unit corresponding to the level in a tank and the secondary unit could send a 4-20 mA signal to the primary unit to control a valve.

Primary and secondary units are also equipped with four digital I/O that can each be independently programmed as an input or an output. A Loss of Signal warning is also available by connecting devices to the G and LS screw terminals.

To indicate alarm situations, both units can be equipped with an optional, field installable, two relay module. These relays are rated Form A (SPST) 5A.

The specified range between the primary and secondary unit is 1 mile line-of-sight outdoor and 500 feet indoor and repeaters are available to extend the range. A low-cost wireless survey tool, Model PDA10, is available to test the signal strength of your application before you buy. And if the PDW30 system does not work in your application, you can return it for full credit!

The PDW30 is available in either aluminum or stainless steel NEMA 4X, IP68 enclosures and these enclosures contain plenty of room for field wiring connections.

Most applications require minimal programming and can be operational in minutes. However, free programming software is available and if touch ups are needed after installation, the instrument can be programmed without re-moving the cover using CapTouch buttons.

A wide range of accessories, including mounting kits, antenna-related accessories, and repeaters are available. The antenna comes attached to the unit and can also be remotely located. High gain directional antennas are also offered.

Key Features



PDW Manager PC Software



PDW Manager PC Software allows for programming the PDW30 wireless primary units and secondary units from a PC with a USB connection. The units connect to a PC via the USB connection on the side of the display module behind the cover of the enclosure. Use of PDW Manager is required for programming advanced settings such as wireless encryption and analog signal calibration. PDW Manager is available for download at www.predig.com/pdwmanager.

Easy-To-Install Display Module



The display module designed specifically for the PDW30 wireless units is easy to remove making it convenient for wiring the unit. The display module is completely enclosed for added protection when wiring and handling.

Relays Option Module



The PDW30 primary and secondary units are available with a relays option module that includes two Form A (SPST) relays. The module is easily installed by the user into the base of the enclosure with the four screws provided. The removable connector plugs make wiring easy.

CapTouch Through-Glass Buttons



The PDW30 primary and secondary units are equipped with four capacitive sensors that operate as through-glass buttons so that they can be operated without removing the cover (and exposing the electronics) in an unclean area.

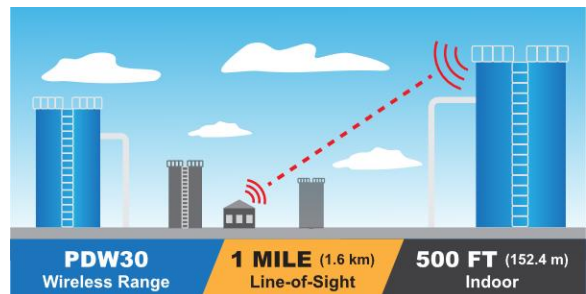
CapTouch buttons are designed to work under any lighting condition and are not affected by random changes in light or shadows. To protect against false triggering a long button press of about 2 seconds is required to wake up the buttons when they have not been in use.

PDW30 Units Available in Aluminum or Stainless Steel



The PDW30 primary and secondary units are available in an IP68, NEMA 4X aluminum or stainless steel enclosure. The enclosures feature a built-in flange for wall or pipe mounting, built-in loop for a stainless steel tag, locking screw, and hole for a tamper-proof wire & seal. The enclosure also includes two 3/4" threaded conduit openings for wiring. The PDW30 units can operate in temperatures of -55 to 75°C (-67 to 167°F).

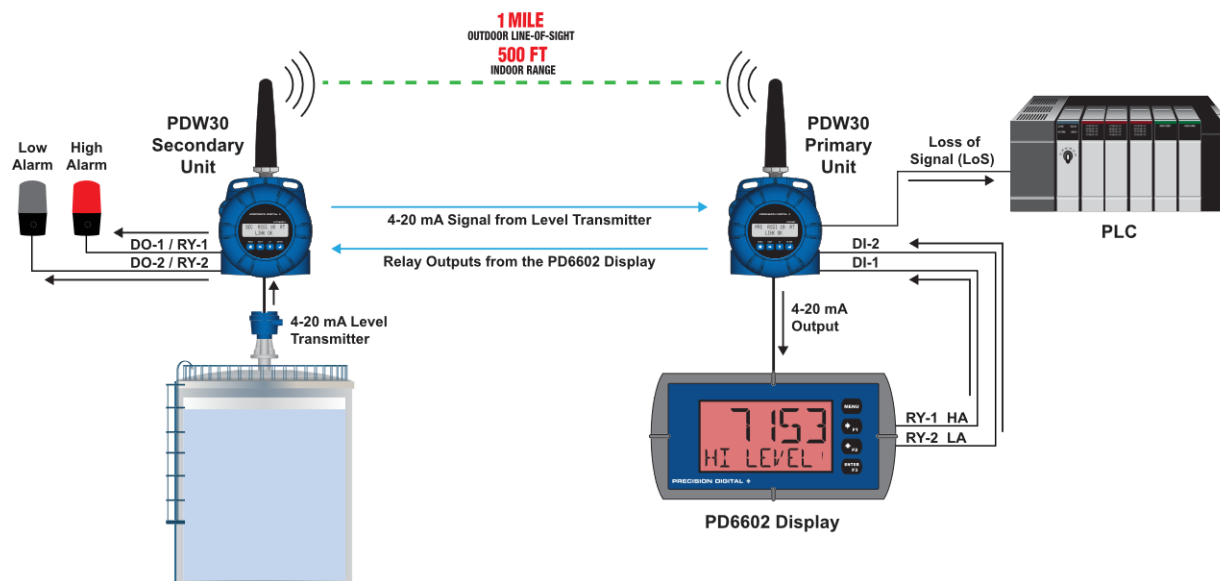
Wireless Solutions in Complex Areas



The PDW30 has a range of 500 ft. indoors and an outside line-of-sight range of 1 mile. Any wireless network can be negatively affected by certain factors, such as physical obstacles and improper equipment placement. Precision Digital sells several solutions for tricky wireless installations, such as remote antennas and repeater field units. Our PDA10 wireless survey kit allows for testing of the wireless signal strength prior to installation so that you know your wireless units will connect the first time.

Application Examples

Wireless Tank Level Monitoring



Note: Power requirements / connections not shown in diagram. Consult manuals for details.

- The 4-20 mA level transmitter is connected to the analog input of the secondary unit.
- The mA signal is transmitted to the primary unit.
- The primary unit's analog output is connected to a PD6602 loop-powered meter, which displays the 4-20 mA signal as volume in gallons.
- The PD6602 is programmed to indicate an alarm condition when the level exceeds 7000 gallons as displayed on the meter.
- Relay 1 on the meter connects to digital input 1 of the primary unit.
- The low and high alarm light / horn in the field are driven as follows:
 - Relay 1 (RY-1) in the PD6602 display is connected to digital input 1 (DI-1) on the primary unit. This signal is wirelessly transmitted to the secondary unit. (On the secondary unit) digital output 1 (DO-1) controls relay 1 (RY-1), which turns on the high alarm light / horn, warning the operator.
 - Relay 2 (RY-2) in the PD6602 display is connected to digital input 2 (DI-2) on the primary unit. This signal is wirelessly transmitted to the secondary unit. (On the secondary unit) digital output 2 (DO-2) controls relay 2 (RY-2), which turns on the low alarm light / horn, warning the operator.

Parts Needed for This System:

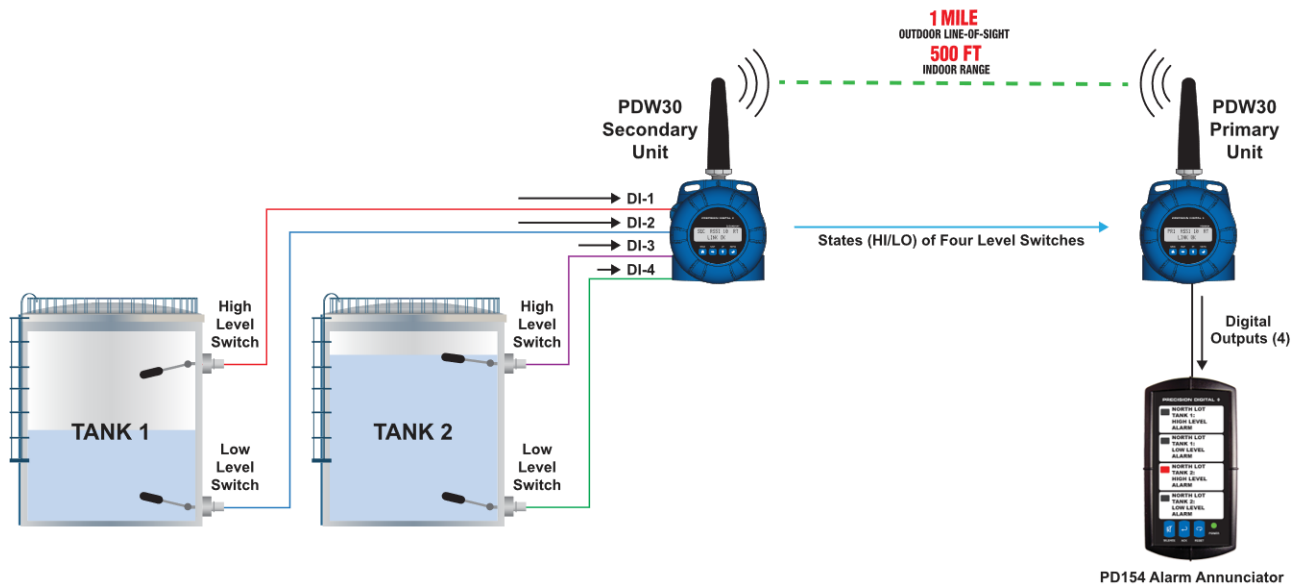
PDW30

Model Number	Qty	Description
PDW30-GP-AL-PAIR	1	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Aluminum Enclosure
PDWM-2RY	1	Relays Option Module, Two Form A (SPST)

Other Products

Model Number	Qty	Description
PDA-LHR	2	Red Light / Horn
PD6602-L2N	1	1/8 DIN Loop-Powered Digital Panel Meter with Two Relays

Wireless Tank Level Monitoring of Level Switches



Note: Power requirements / connections not shown in diagram. Consult manuals for details.

- The switch contacts from the two level switches in each tank are connected to the digital inputs on the secondary unit.
- The states of the switch contacts are wirelessly transmitted to the primary unit.
- The digital outputs from the primary unit are connected to a PD154 Vigilante II 4-point annunciator.

Parts Needed for This System:

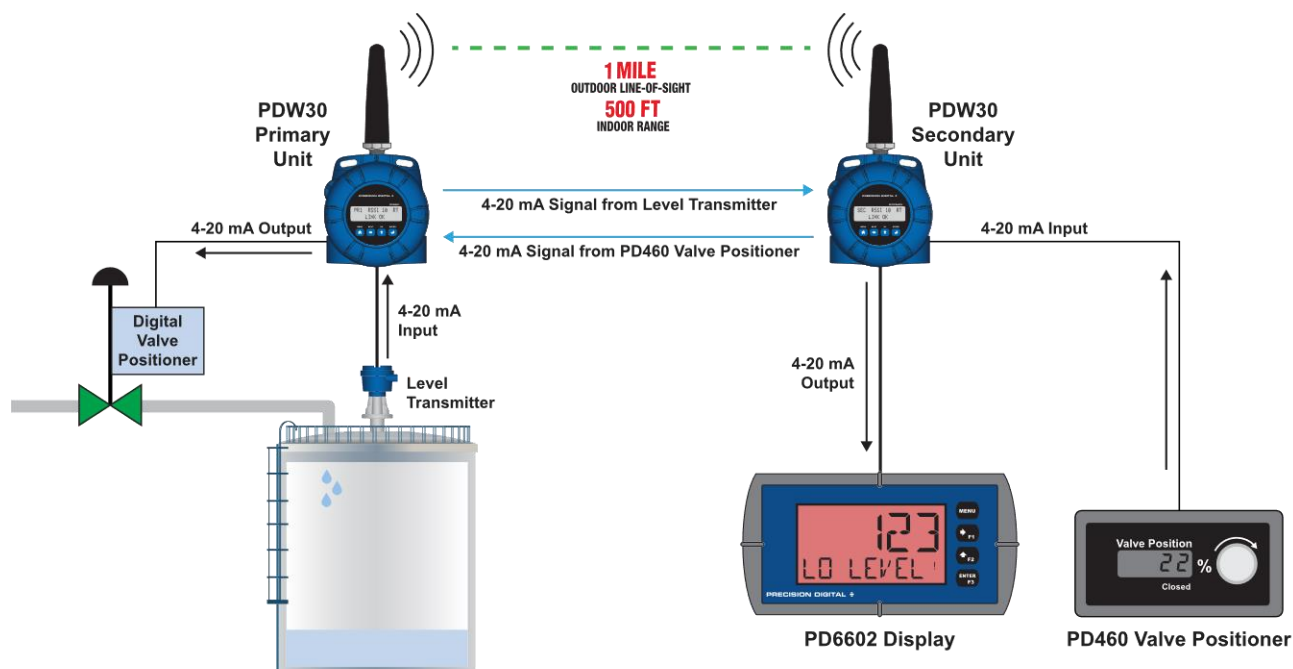
PDW30

Model Number	Qty	Description
PDW30-GP-AL-PAIR	1	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Aluminum Enclosure

Other Products

Model Number	Qty	Description
PD154-6R2-1	1	1/8 DIN 4-Input Alarm Annunciator

Wireless Remote Valve Control



Note: Power requirements / connections not shown in diagram. Consult manuals for details.

- The level transmitter's 4-20 mA signal is connected to the primary unit's analog input.
- The PDW30 primary unit then wirelessly transmits the level signal to the secondary unit located in the control room, where the secondary unit's 4-20 mA output duplicates the signal.
- The secondary unit's 4-20 mA output is connected to a PD6602 that displays the level and operates a high and low alarm. In this example, the meter is indicating a low alarm.
- The operator uses a PD460 valve positioner to send a mA signal to the secondary unit's analog input.
- That valve position signal is wirelessly transmitted to the primary unit located in the field at the tank, where the primary unit's 4-20 mA output duplicates the signal.
- The primary unit's 4-20 mA output is connected to a digital valve positioner. The valve is opened, and the tank starts to fill again.
- The operator monitors the level rising on the PD6602 and uses the PD460 valve positioner to close the valve when the tank reaches the desired level.

Parts Needed for This System:

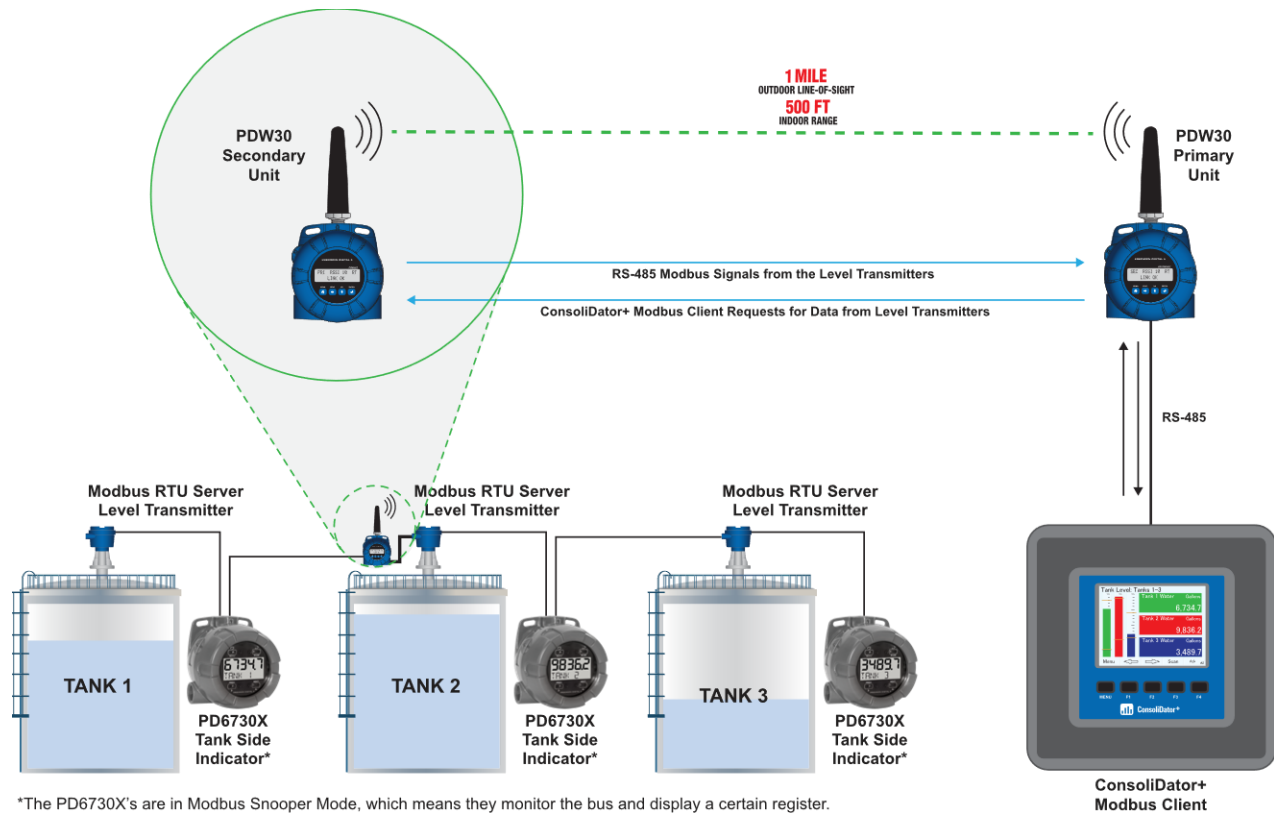
PDW30

Model Number	Qty	Description
PDW30-GP-AL-PAIR	1	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Aluminum Enclosure

Other Products

Model Number	Qty	Description
PDA-LHR	2	Red Light / Horn
PD6602-L2N	1	1/8 DIN Loop-Powered Digital Panel Meter with Two Relays
PD460	1	Panel Mount 4-20 mA Valve Positioner

Wireless Transmission of Modbus Inputs and Outputs



Note: Power requirements / connections not shown in diagram. Consult manuals for details.

- Tank level is measured by Modbus enabled level transmitters.
- The ConsoliDator+ Modbus client is connected to the primary unit and sends requests to the level transmitters.
- The ConsoliDator+ processes the data and displays it in engineering units.
- The PD6730X Modbus scanners provide tank side indication of level, temperature, interface and other Modbus variables.

⚠ IMPORTANT

- Modbus client *must* be connected to the primary RS-485.

Parts Needed for This System:

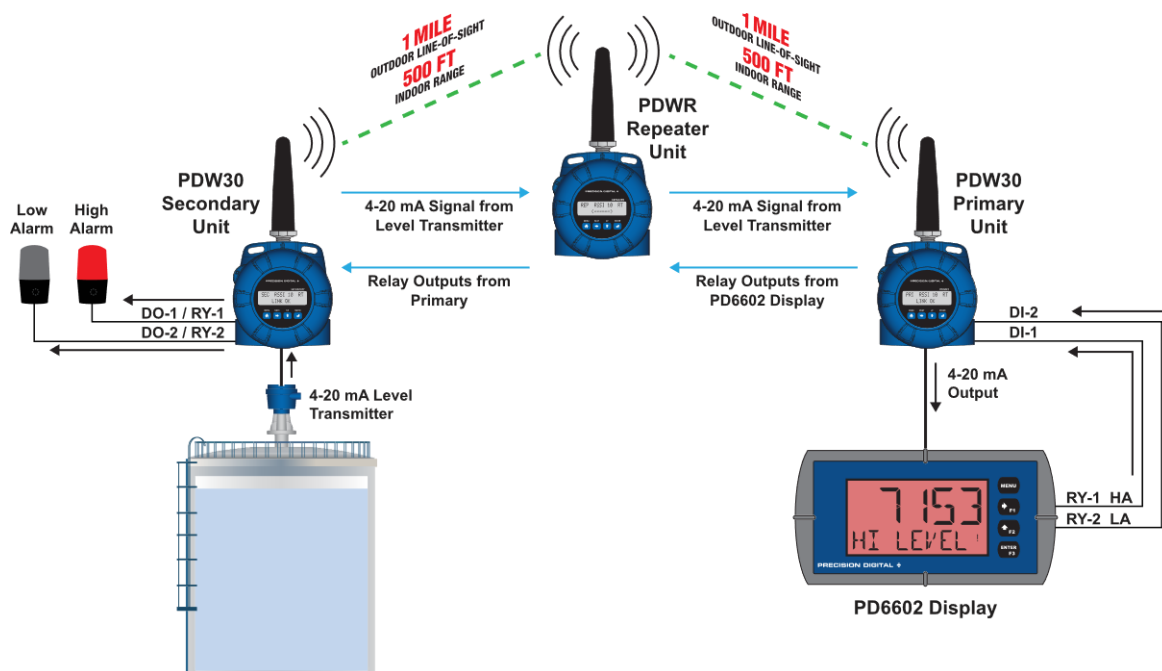
PDW30

Model Number	Qty	Description
PDW30-GP-AL-PAIR	1	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Aluminum Enclosure

Other Products

Model Number	Qty	Description
PDA-LHR	4	Red Light / Horn
PD6730-AX0-I-2	3	General Purpose Modbus Scanner for Tank Side Level Indication

Extending Signal Range with PDWR Repeaters



Note: Power requirements / connections not shown in diagram. Consult manuals for details.

- The 4-20 mA level transmitter is connected to the analog input of the secondary unit.
- The mA signal is transmitted to the repeater unit and then retransmitted to the primary unit.
- The primary unit's analog output is connected to a PD6602 loop-powered meter, which displays the 4-20 mA signal as volume in gallons.
- The PD6602 is programmed to indicate an alarm condition when the level exceeds 7000 gallons as displayed on the meter.
- Relay 1 on the meter connects to digital input 1 of the primary unit and transmits the signal to the secondary unit via the repeater unit.
- The low and high alarm light / horns in the field are driven as follows:
 - Relay 1 (RY-1) in the PD6602 display is connected to digital input 1 (DI-1) on the primary unit. This signal is wirelessly transmitted to the secondary unit via the PDWR repeater. (On the secondary unit) digital output 1 (DO-1) controls relay 1 (RY-1), which turns on the high alarm light / horn, warning the operator.
 - Relay 2 (RY-2) in the PD6602 display is connected to digital input 2 (DI-2) on the primary unit. This signal is wirelessly transmitted to the secondary unit via the PDWR repeater. (On the secondary unit) digital output 2 (DO-2) controls relay 2 (RY-2), which turns on the low alarm light / horn, warning the operator.

Parts Needed for This System:

PDW30

Model Number	Qty	Description
PDW30-GP-AL-PAIR	1	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Aluminum Enclosure
PDWR-GP-AL-REP	1	PDWR Repeater to Extend Wireless Distance, Aluminum Enclosure
PDWM-2RY	1	Relays Option Module, Two Form A (SPST)

Other Products

Model Number	Qty	Description
PDA-LHR	2	Red Light / Horn
PD6602-L2N	1	1/8 DIN Loop-Powered Digital Panel Meter with Two Relays

Ordering Information

Model	Description
PDW30-GP-AL-PAIR	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Aluminum Enclosure ¹
PDWR-GP-AL-REP	PDWR Repeater to Extend Wireless Distance, Aluminum Enclosure ¹
PDW30-GP-SS-PAIR	PDW30 Point-to-Point Wireless Bridge (Primary and Secondary Units), Stainless Steel Enclosure ¹
PDWR-GP-SS-REP	PDWR Repeater to Extend Wireless Distance, Stainless Steel Enclosure ¹
PDWM-2RY	Relays Option Module, Two Form A (SPST) ²

Accessories

Model	Description
PDA10	PDW Wireless Signal Strength Survey Tool
PDWA3120-N	20-Foot RP-SMA F to N Male Extension Cable for Yagi Antenna ³
PDWA3140-N	40-Foot RP-SMA F to N Male Extension Cable for Yagi Antenna ³
PDWA3120-S	20-Foot RP-SMA M/F Extension Cable for Omnidirectional Antenna ³
PDWA3140-S	40-Foot RP-SMA M/F Extension Cable for Omnidirectional Antenna ³
PDWA3900-6Y-N	Yagi Antenna 6dB
PDWA3900-9Y-N	Yagi Antenna 9dB
PDWA3900-20-N	PDW 900 MHz Omnidirectional Antenna, M20
PDWA3900-34-N	PDW 900 MHz Omnidirectional Antenna, 3/4" NPT
PDWA6963-SS	Stainless Steel Pipe Mount Kit for One PDW30 Primary/Secondary Unit, PDW90 Field Unit or PDWR Repeater Unit ⁴
PDAPLUG75	3/4" Metal Conduit/Stopping Plug
PDAREDUCER-75M-50F	M-3/4" NPT to F-1/2" NPT Reducer with Approvals
PDAREDUCER-75M-M20F	M-3/4" NPT to F-M20 Reducer with Approvals
PDA-MICROUSB	Micro-USB PC Programming Cable for Field Unit (supplied)
PDA-SSTAG	Custom Stainless Steel Tag

Notes:

- The PDW30 wireless units come standard with two 3/4" NPT conduit holes. To order models with M20 conduit holes instead, add -22 at the end of the part number (e.g. PDW-GP-AL-PAIR-22).
- The PDWM-2RY Relays Option Module is installed by the customer using the four screws provided.
- Antenna extension cables include the following parts: (1) Extension Cable, (1) Antenna Coupler, (1) 8" Length of Coax Seal Tape, (1) 3/4" NPT Cable Gland
- (2) Two PDWA6963-SS mounting kits are required for mounting a PDW unit on a horizontal pipe.

PDWR Wireless Signal Repeaters



PDWR wireless signal repeaters are used to retransmit wireless signals when connectivity is an issue. They are simple to install as they only require power and a network ID. Any PDW units in range of the repeater with the same network ID will retransmit through it, thus increasing signal strength. Use repeaters to broadcast over very long distances or around permanent obstacles.

Model Number	Description
PDWR-GP-AL-REP	PDWR Repeater to Extend Wireless Distance, Aluminum Enclosure ¹
PDWR-GP-SS-REP	PDWR Repeater to Extend Wireless Distance, Stainless Steel Enclosure ¹

PDWA6963-SS Pipe Mounting Kit



The PDWA6963-SS provides a convenient way to mount one PDW30 primary/secondary, PDWR repeater, or PDW90 field unit to a horizontal or vertical 1.5" or 2" pipe such that the antenna is not right on top of the metal pipe.

Model Number	Description
PDWA6963-SS	Stainless Steel Pipe Mount Kit for One PDW30 Primary/Secondary Unit, PDW90 Field Unit or PDWR Repeater Unit
Note: (2) Two PDWA6963-SS mounting kits are required for mounting a PDW unit on a horizontal pipe.	

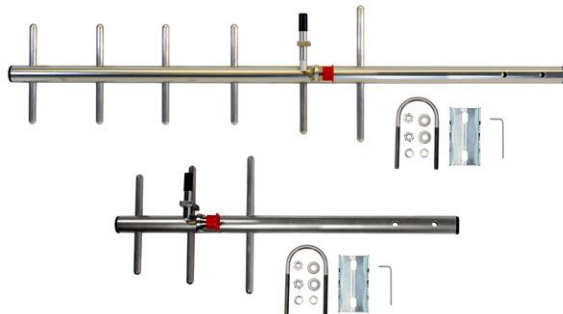
PDA10 Wireless Surveying Tool Kit



The handheld and target units are used to survey wireless signal strength throughout nonhazardous areas of a facility prior to PDW30 or PDW90 equipment installation. The target unit is set in a desired installation location and the handheld is brought to another installation location. The handheld unit will provide an indication of signal strength between the two units.

Model Number	Description
PDA10	PDW Wireless Signal Strength Survey Tool Kit

PDWA3900 Yagi High-Gain Directional Antenna



The PDWA3900 Yagi Antennas are made to work with point-to-point and point to multi-point applications. These high gain antennas are ideal to use with Precision Digital's PDW products because they give you the flexibility of installing the antenna exactly where you need to bridge your point-to-point wireless process signals while keeping the PDW unit in a convenient location for monitoring.

Model Number	Description
PDWA3900-6Y-N	Remote 6 dB Yagi High-Gain Directional Antenna
PDWA3900-9Y-N	Remote 9 dB Yagi High-Gain Directional Antenna

PDWA3100 Antenna Extension Cables



*Included with PDWA3120-N or PDWA3140-N Extension Cable.

The PDWA3120-N and PDWA3140-N are 20-foot and 40-foot extension cables used to extend the distance between the Yagi Antenna and the PDW30 or PDW90 wireless units. The extension cables also come with an antenna coupler to connect the PDW wireless device to the antenna extension cable, coax seal tape, and a 3/4" NPT cable gland.

Model Number	Description
PDWA3120-N	20-Foot RP-SMA F to N Male Extension Cable for Yagi Antenna
PDWA3140-N	40-Foot RP-SMA F to N Male Extension Cable for Yagi Antenna

Specifications

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

General

System	PDW30 consists of a Primary and a Secondary unit, each with built-in antennas.
Display	32-character dual-line alphanumeric dot matrix LCD display with backlight Visual Area: 2.54" x 0.63" (64.6 x 16.0 mm) Character Height: 0.2" (5.5 mm) Display used for programming assistance and displaying communications link status, signal strength, values for the analog inputs and outputs, and status of digital inputs and outputs.
Network ID	Field selectable: 0 - 99
Peak Antenna Gain	1.8 dBi +/- 1.0
Programming Methods	Programming (complete): PC with PDW Manager software Programming (all but advanced): Four CapTouch through-glass buttons
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 Next button once to display the present analog input and output. Press the Next button again to display digital I/O states.
Password	A programmable password restricts modification of program settings.
Input Power	9-30 VDC, 2.5 W max Note: If analog and digital outputs are off: 1.0 W min
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: -55 to 75°C (display inoperable < -20 °C) Storage temp. range: -55 to 85°C Relative humidity: 0 to 90% non-condensing Printed circuit boards are conformally coated
Connections	Removable screw terminal blocks accept 12 to 26 AWG wire.
Connectors Tightening Torque	4.5 lb-in (0.5 Nm)
Mounting	May be mounted directly to conduit. Built-in flange for 1.5" to 2" pipe or wall mounting. See <i>Dimensions</i> on page 19 for mounting space requirements.
Overall Dimensions	5.25" x 11.63" x 4.80" (133 mm x 295 mm x 122 mm) (W x H x D)
Weight	Aluminum: 5.6 lbs (2.5 kg) Stainless Steel: 9.8 lbs (4.4 kg)
Warranty	3 years parts and labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

Enclosure

Material	-AL Models: ASTM A413 LM6 die-cast aluminum, copper-free, enamel coated. -SS Models: ASTM A743 CF8M investment-cast 316 stainless steel
Gasket	Fluoroelastomer
Rating	NEMA 4X, IP68
Color	-AL: Blue; -SS: Silver
Window	Borosilicate glass
Conduits	Three ¾" NPT threaded conduit openings; One used for mounting the antenna (factory installed), the other two available for field wiring. M20 conduits are available. See <i>Ordering Information</i> on page 12 for details.
Flange	Built-in flange for wall and pipe mounting.
Tamper-Proof Seal	Enclosure lid may be secured with tamper-proof seal.
Instrument Tag Loop	Built-in loop for securing stainless steel tag.

PDW30 Point-to-Point Wireless Bridge Available in Stainless Steel



Analog Input

Field Selectable Input	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
HART Transparency	HART signals will not transmit wirelessly. The 4-20 mA signal value will transmit normally (without any HART information) even if a HART signal is present. The analog input will not interfere with HART communications within the wired 4-20 mA loop.

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 μ A/°C max from 0 to 65°C ambient, 0.8 μ A/°C max from -40 to 0°C ambient	
Loss of Signal (RF)	After approximately 15 seconds of trying to reconnect, the Loss of Signal function will occur and result in the mA output going to the Link Lost Output value selected via the PDW Manager software (i.e. 3.2, 3.5, 3.8, 20.5, 20.8, 23.0 mA, or Stay as Is).	
External Output	Power supply	Minimum
Loop Resistance	24 VDC	10 Ω

Digital Inputs / Outputs

Channels	4 Four (discrete) digital I/O connections, independently field selectable as either inputs or outputs	
DI Logic High	3 to 24 VDC (30 V tolerant)	
DI Logic Low	0 to 1.1 VDC	
DI Contact	Dry contact to ground can be used to activate the input (Active Low)	
DO Logic High	3.0 to 5.0 VDC	
DO Logic Low	0 to 0.5 VDC	
Output Source Current	20 mA maximum output current	
Input Sink Current	0.5 mA minimum input current	

IMPORTANT

I/O Operation Configured with PDW Manager

- Active Low Digital Input: A closed dry contact from a digital input terminal to GND will result in a digital output high on the corresponding output pin of the other unit.
- Active High Digital Input: To reverse the output logic, deselect the corresponding digital input box in the PDW Manager software. An open circuit or a logic high at the input will result in a digital output high on the corresponding output pin of the other unit.

Loss of Signal (RF)

Connections	Terminals G and LS on the Digital I/O connector
Function	After approximately 15 seconds of trying to reconnect, the Loss of Signal function will occur and result in the Digital output going to the Link Lost Output state selected via the PDW Manager software. Active: Logic high (5 V) Inactive: Logic low (0 V) Stay as Is: State does not change

Optional Relays

Number of Relays	(2) Two Form A (SPST)
Rating	250 VAC @ 5 A resistive load 30 VDC @ 5 A resistive load 250 VAC @ 2 A inductive load 30 VDC @ 2 A inductive load
Relay Isolation (Dielectric Strength)	3,000 VAC, 50/60 Hz for 1 min
Noise Suppression	Metal oxide varistors across contacts
Relay Control	Relay coils are controlled by the digital outputs (e.g. DO-1 & DO-2)

IMPORTANT

- The relays option module is sold separately, and it is installed on the base of the enclosure by the user.

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 PDW Manager software.
Interference Reduction	Frequency Hopping Spread Spectrum (FHSS)
Power Output	24 dBm (250 mW)
Sensitivity	-101 dBm

RS-485 Modbus® RTU Serial Communications

IMPORTANT

- The Modbus Client *must* be connected to the primary wireless unit.

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, 2 stop bits)
Parity	Even, Odd, or None with 1 or 2 stop bits
Modbus Timeout	0.5, 1, 2, 3, 4, 5 seconds; user selectable
Isolation	1500 VRMS

PDW Manager Software

System Requirements	Microsoft® Windows® 10/11
Communications	USB 2.0; Micro-USB Type B
Configuration	Configure devices one at a time. Inputs on the primary unit are automatically configured as outputs on the corresponding secondary unit.
Compatibility	The PDW Manager v2.00 is compatible with firmware version 1.10; there is a possibility of issues in the GUI (Graphical User Interface), but it should not be a problem configuring the supported features.
Availability	Download from predig.com/pdwmanager

PDWR Wireless Repeater

General

Display	32-character dual-line alphanumeric dot matrix LCD display with backlight Visual Area: 2.54" x 0.63" (64.6 x 16.0 mm) Character Height: 0.2" (5.5 mm) Display used for programming assistance and displaying communications link status and signal strength.
Number of Repeaters	Up to 3 repeaters per system
Network ID	Field selectable: 0 - 99
Peak Antenna Gain	1.8 dBi +/- 1.0
Programming Methods	Change network ID and factory defaults only. Four CapTouch through-glass buttons or PC with PDW Manager software.
Password	A programmable password restricts modification of programmed settings.
Input Power	9-30 VDC, 1.0 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: -55 to 75°C (display inoperable < -20 °C) Storage temp. range: -55 to 85°C Relative humidity: 0 to 90% non-condensing Printed circuit boards are conformally coated
Connections	Removable screw terminal blocks accept 12 to 26 AWG wire.
Connectors Tightening Torque	4.5 lb-in (0.5 Nm)
Mounting	May be mounted directly to conduit. Built-in flange for 1.5" to 2" pipe or wall mounting. See <i>Dimensions</i> on page 19 for mounting space requirements.
Overall Dimensions	5.25" x 11.63" x 4.80" (133 mm x 295 mm x 122 mm) (W x H x D)
Weight	Aluminum: 5.6 lbs (2.5 kg) Stainless Steel: 9.8 lbs (4.4 kg)
Warranty	3 year parts and labor. See Warranty Information and Terms & Conditions on www.predig.com for complete details.

Enclosure

Material	AL Models: ASTM A413 LM6 die-cast aluminum, copper-free, enamel coated. -SS Models: ASTM A743 CF8M investment-cast 316 stainless steel
Gasket	Fluoroelastomer
Rating	NEMA 4X, IP68
Color	-AL: Blue; -SS: Silver
Window	Borosilicate glass
Conduits	Three ¾" NPT threaded conduit openings; One used for mounting the antenna (factory installed), the other two available for field wiring. M20 conduits are available. See <i>Ordering Information</i> on page 12 for details.
Flange	Built-in flange for wall and pipe mounting.
Tamper-Proof Seal	Enclosure lid may be secured with tamper-proof seal.
Instrument Tag Loop	Built-in loop for securing stainless steel tag.

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 PDW Manager software
Interference Reduction	Frequency Hopping Spread Spectrum (FHSS)
Power Output	24 dBm (250 mW)
Sensitivity	-101 dBm

See the [PDWR Wireless Repeater Manual](#) for more information on how to extend the range of wireless signals.

Safety Information

CAUTION

- Read complete instructions prior to installation and operation of the device.

WARNINGS

- Read all product labels completely and follow all instructions and requirements listed on the labels for installation or service.
- Installation and service should be performed only by trained service personnel. Service requiring replacement of internal components must be performed at the factory.

Unpacking

Remove both units from the boxes. 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.

Installation

To access the connectors, remove the enclosure cover and unclip the display module by pulling it from the enclosure. The display module may be disconnected from the relays option module (if installed) to facilitate field wiring.

Mounting Instructions

There are three ways to mount the PDW30:

1. To a wall with the built-in flange
2. To a 1.5" or 2" pipe using the PDWA6963-SS stainless steel pipe mounting kit as shown on page 20.
3. Supported by the conduit using the conduit holes provided.

The factory installed antenna is threaded into one of the three conduit holes and may be moved as appropriate for the installation.

WARNING

- Do not attempt to loosen or remove flange bolts while the PDW30 is in service.

Cover Jam Screw

The cover jam screw should be properly installed once the wireless units have been wired and tested. 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.

Dimensions

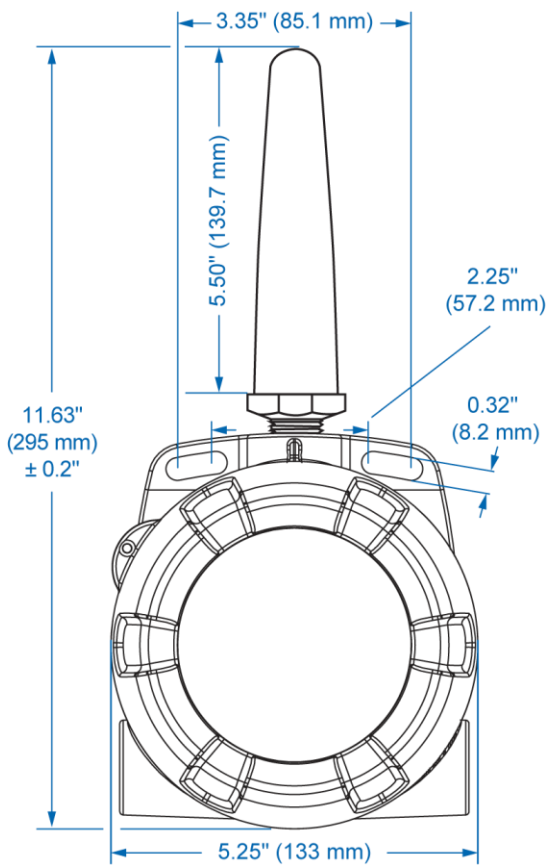


Figure 1. Enclosure & Antenna Dimensions – Front View

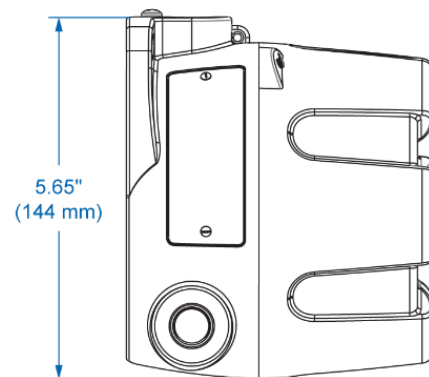


Figure 2. Enclosure Dimensions – Side View

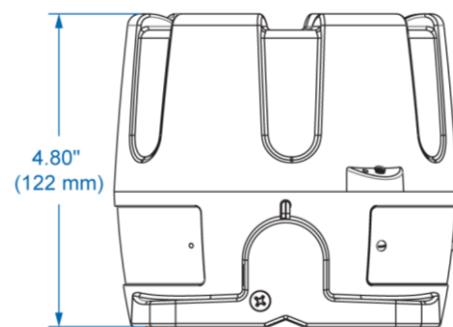


Figure 3. Enclosure Dimensions – Top View

PDWA6963-SS Stainless Steel Pipe Mounting Kit



The PDWA6963-SS provides a convenient way to mount PDW30, PDWR, and PDW90 wireless field units to horizontal or vertical 1.5" or 2" pipes such that the antenna is not right on top of the metal pipe.

The components in the mounting kit are made from 316 stainless steel and all necessary hardware is provided to mount one unit on a vertical pipe. To mount a unit to a horizontal pipe, two kits are required.



Vertical Pipe Mounting



Horizontal Pipe Mounting

Mounting Instructions

1. Attach the mounting plate to the PDW wireless unit with the provided hardware using the round holes on the plate.
2. Mount the plate to the pipe with the provided U-bolt / hardware using the slotted holes on the mounting plate.
3. For best results, mount unit so antenna is as far away from metal devices as possible.
4. Two PDWA6963-SS mounting kits are required for mounting a PDW unit on a horizontal pipe.

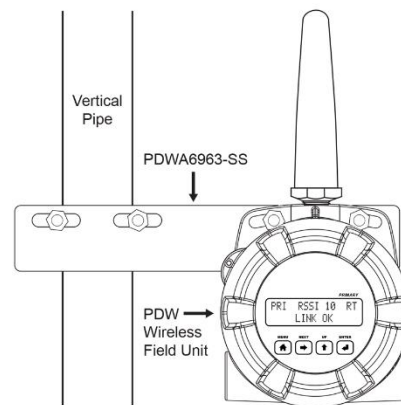


Figure 4. PDW Unit Mounted to Vertical Pipe with One PDWA6963-SS Kit

Note:
(2) Two PDWA6963-SS Pipe Mount Kits are required for mounting unit to horizontal pipes.

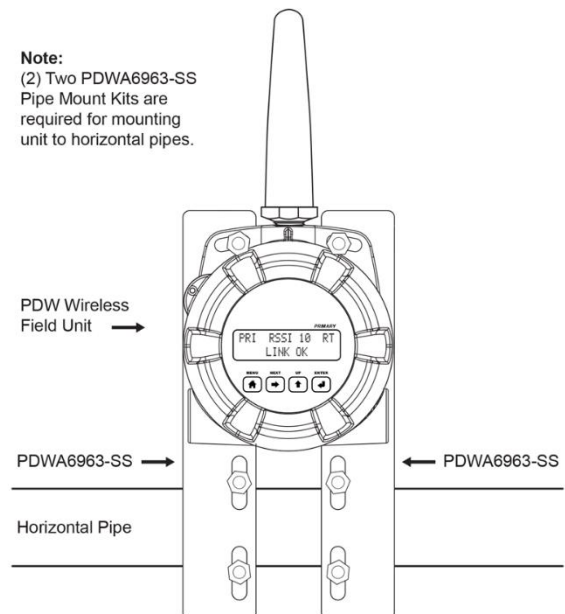


Figure 5. PDW Unit Mounted to Horizontal Pipe with Two PDWA6963-SS Kits

Connections

To access the connectors, remove the enclosure cover and unclip the display module by pulling it from the enclosure. Signal and power connections are made to removable connectors on the back of the display module. Relay output connections (if installed) are made to removable connectors on the relays option module mounted in the base of the enclosure. The display module may be disconnected from the relays option module to facilitate field wiring. Grounding connections are made to the two ground screws provided on the base of the enclosure, one internal and one external.

WARNINGS

- 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.

Installing Display & Relays Option Modules

The display module snaps into built-in rails on the enclosure ensuring a secure and perfect fit every time. No tools are needed to install or remove it. The relays option module is screwed into the base of the enclosure with the four screws provided. Both modules are completely enclosed to protect their printed circuit boards.



Display Module (Left) and Relays Option Module (Right)



Display Module Connected to Antenna
(Connect the antenna to the display module using the included antenna coupler)



Relays Option Module Mounted on the Bottom of Enclosure
(Install the module using the four screws provided)



Display Module Mounted on Built-In Rails
(Snap the module into place lining it up with the rail caps)

Connectors Labeling

The following diagrams show the locations of the connectors on the back of the display module and on the relays option module on the base of the enclosure.

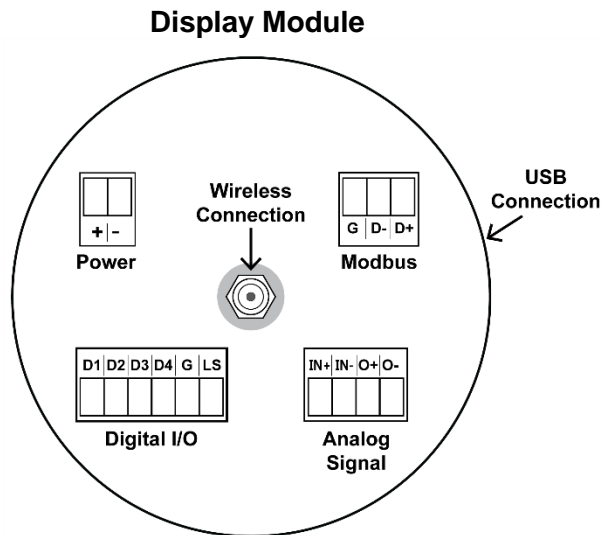


Figure 6. PDW30 Display Module Connectors

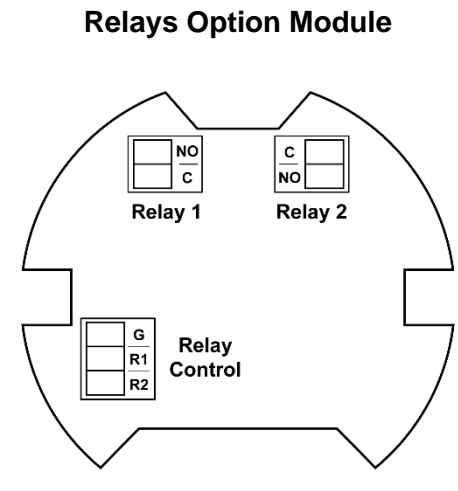


Figure 7. PDWM-2RY Relays Option Module Connectors

IMPORTANT

- Use a flat screwdriver to loosen up the removable terminal blocks

Wiring Diagrams

Power Connections

Power connections are made to a two-terminal connector labeled POWER in Figure 8. The PDW30 is reverse polarity protected; it will not be damaged if wired backward.

Make sure that the power supply can provide between 9 and 30 VDC to the wireless device.

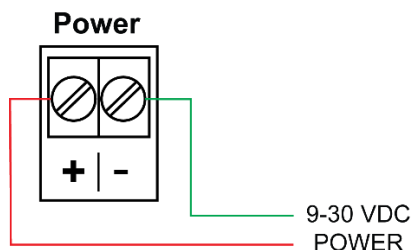


Figure 8. Power Connections

Power PDW30 and 2-Wire Transmitter from Same Power Supply

The PDW30 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 and current for both units. To power both devices from the same supply, wire the devices to the supply as shown below.

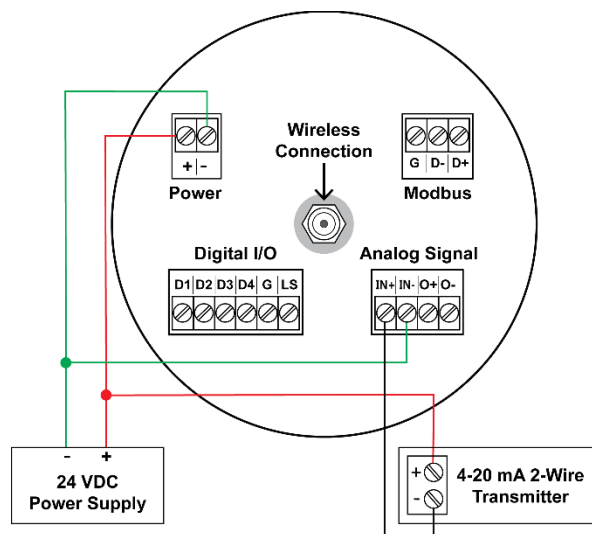


Figure 9. PDW30 and 2-Wire Transmitter Powered from Same Supply

Input Signal Connections

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 below.

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 Signal

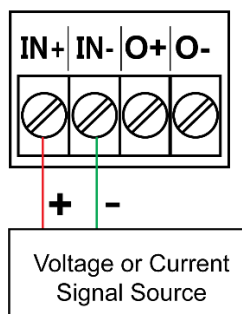


Figure 10. Analog Input Connections

4-20 mA Output Connections

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 device.

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.

Analog Signal

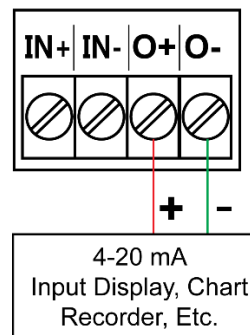


Figure 11. 4-20 mA Output Connections

Digital I/O Connections

All digital connections are referenced to ground. The primary unit digital I/O settings determine the settings of the secondary unit (e.g. if D1 of the primary unit is an input then D1 of the secondary unit is an output).

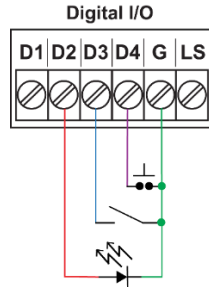


Figure 12. Digital I/O Connections

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

Loss of RF Signal Connections

The Loss of Signal terminal (LS) can be used to alert another device, such as a PLC, that the wireless signal has been lost. After approximately 15 seconds of trying to reconnect, the Loss of Signal function will occur and result in the Loss of Signal digital output going to the Link Lost Output state selected via the PDW Manager software.

Active: Logic high (5 V)

Inactive: Logic low (0 V)

Stay as Is: State does not change.

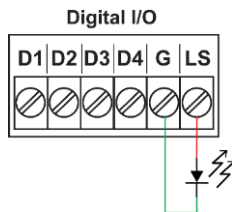


Figure 13. Loss of Signal Connections

Relays Option Connections

The relays are controlled by the digital outputs on the display module so it is necessary to connect R1 and R2 terminals on the relays option module to digital outputs on the display module.

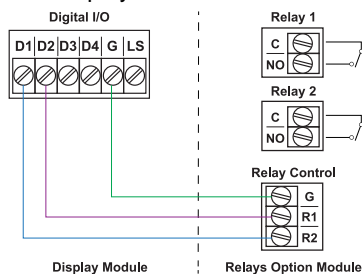


Figure 14. Relays Controlled by Digital Outputs

Note: Connections between relay control connection and relays are with traces on PCB

Modbus RTU Serial Communications

The PDW30 acts as a simple pass-through for Modbus communications. As such, multiple Modbus enabled devices may be transmitted wirelessly using the PDW30 Wireless Bridge.

Note: Modbus Client must be connected to Primary Wireless Unit.

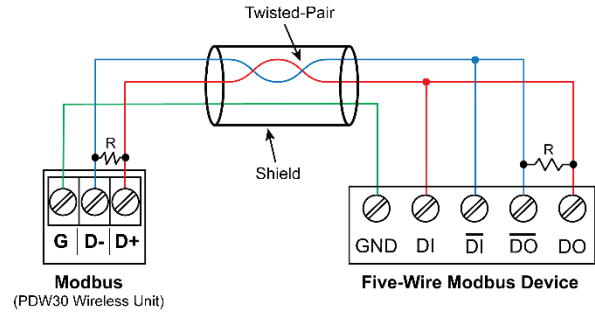


Figure 15. Five-Wire RS-485 Modbus Connections

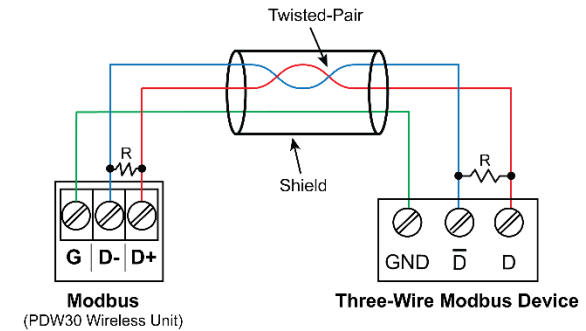


Figure 16. Three-Wire RS-485 Modbus Connections

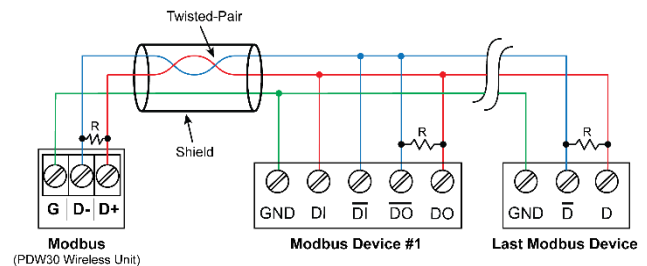


Figure 17. Multiple Device RS-485 Modbus Connections

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.

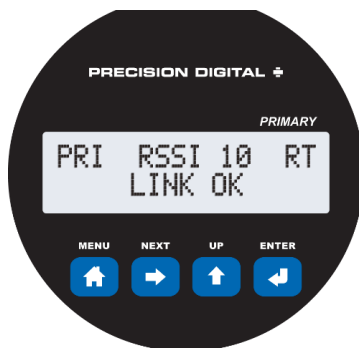
Setup and Programming

The units are factory calibrated prior to shipment to read in milliamps or volts depending on the input selection. The calibration equipment is certified to NIST standards.

Overview

For applications where the only activity is one unit wirelessly transmitting the analog signal to the other unit there is no programming or setup involved. Just apply power to both units and wire the analog signal into one unit and wire the analog signal out of the other unit. Most other features, such as configuring the digital inputs and outputs, can be configured using the CapTouch through-glass buttons. Advanced features such as Loss of Signal function can only be programmed with PDW Manager programming software. PDW Manager programming software will program all PDW30 features.

Buttons & Displays



Display for Primary PDW30 Unit



Display for Secondary PDW30 Unit

Programming Buttons

Settings other than advanced ones can be programmed using the CapTouch through-glass buttons located behind the enclosure cover. Use the MENU button to enter or exit *programming mode*, the NEXT button to cycle forward through menu options, the UP 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 UP button to increment the selected digit.

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

Button/Symbol	Description
	MENU Enter or exit the device menu
	ENTER Select a menu item or option
	UP Cycle backward through menus or increment digit Display previous I/O
	NEXT Cycle forward through menus or select next digit Display next I/O

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.
PRI / SEC	Primary/Secondary Indicates whether the device is the primary unit or the secondary unit. This distinction is fixed and cannot be changed.
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 Next button is pressed)
DI / DO	Discrete Input/ Discrete Output Labels for each of the current discrete inputs or outputs. (Shown when the Next button is pressed twice)

CapTouch Buttons

The PDW30 is equipped with four capacitive sensors that operate as through-window buttons so that certain features can be programmed without removing the cover (and exposing the electronics) in a harsh operating area.



The first time CapTouch buttons are used, or after 20 seconds of inactivity, a long finger press for about two seconds directly over the marked button area of any button is required to wake up the buttons. After that, a brief press directly over the marked button area is all that is required to actuate a button.

When the cover is removed or re-installed, the CapTouch buttons can be used only after the meter completes a self-calibrating routine (which can take up to 20 seconds). Additionally, the sensors are disabled when more than one button is pressed, and they will automatically re-enable after a few seconds.

CapTouch Button Tips

The CapTouch buttons are designed to work under any lighting condition and to protect against false triggering.

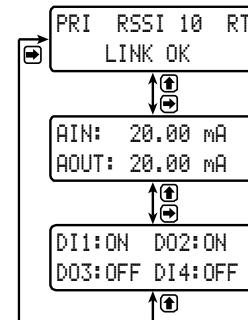
- Keep the window clean.
- Tighten the cover securely.
- Use a password to prevent tampering.

⚠ IMPORTANT

- The first time the CapTouch buttons are used, or after 20 seconds of inactivity, a long finger press directly over the marked button area of any button of about two seconds is required to wake up the buttons.
- When the cover is removed or re-installed, the CapTouch buttons can be used only after the meter completes a self-calibrating routine (which can take up to 20 seconds).
- CapTouch buttons will not work if two or more buttons are detected as being pressed simultaneously. Be careful to avoid triggering multiple buttons or reaching across one button location to press another.

Quick Tip

While programming the wireless units, it may be useful to view the current signal or digital I/O in order to ensure that the correct signals are reaching the units. Pressing either the UP or NEXT buttons while the device is in run mode will cycle through the unit's display modes which are, in order, *link status*, *analog I/O*, and *digital I/O*.



⚠ CAUTION

- The wireless transmission is not interrupted while the unit is in *Programming Mode*. Press MENU to return to *Run Mode*.
- The outputs should not be driving external devices while programming via the USB and PDW Manager software.

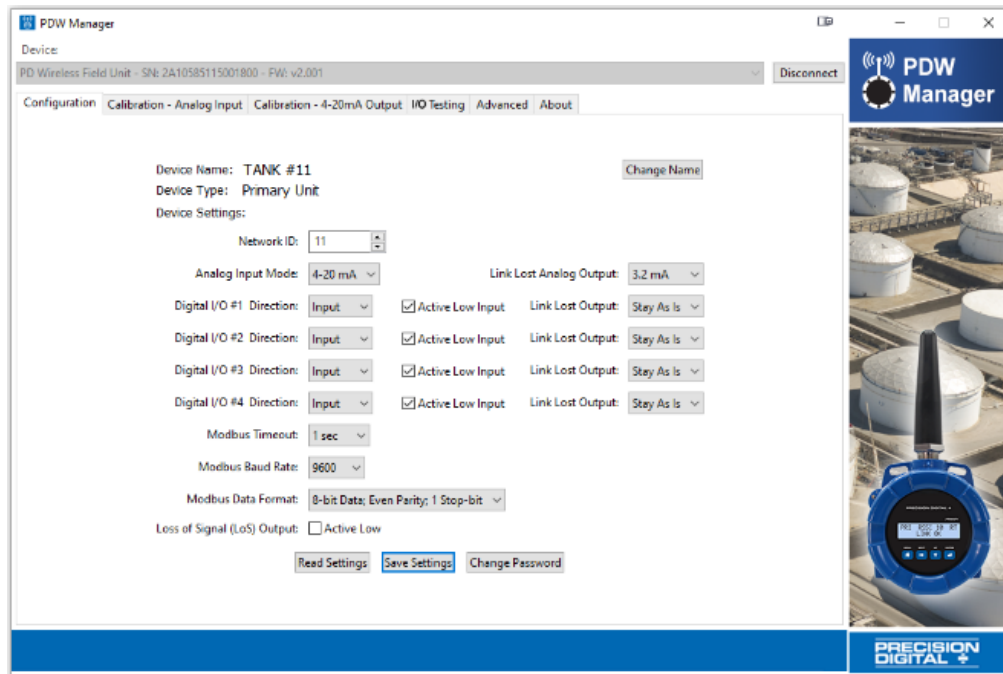
PDW Manager Software

The units can also be programmed using the PC-based PDW Manager. Units connect to a PC via the micro USB connection on the left side of the display module, underneath the enclosure cover.

Use of PDW Manager is required for programming advanced settings, such as digital I/O logic, loss of signal indication, wireless encryption, and analog signal calibration.

⚠ IMPORTANT

- Units must be powered externally prior to programming via USB.



PDW Manager is available for download at www.predig.com/pdwmanager.

Instructions on the use of PDW Manager to program the PDW30 wireless units can be found under *Programming with PDW Manager* on page 32.

Display Functions & Messages

Shown below is a list of all display messages in each device's setup menu. This list is in order of appearance when pressing the Next button. An indented line indicates a sub-menu or item.

Primary Unit

Display	Action/Setting Description
ANALOG INPUT SETUP	Change the analog input type
ANALOG INPUT	Displays the current analog input type (press Enter to change)
4-20mA	Set the analog input to 4-20 mA
0-10V	Set the analog input to 0-10 V
0-5V	Set the analog input to 0-5 V
1-5V	Set the analog input to 1-5 V
BACK TO SETUP MENU	Return to the setup menu
DIGITAL I/O SETUP	Change whether each digital connection is an input or an output
DIGITAL I/O #1	Displays digital connection #1's current setting (press Enter to change)
INPUT	Set the selected digital connection to input
OUTPUT	Set the selected digital connection to output
DIGITAL I/O #2	Displays digital connection #2's current setting (press Enter to change)
DIGITAL I/O #3	Displays digital connection #3's current setting (press Enter to change)
DIGITAL I/O #4	Displays digital connection #4's current setting (press Enter to change)
BACK TO SETUP MENU	Return to the setup menu
NETWORK AND MODBUS SETUP	Change settings related to wireless network and Modbus® input
NETWORK ID	Displays the point-to-point wireless network ID (press Enter to change)
01-99	The network ID can be any number between 01 and 99
MODBUS TIMEOUT	Displays the Modbus timeout setting (press Enter to change)
1 SEC	1 second timeout
2 SEC	2 second timeout
3 SEC	3 second timeout
4 SEC	4 second timeout
5 SEC	5 second timeout
0.5 SEC	0.5 second timeout

Display	Action/Setting Description
MODBUS BAUD RATE	Displays the Modbus baud rate setting (press Enter to change)
9.6K	9.6 K baud rate
19.2k	19.2 K baud rate
28.8k	28.8 K baud rate
38.4k	38.4 K baud rate
57.6k	57.6 K baud rate
1.2k	1.2 K baud rate
2.4k	2.4 K baud rate
4.8k	4.8 K baud rate
DATA FORMAT	Displays the Modbus data format setting (press Enter to change)
8E1	Data format 8E1
8O1	Data format 8O1
8N2	Data format 8N2
8N1	Data format 8N1
BACK TO SETUP MENU	Return to the setup menu
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)

Secondary Unit

Display	Action/Setting Description
NETWORK ID	Displays the point-to-point wireless network ID (press Enter to change)
01-99	The network ID can be any number between 01 and 99
ANALOG INPUT	Displays the current analog input type (press Enter to change)
4-20mA	Set the analog input to 4-20 mA
0-10V	Set the analog input to 0-10 V
0-5V	Set the analog input to 0-5 V
1-5V	Set the analog input to 1-5 V
MODBUS TIMEOUT	Displays the Modbus timeout setting (press Enter to change)
0.1 SEC	0.1 second timeout
0.2 SEC	0.2 second timeout
0.5 SEC	0.5 second timeout
1 SEC	1 second timeout
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 to disable)
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)

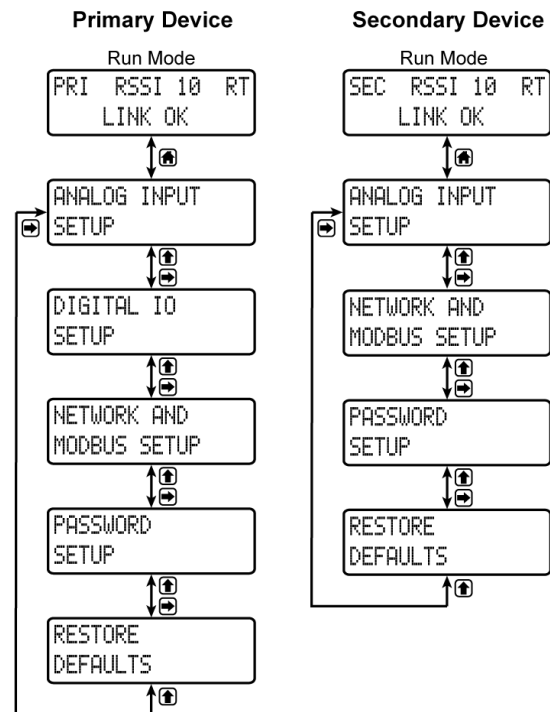
Setup Menu

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

The primary wireless unit determines the digital I/O settings for the secondary unit, simplifying the setup process. For instance, if a digital connection is programmed to be an **input** on the primary unit, that same connection will be an **output** on the secondary unit. Because of this, the secondary wireless unit has fewer menu options than the primary unit.

IMPORTANT

- The network and Modbus setup must be matched in the primary and secondary.

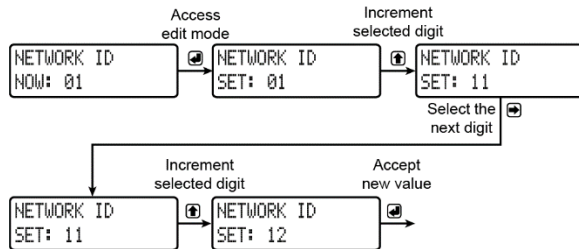


Entering Numeric Values

Numeric values are set using the NEXT and UP buttons. Press NEXT to select next digit and UP 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.

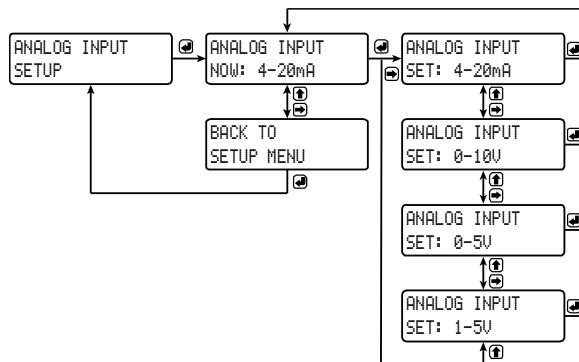


Primary Device Menus

Analog Input Setup

Enter the *Analog Input* menu to set up the wireless unit to accept either a current or a voltage input.

The current input can accept a 4 to 20 mA signal. The voltage input can accept a 0 to 10 VDC signal, 0 to 5 VDC signal, or 1-5 VDC signal.



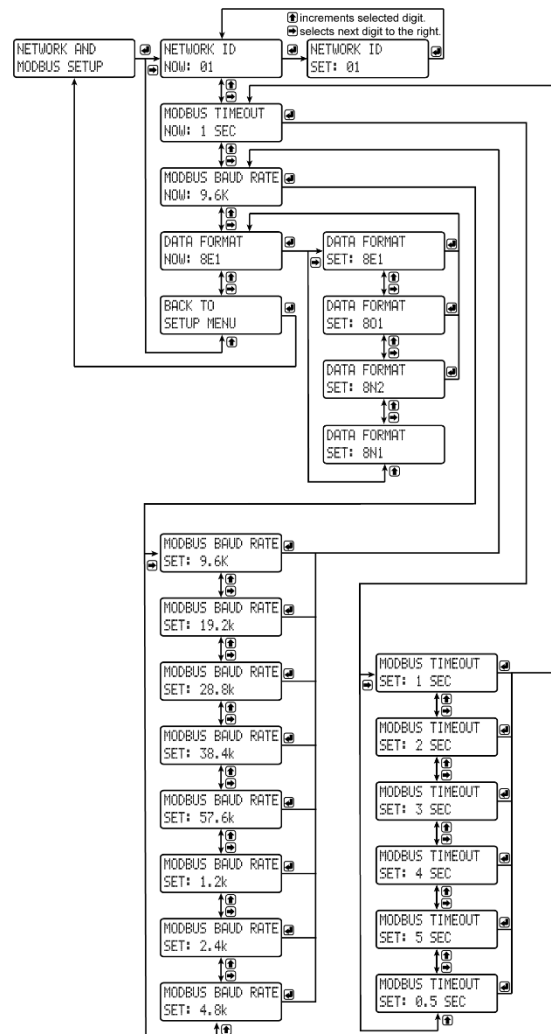
Digital I/O Setup

All four digital connections may be set as either inputs or outputs. The setting on the primary unit determines the corresponding digital connection on the secondary unit. For instance, if digital connection number one is set as an input on the primary unit, it will be an output on the secondary unit.

Each digital connection may be set independently as either an input or output.

Network and Modbus Setup

The *Network and Modbus Setup* menu is where the wireless device's *Network ID* is set and Modbus® serial communications settings are programmed.



Network ID

The network ID determines primary and secondary wireless pairs. The primary and secondary units must share the same unique network ID in order to communicate. Make sure there are no other wireless pairs sharing the same network ID.

Modbus Timeout

The Modbus timeout sets the length of time the wireless devices will wait for a reply from the other Modbus device before returning an error. This should be 1 to 2 seconds at 9600 bps on the primary device.

Modbus Baud Rate

The baud rate of the wireless devices must match the baud rate of the Modbus network in order to prevent collisions on the bus. The baud rate may be set between 1,200 and 57,600 bps.

Data Format

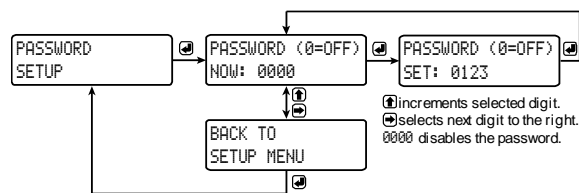
The data format of the wireless devices must match the data format of the Modbus network. Set the data format to either 8E1 (8-bit, even parity, 1 stop bit), 8O1 (8-bit, odd parity, 1 stop bit), or 8N2 (8-bit, no parity, 2 stop bits), or 8N1 (8-bit, no parity, 1 stop bit).

Password Setup

Both the primary and secondary wireless 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.

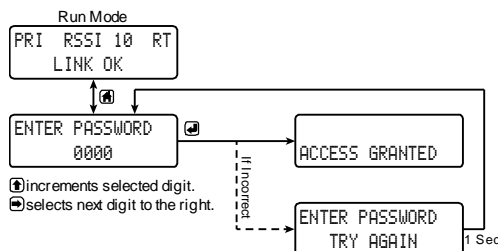
To disable password protection, simply enter 0000 as the password.

Note: See *Entering Numeric Values* on page 30 for instructions on how to enter numbers



Making Changes to a Password Protected Wireless 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.



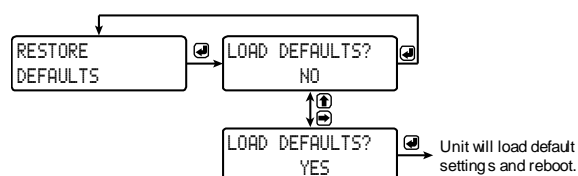
Note: Setting a password will require you to enter the password to access the device settings via the PC software as well.

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.

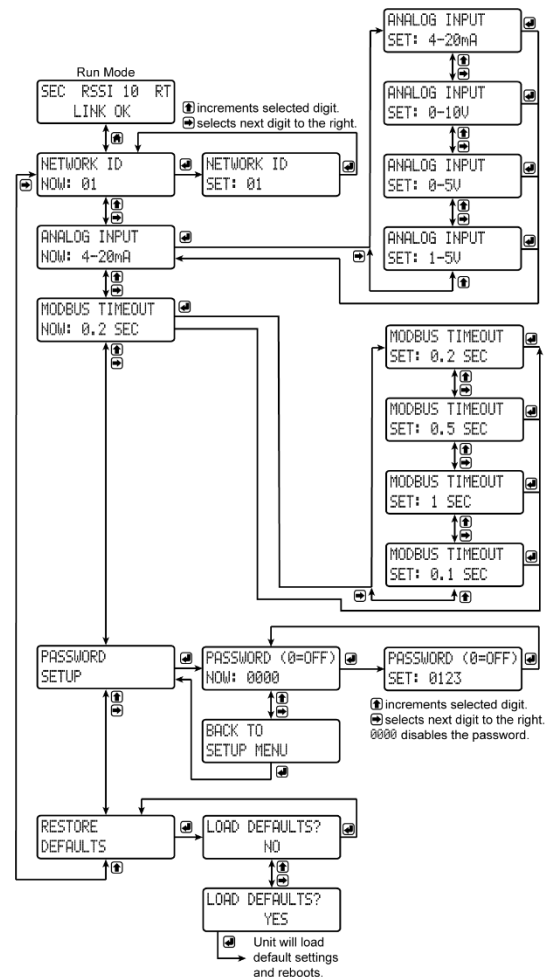
Restore Defaults

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



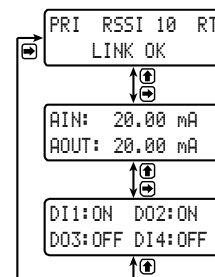
Secondary Device Menus

The secondary device has fewer menu options than the primary device, and the menu structure is shown below.



Display Signal I/O and Digital I/O Status

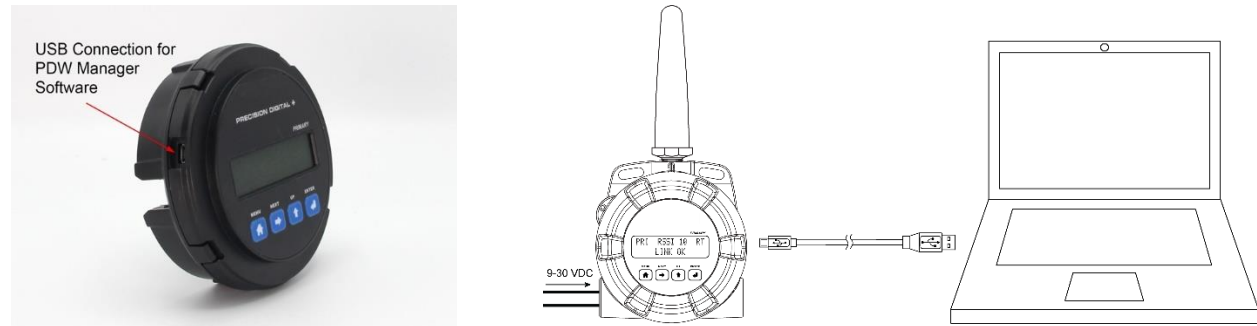
Pressing either the UP or NEXT buttons while the device is in run mode will cycle through the display modes. These modes are, in order, *link status*, *analog I/O*, and *digital I/O*.



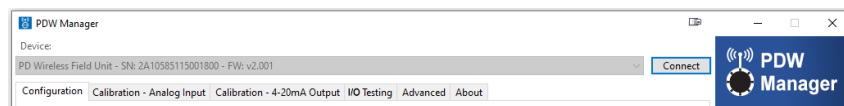
Programming with PDW Manager

PDW Manager allows you to program the PDW30 wireless units from a PC with a USB connection. Units connect to a PC via the micro USB connection on the side of the electronics module, underneath the enclosure cover. Use of PDW Manager is required for programming advanced settings such as digital I/O logic (high or low), loss of signal (LoS) digital output state or analog output value, wireless encryption, and analog signal calibration.

PDW Manager is available for download at www.predig.com/pdwmanager. Once the software is running, power the unit using a 9-30 VDC power supply and connect the device to the PC using the provided USB cable.



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 PDW Manager window. Click *Connect*.



The menu options displayed will vary depending on what type of unit is connected. The PDW30 primary unit will have more options than the secondary unit. The image below shows the available options on the *Configuration* tab while the primary unit is connected.

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

Network ID
Primary & Secondary units should use the same ID. For multiple pairs, each set should use different IDs.

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

Digital I/O Settings
Select whether each digital connection on the device is receiving a digital input or a digital output.

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.

Loss of Signal Output
Select the logic of the LoS digital output terminal.

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 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.

RF Link Lost
Select the mA output value and digital output state when the RF link is lost.

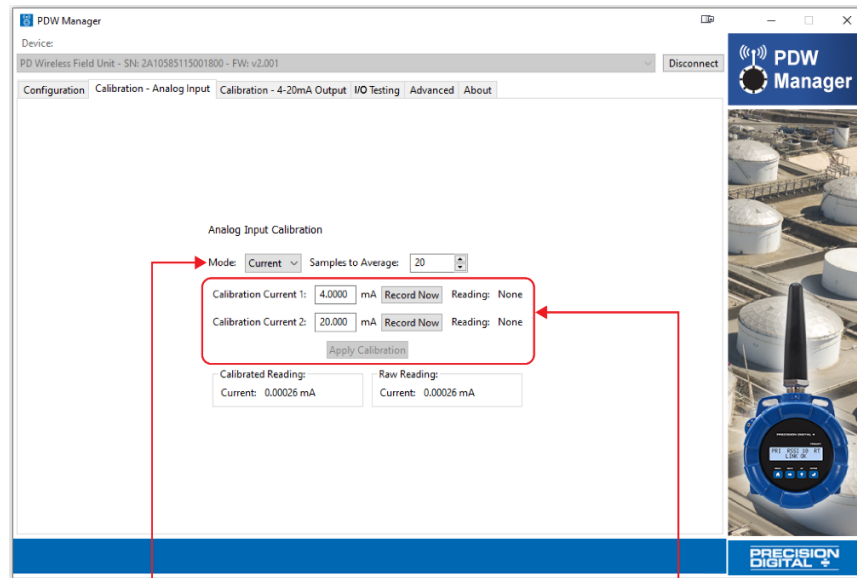
Disconnect
Click this button to disconnect from the wireless unit and prepare it to be unplugged from the computer.

Analog Input & Output Calibration

The devices' analog inputs and outputs can be calibrated using the *Calibration* tabs. The *I/O Testing* tab allows you to perform diagnostics and testing on the units.

Note: The PDW30 units are factory calibrated prior to shipment to read analog input in milliamps and volts depending on the input selection. The calibration equipment is certified to NIST standards.

Calibration – Analog Input



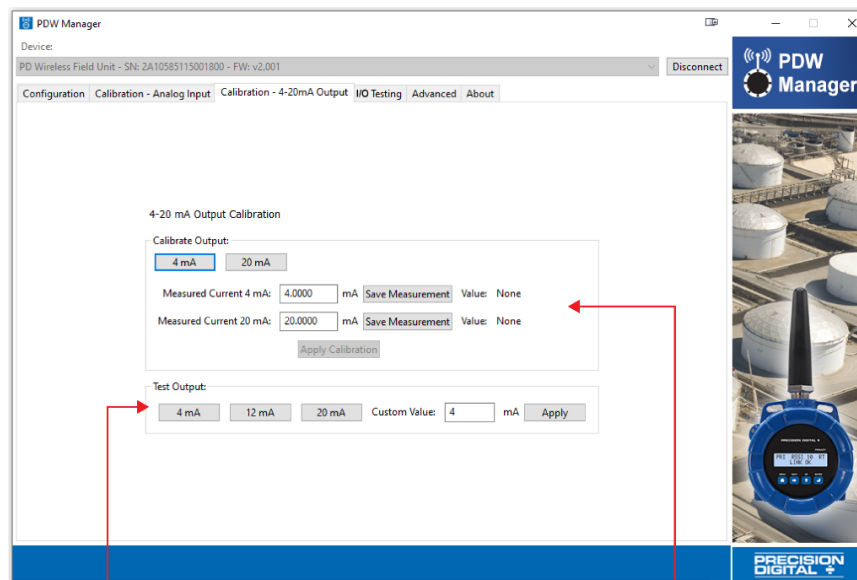
Analog Input Calibration Mode

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.

Calibration – 4-20 mA Output



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 4-20 mA output range from a calibration device and apply calibration to the wireless unit.

I/O Testing

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

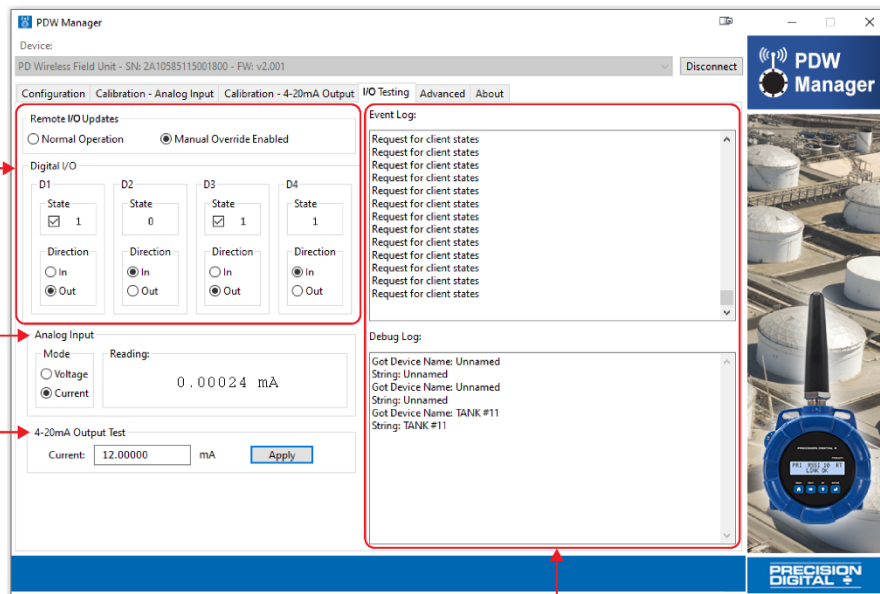
Displays the current analog input reading. Use the radio buttons to change mode.

Output Monitoring

Displays the current 4-20 mA 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 the encryption information has been entered, click *Save Settings*. The wireless devices must share identical encryption keys to communicate, so be sure to enter the same information for the second unit.

Networking Settings and Security

Channel Mask

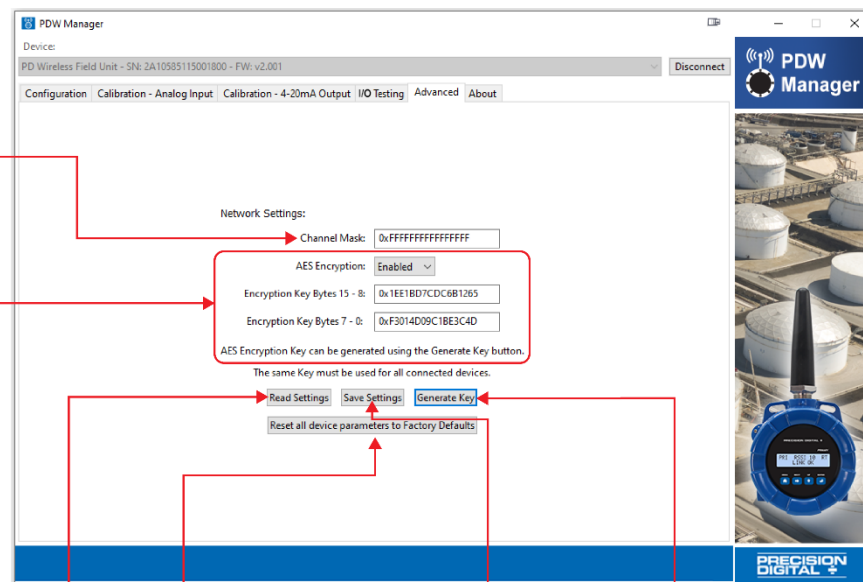
Set a channel mask for interference immunity.

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).

Read Settings

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



Reset to Factory Defaults

Click this button to permanently reset all settings on the device to factory defaults. This will overwrite all changes made to the device.

Save Settings

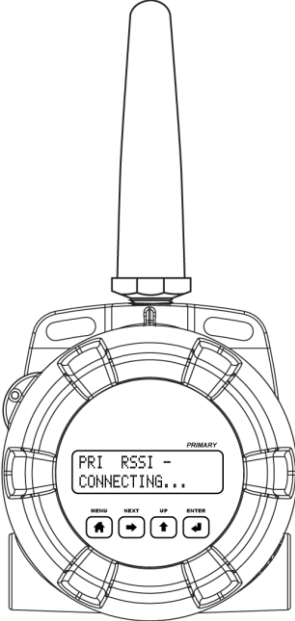
Click this button to write all of the changes made in the above fields to the wireless unit hardware.

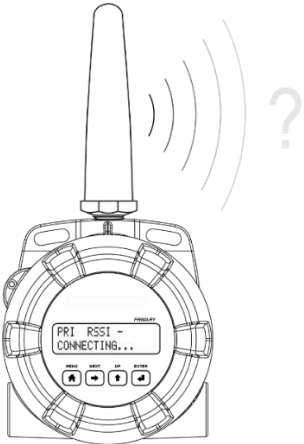
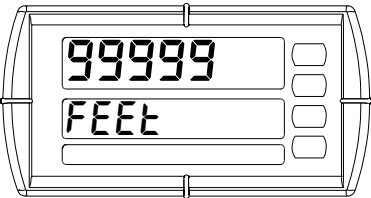
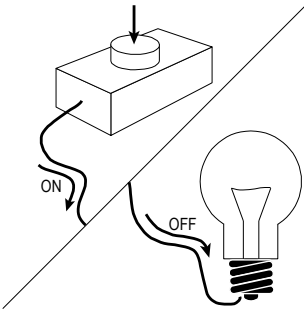
Generate Key

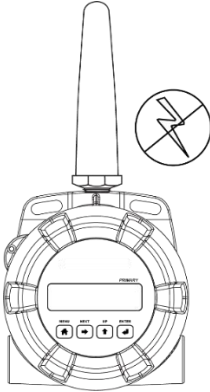
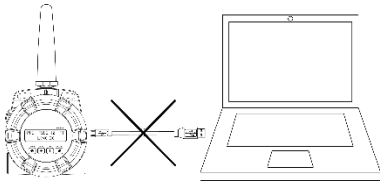
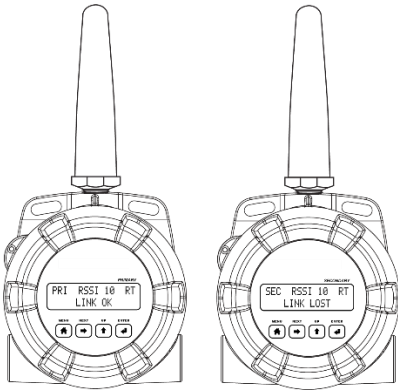
Click this button to generate an AES encryption key.

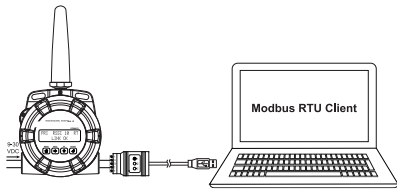
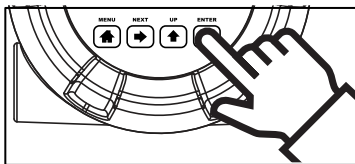

Troubleshooting

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 the corrective actions listed for the particular symptom.

Symptom	Possible Cause	Corrective Action
<p>Devices will not connect.</p> 	Devices have mismatched network IDs.	<ul style="list-style-type: none"> Devices will not connect if they do not have the same network ID. Verify that both devices and repeaters (if used) share the same network ID.
	Devices are out of range or there are obstacles blocking the wireless path.	<ul style="list-style-type: none"> 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 PDWR repeaters or a high gain directional antenna.
	Multiple wireless devices in the area with the same Modbus ID.	<ul style="list-style-type: none"> If there are multiple PDW30 wireless bridges, verify that each pair has its own unique Modbus ID.
	Encryption keys do not match	<ul style="list-style-type: none"> If using encryption, ensure that the encryption keys on both devices match exactly. If using a repeater, the encryption key must be matched also.
	Configuration is not correct.	<ul style="list-style-type: none"> Devices must be configured as secondary or primary units to communicate with each other. Make sure the display shows PRI on one unit and SEC on the other unit.

Symptom	Possible Cause	Corrective Action
Intermittent signal issues. 	Signal is too low.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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.
Destination device reads out of range, zero, or incorrect. 	Wireless device has mismatched input type.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Double check to make sure all of the signal connections are properly wired to all devices. Check <i>Wiring Diagrams</i> starting on page 23.
Digital inputs do not correspond with digital outputs. 	Devices have mismatched input/output settings.	<ul style="list-style-type: none"> Check to make sure the digital connection is programmed appropriately as either an input or an output.
	Devices are improperly wired.	<ul style="list-style-type: none"> Check to make sure all digital inputs and outputs are properly wired to all devices. Check <i>Wiring Diagrams</i> starting on page 23.

Symptom	Possible Cause	Corrective Action
Device will not power on. 	Not enough voltage is coming from the power supply.	<ul style="list-style-type: none"> Devices require at least 9 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 power from the supply.
	Devices are improperly wired.	<ul style="list-style-type: none"> Check to make sure all power connections are properly wired to all devices. Check <i>Wiring Diagrams</i> starting on page 23.
Device will not connect to PC via USB. 	Wireless device is not powered.	<ul style="list-style-type: none"> The device must be powered by a 9-30 VDC power supply in order for the PC to recognize it. Power the wireless device and try again.
	Software version is outdated	<ul style="list-style-type: none"> Check that you are running the latest software version. The latest version of PDW Manager can be downloaded at www.predig.com/pdwmanager.
	USB cable is faulty	<ul style="list-style-type: none"> Try connecting the wireless device using a known good micro USB cable. There are some micro USB cables that are used for power only and do not support transferring data.
Device shows “LINK OK”, but its corresponding pair shows “LINK LOST”. 	A nearby wireless device has the same network ID	<ul style="list-style-type: none"> The primary/secondary pair must share a unique network ID not being used by other wireless devices nearby.

Symptom	Possible Cause	Corrective Action
Modbus client gets timeout errors. 	The Modbus client gets timeout errors trying to read a Modbus server connected to the secondary.	<ul style="list-style-type: none"> Modbus client (master) must be connected to the primary unit. Check all the Modbus settings and make sure they match the corresponding network. Increase the Modbus timeout on the secondary and the primary, if necessary.
CapTouch buttons not working. 	Device has just been powered on	<ul style="list-style-type: none"> When first powered on, the CapTouch buttons require a long press to initialize. After the first long press, you can use them normally.
	Lid was removed or put back on	<ul style="list-style-type: none"> After removing or putting the lid back on, the CapTouch buttons are re-calibrating and will be inoperable for 20 seconds. After the calibration period has passed, long press any of the buttons to start using them again.
	CapTouch buttons have timed out and are inoperable	<ul style="list-style-type: none"> After a 20 second period of inactivity, the CapTouch buttons will go back to their sleep state. Another long press is required to wake them up.
Other symptoms not described above. 	<p>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 31. If you require technical support, please contact us at:</p> <p>Phone: (800) 610-5239 or (508) 655-7300 Email: support@prediq.com Web: www.prediq.com</p>	

Factory Defaults & User Settings

The following table shows the factory setting for most of the programmable parameters on the device. Next to the factory setting, the user may record the new setting for the particular application.

Model: _____ S/N: _____ Date: _____

Primary

Parameter	Default Setting	User Setting
ANALOG INPUT	4-20mA	
DIGITAL I/O #1	INPUT	
DIGITAL I/O #2	INPUT	
DIGITAL I/O #3	INPUT	
DIGITAL I/O #4	INPUT	
NETWORK ID	01	
MODBUS TIMEOUT	1 SEC	
MODBUS BAUD RATE	9.6K	
DATA FORMAT	8E1	
PASSWORD	0000	

Secondary

Parameter	Default Setting	User Setting
ANALOG INPUT	4-20mA	
DIGITAL I/O #1	OUTPUT	Setting based on the primary digital I/O setting
DIGITAL I/O #2	OUTPUT	Setting based on the primary digital I/O setting
DIGITAL I/O #3	OUTPUT	Setting based on the primary digital I/O setting
DIGITAL I/O #4	OUTPUT	Setting based on the primary digital I/O setting
NETWORK ID	01	
MODBUS TIMEOUT	0.2 SEC	
MODBUS BAUD RATE	9.6K	
DATA FORMAT	8E1	
PASSWORD	0000	

Contact Precision Digital

Technical Support

Call: (800) 610-5239 or (508) 655-7300

Email: support@predig.com

Sales Support

Call: (800) 343-1001 or (508) 655-7300

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