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100W-R and 100WP-R Datalogging Water Endpoint Installation Guide

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Identification
100W-R and 100WP-R Datalogging Water Endpoint Installation Guide
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Confidentiality Notice
The information contained herein is proprietary and confidential and provided subject to the condition that (i) it is held in confidence except to the extent required otherwise by law and (ii) it is used only for the purposes described herein. Any third party given access to this information is similarly bound in writing.

Compliance Statement
This device complies with Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Operation is subject to the following two conditions:
- This device may not cause harmful interference.
- This device must accept any interference that may cause undesirable operation.

This device must be permanently mounted such that it retains a distance of 20 centimeters (7.9 inches) from all persons in order to comply with FCC RF exposure levels.

Compliance Statement
This equipment has been tested and found to comply with the limits, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Operation is subject to the following conditions:
- This device may not cause interference.
- This device must accept any interference that may cause undesired operation of the device.

Compliance Statement
This equipment complies with policies RSS-210 and RSS-GEN of the Industry Canada rules.
Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Modifications and Repairs
To ensure system performance, this device and antenna shall not be changed or modified without the expressed approval of Itron. Any unauthorized modification will void the user's authority to operate the equipment.

Trademark Notice
Itron is a registered trademark of Itron, Inc.
All other product names and logos in this documentation are used for identification purposes only and may be trademarks or registered trademarks of their respective companies.

Warning To prevent ignition of flammable or combustible atmospheres, disconnect power before servicing.

Warning Follow these procedures to avoid injury to yourself or others:
- The lithium battery may cause a fire or chemical burn if it is not disposed of properly.
- Do not recharge, disassemble, heat above 100° Celsius (212° Fahrenheit), crush, expose to water, or incinerate the lithium battery. Fire, explosion, and severe burn hazard.
- Keep the lithium battery away from children.
- Replace the lithium battery only with batteries meeting Itron specifications. Any other battery may cause a fire or explosion.

Warning This unit cannot be modified and is not repairable. Modification of this device could cause non-compliance with FCC rules. Attempts to modify this device will void the warranty.

Warning Substitution of components may impair intrinsic safety.

Transportation Classification
The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. When powered, endpoints are considered operating transmitters and receivers and cannot be shipped by air. All product returns must be shipped by ground transportation to Itron.

Suggestions
If you have comments or suggestions on how we may improve this documentation, send them to TechnicalCommunicationsManager@itron.com
If you have questions or comments about the software or hardware product, contact Itron Technical Support:

Contact
- Internet: www.itron.com
- E-mail: support@itron.com
- Phone: 800 635 8725

Contents

CHAPTER 1

Before You Begin

Document Conventions

Convention	Example
Itron product part numbers are noted in parentheses.	To install the endpoint (ERW-1300-XXX), do the following steps.
Hypertext links are in blue.	See the Copyright Page for identification information.

Note A Note indicates neutral or positive information that stresses or supplements important points of the main text. A note supplies information that may apply only in special cases.

Caution A Caution advises users that failure to take or avoid a specified action could result in a loss of data.

Warning A Warning advises users that failure to take or avoid a specified action could result in physical harm to the user or the hardware.

Document Purpose

This document provides installation instructions for the 100W-R and 100WP-R endpoints including step-by-step instructions for pipe mount, remote mount, and direct mount.

Caution Installing a remote endpoint or an integrated 100W endpoint and meter register in a water pit box will void the product warranty. Remote endpoints are designed for interior and exterior (on the side of buildings) installations only. Use a pit endpoint for pit-mount applications. (Refer to the *Water Endpoint Ordering Guide* PUB-0063-001).

How This Document is Organized

This installation guide is organized with the following chapters:

Chapter	Description
1. Before You Begin	Information about this publication
2. About the 100W-R and 100WP-R	Overview of 100W-R and 100WP-R functionality.
3. Connecting, Initializing, and Programming	Instructions to initialize the 100W-R endpoint, connect the endpoint to the register, and program the 100WP-R.
4. Installing the 100W-R and 100WP-R	Step-by-step endpoint installation instructions for: • Pipe mount ○ Optional Leak Sensor • Remote mount • Direct mount
Appendix A Using Gel Cap Connectors	Instructions for installing gel cap connectors.
Appendix B Troubleshooting	Tips for troubleshooting 100W endpoint operation.

Related Documents

Document Description	Itron Part Number
Field Deployment Manager Endpoint Tools Mobile Application Guide	TDC-0934-XXX
Field Deployment Field Representative's Guide	TDC-0936-XXX
900 MHz Belt-Clip Radio User's Guide	TDC-0889-XXX
FC300 Getting Started Guide	TDC-0898-XXX
FC200 Series Getting Started Guide	TDC-0598-XXX
Water Endpoint Ordering Guide	PUB-0063-001
Water Meter Compatibility List	PUB-0063-002
mlogonline™ Network Leak Monitoring System User Guide	TDC-0792-XXX

Note: XXX designates the document revision and is subject to change without notice.

CHAPTER 2

About the 100W-R and 100WP-R

The 100W-R and 100WP-R endpoints are high-power radio frequency automatic meter reading (AMR) devices that attach to water registers to collect consumption usage and tamper data that the endpoint transmits to a data collection device. The endpoint operates in both bubble-up mode and two-way modes.

The 100W-R and 100WP-R ship in Factory Mode. The endpoints acquire and transmit meter register data within one hour following register connection. The endpoint transfers meter data immediately if the unit is initialized with a handheld computer during installation (see Programming and Connecting the 100W-R and 100WP-R on page 6).

Caution Failure to initialize the endpoint may delay the initial reading up to 1 hour. The 100WP-R endpoint will default to a consumption value of 0 if the endpoint is not programmed with Itron's Field Deployment Manager (FDM).

The 100W-R and 100WP-R support protocols for a variety of meter manufacturer's registers. Refer to the *Water Meter Compatibility List* (PUB-0063-002), for the list of supported meters and registers.

100W-R and 100WP-Rs feature the following capabilities:

- **Leak Detection and Reverse Flow Detection.** 100W endpoints feature the same robust features as Itron's 60 series water endpoints to provide Leak Detection and Reverse Flow Detection. For more information about Leak Detection and Reverse Flow Detection, see the Itron white paper *Detecting Leaks and Reverse Flow with 60 Series Endpoints https://extranet-kc.itron.com/Water%20Endpoints/Detecting%20Leaks%20and%20Reverse%20Flow%20with%2060%20Series%20Endpoints.pdf*.

  Note The 100WP-R endpoint will not report reverse flow. Incremental encoded registers do not provide a distinguishing signal while flowing in reverse.

- **Communication Error Indicators.**
  - Last Good Read. The cable is cut.

    Note Last Good Read may be an indicator of a damaged register.

  - Extended Cut Cable. The Last Good Read flag was set in the last 24 hours (Fixed Network [FN] mode) or the last 40 days (Mobile Mode).

100W-R and 100WP-R Models

100W Remote Endpoint Description	Itron Part Number
100W-R Encoder Remote, 10-inch flying lead	ERW-1300-113
100W-R Encoder Remote with Leak Sensor, 10-inch flying lead	ERW-1300-114
100WP-R Pulser Remote, 10-inch flying lead	ERW-1300-115
100WP-R Pulser Remote with Leak Sensor, 10-inch flying lead	ERW-1300-116

Battery Life

Powered by two non-replaceable, long-life lithium batteries, the 100W has an expected battery life of 20 years when the endpoint operates in default Mobile or Fixed Network Operating mode. If the 100W endpoint is programmed for Hard to Read Mobile Mode, the battery life is reduced to 13 years. To proactively indicate the battery has reached a <10% useful battery life, a *Low Battery flag* is set to indicate impending battery failure. Battery life is 15 years for the 100WP-R when endpoint cable lengths exceed 150 feet.

100W-R and 100WP-R Transmission Modes

The 100W-R and 100WP-R endpoints can be set to transmit in Fixed Network, Mobile High Power, Mobile and Handheld, or Hard to Read Mobile and Handheld Mode.

- **Fixed Network Mode.** The 100W water endpoint transmits a high-powered NIM RF message every five minutes and a contingency SCM RF message every minute.
- **Mobile and Handheld Mode.** The 100W water endpoint transmits a medium-powered SCM RF message every 9 seconds.
- **(Optional) Mobile High Power Mode.** The 100W water endpoint transmits a high-powered SCM RF message every 60 seconds.
- **(Optional) Hard to Read Mobile and Handheld Mode.** The 100W water endpoint transmits a high-powered SCM RF message every 30 seconds. The *Hard to Read Mobile and Handheld Mode* should only be used for exceptionally hard-to-read applications.

Note The battery life is significantly affected in Hard to Read Mobile and Handheld Mode. The 900 MHz Remote Antenna can be used to increase reading range.

An FCC license is not required to read 100W-R and 100WP-R endpoints.

100W-R Operating Modes

1. Factory Mode
   - 100W-Rs are shipped from the factory in Factory Mode.
   - The endpoint's transmitter is turned off.
   - The endpoint's receiver is bubbling-up to listen for a programming command.
   - 100W-R encoder models will attempt to read the register every hour.
   - Last good read and cut tamper flags may be set when a register is not connected.
   - If the 100W-R reads a connected register, the endpoint automatically moves to Run Mode (100W-R only).

2. Run Mode
    - 100W-R normal operation mode.
    - The 100W-R transmitted message is dependent on its factory settings for standard consumption messages (SCM) or network interval message (NIM).
        - For SCM, the 100W default bubble-up rate is 9 seconds.
        - For NIM, the 100W default bubble-up rate is five minutes. When the endpoint is set for NIM, the 100W-R transmits a contingency SCM message every minute. NIM mode is configured by programming FN mode with a programming device.

100WP-R Operating Modes

The 100WP-R has three standard operating modes.

1. Factory Mode
    - 100WP-Rs are shipped from the factory in Factory Mode.
    - The endpoint's transmitter is turned off.
    - The endpoint's receiver is bubbling-up to listen for a programming command.
    - 100WP-R encoder models will attempt to read the register every hour.
    - Last good read and cut tamper flags may be set when a register is not connected.
    - If the 100WP-R reads a connected register, the endpoint automatically moves to Run Mode and defaults to a zero consumption.
2. Run Mode
    - 100WP-Rs normal operation mode.
    - The 100W transmitted message is dependent on its factory settings for standard consumption messages (SCM) or network interval message (NIM).
        - For SCM, the 100WP-R default bubble-up rate is 9 seconds.
        - For NIM, the 100WP-R default bubble-up rate is five minutes. When the endpoint is set for NIM, the 100WP-R transmits a contingency SCM message every minute. NIM mode is configured by programming NIM mode with a programming device.
3. Quiet Mode

- OEMs can configure the endpoint for quiet mode after programming and direct mounting the 100WP-R in a factory.
- An endpoint is awakened from quiet mode and enters Run Mode in one of two ways:
    - Counting two pulses. The pulses are counted internal to the 100WP-R while it is in quiet mode.
    - Receiving a two-way command, such as a **Read ERT** using FDM.
- If an endpoint installed in quiet mode is not bubbling up SCM or NIM messages, it may be due to zero consumption on the endpoint, such as a vacant or vacation home. Initiate a two-way command (for example, perform a **Read ERT** with FDM) before removing the unit.

CHAPTER 3

Initializing, Connecting and Programming

This chapter provides the instructions to initialize the 100W-R, connect the endpoint to water meter registers and program the 100WP-R.

Initializing the 100W-R

- To initialize the 100W-R immediately, use one of the following handheld computers running Field Deployment Manager (FDM) version 1.0 or later.
  - FC200SR handheld computer (Itron part number FC2-0005-004 or FC2-0006-004)
  - FC300 with SRead
- For normal activation, connect the 100W-R to the water meter register. The endpoint polls for a register every hour. After a register is detected, the 100W-R automatically activates.

Connecting the 100W-R to a Remote Meter Register

- Connect the wires from the endpoint to the register according to the following table.

100W-R Connections			
	100W-R wire color		
	Brown (data)	Gray (power/clock)	Yellow (ground)
Register Manufacturer	Register screw color designator		
Elster AMCO Invision	R	GRN	BLK
Elster AMCO Scancoder	R	GRN	BLK
Elster AMCO evoQ4 (Q4000)	R	White	BLK
Hersey Translator	GRN	R	BLK
Badger ADE	GRN	R	BLK
Sensus ECR (all variants)	GRN	R	BLK
Sensus ICE	GRN	R	BLK
Itron (Actaris) Coder	GRN	R	BLK
Metron Famier	GRN	R	BLK
ProRead & ProRead Auto Detect	R	BLK	GRN
Performance ETR	GRN	R	BLK
SevernTrent SM700 SmartMeter (Sensus Protocol)	GRN	R	BLK
Neptune E-coder	R	BLK	GRN

Connecting the 100WP-R to a Remote Meter Register

- Connect the wires from the endpoint to the register according to the following table.

100WP-R Connections			
Register Manufacturer	100WP-R wire color		
	Brown (signal)	Gray (common)	Yellow (tamper)
	Register screw color designator		
Elster Digital	BLK	GRN	R
Itron (Actaris) Cyble Sensor (2-wire)	Either wire	Remaining wire must be connected to both endpoint wires	
Badger RTR	R	BLK	Green/bare
Elster V100	BLK	R	Blue
Sensus PMM	R	BLK	Bare

Connect the endpoint to the cable using gel-cap connectors (see Using Gel Cap Connectors on page 32).

Using Extension Cable

Order extension cable from Itron. Extension cable length must not exceed 300 ft.

Caution Extension cable lengths must not exceed 300 ft. Extension cabling from Itron is stranded, tinned, and pre-bonded for reliability and proper connection to gel cap connectors. Extension cabling manufactured by non-approved Itron manufacturers may result in unreliable and problematic connections. Contact Itron Support for more information.

Programming

100W-R

- The 100W-R consumption values are not programmable. (Programmable parameters include values like ID and register type.)
- Programming the 100W-R will move the endpoint into the specified operating mode.
- If the 100W-R is not programmed, the endpoint will attempt to read the register every hour and will wake up into default Mobile Handheld mode when a register is found.

100WP-R

Use an FC200SR or FC300 with SRead handheld running Field Deployment Manager (FDM) software and your utility's programming configuration file to program the 100WP-R.

Note Do not program the 100W-R or 100WP-R endpoint until it is connected to the water meter register.

Refer to the *Field Deployment Manager Endpoint Tools Mobile Application Guide* (TDC-0934) for programming information.

After programming, the endpoint enters the selected operating mode and begins bubbling-up specified messages at the selected rate.

Caution

- The FC200SR and FC300 with SRead are the only handhelds that support programming for the 100WP-R endpoint.
- The endpoint and programmer should be a minimum of 12-inches apart while programming.
- Do not place the programmer antenna directly on the endpoint.

Verifying 100W-R and 100WP-R Endpoint Operation

Use one of the following handheld computers to verify the endpoint is correctly recording consumption data.

- FC200SR
- FC300 with SRead

Caution

- Each handheld radio requires special setup and configuration parameters to successfully read and program 100-series products. Refer to the respective meter reading application for specific instructions.
- Do not use ReadOne Pro, FS2PN and FS3PN readers to read the 100WP-R. These readers do not keep their receivers on long enough to reliably capture a 100WP-R transmission.

Refer to the user guide for your programming device (see Related Documents on page 2) and data collection application for more information.

CHAPTER 4

Installing the 100W-R and 100WP-R Endpoints

Install the 100W-R and 100WP-R endpoints using one of the following mounting options:

100W-R and 100WP-R endpoints Mounting Options

Pipe Mount	The endpoint mounts to a pipe near the meter (see Pipe Mount Installation on page 13). This option requires the Remote Mount Kit and the appropriate Pipe Mount Kit.
Remote Mount	The endpoint mounts to a flat surface and connects to the meter register with a cable up to 300 feet (see Remote Mount Installation on page 22). This option requires the Remote Mount Kit.
Direct Meter Register Mount	The endpoint mounts directly to a meter register designed for endpoint direct mounting. This installation does not require a mounting kit (see Direct-Mounting to the Meter Register on page 24).

100W-R and 100WP-R Endpoints Accessories

100W-R/100WP-R Mounting Accessories

Accessory	Part Number
Remote Mount Kit (Encoder/Pulser only)	CFG-0771-021
Remote Mount Kit (Encoder/Pulser with Leak Sensor)	CFG-1300-003
Pipe Mount Kit	
pipes from 3/4 to 1 3/4 inches	CFG-0217-503
pipes from 1 5/16 to 2 1/4 inches	CFG-0217-504
pipes up to 4 inches	CFG-0217-501
Direct Mount Screw Pack	
Bulk	SCR-0010-005
80 per bag	SCR-0010-004
122 per bag	SCR-0010-001

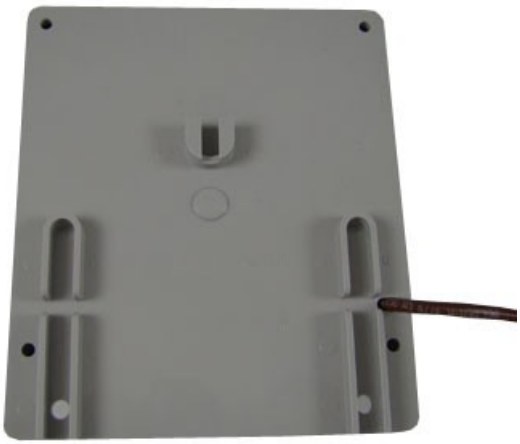
Attaching the Backplate

Select the appropriate Remote Mount kit for your 100W endpoint (see 100W-R and 100WP-R Accessories on page 9). Attach the 100W endpoint's backplate before completing a Remote Mount or Pipe Mount installation.

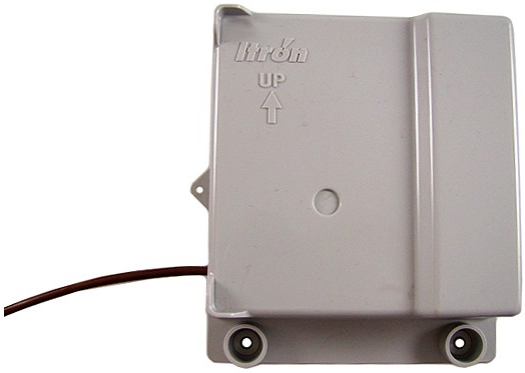
To attach an encoder/pulser only backplate

1. Fold the completed encoder/pulser wire connections into the endpoint housing where the instructions *PLACE GEL CAPS AND EXCESS WIRE IN THIS POCKET* are stamped.

2. Route the register cable through the single backplate cutout.



3. Align the endpoint backplate with the mounting screw holes. Verify the Itron logo and arrow point up.

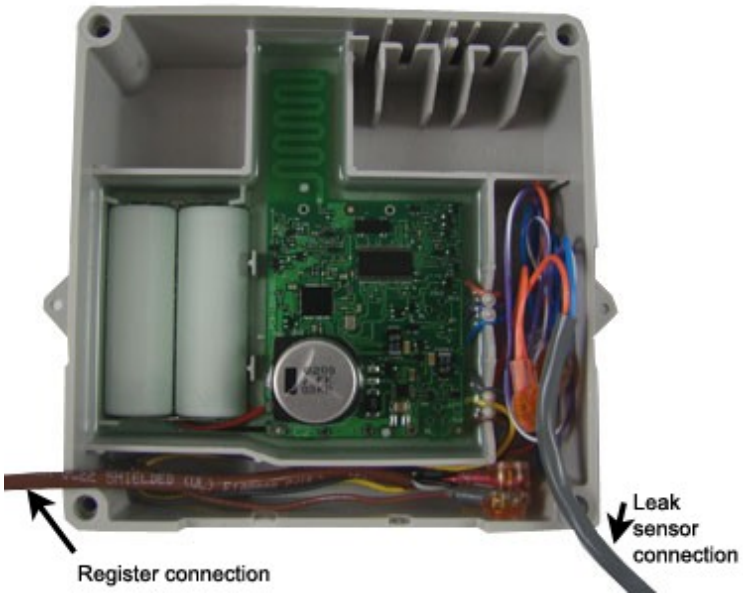


4. Insert a backplate mounting screw in one corner and tighten two to three turns. Insert the remaining three screws, tightening a few turns.

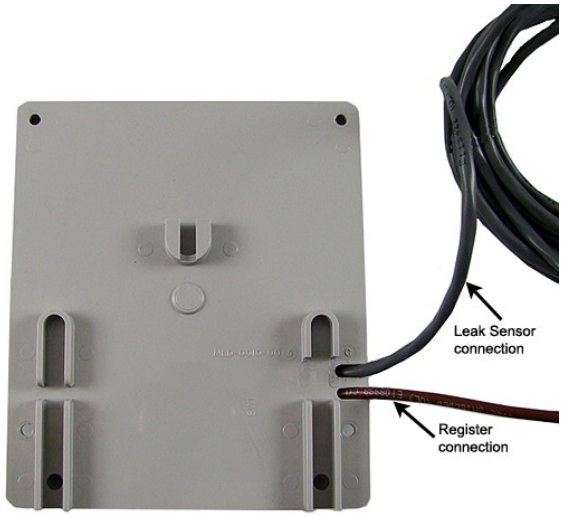
5. Tighten all screws in an alternating fashion.

To attach an encoder/pulser and leak sensor backplate

1. Fold the completed encoder/pulser and Leak Sensor wire connections into the endpoint housing where the instructions *PLACE GEL CAPS AND EXCESS WIRE IN THIS POCKET* are stamped.

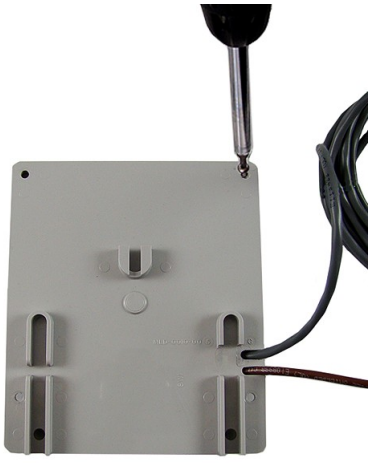


2. Route the register cable through the appropriate backplate cutout and the Leak Sensor cable through the remaining cutout.



3. Align the endpoint backplate with the mounting screw holes. Verify the Itron logo and arrow point up.

4. Insert a backplate mounting screw in one corner and tighten two to three turns. Insert the remaining three screws, tightening a few turns.



5. Tighten all screws in an alternating fashion.

Pipe Mount Installation

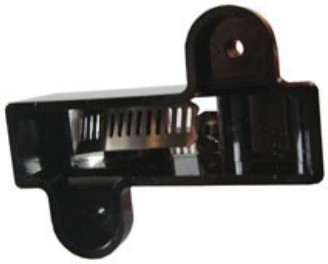
The endpoint can mount on a pipe vertically, diagonally, or horizontally using a Pipe Mounting Kit and Remote Mount Kit (see 100W-R and 100WP-R Accessories on page 9).

To mount the adapter plate on a vertical pipe

1. Take the pipe bracket and band clamp from the Pipe Mount Kit.


2. Loosen the clamp screw until the end of the band releases.

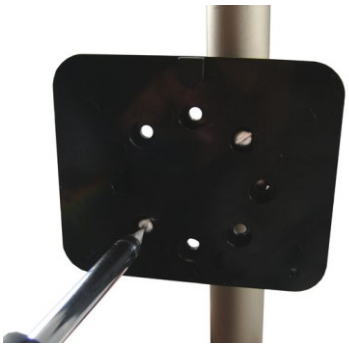
3. Push the end of the band through the hole in the pipe bracket.



4. Place the band clamp around the pipe. Push the end of the band through the hole in the band clamp and into the entrance to the screw assembly.Tighten the band clamp until you can push the end of the band into the hole in the pipe bracket.

5. Tighten the clamp screw three or four more turns to make sure the end of the band does not pop back out on this side of the pipe bracket. Verify the pipe clamp is in the final installation position on the pipe and completely tighten the band clamp screw.
6. Place the adapter plate on the pipe bracket. The adapter-plate screw boss goes into the pipe-bracket recess.

7. Using the two shortest (1/2-inch) adapter-plate mounting screws from the Remote Mount Kit, connect the adapter plate to the pipe bracket using the screw holes shown below.



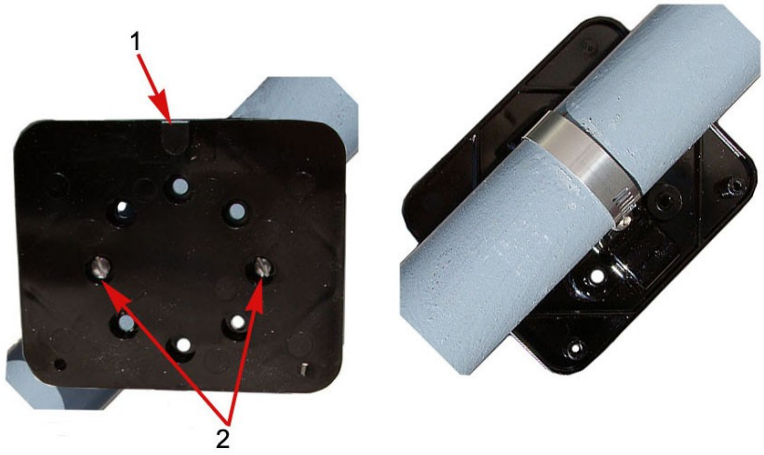
8. Tighten both screws to 9 to 12 inch-pounds of torque.

To mount the adapter plate in other positions

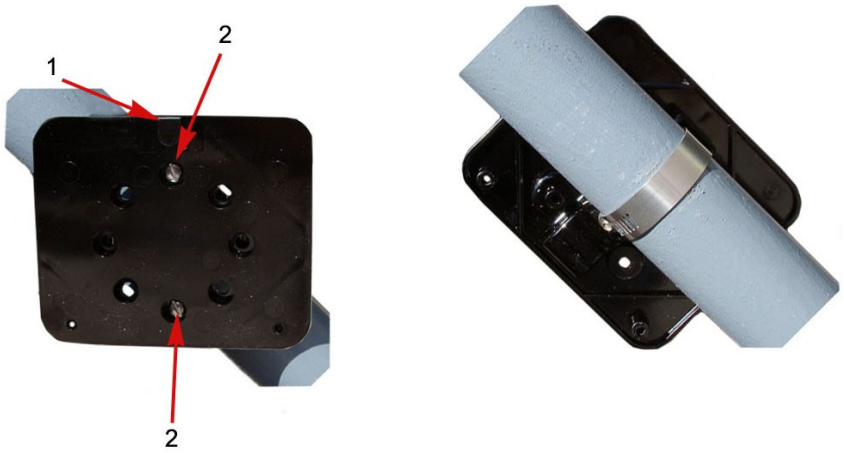
The installation procedure in the previous section shows how to mount the adapter plate on a vertical pipe.

The following pictures show the adapter plate on 45 degree angle and horizontal pipes. Regardless of the angle of the pipe, the adapter plate mounting lug (1) must always be at the top.

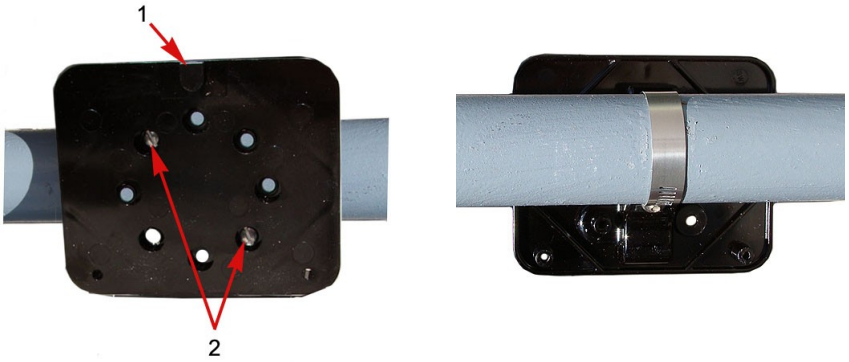
If the pipe is at a 45 degree angle up to the right, install the adapter plate with the mounting screws (2) as shown in the pictures below.



If the pipe is at a 45 degrees angle up to the left, install the adapter plate as shown in the pictures below.



If the pipe is horizontal, install the adapter plate as shown in the pictures below.



To mount the 100W-R and 100WP-R endpoints on the adapter plate

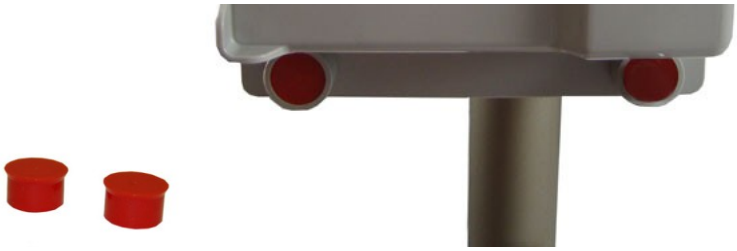
1. Find the two 1-inch mounting screws in the Pipe Mount Kit.
2. Slide the endpoint back cover onto the adapter, pushing up to secure the lug adapter in the lug slot.

3. Install the two 1-inch endpoint mounting screws.

4. Tighten the screws to 9 to 12 inch-pounds of torque.

To install tamper seals and cable ties

1. Using the two new tamper seals from the mounting kit, place a new tamper seal over each endpoint mounting screw.

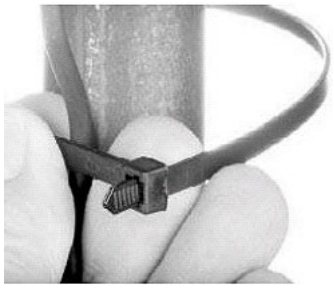


2. Push both tamper seals all the way into place with a 1/4-inch nut driver or similar tool.

The final installation will resemble the image below after the tamper seals are installed.

Note A tamper seal is fully seated when the top of the tamper seal is approximately 1/16-inch below the top of the screw recess.

3. Secure the cable to the meter pipe with a cable tie.



4. Push excess wire up between the back of the endpoint and the face of the adapter plate.