



Knowledge to Shape Your Future

Water Solutions

100W and 100WP Pit Datalogging Water Endpoint Installation Guide

Identification

100W and 100WP Pit Datalogging Endpoint Installation Guide
03/08/2011 TDC-0909-002

Copyright

© 2010 - 2011 Itron, Inc. All rights reserved.

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 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.

Déclaration de conformité

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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	1
Document Conventions	1
Document Purpose.....	1
How This Document is Organized.....	2
Related Documents.....	2
Chapter 2 About the 100W Endpoint.....	3
100W and 100WP Models.....	4
Battery Life	4
100W and 100WP Transmission Modes.....	4
100W Operating Modes	5
100WP Operating Modes	5
Chapter 3 Connecting, Initializing, and Programming	7
Initializing the 100W	7
Connecting to a Meter Register Using the Inline Connector.....	7
Connecting to a Meter Register Using a Cable.....	7
Connecting the 100WP to a Remote Meter Register	9
Using an Extension Cable	9
Verifying 100W endpoint Operation	9
Chapter 4 Installing the 100W Endpoint	10
100W Endpoint Accessories	10
100W Endpoints with Integral Connectors	10
Rod Mount Installation.....	11
Required Tools and Hardware	12
Wall Mount Installation	15
Required Tools and Hardware	15
Base Mount Installation	17
Required Base Mounting Tools and Hardware	17
Shelf Mount Installation	18
Required Tools and Hardware	18
Through Lid mount	20
Required Tools and Hardware	21
Installing in a New Lid	23
Optional Leak Sensor Installation	24
Required Equipment	24
Required Materials	26
Pipe Preparation	27
Chapter 5 Optional Remote Antenna Installation	32
Mounting the Remote Antenna.....	32

Appendix A Using an Inline Connector	35
Appendix B Using Gel-cap Connectors.....	37
Appendix C Troubleshooting	40
Index	41

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 the installation instructions for the 100W and 100WP. Mounting options for the 100W endpoint include rod mount, wall mount, through-lid (remote antenna), and shelf-mount installation. The 100W is available with the following configurations:

- Integral connector
- 5-foot open-end cable
- 20-inch open-end cable

An optional Itron Leak Sensor is available for all three configurations to provide leak monitoring capability. 100W endpoint configurations provide an easy interface to several register types. The 20-inch cable variant allows meter manufacturers to mount the endpoint directly to their respective meter registers before delivery to the installer.



Caution Installing an integrated 100W endpoint and meter register in a water pit box reduces the endpoint's RF signal distance significantly. If read reliability is a problem, install a remote antenna or select a new installation method.

How This Document is Organized

This document is organized into the following chapters:

Chapter	Description
1. Before You Begin	Information about this publication
2. About the 100W endpoint	Overview of 100W endpoint installation.
3. Initializing and Connecting the 100W endpoint	Instructions to initialize the 100W endpoint and connect the endpoint to the water meter.
4. Installing the 100W endpoint	Step-by-step endpoint installation instructions for: <ul style="list-style-type: none"> • Rod mount • Wall mount • Base mount • Shelf mount (kit CFG-1300-001) • Through lid mount • Optional Leak Sensor installation • Remote antenna (CFG-0900-001) installation
Appendix A Using an Inline Connector	Instructions for installing an inline connector.
Appendix B Using Gel Cap Connectors	Instructions for installing gel cap connectors.
Appendix C Troubleshooting	Troubleshooting 100W and 100WP endpoint operation.

Related Documents

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

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

About the 100W Endpoint

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

The 100W endpoints 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 [Initializing the 100W Endpoint](#) on page 6).



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

The 100W endpoint supports 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 endpoints 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* see <https://extranet-kc.itron.com/Water%20Endpoints/Detecting%20Leaks%20and%20Reverse%20Flow%20with%2060%20Series%20Endpoints.pdf>.
- **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 and 100WP Models

100W Endpoint Description	Itron Part Number
100W Encoder, integral connector	ERW-1300-101
100W Encoder with Leak Sensor, integral connector	ERW-1300-102
100W Encoder, 5-foot cable	ERW-1300-103
100W Encoder with Leak Sensor, 5-foot cable	ERW-1300-104
100W Encoder, 20-inch cable	ERW-1300-105
100W Encoder with Leak Sensor, 20-inch cable	ERW-1300-106
100WP Pulsar, integral connector	ERW-1300-107
100WP Pulsar with Leak Sensor, integral connector	ERW-1300-108
100WP Pulsar, 5-foot cable	ERW-1300-109
100WP Pulsar with Leak Sensor, 5-foot cable	ERW-1300-110
100WP Pulsar, 20-inch cable	ERW-1300-111
100WP Pulsar with Leak Sensor, 20-inch cable	ERW-1300-112

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. To proactively indicate the battery has reached a <10% useful battery life, a *Low Battery flag* is set to indicate impending battery failure.

100W and 100WP Transmission Modes

The 100W endpoint 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 six 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. You may use the 900 MHz Remote Antenna to increase reading range.

An FCC license is not required to read 100W endpoint.

100W Operating Modes

1. Factory Mode

- 100Ws ship from the factory in Factory Mode.
- The endpoint's transmitter is off.
- The endpoint's receiver bubbles-up to listen for a programming command.
- 100W encoder models 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 reads a connected register, the endpoint automatically moves to Run Mode (100W only).

2. Run Mode

- 100W 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 100W default bubble-up rate is 9 seconds.
- For NIM, the 100W default bubble-up rate is 6 minutes. When the endpoint is set for NIM, the 100W transmits a contingency SCM message every minute. Program FN mode with a programming device to configure NIM mode.

100WP Operating Modes

The 100WP has three standard operating modes.

1. Factory Mode

- 100WPs ship from the factory in Factory Mode.
- The endpoint's transmitter is off.
- The endpoint's receiver bubbles-up to listen for a programming command.
- 100WP encoder models 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 reads a connected register, the endpoint automatically moves to Run Mode and defaults to a zero consumption.

2. Run Mode

- 100WP's 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 default bubble-up rate is 9 seconds.

For NIM, the 100WP default bubble-up rate is 6 minutes. When the endpoint is set for NIM, the 100WP 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.

Connecting, Initializing, and Programming

This chapter provides the instructions to connect the 100W or 100WP, to initialize the 100W endpoint, connect the endpoint to the meter register, and program the 100WP endpoint. The 100W endpoint initializes immediately when the endpoint is programmed with an approved handheld computer or the endpoint recognizes the meter register and activates itself after connection to a register.



Caution To obtain an immediate reading, initialize the 100W with an approved handheld computer. Failure to initialize the endpoint may delay the initial reading up to 1 hour.

Initializing the 100W

- To initialize the 100W 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 to the water meter register. The endpoint polls for a register every hour. The 100W automatically activates after the endpoint detects a register.

Connecting to a Meter Register Using the Inline Connector

The inline connector system easily allows a separation between the endpoint and meter register and provides for general maintenance or system troubleshooting (see [Using an Inline Connector](#) on page 35).

Connecting to a Meter Register Using a Cable

You may connect the 100W endpoint to the water meter register using the 5-foot or 20-inch cable.



Caution The wire terminations must be properly sealed with a non-conductive gel material to prevent water intrusion (otherwise, this configuration should not be used in a pit box environment). Itron recommends the 5-foot cable configuration for OEM users only.

To connect the 100W to the register

- Connect the 100W wires to the register screw terminals according to the following table.

Register Manufacturer	100W wire color		
	Red (data)	Black (power/clock)	White (ground)
	Register screw terminal		
Elster AMCO Invision	R	G	B
Elster AMCO Scancoder	R	G	B
Elster AMCO evoQ4 (Q4000)	R	W	B
Hersey Translator	G	R	B
Badger ADE	G	R	B
Sensus ECR	G	R	B
Sensus ICE	G	R	B
Metron Famier	G	R	B
Ítron (Actaris) Coder	G	R	B
ProRead	R	B	G
Performance ETR	G	R	B
Severn Trent SM700 SmartMeter (Sensus Protocol)	G	R	B

Caution Wrap the wire one complete revolution around the register screw. Completely tighten the register screw and verify the wire insulation is not under the screw terminal heads or intermittent electrical connection may occur. You must use a moisture-proof sealant if the meter is installed outdoors or in any environment where moisture can collect on the screw terminals.

Connecting the 100WP to a Remote Meter Register

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

100WP Connections			
Register Manufacturer	100WP wire color		
	Red (signal)	Black (common)	White (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 37).

Using an Extension Cable

Order the 25-foot inline connector extension cable assembly (CFG-0151-401) to extend the 100W with the inline connector.

Verifying 100W Endpoint Operation

Use one of the following handheld computers to verify consumption:

- FC200SR handheld computer (Itron part number FC2-0005-004 or FC2-0006-004)
- FC300 with SRead



Notes

- Each handheld radio requires special setup and configuration parameters to successfully read and program 100W products. Refer to the respective meter reading application for specific instructions.
- When comparing the actual register value to that reported by the 100W endpoint, please keep in mind the endpoint's consumption value is updated once an hour when it is in a Run Mode.



Caution Do not use ReadOne Pro, FS2PN, FS3PN, or FC200 readers to read the 100W endpoint. These readers do not operate their receivers long enough or at the right frequency to reliably capture a 100W endpoint transmission.

Installing the 100W Endpoint

Install the 100W endpoint using one of the following methods:

100W and 100WP Mounting Options

Rod mount	The endpoint mounts on a 1/2 inch outside diameter rod.
Wall mount	The endpoint mounts to a wall or other vertical surface.
Base mount	The endpoint mounts on a horizontal, flat surface.
Shelf Mount	The endpoint mounts in pre-fabricated pockets or shelves within the pit lid using a shelf mount accessory kit.
Through-Lid	The endpoint mounts in lids with hole sizes from 1-3/4 inches to 2-inches. Through-lid installation requires the Pit Lid Mounting Kit (CFG-1300-004).

For water pit boxes, the type of installation method is based on two factors: the lid material and the current lid configuration. Metal lids may require a through-lid remote mount antenna for optimal endpoint radio performance. Plastic lids and other composite materials accept any installation methods described above. The 100W endpoint is temperature rated from -20° C to +60° C. Do not install the 100W endpoint in locations that may exceed the temperature rating.



Caution Observe the following guidelines for mounting the 100W:

- Endpoint positioning other than upright could negatively affect radio performance and battery life.
- Use only Itron-approved splice kits or inline connectors.

100W Endpoint Accessories

100W/100WP Mounting Accessories

Accessory	Part Number
Remote Antenna Kit (mobile applications only)	CFG-0900-001
Shelf Mount Kit	CFG-1300-001
Pit Lid Mounting Kit	CFG-1300-004

100W Endpoints with Integral Connectors

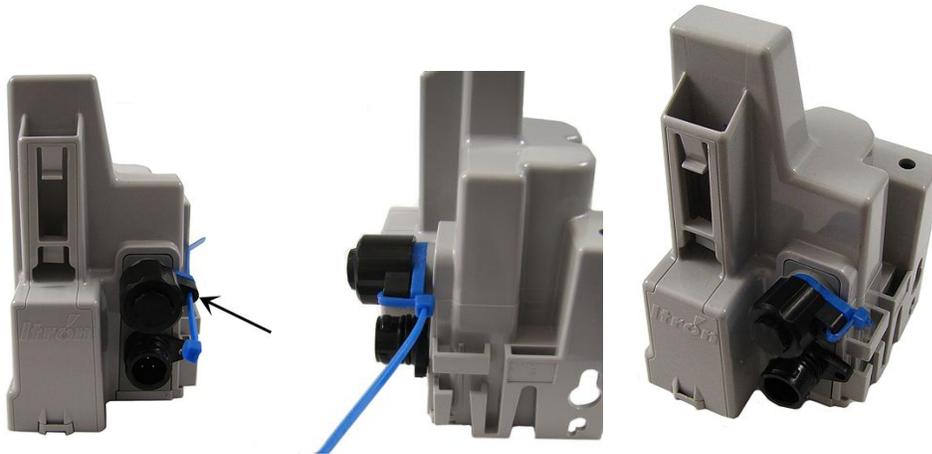
If 100W endpoints with integral connectors (ERW-1300-X0X) and the registers are not installed at the same time, secure the protective connector cover on the endpoint using a cable tie (Itron part number MSE-0005-002). Cable ties are not shipped with the 100W endpoint, but can be ordered from Itron. Use the protective cover (on the endpoint side) in the field for up to one year.



Warning If a dual-port 100W endpoint is installed but the Leak Sensor is not attached, the environmental cap (MSC-0019-005) must remain in place on the blue connector (Leak Sensor connector) to protect the connector from damage.

To install a cable tie to the connector

1. Thread the cable tie through the security holes in the connector and the protective cover.
2. Thread the cable tie end through the eye of the cable tie.
3. Pull the cable tie tight to secure it (as shown).
4. Remove the excess cable tie.



Rod Mount Installation

100W endpoints can mount below the pit lid on a customer-supplied 1/2-inch OD rod. The example installation described in this section uses a fiberglass rod. For more information, visit www.itron.com and reference the *Water Meter Compatibility List* (PUB-0063-002).



Warning The rod installation area must be free from other pipes, wires, or facilities that may be damaged by driving a rod into the ground.



Caution You must follow local codes when using the rod mount installation method. Failure to use 1/2-inch rod and follow instructions may result in an unreliable installation.

Caution Observe the following guidelines for mounting the 100W using the wall mount procedure:

- Endpoint positioning other than upright could negatively affect radio performance and battery life.
- Use only Itron-approved splice kits or inline connectors.

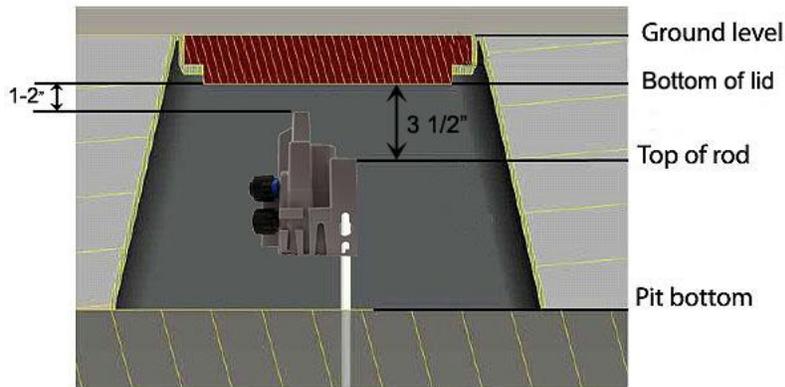
- Without touching the meter body or adjacent pipes, position the rod as close to the center of the pit as possible. Drive the rod into the ground. Ensure the rod remains vertical.



Note The rod shown has an end cap to protect the rod while driving it into the ground.

- Drive the rod into the ground so the top of the rod is approximately 3-1/2 inches below the bottom of the pit lid.
 - If you cannot drive the rod in enough to equal the necessary spacing, cut the remaining rod length to the proper height using an abrasive cut-off tool.
 - If the rod is the correct depth but remains loose in the soil, replace the rod with a longer version.

Caution Cutting fiberglass creates dust particles. Practice proper safety precautions when using cut-off tools to prevent exposure to fiberglass dust particles.



6. The top of the rod must be 3-1/2 inches below the bottom of the lid. Place the endpoint on the rod. Completely insert the rod into the endpoint's rod mount hole. Do not force the endpoint onto the rod. If the endpoint does not slide freely on the rod, remove the endpoint and examine the endpoint rod hole and rod for burrs or obstructions. You may secure the endpoint to the rod with a self-drilling screw through the hole in the top of the 100W rod mount cavity. The screw mounting hole is shown in the following product image.



7. Installation is complete when the endpoint is perpendicular to the underside of the lid. The endpoint must not contact the pit structure or lid.

Caution Verify the pit lid does not touch the endpoint when the lid is replaced. There must be a 1 to 2-inch space between the top of the endpoint and the bottom of the pit lid. If the 100W endpoint is installed too high, too low, or is touching any of the surrounding surfaces, adjust as necessary.



Wall Mount Installation

Select a flat vertical mounting surface. Install the endpoint in an upright position. Locate the endpoint as high as possible. To mount the endpoint to the wall in a water pit box, select a mounting location on the inside of the pit box and try to maintain a distance of one to two inches from the bottom of the pit box lid.



Caution Observe the following guidelines for mounting the 100W using the wall mount procedure:

- Endpoint positioning other than upright could negatively affect radio performance and battery life.
- Use only Itron-approved splice kits or inline connectors.

The 100W is suitable for use with up to 300 feet of Itron approved cable.

Required Tools and Hardware

Itron 100W Shelf Mount Kit

To install the 100W endpoint using the wall mount procedure

1. Select a vertical surface in the pit box or on a wall (for example, an endpoint mounted in a basement).
2. Position the endpoint vertically so the top of the endpoint is between 1 and 2-inches below the bottom of the lid.
3. Mark the location of the top mounting hole.
4. Drill a pilot hole in the pit box wall. Follow the screw manufacturer's recommendation for the pilot hole size.

- For concrete-type pit boxes, it may be necessary to use a screw anchor. Choose an anchor appropriate for a #10 pan head screw.

Caution Do not over-tighten the mounting screws. Over-tightening the mounting screws may break the endpoint mounting tabs.

- Start a screw into the pilot hole. Using the top hole of the endpoint, set the endpoint over the screw head and slide it down so the screw is now at the top of the notch (as shown). Carefully tighten the screw until snug. Over-tightening the mounting screw could crack the endpoint housing.



Note If mounting requires a screw anchor, mark the location of the bottom anchor and remove the endpoint. Drill the required mounting hole, insert the anchor, and re-attach the endpoint.

- Holding the 100W endpoint in the upright position, drill the second pilot hole. Use the bottom mounting hole as a template.

Caution Any endpoint position other than upright may negatively affect radio performance and battery life.

- Screw the bottom screw into the pilot hole until snug. Do not over-tighten the mounting screw.

