Itron

OpenWay Riva

100W+ ERT Module Installation Guide

Includes pit and remote-mount installation

100W+ ERT Module Installation Guide
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New in this document

Revision	Date	Description
REV 002	August 27, 2024	■ Updated imagery in Introduction on page 7
REV 001	August 15, 2024	■ This document has been combined with the *100W/100W+ and 100WP/100WP+ Water ERT Module Installation Guide* (TDC-0909-018). The *100W/100W+ and 100WP/100WP+ Water ERT Module Installation Guide* has been archived. ■ Added new part numbers to 100W+ ERT Module variants on page 10 ■ Updated imagery in Installing the remote module on page 38 ■ Removed mention of pulse 100W+ ERT Modules ■ Rearranged order of information
REV 000	April 21, 2020	■ This document used to be tracked under part number TDC-0951-015. It is now tracked under part number 815-0291-00. ■ Added note to Using gel-cap connectors to complete wiring connections on page 55 ■ Updated document template. ■ Removed chapter describing book chapters.

1 Introduction

The 100W+ ERT Module is a high-power radio frequency transmitting module that attaches to water registers or meters to collect consumption usage and tamper data. The 100W+ ERT Module transmits the meter or register data to a collection device which in turn transfers the information to the utility's customer billing system.

100W+ ERT Modules can be configured to operate in Mobile, Fixed Network, or hybrid-system environments. The 100W+ ERT Module reports seven-digit register data in Mobile standard consumption messages (SCM) and Fixed Network network interval (NIM) messages. It transfers nine-digit register data with Mobile SCM+ and Fixed Network NIM messaging. Additionally, the 100W+ ERT Module can be programmed to truncate up to three of the meter or register's least significant digits.

100W+ ERT Modules ship from the factory in factory mode, which prevents unwanted radio transmissions during transit. After installation and programming, the 100W+ ERT Modules acquire and transmit meter register data in accordance with the various selected parameter settings.

100W+ ERT Modules feature the following capabilities:

- **Leak Detection and Reverse Flow Detection**. 100W+ ERT Modules feature robust algorithms to provide Leak Detection and Reverse Flow Detection. For more information about Leak and Reverse Flow Detection, see *Detecting Leaks and Reverse Flow with 100 Series ERT Modules* (Itron White Paper 100911WP-XX).
- (Optional) **Itron Leak Sensor**. An optional Itron Leak Sensor analyzes water flow sound patterns to detect water leaks. Itron Leak Sensor analysis data is uploaded to the mlogonline Network Leak Monitoring online portal. Systems with optional Itron Leak Sensor devices access leak information through a utility-specific, secure mlogonline portal (for more information, see the *mlogonline Network Leak Monitoring System User Guide*.

100W+ ERT Modules support protocols for a variety of meter manufacturer's registers. Refer to the *Legacy Water Meter and Telemetry Module Compatibility List* for the list of supported meters and registers.

This document describes the requirements and procedures for initializing and installing both the 100W+ ERT Module in pit and remote environments. Readers can also find troubleshooting procedures and best practices for 100W+ ERT Module installation.

> **Note:** This document contains images of older variants of the 100W+ ERT Module. Your module may look different than what is pictured, but still functions and should be installed in the same manner as what is described.

Pit modules versus remote-mount modules

The 100W+ ERT Module comes in two variants: pit and remote mount. Which variant you use depends on the environment in which it is being installed.

Pit modules, as indicated by the name, are installed in the ground (read: pit). They are IP68 rated, which means they can endure short periods of water submersion and still operate as expected. They can be installed through a radio frequency (RF) friendly lid, on a pole or rod, and on a pit wall.

Pit-lid mounting is not intended for applications involving vehicular traffic. Use the remote antenna kit in incidental traffic areas (such as residential environments). The 100W+ ERT Module for pit installation works with cable lengths up to 300 feet. Use an Itron-approved extension cable.

Important! Pit installations are required to be installed in a RF-friendly pit lid. Endpoints that are not properly installed may be subject to negative performance.

The image below depicts the pit variant of the 100W+ ERT Module.

Remote modules are IP65 rated and designed with the possibility of UV exposure in mind. Remote modules can be installed indoors or outdoors, on a wall, or on a pole. The following image depicts a remote-mount 100W+ ERT Module.

Each variant has their own set of installation methods associated with them, which are described further in Installation overview and prerequisites on page 13.

Related documents

The listed documents may also be of use to you. These documents, as well as other product documentation, can be accessed at https://customer.itron.com/products.

- *100W/100W+ ERT Module Troubleshooting Guide*
- *100W/100W+ Series ERT Module Troubleshooting with FDM Endpoint Tools*
- *Battery Life in Water Communication Modules*
- *Detecting Leaks and Reverse Flow with 100 Series ERT Modules*
- *FDM Tools Configuration Guide*
- *FDM Tools Mobile Application Guide*
- FDM Tools Mobile Application Online Help
- Field Tools Online Help
- *Itron Mobile Radio Quick Reference Guide*
- *Itron Mobile Radio User Guide*
- *Itron Water Module Pit Lid Compatibility Guide*
- *Legacy Water Meter and Telemetry Module Compatibility List*
- *mlogonline Network Leak Monitoring System User Guide*
- *OpenWay Riva Leak Sensor Installation Guide*
- *Tampers and Water ERT Endpoints White Paper*
- *Water Pit ERT Splice Kits White Paper*

2 About the 100W+ ERT Module

This chapter provides a high-level overview of the 100W+ ERT Module and its functionality.

100W+ ERT Module variants

Table 1 describes the various 100W+ ERT Module variants and their ordering part numbers.

Table 1 100W+ ERT Module variants

100W+ ERT Module description	Itron part number
100W+, encoder pit with three ports	ERW-1350-001
100W-R+, encoder remote with 10-inch cable and 10-inch cable for telemetry	ERW-1350-002

Security

Users have the option of enabling enhanced security in 100W+ ERT Modules. Itron Security Manager (ISM) is a feature of the ChoiceConnect system that ensures certain 100W+ ERT Module commands are controlled through secure radio communications between the handheld computer, Mobile Collector, or Fixed Network system.

There are two fundamental security processes used in the ChoiceConnect system to ensure confidentiality and validity of secured commands:

- **Authentication**. Authentication is the process of confirming that an artifact is genuine or valid. Authentication in the 100W+ ERT Module is the process of verifying a request is from a valid source and in its original form.
- **Encryption**. Encryption is the process of transforming information to make it unreadable to anyone who does not have a valid security key. There are two types of encryption, symmetric and asymmetric. Symmetric encryption uses a shared key to decrypt or encrypt information. Asymmetric encryption uses a private key to encrypt and a public key to decrypt.

Enabling 100W+ ERT Module security

Each 100W+ ERT Module ships from the Itron factory with a utility factory security key. The presence of this utility factory key does not enable security. To utilize the module's security feature, the installer must use an Itron programming device (described in Installation overview and prerequisites on page 13) that is configured with the corresponding security

key for that particular 100W+ ERT Module. Initial key exchange commands are secured using the utility factory key. For more information about programming the 100W+ ERT Module, see the *FDM Tools Mobile Application Guide*.

Battery life

Powered by two non-replaceable, long-life lithium batteries, the 100W+ ERT Module has an expected battery life of 20 years when the module operates in its default mobile or fixed network operating mode (for more information about operating modes, see Operating modes on page 12). If the 100W+ ERT Module is programmed for hard-to-read mobile mode, the battery life is reduced to 12 years.

To proactively indicate the battery has reached a <10% useful battery life, a *Low Battery flag* is set to indicate a low-battery warning and alert the utility of an impending battery failure.

Transmission modes

The 100W+ ERT Module can be set to transmit in the modes listed below.

> **Note:** An FCC license is not required to read 100W+ ERT Modules.

- **Fixed network mode**
  - The 100W+ ERT Module transmits a high-powered NIM radio frequency (RF) message every five minutes and a contingency SCM RF message every minute.
  - The 100W+ ERT Module transmits a high-powered NIM RF message every six minutes and a contingency SCM+ RF message every minute.
- **Mobile and handheld mode (factory default setting)**
  - The 100W+ ERT Module transmits a medium-powered SCM RF message every nine seconds.
  - The 100W+ ERT Module transmits a medium-powered SCM+ message every 10 seconds.
- **(Optional) Mobile high power mode**
  - The 100W+ ERT Module transmits a high-powered SCM+ RF message every 60 seconds.
- **(Optional) Hard-to-read mobile mode**
  - The 100W+ ERT Module 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 locations as this mode reduces battery life significantly.

> **Note:** The 100W+ ERT Module's battery life is significantly affected in hard-to-read mobile mode. You may use the 900 MHz Remote Antenna to increase reading range.

- (Optional) **GeoMode**
  - GeoMode is a method of utilizing another 100W+ ERT Module to act as a relay for a module that cannot be heard by the Fixed Network Cell Control Unit (CCU). This requires an on-site visit to reprogram both 100W+ ERT Module (for more information, see the *FDM Tools Mobile Application Guide*.
- **Audit mode**
  - Audit mode reduces the normal read latency time associated with standard modes of operation and is often used after initial installation. This mode is useful in fixed-network installations where the normal bubble rate is very slow. Audit mode remains active for 30 days and then reverts to the initially programmed mode. Audit mode is intended to be used once.

Operating modes

The 100W+ ERT Module have the following standard operating modes.

- **Factory mode**
  - 100W+ ERT Modules ship from the factory in factory mode.
  - The 100W+ ERT Module's transmitter is off.
  - The 100W+ ERT Module's receiver bubbles-up to listen for a programming command.
  - Cut Detected and Extended Tamper flags may be set when a register is not connected.
- **Run mode**
  - 100W+ ERT Module's normal operation mode.
    - For NIM (Fixed Network), the 100W+ ERT Module's default bubble-up rate is five minutes.
- **GeoMode**
  - GeoMode is a method of utilizing another 100W+ ERT Module to act as a relay for a module that cannot be heard by the Fixed Network Cell Control Unit (CCU). This requires an on-site visit to reprogram both 100W+ ERT Modules (for more information, see the *FDM Tools Mobile Application Guide*)

3 Installation overview and prerequisites

Installing a 100W+ ERT Module involves several steps, which vary in number depending on whether you are installing via Itron's Zero Touch Deployment (ZTD) method. When installed with the ZTD method (also known as the auto-detect feature), the 100W+ ERT Module automatically senses which encoder-type register it is connected to. This also means that the user does not need to program the 100W+ ERT Module, which reduces the chances of programming mistakes and speeds up the installation process.

1. Connect and initialize the 100W+ ERT Module to the water meter register.
2. Install/mount the 100W+ ERT Module. This process varies based on the module variant and location. The utility is responsible for identifying which method is best for the environment in which they are installing their 100W+ ERT Module.
   - For pit installations, you can mount:
     - Through a plastic or composite (RF-friendly) pit lid.
     - To a pit wall.
   - For remote installations, you can mount:
     - To a flat surface.
     - To a pipe.
3. Install accessories as needed (described in Installing compatible components on page 47).
4. (If using a Neptune eight-dial encoded meter) Program the 100W+ ERT Module using an Itron-approved meter-reading application.
5. Verify operation using an Itron-approved meter-reading application (discussed further in Installation prerequisites on page 14).

When choosing installation locations, prioritize the area with the closest proximity to the intended reading device and with the least amount of obstructions.

Warning! Do not drop! While Itron modules are designed to withstand a drop, dropping the module can damage the device and may void the warranty. Internal circuit card components can be sensitive to electrostatic discharge. Before installation, discharge electrostatic buildup by touching a metal water pipe or other earth-grounded metal object prior to touching the meter body, register housing, or 100W+ ERT Module.

Installation prerequisites

To ensure a successful installation, you must first identity and assemble some required tools. The materials required for your installation vary based on the module variant you are installing and where you are installing it.

All 100W+ ERT Module installations require the following:

- One of the following meter-reader application and device combinations:
  - **Field Tools** software on a user-supplied smartphone, laptop, or tablet running one of the following operating systems:
    - iOS 14 – 16.5.1.
    - Android 11.0 – 13.
    - Windows 10 or 11.

    For Field Tools programming instructions, see the Field Tools for North American Gas and Water ERTs and Meters Help.
  - **Field Deployment Manager (FDM) version 4.0** or later running on either:
    - A FC300SR handheld computer
    - A supported Itron Mobile Radio (IMR) connected to a user-supplied computer or Bluetooth® device. Supported IMRs include:
      - IMR2.
      - IMR – Field Tools version (IMR-FT).

    For FDM programming instructions, see the FDM Tools Mobile Application Online Help.
- Security material. 100W+ ERT Modules operating with security, security materials (signed authorizations, secure commands, keys, and so on) must be passed along from the FDM Tools server to your Field Tools or FDM Tools mobile application during the sync process.

  Your mobile device running FDM Tools or Field Tools must have an internet connection to request commands. If you aren't sure that you will be able to connect to the internet while out in the field, be sure to request all necessary commands before going out in the field.
  - If using Field Tools: See the Request commands section in the *Field Tools for North American Gas and Water ERTS and Meters* documentation.
  - If using FDM: See the Retrieving Secure Commands from the FDM Server section in the *FDM Tools Mobile Application* documentation.

If you are installing a pit module, see the requirements outlined in Pit module variant on page 15. If you are installing a remote module variant, see the requirements outlined in Remote-mount module variant on page 16.

Pit module variant

The 100W+ ERT Module can be installed via one of the methods described below. Take note of the requirements for your chosen mounting method.

Through-the-lid installation

The 100W+ ERT Module can be mounted in lids with hole sizes 1-3/4 inches to 2 inches big. Installation requires a:

- Through-the-lid mounting kit (part number CFG-1601-001), which includes:
  - Through-the-lid retainer clip.
  - Retainer clip collar.
- User-supplied RF-friendly pit lid with a pre-drilled hole.

> **Important!** Pit installations are required to be installed in a RF-friendly pit lid. Endpoints that are not properly installed may be subject to negative performance.

Rod-mount installations

The 100W+ ERT Module can mount on a 1/2 inch outside-diameter rod. Installation requires a:

- Rod-mount adapter (part number CFG-1601-002).
- Remote antenna kit (CFG-0900-003).

Users must also supply a:

- 1/2-inch outside-diameter rod (you may use either a square or round rod).

> **Note:** For mounting rods available from Itron, see the *500W Module Ordering Guide*.

- Hammer.
- Tape measure.
- Rod cutting tool.

Wall-mount installations

The 100W+ ERT Module can mount to a wall or other flat vertical surface. Installation requires a:

- Rod-mount adapter (part number CFG-1601-002).
- Remote antenna kit (CFG-0900-003).

Users must also supply a:

- Screw driver/electric drill.
- Screw.

Wire termination

In the occasional event that an installation requires a splice kit to retrofit the pit module to an existing meter in the field you may need wire termination tools, including:

- E-9E 3M® gel port crimping tool (or other 3M-approved crimping tool).
- Itron splice kit (part number OEM-0034-002).

Remote-mount module variant

All remote-mounting installation methods require:

- A remote mount kit (part number CFG-1300-003), which includes:
  - An adapter plate.
  - Remote mount screws.
  - Mounting screws.
  - Cable ties.
  - Tamper seals.
- A #2 Phillips screwdriver (user supplied).
- Tools for cable strain relief installation (user supplied), including:
  - Side cutter pliers.
  - Gel-port crimping tool.
  - Cable tie gun.
  - Torx T-15 screwdriver.
- Wire termination tools, including:
  - E-9R 3M® gel port crimping tool (or other 3M-approved crimping tool).
  - Itron splice kit (part number OEM-0034-002).

The 100W+ ERT Module can be installed via one of the methods described below. Take note of the requirements for your chosen mounting method.

Flat-surface installation

The 100W+ ERT Module can mount to a wall or other flat vertical surface. Installation requires a:

- Drill (electric) and drill bit.
- Nut driver or a similar tool.
- *(Optional)* Level.

Mounting to a pipe installation

The 100W+ ERT Module can mount on a pipe vertically, diagonally, or horizontally. Installation requires one of the following pipe mount kits:

- Pipe mount kit for pipe diameters between 1-5/16" to 2 ¼" (part number CFG-0217-504)
- Pipe mount kit for pipe diameters between 3/4" to 1-3/4" (part number CFG-0217-503)
- Pipe mount kit for pipe diameters up to 4" (part number CFG-0217-501)

4 Initializing and connecting

This chapter provides the instructions to initialize and connect the 100W+ ERT Module to the meter or register. Remote 100W+ ERT Modules must be connected to the register or meter before they can be installed.

For normal activation, connect the 100W+ ERT Module to the water meter register. The module polls for a register every hour and automatically activates after it detects a register.

The 100W+ ERT Module 's auto-sensing technology eliminates the need to initialize the module at the time of installation. The module automatically detects the connected register type. Register consumption values are automatically updated at the top of each hour.

When started, the 100W+ ERT Module automatically:

- Detects the connected register type at the top of the hour, exits factory ship mode, and enters run mode.
- Detects a telemetry device such as an Itron Leak Sensor or a Remote Shutoff Valve.

> **Caution:** To obtain an immediate reading, initialize the 100W+ ERT Module with an approved handheld computer. Failure to initialize the 100W+ ERT Module may delay the initial reading up to one hour.

To obtain a meter reading sooner than the top of the next hour, use one of devices listed in Installation prerequisites on page 14 to perform a **Check Endpoint** (if using FDM Tools) or **Check** (if using Field Tools).

Determining your meter type

To identify your meter type and whether its compatible, refer to the *Legacy Water Meter and Telemetry Module Compatibility List*.

About the Remote Disconnect Valve

The Smart Earth Technologies (SET) or Aquana Remote Disconnect Valve is used in conjunction with 100W+ ERT Module installations to control water service interruptions without the need to remove the water meter. Because it is remote controlled, the Remote Disconnect Valve provides water utilities with a non-intrusive means of managing customer disconnects and reconnects that traditionally required on-site visits.

You can install the Remote Disconnect Valve at the same time as the 100W+ ERT Module or later in its lifetime. For more information, see Installing the Remote Disconnect Valve on page 47.

Installing the Inline port

> **Note:** This procedure applies only to pit modules. If you are installing a remote-mount module, skip to Remote-mount module connections on page 22.

The Itron's Inline port (ILC) system incorporates O-ring sealed twist-lock ports to ensure a water-tight attachment. New 100W+ ERT Modules can be ordered with the ILC system attached. This section describes attaching the ILC if adding it after purchase.

100W+ ERT Modules have two ILC ports: one for registers and one for telemetry devices. Itron advises customers to use meters with Itron's ILC cable. If you are installing on a meter without the ILC cable, go to Pit module reto-fitting on page 20 and follow the wiring instructions to splice the ILC cable. When the cable is spliced, return to this section to follow the procedure below.

1. Remove the port protector.
2. Remove the protective dust cap from the register port and, if they installing a telemetry device at the same time as a meter, the environmental cap from the telemetry port.
3. Verify that the port ends are clean and dry before assembly.

   If any of the following conditions occur, do not install the modules.

   - Any of the three pins are damaged or missing.
   - The O-ring is missing.
   - The meter or telemetry device cable is cut or nicked.
4. Remove the protective cap from the register or accessory cable.
5. Connect the register cable to the 100W+ ERT Module port.
   - Align the ports.
   - Push until snug.
   - Twist the register cable's black coupling nut to align the two tabs.
6. Install the tamper seal.
   - Align the top half of the tamper seal with the tamper seal holes on the register port and guide it through.
   - Push together the male and female ends of the tamper seal until you feel them click

together.

For future meter or servicing, break the security seal by pulling the seal apart.

7. Shield ports with protective environmental caps. Do not leave an exposed port in the field.

   The original protective port caps can be reused if kept clean and dry. Install a new security seal after servicing either device. To order replacement security seals, see the *500W Modules Ordering Guide*. Environmental caps employ multiple seals to protect the port from the environment. Environmental cap design allows utilities to install the 100W+ ERT Module and, at a future date, install a Leak Sensor or Remote Disconnect Valve (for more information about the Remote Disconnect Valve, see Installing the Remote Disconnect Valve on page 47).

Pit module reto-fitting

Retro-fitting a 100W+ ERT Module that doesn't use an Itron ILC cable to an existing meter in the field requires the user to splice an ILC (In-line Connector) cable to a water meter. Connect the ILC cable to a compatible water meter using the wiring diagrams in Table 2.

If necessary, a five-foot flying lead cable can be purchased separately. Note that wiring is only used if the customer needs to splice to an existing meter.

Caution: Itron recommends 100W+ ERT Module connections be completed using this wiring with the inline port. In rare instances, if a spliced connection is made, the Itron splice kit must be used (Itron part number OEM-0034-002). For more information, see Using gel-cap connectors to complete wiring connections on page 55.

Table 2 Encoder-type meter register connections to pit module wires

Register manufacturer	100W+ ERT Module red wire (data) to:	100W+ ERT Module black wire (power/clock) to:	100W+ ERT Module white wire (ground) to:
■ Badger ADE – E Series – HR E LCD – HR E Mechanical	Green	Red	Black
■ Badger M5000 Mag Meter	Green: Out 4+	Red: Input +	Black: Input - and Out 4-
■ Diehl Hydrus	Green - Nicor Red - Itron	Red - Nicor Black - Itron	Black - Nicor White - Itron
■ Elster AMCO SM 700 (Severn Trent), Q200 (Sensus Protocol)	Green	Red	Black
■ Elster AMCO InVision – AquaMaster III – AquaMaster – Scancoder	Red	Green	Black
■ Elster AMCO Mag Meter – evoQ4 – (Sensus Protocol)	Red	White	Black
■ Itron (Actaris) Cyble Coder	Green	Red	Black
■ Kamstrup flowIQ2100	Green	Red	Black
■ MasterMeter AccuLinx – Octave	Green	Red	Black
■ McCrometer	Data port/green	Clock/red	Gnd port/black
■ Metron Farnier OER	Green	Red	Black

Table 2 Encoder-type meter register connections to pit module wires (continued)

Register manufacturer	100W+ ERT Module red wire (data) to:	100W+ ERT Module black wire (power/clock) to:	100W+ ERT Module white wire (ground) to:
■ Mueller (Hersey) Translator, SSR	Green	Red	Black
■ Neptune ProRead, ProRead Auto-Detect – ARB-V – E-Coder	Red	Black	Green
■ Performance ETR	Green	Red	Black
■ RG3 Tomahawk	Green	Red	Black
■ Sensus ECR – ICE – iPERL – OMNI – SRII	Green	Red	Black
■ Siemens Mag Meter – Mag8000-7ME6810 – Mag8000CT-7ME6820	92	91	93
■ Zenner (Hendey) ETR	Green	Red	Black

Extending the cable

When in a deeper than average pit, Itron recommends ordering the 25-foot inline port extension cable assembly (CFG-0151-404) to extend the 100W+ ERT Module's cable. The use of this cable allows for good RF performance even when in a deep pit.

Remote-mount module connections

Connect the wires from the 100W+ ERT Module to the register's port cable according to Table 3.

Direct wire to the meter register using the register's internal wires. You can also employ Itron-approved cabling in lengths up to 300 feet.

> **Note:** Itron recommends 19-26 gauge, pre-bonded or solid conductor wire with a maximum diameter of .082 inches (individual wire insulation). The use of unbonded wire may produce an unreliable connection when using gel caps for joining wires.

Table 3 Encoder-type meter register connections to remote-mount module wires

Register manufacturer	100W+ ERT Module brown wire (data) to:	100W+ ERT Module gray wire (power/clock) to:	100W+ ERT Module yellow wire (ground) to:
■ Badger – ADE E Series – HR E LCD – HR E Mechanical	Green	Red	Black
■ Badger – M5000 Mag Meter	Green: Out 4+	Red: Input +	Black Input - and Out 4 -
■ Elster AMCO – AquaMaster – AquaMaster III – Invision – Scancoder	Red	Green	Black
■ Diehl – Hydrus	Green - Nicor Red - Itron	White - Nicor Black - Itron	Brown - Nicor White - Itron
■ Diehl – Hydrus		Black	White
■ Elster AMCO – evoQ4 (Sensus Protocol) – Q200 (Sensus protocol) – SM 700 (Severn Trent)	Green	Red	Black
■ Elster – AMCO evoQ4 Mag	Red	White	Black
■ Itron (Actaris) – Cyble Coder	Green	Red	Black
■ Kamstrup – flowIQ2100	Green	Red	Black
■ MasterMeter – Acculinx Octave	Green	Red	Black
■ McCrometer	Green/data port	Red/clock port	Black/GND port
■ Metron Farnier – OER	Green	Red	Black

Table 3 Encoder-type meter register connections to remote-mount module wires (continued)

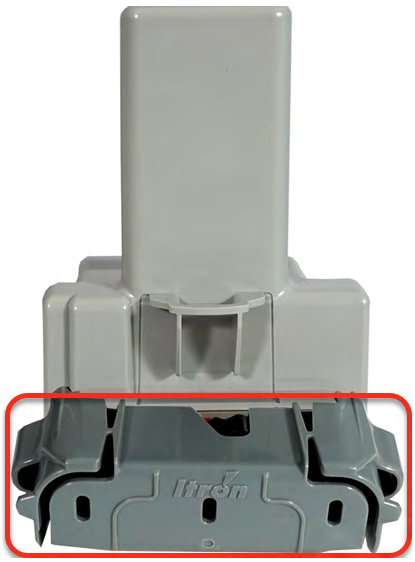
Register manufacturer	100W+ ERT Module brown wire (data) to:	100W+ ERT Module gray wire (power/clock) to:	100W+ ERT Module yellow wire (ground) to:
■ Mueller (Hersey) – Translator SSR	Green	Red	Black
■ Neptune – E-Coder ARB-V – ProRead – ProRead Auto-Detect	Red	Black	Green
■ Performance – ETR	Green	Red	Black
■ RG3 – Tomahawk	Green	Red	Black
■ Sensus – ECR – ICE – iPERL – OMNI – SRII	Green	Red	Black
■ Siemens Mag Meter – Mag8000-7ME6810 – Mag8000CT-7ME6820	92	91	93
■ Zenner (Hendey) – ETR	Green	Red	Black

5 Installing the pit module

This section describes the Itron-approved pit installation methods for the 100W+ ERT Module and its necessary and optional accessories. Install the 100W+ ERT Module adhering to the guidelines set forth and with one of the methods described in this chapter.

Important: read before installing

- Pit installations are required to be installed in a RF-friendly pit lid. Endpoints that are not properly installed may be subject to negative performance.
- The 100W+ ERT Modules are temperature rated from -30°C to +60°C. Do not install the 100W+ ERT Module in locations that may exceed the temperature rating.
- The 100W+ ERT Module is shipped with a protective cover over the ports. The protective cover must be fully engaged over the ports until the module is installed to protect the module's ports from damage.



- While Itron modules are designed to withstand a drop, dropping the module may damage the device and void the warranty.
- The 100W+ ERT Module works accurately with cable lengths up to 300 feet. Use an Itron-approved extension cable.
- Pit module positioning other than upright will negatively affect radio performance.

- Internal circuit board components are sensitive to electrostatic discharge. Be careful not to touch any part of the meter body, register housing, or module prior to discharging any static buildup on your person. To discharge yourself, touch a grounded metal object such as the metal water pipe or an earth-grounded metal structure.

Installing through-the-lid

This section provides instructions to mount the 100W+ ERT Module in a plastic or composite pit lid of 1/2-inch to 2.5-inch thickness with a drilled, round 1-3/4-inch, 1-7/8-inch, or 2-inch hole.

Figure 1 Through-the-lid installation required components

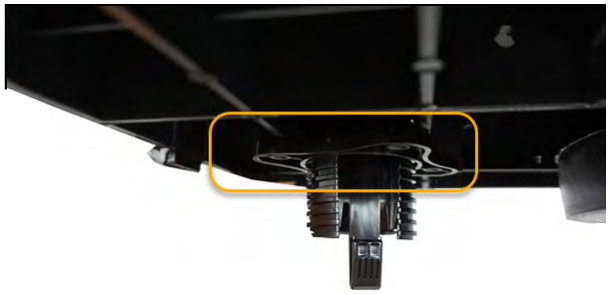
The following procedure assumes you have:

- The components described in Installation prerequisites on page 14 and Through-the-lid installation on page 15
  - The figure above depicts:
    - Pit lid with a pre-drilled hole (1).
    - Through-the-lid retainer clip (2).
    - Retainer clip collar (3).
- Completed the procedures outlined in Initializing and connecting on page 18
- Read through Important: read before installing on page 25

Through-the-lid mounting instructions

1. Insert the retainer clip into the pit lid hole with the convex surface on the top of the pit lid.

2. From the bottom side of the lid, screw on the threaded retainer clip collar until the beveled top rests against the pit lid.

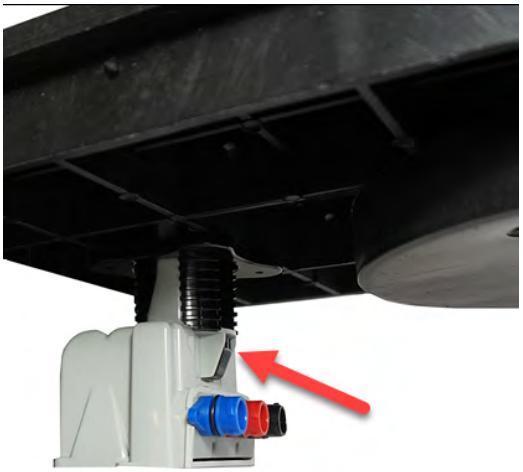


> **Note:** Ensure that the beveled edge of the clip collar is toward the top of the pit lid.

3. Align and insert the retainer clip tab (1) into the retainer clip receptacle (2) on the 100W+ ERT Module housing.

4. Verify that the clip locks into place and the retainer clip collar is hand-tightened against the pit lid.

Caution: Carefully align the 100W+ ERT Module through lid assembly. If the assembly is improperly aligned, the pit lid may not close.



Pit lid mounting installation is complete.

Installing the through-the-lid remote antenna

This section provides antenna mounting and connection instructions for 100W+ ERT Modules installed through a pit lid.

Caution: Remove cable or twist ties from the antenna cable to prevent damage to the pit module or antenna.

1. Thread the remote antenna port and cable through the pit lid hole. Verify that the antenna's convex surface is on the top of the pit lid. (These instructions show a simulated pit lid material.)

2. Insert the antenna port through the rectangular opening in the threaded collar.

3. Turn the threaded collar until it is tight against bottom of the pit lid.

4. Align the antenna's port pins with the middle red port on the 100W+ ERT Module.
5. Push in the antenna port to complete the connection.

Remote antenna installation is complete.

About the through-the-lid remote antenna

This device has been designed and approved per FCC and ISED rules to operate with the antennas listed below. Antennas not included in this list are strictly prohibited for use with this device.

The required antenna impedance is 50 ohms. To reduce potential radio interference to other users, the antenna type and its gain should be chosen so that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. The optional 900 MHz remote mount antenna provides increased RF range coverage for the listed mobile applications where the meters are located deep in pit boxes.

Table 4 describes the through-the-lid remote antenna specifications.

Table 4 Through-the-lid remote antenna specifications

Specification	Value
Part number	CFG-0900-003
Gain	4 dBi
Horizontal beamwidth	Omni-directional
Impedance	50 ohms
Termination	Proprietary

Metal lids on 100W+ ERT Module pit boxes require a through-lid solution for optimal pit module radio performance. The remote antenna is designed to fit in a pit-lid hole with a diameter of 3/4-inch and lid thicknesses from 1/4-inch to 1-3/4-inch.

Mounting on a rod

100W+ ERT Modules can mount below the pit lid on a 1/2-inch outside-diameter rod. The customer can supply the rod, or purchase one from Itron. For more information, see the *500W Module Ordering Guide.*

Caution: Consider the following when installing the 100W+ ERT Module on a rod mount:

- The rod installation area must be free from other pipes, wires, or facilities that may be damaged by driving a rod into the ground.
- You must follow local codes when using the rod mount installation method.
- Failure to use a 1/2-inch rod and follow instructions may result in an unreliable installation.
- Pit module positioning other than upright will negatively affect radio performance.

The following procedure assumes you have:

- The components described in Installation prerequisites on page 14 and Rod-mount installations on page 15
- Completed the procedures outlined in Initializing and connecting on page 18
- Read through

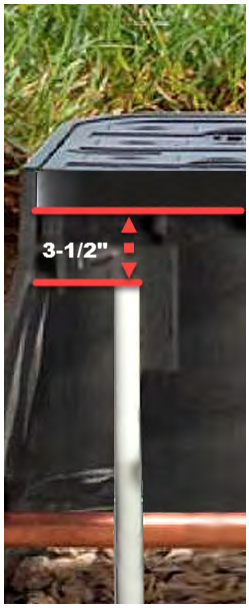
Rod-mounting instructions

1. Remove the pit lid.
2. Inspect the area to make sure there are no buried cables, pipes, or other obstructions.
3. Measure the pit box depth from the top of the lip (where the lid will rest) to the bottom of the pit. Be sure to measure the depth at the point where you will drive the rod into the ground.
4. Add 12 inches to the pit box depth measurement taken in step 2. The resulting total represents the minimum length of rod needed.

   Soil types and moisture conditions may require longer rod lengths to ensure that the 100W+ ERT Module is well supported and remains vertical.
5. Without touching the meter body or adjacent pipes, position the rod as close to the center of the pit as possible.
6. Drive the rod into the ground. Ensure that the rod remains vertical.

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

7. 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.

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

   - If the rod is the correct depth but remains loose in the soil, replace the rod with a longer version.
   - The top of the rod must be 3-1/2 inches below the bottom of the lid.

8. Insert the rod/wall mounting bracket tab (1) into the module tab receptacle (2).

9. Place the module on the rod.
10. Completely insert the rod into the 100W+ ERT Module's rod mount hole. Do not force the 100W+ ERT Module onto the rod.

    If the 100W+ ERT Module does not slide freely on the rod, remove the 100W+ ERT Module and examine the 100W+ ERT Module rod hole and rod for burrs or obstructions.
11. You may secure the 100W+ ERT Module to the rod with a self-drilling screw through the hole in the top of the 100W+ ERT Module's rod mount cavity.

12. Connect the register (black port, 1) and optional telemetry device (blue port, 2) into the appropriate connection.

13. Turn the port locking ring to secure the connection.

> **Caution:** Turn only the locking ring. Turning the entire port could damage the port pins.

14. Installation is complete when the 100W+ ERT Module is perpendicular to the underside of the lid. The 100W+ ERT Module must not contact the pit structure or lid.

> **Caution:** Verify that the pit lid does not touch the 100W+ ERT Module when the lid is replaced. There must be a one- to two-inch space between the top of the 100W+ ERT Module and the bottom of the pit lid. If the 100W+ ERT Module is installed too high or too low, or is touching any of the surrounding surfaces, adjust the installation as necessary.

Mounting to a pit wall

The 100W+ ERT Module can mount to a wall or other flat vertical surface.

Caution! Observe the following guidelines for mounting the 100W+ ERT Module using the wall mount procedure:

- Any module positioning other than upright will negatively affect radio performance.
- Locate the 100W+ ERT Module as high as possible in the pit box .
- Connect the 100W+ ERT Module to the register or meter. If a splice is required to connect the register or meter, you must use the Itron splice kit (OEM-0034-002).
- Maintain a distance of one to two inches from the bottom of the pit box lid.
- The 100W+ ERT Module works accurately with Itron-approved cable type and lengths up to 300 feet.

The following procedure assumes you have:

- The components described in Installation prerequisites on page 14 and Mounting to a pit wall on page 34
- Completed the procedures outlined in Initializing and connecting on page 18
- Read through

Wall mounting instructions

1. Select a flat, vertical mounting surface in the pit box.
2. Insert the rod/wall mounting bracket tab (1) into the module tab receptacle (2).

3. Position the 100W+ ERT Module vertically so the top of the 100W+ ERT Module is between one to two inches below the bottom of the lid .
4. Mark the location of the top mounting hole.

5. Drill a pilot hole in the pit box wall. Follow the screw manufacturer's recommendation for the pilot hole size.
6. 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 100W+ ERT Module mounting tabs.

7. Start a screw into the pilot hole. Using the top hole of the 100W+ ERT Module, set the 100W+ ERT Module over the screw head and slide it down so the screw is now at the top of the notch. Carefully tighten the screw until snug. Over-tightening the mounting screw could damage the 100W+ ERT Module housing.

> **Note:** If the mounting location requires a screw anchor, mark the location of the bottom anchor and remove the 100W+ ERT Module. Drill the required mounting hole, insert the anchor, and re-attach the 100W+ ERT Module.

8. Holding the 100W+ ERT Module in the upright position, drill the second pilot hole. Use the bottom mounting hole as a template.

Caution: Any module position other than upright will negatively affect radio performance.

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

   Wall mounting the 100W+ ERT Module is complete.

6 Installing the remote module

This section describes the remote installation process for the 100W+ ERT Module and its necessary and optional accessories. Read this chapter in the order it is provided, as certain procedures must be completed ahead of remote 100W+ ERT Module installation.

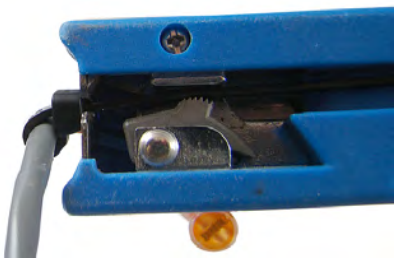
Installing the module cable strain relief

After you complete the 100W+ ERT Module to register connections (described in Remote-mount module connections on page 22), install a cable tie to the meter cable just below the exposed colored lead wires on the cable insulation. The cable tie provides a cable strain relief to reduce the risk of destructive tension on the lead wires.

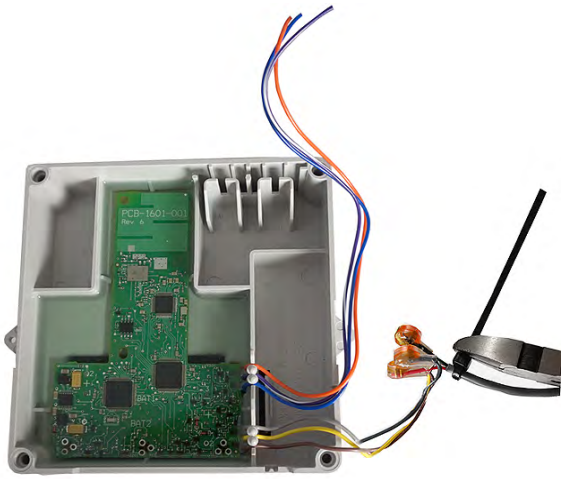
> **Note:** Required tools for this procedure are outlined in Installation overview and prerequisites on page 13.

1. Wrap the cable tie around the meter register or telemetry device cable.

2. Insert the pointed end of the cable tie into the receptacle end of the cable tie with the ribbed edge facing in.
3. Pull the pointed end of the cable tie until the cable tie is hand-tightened.
4. Insert the excess cable tie into the cable tie gun. Pull the cable gun trigger to tighten and clip the excess cable tie. The cable tie gun shown in the illustration is equipped with a red dial that allows the user to set the cable tightening pressure of the cable gun.



5. If your cable tie gun is equipped with a dial to set the tightening pressure, set the pressure to ensure that the cable tie is secure on the lead wire. After installation, the cable tie must not move on the register or secondary lead wire.
6. If your cable tie gun does not have a clipping feature, remove the cable tie from the cable tie gun. Using a side-cutter pliers, clip the excess cable tie.



7. Place the cable connection into the 100W+ ERT Module housing with the cable ties to the inside.

Installing the backplate

After the connections are made to the register and optional telemetry device, attach the 100W+ ERT Module's backplate.

Mount the remote-mount module after the backplate is attached.

1. Route the register cable and telemetry device cable through the dual-port backplate. Ensure that the cable strain reliefs are inside the module housing and backplate assembly.

2. Route the register cable through the bottom backplate cable cutout and telemetry device cable through the top backplate cable cutout.

3. Align the remote-mount module backplate with the mounting screw holes. Verify that the Itron logo is not upside down.
4. Insert a backplate mounting screw in one corner and tighten the screw two or three turns. Insert the remaining three screws and tighten each a few turns.

5. Completely tighten all screws evenly in an alternating fashion.

Mounting on a flat surface

The 100W+ ERT Module can mount to a wall or other flat vertical surface.

The following procedure assumes you have:

- The components described in Installation prerequisites on page 14 and Flat-surface installation on page 16
- Completed the procedures outlined in:
  - Initializing and connecting on page 18

–

– Installing the backplate on page 39

Flat surface mounting instructions

1. Connect the 100W+ ERT Module to the register as described in Remote-mount module connections on page 22.
2. Select an installation location.

   Important! The arrow on the 100W+ ERT Module must point up when installation is complete. Take this into consideration when choosing your installation location. Install the 100W+ ERT Module as high off the ground as possible.

3. Using the backplate template, drill three pilot holes into the wall or other surface.

   Make sure the two bottom holes are level.

4. Screw a mounting screw for the lug slot into the surface, leaving approximately 1/8 inch of the screw protruding. The lug slot should slide over the screw with a tight fit.

5. Slide the 100W+ ERT Module lug slot onto the mounting screw, pushing the 100W+ ERT Module upward until the screw head is all the way into the slot.

6. Screw the 100W+ ERT Module to the wall using the remaining two mounting screws.

7. Insert a tamper seal over each mounting screw and drive into place with a nut driver or a similar tool.

> **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.

8. Secure any excess cable using the provided cable ties.

   The arrow on the 100W+ ERT Module must point up when installation is complete.

Mounting to a pipe

The 100W+ ERT Module can mount on a pipe vertically, diagonally, or horizontally using a pipe mount kit (see Mounting to a pipe installation on page 17) and remote mount kit (part number CFG-1300-003).

Caution: A vertical mounting position is important to maximize RF performance. Mount the 100W+ ERT Module with the module's label arrow pointing up. *The module's arrow must always point up.* The module's tilt tamper functionality is designed to operate with the module installed vertically.

The following procedure assumes you have:

- The components described in Installation prerequisites on page 14 and Mounting to a pipe installation on page 17
- Completed the procedures outlined in:
  - Initializing and connecting on page 18
  - Installing the module cable strain relief on page 38
  - Installing the backplate on page 39

Pipe mounting instructions

1. Remove the pipe bracket and band clamp from the pipe mount kit (Itron part number CFG-0005-003). Pipe brackets may be black or gray. These instructions show a black pipe bracket.

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

3. Push the end of the clamp's band through the holes in the pipe bracket.

4. Place the band clamp around the pipe. The band loosely wraps around the pipe.

5. Push the end of the band through the band clamp screw assembly. Turn the band clamp's screw assembly to fit into the pipe bracket opening. Tighten the clamp screw until the band clamp is secure on the pipe.

Mounting on the adapter plate

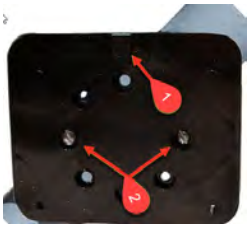
1. Locate the two one-inch 100W+ ERT Module mounting screws in the pipe mount kit.
2. Slide the 100W+ ERT Module back cover onto the adapter, pushing up to secure the lug adapter in the lug slot.

3. Install the two one-inch 100W+ ERT Module mounting screws.

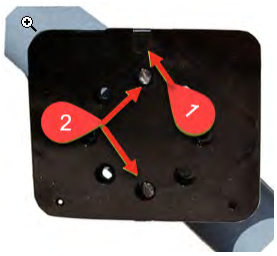
4. Tighten the screws to 9 to 12 inch-pounds of torque.

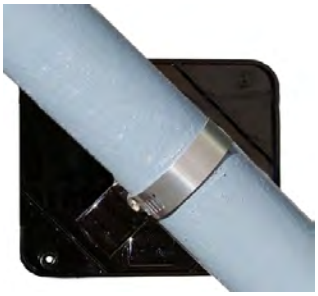
Adapter plate mounting positions

The installation procedure in Mounting on the adapter plate on page 45 describes 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.

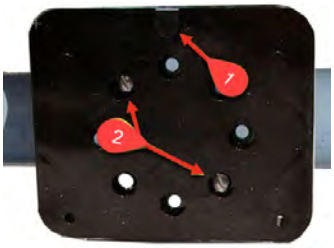


If the pipe is at a 45-degrees angle up to the left, install the adapter plate as shown.





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



7 Installing compatible components

This chapter provides the installation procedures for 100W+ ERT Module accessories, including:

- Installing the Remote Disconnect Valve on page 47
- Installing the Itron Cable Armor on page 50
- Installing the Leak Sensor on page 51

Installing the Remote Disconnect Valve

The Smart Earth Technologies (SET) or Aquana Remote Disconnect Valve is used in conjunction with 100W+ ERT Module installations to control water service interruptions without the need to remove the water meter. Because it is remote controlled, the Remote Disconnect Valve provides water utilities with a non-intrusive means of managing customer disconnects and reconnects that traditionally required on-site visits.

The 100W+ ERT Module automatically detects the presence of connected water disconnect devices within 22.5 minutes and begins reading disconnect valve data. To immediately detect the water disconnect valve and begin reading data, perform a **Check Endpoint** (if using FDM) or **Check** (if using Field Tools).

The 100W+ ERT Module supports the following valve states:

- **Connected**. The water flow is open and flowing at 100% configured capacity.
- **Disconnected**. The water flow is shut off with no water flowing. The Remote Disconnect Valve provides the ability to remotely open (reconnect) the valve.
- **Restricted**. The water is restricted and flowing at the configured installation flow.

> **Note:** Remote water disconnect operation requires a 100W+ ERT Module with enhanced security enabled.

Remote Disconnect Valves have the option to ship from the supplier with the Itron Inline port attached. See the manufacturer's installation instructions for the procedure to mount the disconnect valve.

For pit modules

The 100W+ ERT Module disconnect valve ships from the supplier with the Itron cable installed. See the manufacturer's installation instructions for the procedure to mount the disconnect valve in the pipe close to the 100W+ ERT Module.

1. Remove the protective plastic cover from the module's port ports.

2. Remove the environmental cap from the 100W+ ERT Module's (blue) telemetry port.
3. Verify that the ports are clean and dry.
4. Align the disconnect valve connector with the 100W+ ERT Module's blue telemetry port.

5. Push the valve's inline port into the 100W+ ERT Module's telemetry port (blue).

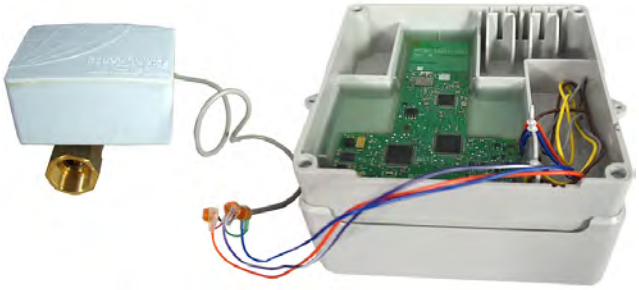
6. Rotate the port locking ring until the security holes align.

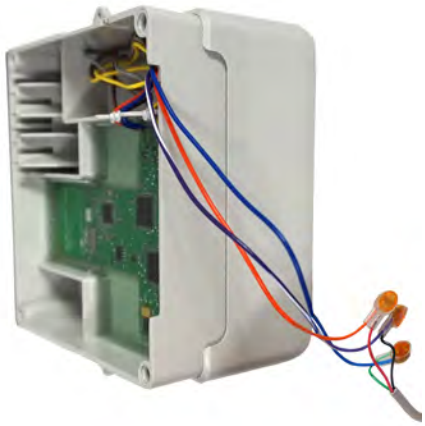
7. Install an Itron security seal through the aligned security holes.

For remote modules

Connect the 100W+ ERT Module wires to the Remote Disconnect Valve wires following the connections shown in the table below. The Remote Disconnect Valve connects to the 100W+ ERT Module's orange, white/purple, and blue wires.

100W+ ERT Module wire color	Remote Disconnect Valve wire color
Orange	Red
White/purple	Black
Blue	Green





Installing the Itron Cable Armor

The Itron cable armor provides a layer or protection for the module's cable jacket. Itron cable armor is available in five-foot sections. For more information about the options, see Installation prerequisites on page 14.

> **Note:** You can purchase the Itron cable armor pre-added. If the Itron cable armor has not been pre-added, use the following procedure to add it correctly.

This section describes the procedure for installing Itron cable armor in a field installation.

> **Warning!** Use caution when you are installing the cable armor.
>
> - Itron cable armor is stainless steel and may have sharp edges.
> - Perform a **Check Endpoint** (if using FDM) or **Check** (if using Field Tools) after you reprogram the 100W+ ERT Module to verify communication with the meter register.

1. Without disconnecting the 100W+ ERT Module from the meter's register, remove the 100W+ ERT Module from its installation to allow yourself room to install the cable armor.
2. Cut a two- to three-inch strip of electrical tape.

3. Wrap the entire piece of electrical tape around the 100W+ ERT Module cable near the 100W+ ERT Module.

4. Beginning over the installed electrical tape, twist the Itron cable armor onto the 100W+ ERT Module cable using a right-handed twist.

> **Warning!** You must twist—not wrap—the cable armor onto the 100W+ ERT Module cable. Wrapping the cable armor can cause the stainless steel jacket to warp.
>
> You must begin twisting the cable armor over portion of the cable protected by the electrical tape. If you do twist the cable armor onto the 100W+ ERT Module cable on the unprotected portion of the 100W+ ERT Module cable, you could damage the module's cable. A cut cable could cause a 100W+ ERT Module or register communication failure.

5. Continue to twist the cable armor onto the 100W+ ERT Module cable until the cable armor covers the entire cable.

6. Remove any leftover materials from the customer premises. Discard or recycle leftover materials.

Installing the Leak Sensor

The Leak Sensor analyzes water flow sound patterns to detect water leaks. Leak sensor analysis data is uploaded to an online portal. Systems with optional Leak Sensor devices access leak information through their utility-specific, secure portal.

Installation of the Leak Sensor with a 100W+ ERT Module requires the Leak Sensor with an inline port (Itron part number LDS-1601-001). The Leak Sensor connects to the telemetry port on the 100W+ ERT Module, is automatically detected by Field Tools or FDM, and displays in Field Tools or FDM as **Peripheral Device** within the Check Endpoint table. Additionally, the state of the device — **Operational** or **Connected** — and related firmware and hardware versions displays.

For the installation instructions, see the *Itron Leak Sensor Installation Guide*.

If the Leak Sensor five-foot cable is not long enough to reach the 100W+ ERT Module, an extension cable is available from Itron (CFG-0151-404). The maximum cable length between the Leak Sensor and the 100W+ ERT Module should not exceed 30 feet.

Caution: If the 100W+ ERT Module is installed to enable communications for the Leak Sensor but a register is not connected, replace the register port's cap with the environmental cap removed from the blue telemetry port to protect the register port.

8 Programming and verifying

If you installed your 100W+ ERT Module using the ZTD method, skip to Verifying operation on page 54.

Programming is required to:

- Change the operation mode (for example, to change the 100W+ ERT Module from the default mobile mode to fixed network mode).
- Enter a Utility ID or Lock Type.
- Read an eight-dial output from a Neptune encoded meter.

100W+ ERT Modules used with Neptune meters that have an eight-dial output require programming before they can record meter data with accuracy. When you program a 100W+ ERT Module, you provide it with essential information about the meter, like the meter's configuration and current reading. This information synchronizes the 100W+ ERT Module with the meter and gives it a base from which to calculate future reads.

When programming the 100W+ ERT Module:

- Do not program configuration changes to the 100W+ ERT Module until it is connected to the water meter register.
- Keep a minimum of 12 inches between the 100W+ ERT Module and programming device while programming configuration changes are completed.
- Do not place the programming device antenna directly on the 100W+ ERT Module.

The requirements and procedures for programming vary between meter-reading applications. Refer to the respective meter-reading application's documentation for specific instructions:

- For FDM, see the FDM Tools Mobile Application Online Help.
- For Field Tools, see the Field Tools for North American Gas and Water ERTs and Meters Help.

To identify whether the 100W+ ERT Module is in network or mobile mode, issue an **Auto detect** command.

Important! Make sure you have the ability to request commands (if using Field Tools) or retrieve secure commands (if using FDM Tools), described in Installation prerequisites on page 14.

After programming, the 100W+ ERT Module enters the selected operating mode and begins to bubble up specified messages at the chosen rate.

Verifying operation

Itron strongly recommends performing a **Check Endpoint** (if using FDM) or **Check** (if using Field Tools) to verify that the 100W+ ERT Module is operating correctly after installation. Performing a **Check Endpoint/Check**:

- Initiates an immediate connection to the network and a register read.
- Verifies communication with the Leak Sensor or Remote Disconnect Valve (if installed).
- Generates an immediate request for a read from an encoded register.
- Checks for and indicates event or alarm flags.

Performing a Check Endpoint/Check does not immediately indicate that the 100W+ ERT Module is connected to the network and receiving information. Wait 24-72 hours after initial installation to check for 100W+ ERT Module performance.

Use one of the meter-reading applications and devices described in Installation prerequisites on page 14 to verify that the 100W+ ERT Module is correctly recording consumption data. Make sure you have the ability to request commands (if using Field Tools) or retrieve secure commands (if using FDM), also described in Installation prerequisites on page 14.

9 Using gel-cap connectors to complete wiring connections

This section describes connecting the Itron device to the water meter register using gel cap connectors.

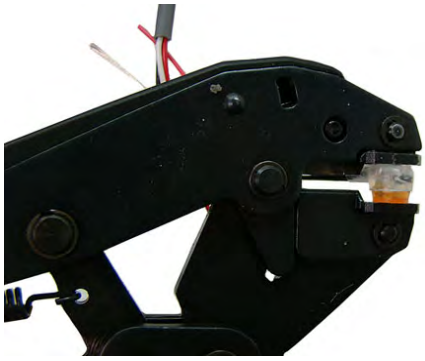
Important! All unused wires on 100W+ ERT Modules must be terminated. Wire terminations must be properly sealed with a non-conductive gel material to prevent water intrusion and possible environmental or electrical issues.

This section provides the instructions to complete remote-mount module to meter wiring connections.

1. Push two wires as far as possible into the port.

   Caution: Do not strip insulation from the ends of the wires before inserting them into the port.

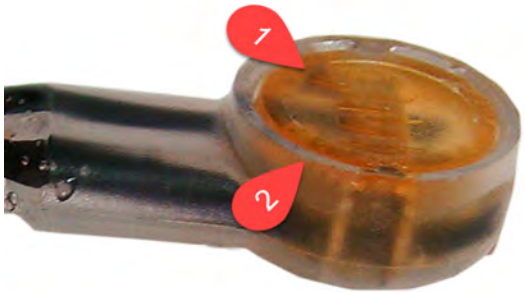
2. Place the port and wires into the jaws of the crimping tool. Ensure the wires remain fully inserted in the port.



   Note: The E-9E gel connector crimping tool is not pictured here.

3. Squeeze the handles to crimp the port. Apply pressure until the cap is fully seated (at least three seconds).

The port is properly crimped when the top of the moveable yellow center (1) is flush with the top of the port body (2).



Warning! Crimping the port forces some sealant out of port. The sealant protects the inside of the port against insects, moisture, and other contaminants. The sealant may cause minor eye and skin irritation. Avoid eye contact. Avoid prolonged or repeated skin contact. Contact Itron Support for Safety Data Sheets (SDS).

A Best practices

Ensure 100W+ ERT Modules are installed in accordance with the requirements stated in the respective installation manual.

The 100W+ ERT Module should always be in a vertical upright position.

Pit modules

Table 5 Installation best practices

Do install	Do not install
With an RF-friendly (plastic) lid	With a metal or iron lid
The pit cover and through-the-lid antenna at or above grade level	The pit cover and through-the-lid antenna below grade level
With enough slack in the endpoint wire so that in the case that the pit lid is lifted, the wire does not disconnect	The endpoint wire with little to no slack
The through-the-lid antenna straight up	The through-the-lid antenna at an angle or upside down

Additionally:

- Ensure that the pit lid is free of debris or other obstructing material, such as grass and mulch and that the 100W+ ERT Module does not have a cut cable or is submerged in water. The 100W+ ERT Module cannot be heard if it is under water.
- In the through-the -lid installations, verify that the retainer clip is locked into place and the retainer clip collar is hand-tightened against the pit lid.
- For 100W+ ERT Module in hard-to-read locations, install a remote antenna in a location where the signal can be picked up.

Remote modules

When choosing installation locations, prioritize the area with the closest proximity to the intended reading device and with the least amount of obstructions.

When performing an indoor remote installation, make sure that the 100W+ ERT Module is installed at or above grade level, and is not near dense trees or shrubs that could obstruct the endpoint. Do not put anything on top of the 100W+ ERT Module. When installed in basements, try to mount the unit as high as possible, preferably on the upper-floor joist near a window.

When performing an outdoor remote installation, prioritize mounting the 100W+ ERT Module on an outside wall (or as close as possible). Install it vertically (so that the 100W+ ERT Module points up) and as high as possible without compromising the meter cable.

B Troubleshooting

This section describes common errors that arise during installation and guidelines for what to do. See the following sections for checking performance and common errors:

- Unable to read or program on page 59
- Register and 100W+ ERT Module readings do not match on page 59
- Register reading is not reported on page 61
- Cut Cable or Previous Cut Detected is indicated on page 61
- Cut Detected is indicated on page 62
- Leak Sensor not detected on page 62

Unable to read or program

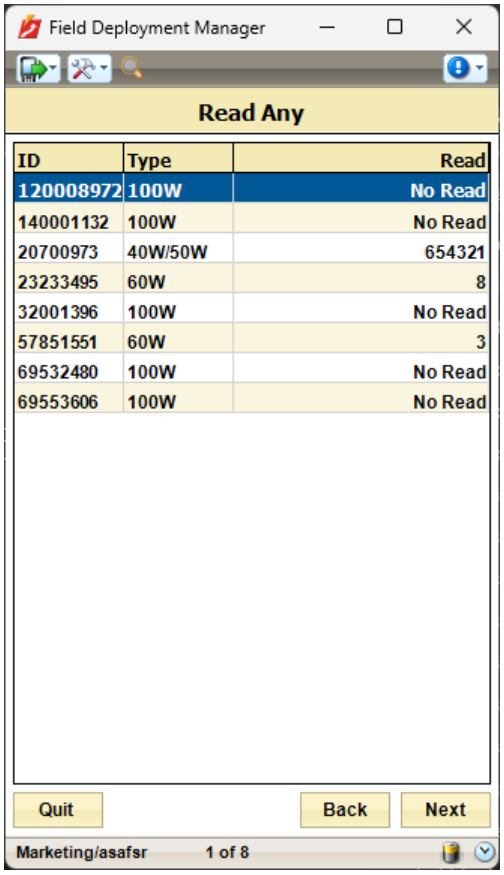
- If using an IMR, make sure the rounded side of the radio is facing the endpoint.
- If using an FC300, make sure you are holding it vertically (in relationship to the ground) and not pointed at the endpoint.
- Verify the correct endpoint ID was entered in reading device.
- Issue an Auto Detect command to verify that the 100W+ ERT Module is in the expected mode (mobile or network mode).
- Move closer to the 100W+ ERT Module.
- Make sure the 100W+ ERT Module is mounted correctly and not under water. If it is under water, change installation method to implement a through-the-lid mount. See Installing through-the-lid on page 26.
- Make sure the 100W+ ERT Module is in an upright position.
- Determine if the installed 100W+ ERT Module is working properly by temporarily substituting a known good unit.

Register and 100W+ ERT Module readings do not match

- Verify that the cable is connected and not damaged or pinched.
- Gel ports may not be crimped properly. Review Using gel-cap connectors to complete wiring connections on page 55.

- Verify the 100W+ ERT Module is wired correctly. Review Initializing and connecting on page 18 or the Pulser-type meter register connections tables in either Pit module reto-fitting on page 20 or Remote-mount module connections on page 22.
- Perform a **Check Endpoint** (if using FDM) or **Check** (if using Field Tools) to check that the 100W+ ERT Module was programmed correctly. See Verifying operation on page 54.
- Perform a Ready Any operation using either FDM or Field Tools, and filter for the endpoint ID in question. If the Read Any does not "hear" the 100W+ ERT Module, this can indicate a problem with the module.

  Note: FDM Tools cannot perform a Read Any command on 100W+ ERT Modules when the module is in network mode.



- Verify that the 100W+ ERT Module and is attached to a compatible meter. See the *Water Meter and Telemetry Module Compatibility Matrix*.
- Determine if the installed 100W+ ERT Module is working properly by temporarily substituting a known good unit.
- Check for physical damage.

Register reading is not reported

Often, a No Read error is indicated if the endpoint is not wired correctly.

- For remote-installed 100W+ ERT Modules, check that the gel ports are properly crimped. Review Using gel-cap connectors to complete wiring connections on page 55.
- Verify that the 100W+ ERT Module is attached to a compatible meter. See the *Water Meter and Telemetry Module Compatibility Matrix*.
- Perform a **Check Endpoint** (if using FDM) or **Check** (if using Field Tools) to check that the 100W+ ERT Module was programmed correctly. See Verifying operation on page 54.
- Determine if the installed 100W+ ERT Module is working properly by substituting with a known good unit.
- For encoder-type endpoints and registers, an **Invalid Read** error is reported if there is improper register/endpoint communications or if the register is trying to transfer unacceptable data.
- Check for physical damage.

Cut Cable or Previous Cut Detected is indicated

> **Important!** When using FDM Tools, the term **Cut Cable** is used. When using Field Tools, the term **Cut Detected** is used.

Cut Cable or **Previous Cut Detected** indicates that at some point in the last 40 days, the 100W+ ERT Module was not communicating with the encoded-meter register.

- Verify that the cable is connected and not damaged or pinched.
- Check that the gel ports are properly crimped. Review Using gel-cap connectors to complete wiring connections on page 55.
- Ensure the reading on the 100W+ ERT Module and meter match. If pulses are missed, the reading will be incorrect.
- Verify the 100W+ ERT Module is wired correctly. Review Initializing and connecting on page 18 or the Pulser-type meter register connections tables in either Pit module reto-fitting on page 20 or Remote-mount module connections on page 22.
- Verify that the 100W+ ERT Module and meter register are correctly matched. See the *Water Meter and Telemetry Module Compatibility Matrix*.
- Determine if the installed endpoint is working properly by substituting with a known good unit.
- Check for physical damage.

Cut Detected is indicated

Cut detected indicates that the endpoint has not been communicating with the meter register for at least a 24-hour period.

- Verify that the 100W+ ERT Module and meter register are correctly matched. See the *Water Meter and Telemetry Module Compatibility Matrix*.
- Verify the cable is connected and not damaged or pinched.
- Check that the gel ports are properly crimped. Review Using gel-cap connectors to complete wiring connections on page 55.
- Verify the 100W+ ERT Module is wired correctly. Review Initializing and connecting on page 18 or the Pulser-type meter register connections tables in either Pit module reto-fitting on page 20 or Remote-mount module connections on page 22.
- Check for physical damage.

Installing with commercial vaults

Installing the 100W+ ERT Module with a commercial vault (that is, placing the 100W+ ERT Module outside the vault) is not typical, but may be required in a specific context that does not support typical installation. For example:

- You can drill a hole in the side of the vault and:
  - run a conduit to a wall-mounted remote 100W+ ERT Module
  - run a conduit to a 4x4 post on which a remote-mount 100W+ ERT Module is mounted.

When installing with a commercial vault, Itron recommends you keep the following in mind:

- Use a remote-mount 100W+ ERT Module, as they are UV rated.
- The distance between the meter and 100W+ ERT Module should not exceed 300 feet.
- There distance between the 100W+ ERT Module and an Itron Leak Sensor should not exceed 30 feet.

Leak Sensor not detected

- Verify the cable is connected and not cut or pinched.
- *(Remote-mount installations only)* Verify the 100W+ ERT Module is wired correctly. Review Initializing and connecting on page 18 or the meter register connections tables in either Pit module reto-fitting on page 20 or Remote-mount module connections on page 22.
- *(Remote-mount installations only)* Check that the gel ports are properly crimped. Review Using gel-cap connectors to complete wiring connections on page 55.

- Check for physical damage.
- Attach a known good leak sensor. If you do not detect the known good sensor, replace the 100W+ ERT Module.

Error and warning flags

The following list describes supported error and warning flags on the 100W+ ERT Module.

- **Cut Detected**
  - Cut Detected indicates that the 100W+ ERT Module is not communicating with the register/meter. The tamper flag automatically clears after the 100W+ ERT Module receives a successful read from the register.

    > **Note:**A cut detected may be an indicator of a damaged register.

- **Low Battery Warning**
  - The 100W+ ERT Module includes a battery life estimator. The estimator is based on the number of data packets sent at the various power levels and the age (self-discharge) of the 100W+ ERT Module. The low-battery warning allows the utility to easily identify which 100W+ ERT Module are nearing end-of-life in a mixed population and gives the opportunity to schedule replacement.

    > **Note:** The low battery warning is a single flag set when the battery has less than 10% remaining capacity, which typically corresponds to two years of battery life remaining. Battery life is evaluated daily at midnight.

- **Extended Tamper Flag** (retrievable with two-way communication)
- **Cut Cable Flag**
  - The Cut Cable Flag sets if Cut Detected is active for 24 hours.
  - The Cut Cable Flag remains active for 40 days in mobile mode.
  - The Cut Cable Flag remains active for 24 hours in fixed network mode.

C Important safety and compliance information

This section provides important information for your safety and product compliance.

USA, FCC Part 15 spectrum compliance

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 installed to provide a separation distance of at least 20 centimeters (7.9 inches) from all persons to be compliant with regulatory RF exposure.

USA, FCC Class B-Part 15

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:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.

Modifications and repairs

To ensure system performance, this device and antenna shall not be changed or modified without the express approval of Itron. Per FCC/ISED rules, unapproved modifications or

operation beyond or in conflict with these instructions for use could void the user's authority to operate the equipment.

Warning! This unit cannot be modified and is not repairable. Attempts to modify or repair this module will void the warranty.

Canada, ISED spectrum compliance

Compliance statement Canada	Déclaration de Conformité
This device complies with Innovation, Science and Economic Development Canada (ISED) license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, (2) this device must accept any interference, including interference that may cause undesired operation of the device. Under Innovation, Science and Economic Development Canada (ISED) regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.	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, (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement. Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

RF exposure (FCC/ISED)

This equipment complies with radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter	Cet équipement est conforme aux limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement do it être installé et utilisé à distance minimum de 20 cm entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec tout autre antenne ou transmetteur.

Lithium battery safety

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 212°Fahrenheit (100°C Celsius), crush, expose to water, or incinerate the lithium battery. Fire, explosion, and severe burn hazard.
- The battery used in this device may present a risk of fire or chemical burn if mistreated.
- Keep the lithium battery away from children.

Disconnecting power

Warning! Qualified technician: during service, disconnect power to prevent ignition of flammable or combustible atmospheres.

Electromagnetic compatibility

Caution: Use only approved accessories with this equipment. Unapproved modifications or operation beyond or in conflict with these instructions for use may void authorization by the authorities to operate the equipment.

Electrostatic discharge

Caution: Internal circuit components can be sensitive to electrostatic discharge. Before installation, discharge electrostatic buildup by touching a metal pipe or other earth-grounded metal object prior to touching the meter body, register housing, or Itron device.

Do not drop

Caution: While Itron modules are designed to withstand a drop, dropping the module may damage the device and void the warranty.