Gen™5

500W ERT® Module Pit Installation Guide

Gen5 500W ERT Module Pit Installation Guide
June 28, 2023
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New in This Document

Revision	Date	Description
REV 002	June 28, 2023	Changed the dBi value in the specifications described in Installing the Through-the-lid Remote Antenna on page 33 from 2 to 2.6.
REV 001	December 2, 2022	The part number for this document has been updated from LDI-0344 to 815-1224-00.
REV 000	October 2022	First publication of this document. This document was previously part of the *500W ERT Module Pit Installation Guide*, which has been split into two documents: ■ *Gen™5 500W ERT Module Pit Installation Guide* (this document) ■ *OpenWay Riva 500W ERT Module Pit Installation Guide* (part number: *815-0006-00*)

1 Introduction

Itron Gen™5 500W ERT® Modules are radio-frequency (RF) water modules that connect to the Gen5 Network as a leaf on a continuously powered device (CPD). The modules choose one CPD as a gateway to the Gen5 Network. The CPD communication with the modules is based on a Limited Listening Schedule (LLS). The CPD forwards and transmits the module's messages. The modules can communicate in 100S mobile mode to support a ready-to-secure installation when a third-party work-order system is used. The utility configures the module to switch to network mode.

The CPD device accepts up to 20 modules at a time. The modules choose the CPD association. Associated parent CPDs can change over time. The 500W ERT Modules are not IP-addressable. The Gen5 network head end addresses the 500W ERT Modules through the CPD and maintains a list of CPDs and associated 500W ERT Modules. The CPD forwards messages addressed to the 500W ERT Module. The modules continue Itron's tradition of reliability, accuracy, and long battery life while supporting the industry's standards for security.

Description

The following table describes the 500W ERT Module's location compliance and part number.

Description	Location compliance	Itron part number
500W ERT Module, 4 battery, register, remote antenna, and telemetry Ports	USA/Canada, Australia, Tonga	ERW-1601-001
500W ERT Module, 4 battery, register, and telemetry ports	USA/Canada, Australia, New Zealand	ERW-1601-004
500W ERT Module, 2 battery, register, remote antenna, and telemetry ports **Note:** Remote antenna is not approved for New Zealand.	USA/Canada, Australia, New Zealand	ERW-1601-005
500W ERT Module, 2 battery, register, and telemetry port	USA/Canada, Australia, New Zealand	ERW-1601-006
500W ERT Module, 2 battery, register, remote antenna, and telemetry ports **Note:** Remote antenna is not approved for New Zealand.	USA/Canada, Australia, New Zealand	ERW-1601-008
500W ERT Module, 2 battery, register, and telemetry port	USA/Canada, Australia, New Zealand	ERW-1601-009

> **Note:** The 500W ERT Module works accurately with cable lengths up to 300 feet. Use an Itron-approved extension cable.

Related Documents

The following documents may also be of use to you. These documents, as well as others, can be accessed and viewed at https://products.itron.com.

- *500 Modules Ordering Guide*
- *Gen™5 500W ERT® Module Specification Sheet*
- *Gen™5 500W ERT® Module Technical Reference Guide*
- *UtilityIQ® Installation Guide*
- *Water Meter and Telemetry Module Compatibility List*

Security

When configured to operate in network mode, 500W ERT Modules attempt to join a Gen5 network. The next hop from the module is to a CPD. When the 500W ERT Module has found a suitable CPD, confirmed a secure link, and received a drivers' license from the head end, UtilityIQ can present the module data in the user interface and export it to customer applications.

Refer to the *Gen™X 500W ERT® Module Specification Sheet* for information on compatible hardware, firmware, and UtilityIQ versions.

Transmission Modes

The 500W ERT Module is an IPv6 Wi-SUN compliant device that operates in network mode or mobile mode.

Network Mode

In network mode, the module supports 5-, 15-, 30-, or 60-minute intervals. It provides storage and reporting for up to 62 days of 15-minute interval data and associated event data, or 8 months of hourly interval data.

> **Note:** Interval data configuration is dependent on the module's firmware version. See Firmware Functionality on page 11 for more information.

The 500W ERT Module also sends a local access beacon message every 60 seconds that allows users to gather contingency readings locally when needed.

> **Caution:** If you perform a switch to network mode or switch to mobile mode operation, it results in a loss of interval data.

The 500W ERT Module operates using the 902 to 928 MHz in the ISM band frequency band and does not require an FCC license.

Mobile Mode

In mobile mode, the module transmits every nine seconds over multiple RF channels to report on:

- meter register value
- cut cable or communication error event
- reverse flow (encoder version selected)
- system leak status
- low battery indicator

Operating Modes

The 500W ERT Module has the following operating modes.

- **Factory mode**
  - 500W ERT Modules are shipped from the factory in factory mode.
  - The 500W ERT Module's transmitter is turned off.
  - The 500W ERT Module's receiver is bubbling up to listen for a programming command.
  - 500W ERT Module attempt to read the register every hour.

  - Register Error Detected and Register Error alarm or event flags may be set when a register is not connected.
  - If the 500W ERT Module reads a connected register, the module automatically moves to run mode.
- **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 network installations where the normal bubble rate is very slow.
  - Audit mode remains active for 30 days and then reverts to the initial programmed mode.
  - Audit mode is intended to be used once.
- **Run mode**
  - The 500W ERT Module's normal operation mode.
  - The 500W ERT Module's transmitted message is dependent on its factory settings for standard consumption + messages (SCM+).
  - SCM+ 500W ERT Module default bubble-up rate is 10 seconds.
- **Quiet mode**
  - Meter manufacturers can configure the 500W ERT Module for quiet mode after programming and direct mounting the 500W ERT Module in a factory.
  - The 500W ERT Module is awakened from quiet mode and enters run mode in one of two ways:
    - The 500W ERT Module detects consumption at the top of the hour (last hourly interval is greater than 1 or less than -1).
    - Receiving a two-way command, such as a **Read ERT** using FDM.

Battery Life

The 500W ERT Modulehas an expected battery life of 20 years, dependent on use case.

Low Battery

The 500W ERT Module includes a low battery indicator that helps utilities proactively plan and manage field module replacements.

Events and Alarms

The following section describes common events and alarms in the 500W ERT Module.

Mobile Mode

Extended Alarm Flag

This is retrievable with two-way communication.

Register Error Flag

- The Register Error flag sets if the Register Error Detected flag is active for 24 hours.
- The Register Error Flag remains active for 40 days in mobile mode.

Register Error Detected

- Register Error Detected indicates that the 500W ERT Module is not communicating with the register/meter. The event or alarm flag automatically clears after the 500W ERT Module receives a successful read from the register.

> **Note:** The Register Error Detected flag may be an indicator of a damaged register.

Low Battery Warning

- The remote modules include 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 500W ERT Module . The low battery warning allows the utility to easily identify which 500W ERT Modules are nearing end-of-life in a mixed population and gives the utility the opportunity to schedule replacement.

> **Note:** The low battery warning is a single flag that is 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.

Network Mode

> **Note:** 500W ERT Module events and alarms are dependent on the module's firmware version. For more information, see Firmware Functionality on page 11.

The 500W ERT Module reports the tampers available in mobile mode as well as extended meter alarms available from new solid-state and electronic meters connected to the 500W ERT Module. The extended alarms include:

- Empty pipe
- Temperature
- High flow
- Meter low battery
- Meter tampering
- Reverse flow
- Zero consumption

Extended meter alarms are only available when a 500W ERT Module is in network mode.

For more information about the extended alarms, see the *OpenWay® Collection Manager Device Interface Guide*.

Firmware Functionality

This section lists the 500W ERT Module firmware information and lists functionality by version. Each new version contains the features associated with the previous GSR.

Part number	Global software release (GSR) version	FDM Check Endpoint firmware version	Over-the-Air firmware part number	Firmware functionality
FMW-1606-001	2.0	6.6.0.0	DFW-1606-001	■ Firmware download ■ 100S mobile modes ■ 5-, 15-, 30-, 60-minute interval data ■ Extended meter alarms
FMW-1606-002	2.0	6.6.2.0	DFW-1606-002	■ Supports all functionality described for firmware FMW-1606-001 for the 2-battery 500W ERT Module

2 Initializing, Connecting, and Programming

This chapter provides the instructions to initialize, connect, and program the 500W ERT Module.

Requirements are based on the network system mode. The 500W ERT Module's auto-sensing technology eliminates the need to program the module at the time of installation for most popular registers by automatically detecting the connected register type.

When started, the 500W ERT Module automatically:

- Detects the connected register type at the top of the hour, exits factory mode, and enters run mode.
- Detects an Itron Leak Sensor.

The 500W ERT Module programming is required to:

- Change the operation mode
- Enter a utility ID or lock type.
- To enter an E-Coder 8-digit driver.
- Commission security

Programming

Programming the 500W ERT Module requires one of the following handheld computers running Field Deployment Manager (FDM) or FDM Tools version 4.0 or later.

- FC300SR handheld computer
- Itron Mobile Radio (IMR) connected to a user-supplied computer or Bluetooth® device

For normal activation, connect the 500W ERT Module to the water meter register. The 500W ERT Module polls for a register every hour. The 500W ERT Module automatically activates after it detects the register.

> **Caution!** Do not program configuration changes to the 500W ERT Module until it is connected to the water meter register.
>
> - The FC300SR or Itron Mobile Radio are the only devices that support programming for the 500W ERT Module.
> - Keep a minimum of 12 inches between the 500W ERT Module and programming device while programming configuration changes are completed.
> - Do not place the programming device antenna directly on the 500W ERT Module.

Encoder-type Meter Register Connections

500W ERT Module connections are made by the meter manufacturer for encoder-type registers. The following table describes the connections between the register manufacturer and the 500W ERT Module wire colors.

Caution: Itron recommends 500W ERT Module connections be completed using the inline connector. 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 Connections to Complete Wiring Connections on page 38.

	500W ERT Module wire color		
	Red (data)	**Black (power/clock)**	**White (ground)**
Register manufacturer	**Register screw terminal**		
Badger ADE E Series HR E LCD HR E Mechanical	Green	Red	Black
Badger M5000 Mag Meter	Green Terminal: Out 4+	Red Terminal: Input +	Black Terminal: Input - and Out 4-
Diehl Hydrus	Green	Red	Black
Elster AMCO InVision Scancoder AquaMaster AquaMaster III	Red	Green	Black
Elster AMCO SM 700 (Severn Trent) Q200 (Sensus Protocol) evoQ4 (Sensus Protocol)	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

	500W ERT Module wire color		
	Red (data)	**Black (power/clock)**	**White (ground)**
Register manufacturer	**Register screw terminal**		
McCrometer	Data port/green	Clock/red	Gnd port/black
Metron Farnier OER	Green	Red	Black
Mueller (Hersey) Translator SSR	Green	Red	Black
Sensus ECR ICE iPERL SRII OMNI	Green	Red	Black
Neptune ProRead ProRead AutoDetect E-Coder ARB-V	Red	Black	Green
Performance ETR	Green	Red	Black
RG3 Tomahawk	Green	Red	Black
Siemens Mag Meter Mag8000CT-7ME6820 Mag8000-7ME6810	92	91	93
Zenner (Hendey) ETR	Green	Red	Black

Pulser-type Register Connections

500W ERT Module connections are made by the meter manufacturer for pulser-type registers. The following table describes the connections between the register manufacturer and the 500W ERT Module wire colors.

Caution: Itron recommends 500W ERT Module connections be completed using the inline connector. 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 Connections to Complete Wiring Connections on page 38.

	500W ERT Module wire color		
	Red	**Black**	**White**
Register manufacturer	**Register screw color designator**		
Badger RTR (3-wire)	Red	Black	Green
Badger RTR (2-wire)	Red	Black	No connection
Badger M5000 Mag Meter	Red terminal: Out 1+	Black terminal: Out 1-	White terminal: Out 1+
Cadillac Meter CMAG/EMAG Magnetic Flow	DO1/DO2	COM	DO1/DO2
Elster Digital	Black	Green	Red
Elster V100T	Black	Red	Blue
■ Itron (Actaris) ■ Flostar (2-wire) ■ Cyble Sensor	Either wire	Remaining wire must be connected to both 500W ERT Module wires	
Krohne IFC	Term B	Term H	Term B
RG3 Tomahawk	Green	Black	Green
Sensus PMM	Red	Black	Bare

Extending the Cable

Order the 25-foot inline connector extension cable assembly (CFG-0151-404) to extend the 500W ERT Module's cable.

Verifying Operation

Itron strongly recommends performing a **Check ERT** with a handheld computer running FDM to verify that the 500W ERT Module is operating correctly after installation. Performing a **Check ERT**:

- Initiates an immediate connection to the cellular network and a register read.
- Verifies communication with the Leak Sensor or remote shut-off valve.
- Checks for event or alarm flags.

Use one of the following programming devices to verify that the 500W ERT Module is correctly recording consumption data.

- FC300SR handheld computer
- Itron Mobile Radio connected to a user-supplied computer or Bluetooth device

Caution: Verifying the 500W ERT Module operation requires an FC300SR handheld computer or Itron Mobile Radio running FDM 4.0 or later. Legacy Itron handheld programming devices cannot read the 500W ERT Module .

Each handheld radio requires special setup and configuration parameters to successfully read and program remote modules. Refer to the respective meter reading application for specific instructions.

When comparing the actual register value to that reported by the 500W ERT Module , please keep in mind the 500W ERT Module 's consumption value is updated once an hour when it is in run mode.

3 Installing

Install the 500W ERT Module using one of the following methods. (For mounting option accessories, see the *500W Modules Ordering Guide*.)

Through-lid

The 500W ERT Module mounts in lids with hole sizes from 1-3/4 inches to 2 inches. Installation requires the pit mount kit. For more information, see Installing Through-the-lid in Commercial Installations on page 19.

Rod mount

The 500W ERT Module mounts on a 1/2 inch outside diameter rod. Installation requires the rod mount adapter. For more information, see Mounting on a Rod for Residential Installations on page 22.

Wall mount

The 500W ERT Module mounts to a wall or other vertical surface. Installation requires the rod mount adapter. For more information, see Mounting to a Pit Wall on page 26.

For 500W ERT Module pit boxes, the type of installation method is based on the location of the meter in the pit box and the lid material. Itron recommends mounting the 500W ERT Module in pit boxes with in plastic lids (or other composite materials) for optimum network performance. The 500W ERT Modules are temperature rated from -30° C to +60° C. Do not install the 500W ERT Module in locations that may exceed the temperature rating.

Important! The 500W ERT Module is shipped with a protective cover over the connectors. The protective cover must be fully engaged over the connectors until the module is installed to protect the module's connectors from damage.

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

Pit module positioning other than upright will negatively affect radio performance.

Internal circuit card 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.

Mounting Accessories

The 500W ERT Module can be purchased along with multiple mounting accessories. For more information, see the *500W Modules Ordering Guide*.

Caution: Use protective environmental caps to shield unconnected 500W ERT Module connectors on field-installed modules. Do not leave an exposed connector in the field. Environmental caps employ multiple seals to increase connector life.

500W ERT Modules with Integral Connectors

Prior to connecting inline connectors to the 500W ERT Module connectors, remove the environmental cap. If 500W ERT Modules with integral connectors and the registers are not installed at the same time, secure the protective environmental connector cap on the 500W ERT Module connector using an Itron security seal (MSC-0018-001). Cable ties are not shipped with the 500W ERT Module, but can be ordered from Itron. Use the protective cap (on the 500W ERT Module side) in the field for up to one year.

After installation is complete, recycle or discard installation waste. Do not leave materials on the customer's premises.

Warning! If a three-port 500W ERT Module is installed but the telemetry device is not attached, the environmental cap (MSC-0019-0011) must remain in place on the blue connector (telemetry) to protect the connector from damage.

Installing Through-the-lid in Commercial Installations

This section provides instructions to mount the 500W 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.

Prerequisites

This mounting method requires the pit lid mounting hardware (CFG-1601-001). This procedure also assumes you have one of the 500W ERT Module variants listed in Description on page 6.

Note: Pit lid mounting is not intended for applications involving vehicular traffic. Use the remote antenna kit in incidental traffic areas (such as residential environments).

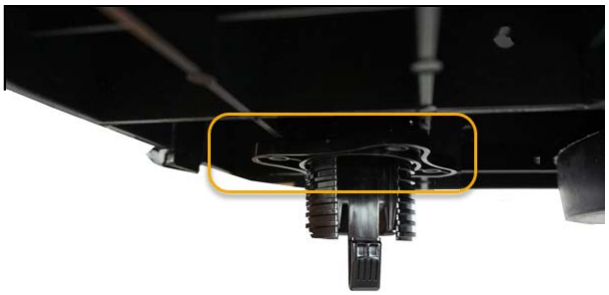
This section provides the instructions to install the 500W ERT Module in a pit lid with a hole using the pit lid mounting bracket. Verify that you have the following items to complete the installation.

1	Pit lid with a pre-drilled hole	User-supplied
2	Through-the-lid retainer clip	CFG-1601-001
3	Retainer clip collar	
4	500W ERT Module	See Description on page 6.

Mounting the Module in a Through-the-lid

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 500W 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 500W ERT Module through lid assembly. If the assembly is improperly aligned, the pit lid may not close.

Pit lid mounting installation is complete.

Connecting the Antenna

1. Align the connector pins with the middle red connector on the 500W ERT Module.
2. Push in the antenna connector to complete the connection.

3. For guidance on the options for mounting the 500W ERT Module, see the .

   Remote antenna installation is complete.

Mounting on a Rod for Residential Installations

Important! Rod mount installation requires the remote antenna and the rod mount adapter. For more information, see Mounting Accessories on page 18.

500W ERT Modules can mount below the pit lid on a customer-supplied 1/2-inch diameter rod. A mounting rod is available from Itron. For more information, see the *500W Module Ordering Guide.*

Caution: Consider the following when installing the 500W 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.

Prerequisites

The following tools are required for rod mount installation.

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

  Note: For mounting rods available from Itron, see Mounting Accessories on page 18 or the *500W Module Ordering Guide*.

- Tape measure

- Rod-driving tool (optional)
- Rod cutting tool

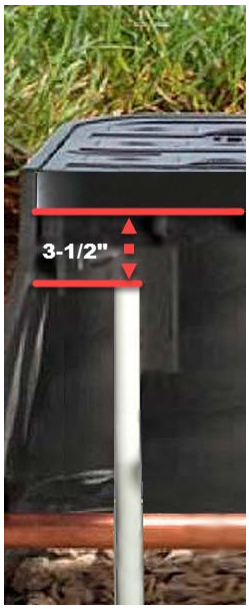
Mounting the Module on a Rod

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 500W 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.

  Caution: 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. Place the module on the rod.
9. Completely insert the rod into the 500W ERT Module's rod mount hole. Do not force the 500W ERT Module onto the rod.

   If the 500W ERT Module does not slide freely on the rod, remove the 500W ERT Module and examine the 500W ERT Module rod hole and rod for burrs or obstructions.
10. You may secure the 500W ERT Module to the rod with a self-drilling screw through the hole in the top of the 500W ERT Module's rod mount cavity.

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

12. Turn the connector locking ring to secure the connection.

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

13. Installation is complete when the 500W ERT Module is perpendicular to the underside of the lid. The 500W ERT Module must not contact the pit structure or lid.

> **Caution:** Verify that the pit lid does not touch the 500W ERT Module when the lid is replaced. There must be a 1 to 2 inch space between the top of the 500W ERT Module and the bottom of the pit lid. If the 500W 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

Important! Wall mount installation in a pit requires the mounting adapter from the remote antenna kit. For more information, see Mounting Accessories on page 18.

Select a flat vertical mounting surface. Install the 500W ERT Module in an upright position. Locate the 500W ERT Module as high as possible in a pit box. Maintain a distance of one to two inches from the bottom of the pit box lid.

Caution! Observe the following guidelines for mounting the 500W ERT Module using the wall mount procedure:

- Any module positioning other than upright will negatively affect radio performance.
- Use inline connectors to connect the 500W 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).
- The 500W ERT Module works accurately with Itron-approved cable type and lengths up to 300 feet.

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

3. Position the 500W ERT Module vertically so the top of the 500W 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 500W ERT Module mounting tabs.

7. Start a screw into the pilot hole. Using the top hole of the 500W ERT Module, set the 500W 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 500W ERT Module housing.

   Note: If the mounting location requires a screw anchor, mark the location of the bottom anchor and remove the 500W ERT Module. Drill the required mounting hole, insert the anchor, and re-attach the 500W ERT Module.

8. Holding the 500W 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 500W ERT Module is complete.

4 Installing Accessories

This chapter provides the installation procedures for 500W ERT Module accessories, including:

Installing the Inline Connector

> **Note:** If an inline connector is not used or the 500W ERT Module is already connected to the water meter or register, skip this procedure.

1. Remove the protective environmental cap from the module connector.
2. Verify that the connector ends are clean and dry before assembly.
3. 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 cable is cut or nicked.
4. Remove the protective cap from the register or accessory connector.
5. Connect the register cable to the 500W ERT Module connector.
   - Align the connectors.
   - Push until snug.
   - Twist the register cable's black coupling nut to align the two tabs.

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

   The original protective connector caps can be reused if kept clean and dry. Install a new security seal after servicing either device. Install a new security seal after servicing either device. To order replacement security seals, see the *500 Modules Ordering Guide*. Environmental caps employ multiple seals to protect the connector from the environment. Environmental cap design allows utilities to install the 500W ERT Module and, at a future date, install a Leak Sensor or optional remote antenna.

7. Shield connectors with protective environmental caps (for more information, see Mounting Accessories on page 18). Do not leave an exposed connector in the field.

Installing the Remote Disconnect Valve

The Smart Earth Technologies (SET) Remote Disconnect Valve is used in conjunction with both indoor (basement) and outdoor (mounting on the exterior of the house) 500W ERT Module installations. Water disconnect devices mount on a water service pipe or meter insetter (meter horn) and connect to the telemetry connector (blue) on the 500W ERT Module. For more information, see Mounting Accessories on page 18.

The 500W 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 ERT**with a handheld computer running FDM software.

Note: Remote water disconnect operation requires a 500W ERT Module with enhanced security enabled.

The 500W 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 water disconnect valve provides the ability to remotely open (reconnect) the valve.
- **Restricted**. The water is restricted and flowing at the configured installation flow.

The 500W 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 500W ERT Module.

Caution: Remote disconnect valves must connect to the telemetry (blue port) of the module.

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

2. Remove the environmental cap from the 500W ERT Module's telemetry connector (blue).

3. Verify that the connectors are clean and dry.
4. Align the disconnect valve connector with the 500W ERT Module's blue telemetry connector.

5. Push the valve connector into the 500W ERT Module's connector.

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

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

Installing the Through-the-lid Remote Antenna

Important! The remote antenna and rod mount adapter are required for all rod and wall mount installations. For more information, see the *500W Modules Ordering Guide.*

This section provides antenna mounting and connection instructions for 500W ERT Modules installed through a pit lid. 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 (e.i.r.p.) 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.

Specifications	
Part number	CFG-0900-003
Gain	2.6 dBi
Horizontal beamwidth	Omni-directional
Impedance	50 ohms
Termination	Proprietary

Innovation, Science and Economic Development Canada (ISED) Conformity	
The radio transmitter (IC:864D-RIVAWA) has been approved by Innovation, Science and Economic Development Canada (ISED) to operate with the antenna types listed above with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.	Le présent émetteur radio (IC: 864D-RIVAWA) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

Metal lids on 500W 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.

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

1. Thread the remote antenna connector 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 connector through the rectangular opening in the threaded collar.

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

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.

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.
- If you remove the inline connector from the remote module to install the cable armor, you must use an Itron handheld to reprogram the module using FDM Endpoint Tools.
- Perform a **Check ERT** function (with FDM Endpoint Tools) after you reprogram the 500W ERT Module to verify communication with the meter register.

1. Remove the installed 500W ERT Module.

   Note: Itron strongly recommends that you keep the 500W ERT Module connected to the register during cable armor installation.

2. Cut a two- to three-inch strip of electrical tape.

3. Wrap the entire piece of electrical tape around the 500W ERT Module cable near the 500W ERT Module .

4. Beginning over the installed electrical tape, twist the Itron cable armor onto the 500W ERT Module cable using a right-handed twist.

> **Warning!** You must twist—not wrap—the cable armor onto the 500W 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 500W ERT Module cable on the unprotected portion of the 500W ERT Module cable, you could damage the module's cable. A cut cable could cause an 500W ERT Module or register communication failure.

5. Continue to twist the cable armor onto the 500W 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

Installation of the Leak Sensor with a 500W ERT Module requires the Leak Sensor with an inline connector (Itron part number LDS-1601-001). The Leak Sensor connects to the telemetry connector on the 500W ERT Module. For the installation instructions, see *OpenWay® Riva™ Leak Sensor Installation Guide*.

If the Leak Sensor five foot cable is not long enough to reach the 500W ERT Module, an extension cable is available from Itron (CFG-0151-404). The maximum cable length between the Leak Sensor and the 500W ERT Module should not surpass 30 feet.

> **Caution:** If the 500W ERT Module is installed to enable communications for the Leak Sensor but a register is not connected, replace the register connector's cap with the environmental cap removed from the blue telemetry connector to protect the register connector.

5 Using Gel-cap Connections to Complete Wiring Connections

> **Important!** All unused wires on 500W ERT Module 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.

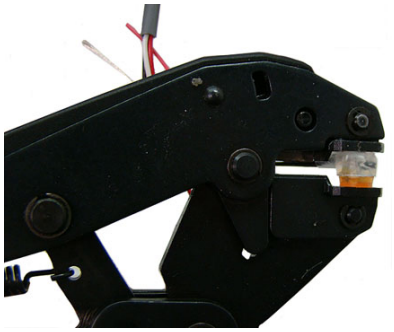
This section provides the instructions to complete remote module to meter wiring connections. Gel-cap connections require:

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

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

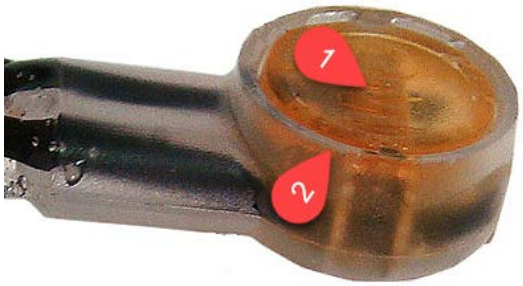
   > **Caution:** Do not strip insulation from the ends of the wires before inserting them into the connector.

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



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

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



> **Warning!** Crimping the connector forces some sealant out of connector. The sealant protects the inside of the connector 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).

5. After the 500W ERT Module to register or meter wire connections are completed, arrange the connectors in a single file.

6. Insert the connectors and wires into the splice tube until the connectors and wires are completely immersed in the non-conductive gel material.

7. Separate the cable wires to the sides and close the splice tube cover.

8. Remove any leftover materials from the customer premises.

A Troubleshooting

This information is provided to help you troubleshoot issues related to 500W ERT Modules.

The following table describes possible issues and provides suggested actions to resolve the issue.

Issue	Action
Cannot program the 500W ERT Module.	Check the programming device and software version. Program 500W ERT Module using the FC300 handheld computer running Field Deployment Manager (FDM) software v4.0 or higher.
Cannot read the 500W ERT Module.	A 500W ERT Module that is not programmed will not transmit an SCM+ message. Reprogram the 500W ERT Module and perform a reread. If a 500W ERT Module is not initially programmed, it will not bubble-up and listen for an SCM+ message.
The 500W ERT Module is reporting an invalid read.	A 500W ERT Module that has set the Register Error flag will cause an Invalid Read to display in the FDM Consumption field.
Marginal readability due to 500W ERT Module location (for example, a 500W ERT Module deep inside a pit).	Consider reprogramming the 500W ERT Module for Hard-to-read (H2R) mode. Programming the 500W ERT Module for hard-to-read mode increases the output to high power. **Note:** Hard-to-read mode will reduce battery life.
The handheld programmer is locked up and button presses produce no response.	*Soft boot* the handheld. Reference the documentation for your programming device. For more information, see Related Documents on page 7.

B 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.

Australia, ACMA Spectrum Compliance

When this device is sold and shipped to Australia, it is configured and labeled accordingly to be compliant with ACMA Standards for the Radio, EMC and RF Exposure. This includes standard AS/NZS 4268 RF spectrum for frequency, power out, emissions, and so on.

New Zealand, RCM Spectrum Compliance

When this device is sold and shipped to New Zealand, it is configured and labeled accordingly to be compliant with RCM Standards for the Radio, EMC and RF Exposure. This includes AS/NZS 4268 RF spectrum standard and RCM Radiocommunications Regulations (General User Radio Licence for Short Range Devices) for frequency and power out.

Note: The Remote Antenna Kit (CFG-0900-003), 500W Remote Modules, Leak Sensor (LDS-1601-001 and LDS-1601-002), OpenWay Riva network mode, and legacy ChoiceConnect modes are not approved for New Zealand.

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.

Electromagnetic Compatibility

Warning! 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

Warning! 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

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