



Water Solutions

OpenWay Riva Water Pit Module Installation Guide

Identification

OpenWay Riva Water Pit Module Installation Guide
26 September 2016 TDC-1666-000
OpenWay Riva Water Pit Module

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Compliance Statement

This device complies with Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference that may cause undesirable operation.

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

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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.

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



Warning Follow these procedures to avoid injury to yourself or others:

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



Warning ELECTROMAGNETIC COMPATIBILITY

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.



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



Warning 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 Riva module.



Warning Water modules contain sensitive electronic components which can be damaged if the module is dropped from heights greater than 36 inches. Product warranty coverage is contingent on not exceeding this drop height limitation.

Transportation Classification

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

Suggestions

If you have comments or suggestions on how we may improve this documentation, send them to TechnicalCommunicationsManager@itron.com

If you have questions or comments about the software or hardware product, contact Itron Technical Support:

Contact

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Before You Begin

Document Conventions

Convention	Example
Itron product part numbers are noted in parentheses.	To install the pit module (ERW-1601-XXX), do the following steps.
Hypertext links are in blue.	See How The Document is Organized for document structure information.



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



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



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

Document Purpose

This document provides the installation instructions for the OpenWay Riva Water Pit Module and details the various mounting options.

How This Document is Organized

This document is organized into the following chapters:

Chapter	Description
1. Before You Begin	Information about this publication.
2. About the OpenWay Riva Water Pit Module	Overview of pit module installation.
3. Initializing, Connecting, and Programming the Pit Module	Instructions to initialize, program, and connect the pit module to the water register/meter.
4. Installing the OpenWay Riva Water Pit Module	Step-by-step installation instructions for: <ul style="list-style-type: none">• Through lid mount• Rod mount• Wall mount• Optional Riva Leak Sensor installation• Optional remote water disconnect valve installation
Appendix A Using the Itron Cable Armor	Instructions for installing the optional cable armor.
Appendix B Using an Inline Connector	Instructions for installing an inline connector.
Appendix C Troubleshooting	Troubleshooting pit module operation.

Related Documents

Document Description	Itron Part Number
<i>OpenWay Riva Water Remote Module Installation Guide</i>	TDC-1687-XXX
<i>OpenWay Collection Manager Operational Guidelines</i>	
<i>OpenWay Riva Events and Exceptions Reference Guide</i>	
<i>Field Deployment Manager Endpoint Tools Mobile Application Guide</i>	TDC-0934-XXX
<i>Field Deployment Manager Field Representative's Guide</i>	TDC-0936-XXX
<i>900 MHz Belt-Clip Radio User's Guide</i>	TDC-0889-XXX
<i>FC300 Getting Started Guide</i>	TDC-0898-XXX
<i>FC200 Series Getting Started Guide</i>	TDC-0598-XXX
<i>Water Module Products Ordering Guide</i>	PUB-0063-001
<i>Water Meter and Telemetry Module Compatibility List</i>	PUB-0063-002
<i>mlogonline™ Network Leak Monitoring System User Guide</i>	TDC-0792-XXX



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

About the OpenWay Riva Pit Module

OpenWay Riva water modules are high-power radio frequency transmitting modules that attach to water registers/meters to collect consumption usage and tamper data. The OpenWay Riva water module transmits the meter/register data to a collection device which in turn transfers the information to the utility's customer billing system. The OpenWay Riva water module operates in a Mobile/Handheld environment. The OpenWay Riva Water Pit Module reports 9-digit register data with Mobile SCM+. Additionally, the OpenWay Riva water module may be programmed to truncate up to three of the meter/register's least significant digits.

The OpenWay Riva water modules ship from the factory in Factory Mode which prevents unwanted radio transmissions during transit. After installation and programming, the OpenWay Riva Water Pit Modules acquire and transmit meter register data in accordance with the selected pit module parameter settings.

The OpenWay Riva Water Pit Modules support protocols for a variety of meter manufacturer's registers. Refer to the *Water Meter and Telemetry Module Compatibility List* (PUB-0063-002), for the list of supported meters and registers.

OpenWay Riva Water Pit Modules feature the following capabilities:

- Leak Detection and Reverse Flow Detection. OpenWay Riva water modules feature robust algorithms that provide Leak and Reverse Flow Detection.
- (Optional) OpenWay Riva Leak Sensor
 - The optional Riva Leak Sensor analyzes water flow sound patterns to detect water leaks. Leak sensor analysis data is uploaded to the mlogonline Network Leak Monitoring online portal. Systems with optional Riva 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 TDC-0792-XXX).
- (Optional) Telemetry Devices
 - Optional remote water disconnect valves provides water utilities with a non-intrusive means of managing customer disconnects and reconnects that traditionally required on-site visits. The remotely-controlled disconnect valve helps lower the utility's costs by eliminating routine move-in/move-out service calls.
 - ! **Note** Remote water disconnect operation requires an OpenWay Riva water module with enhanced security enabled. To learn more about enabling enhanced security, see the Field Deployment Manager Endpoint Tools Mobile Application Guide (TDC-0934-XXX).

OpenWay Riva Water Pit Module Description

Description	Itron Part Number
OpenWay Riva Water Pit Module	ERW-1601-001

- ! **Note** The OpenWay Riva Water Pit Module works accurately with cable lengths up to 300 feet.

Itron Security Manager (ISM)

Users have the option of enabling enhanced security in OpenWay Riva Water Pit Modules. Itron Security Manager (ISM) is a feature of the OpenWay Riva system that ensures certain pit module commands are issued through secure radio communications between the handheld computer, Mobile Collector, or OpenWay system.

There are two fundamental security processes used in the OpenWay Riva 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 OpenWay Riva Water Pit 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. Data transmissions over the network are protected using AES-256 encryption.

Enabling OpenWay Riva Water Pit Module Security

Each pit 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 (FC300) that is configured with the corresponding security key for that particular pit module. Initial key exchange commands are secured using the utility factory key. For more information about programming the pit module, see the *FDM Endpoint Tools Mobile Application Guide* (TDC-0934).

Battery Life

The OpenWay Riva Water Pit Module is powered by two non-replaceable, long-life lithium batteries, and has an expected battery life of 20 years when the pit module operates in default mobile operating mode. If the pit 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.

OpenWay Riva Water Pit Module Transmission Modes

The OpenWay Riva Water Pit Module can be set to transmit in Standard Mobile/Handheld Mode (factory default setting), Mobile High Power Mode, Hard-to-Read, or Audit Mode.

- **Mobile and Handheld Mode.** In Mobile and Handheld Mode:
 - the pit module transmits a medium-powered SCM+ message every 10 seconds.
- **(Optional) Mobile High Power Mode.** The pit module transmits a high-powered SCM+ RF message every 60 seconds.
- **(Optional) Hard to Read Mobile Mode.** The pit module transmits a high-powered SCM+ RF message every 30 seconds. *The hard-to-read Mobile Mode should only be used for exceptionally hard-to-read locations as this mode reduces battery life significantly.*

Note The OpenWay Riva Water Pit Module's battery life is significantly affected in hard to read mobile 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 installations where the normal bubble-up 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.

An FCC license is not required to read OpenWay Riva Water Pit Modules.

OpenWay Riva Water Pit Module Operating Modes

1. Factory mode

- Pit Modules ship from the factory in Factory Mode.
- The pit module's transmitter is off.
- The pit module's receiver bubbles-up to listen for a programming command.
- pit modules attempt to read the register every hour.
- Last Good Read and Extended Tamper Flags may be set when a register is not connected.
- If the pit module reads a connected register, the pit module automatically moves to Run Mode.

2. Run mode

- Pit Module normal operation mode.
- The OpenWay Riva Water Pit Module transmitted message is dependent on its factory settings or setting programmed with FDM for standard consumption messages (SCM+).
For SCM+ (Mobile), the pit module default bubble-up rate is 10 seconds.

3. Meter manufacturer quiet mode

- Meter manufacturers can configure the pit module for quiet mode after initializing and direct mounting the pit module in the factory.
- The pit module awakens from quiet mode and enters run mode in one of two ways:
 1. The pit module detects consumption at the top of the hour (last hourly interval >1 or <-1).
 2. The pit module receives a two-way command (for example, a **Read ERT** using FDM software).

Error/Warning Flags

Register Error Detected. Register Error Detected indicates that the pit module is not communicating with the register/meter. The tamper flag automatically clears after the pit module receives a successful read from the register.

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

Extended Tamper Flag (retrievable with two-way communication).

Low Battery Warning. The pit 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 pit module. The low battery warning allows the utility to easily identify which water 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 2 years of battery life remaining. Battery life is evaluated daily at midnight.

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.

Initializing, Connecting, and Programming the OpenWay Riva Water Pit Module

This chapter provides the instructions to program and connect the pit module.

OpenWay Riva Water Pit Module Start-up

The pit module automatically:

- Detects the connected register type at the top of the hour, exits Factory Mode, and enters Run Mode.
- Detects an Itron Riva Leak Sensor.

OpenWay Riva Water Pit 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

Itron strongly recommends performing a **Check ERT** with a handheld computer running FDM to verify the pit module is operating correctly after installation. Performing a **Check ERT** will:

- Generate an immediate register read.
- Verify communication with the Riva Leak Sensor.
- Check for tamper flags.

Programming the Pit Module

Programming the pit module requires one of the following handheld computers running Field Deployment Manager (FDM) version 4.0 or later.

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

For normal activation, connect the pit module to the water meter register and program the pit module using FDM.

Connecting to a Meter Register Using the Inline Connector

The inline connector system provides easier general maintenance or system troubleshooting (see [Using an Inline Connector](#) on page 23).

Connecting the OpenWay Riva Water Pit Module to a Remote Meter Register

Order the 25-foot inline connector extension cable assembly (CFG-0151-401) to extend the cable of the pit module.

Connect the pit module cable to the register according to the following table.

Register Manufacturer	Pit Module wire color		
	Red (data)	Black (power/clock)	White (ground)
	Register screw terminal		
Badger ADE E Series HR E LCD HR E Mechanical	Green	Red	Black
Badger M5000 Mag Meter	Terminal: Out 1+	Terminal: Out 1-	Terminal: Out 1+
Elster AMCO InVision Scancoder	Red	Green	Black
Elster AMCO SM 700 (Severn Trent), Q200	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
Metron Farnier	Green	Red	Black
Mueller (Hersey) Translator, SSR	Green	Red	Black
Sensus ECR ICE iPERL SR11 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

Connecting the Pit Module to a Remote Meter Register

Connect pit module cable to the register according to the following table.

Pit Module Connections			
Register Manufacturer	Pit Module wire color		
	Red (signal)	Black (common)	White (tamper)
	Register screw color designator		
Badger RTR (3-wire)	Red	Black	Green/bare
Badger RTR (2-wire)	Red	Black	No connection*
Badger M5000 Mag Meter	Out 1+	Out 2-	Out 1+
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 pit module wires	
Krohne IFC	Term B	Term H	Term B
RG3 Tomahawk	Green	Black	Green
Sensus PMM	Red	Black	Bare

Verifying Pit Module Operation

Use one of the following handheld computers to verify consumption:

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



Notes

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



Caution Verifying the OpenWay Riva Water Pit Module operation requires an FC200SR or and FC300 handheld computer running FDM v. 4.0 or higher. Legacy Itron handheld programming devices cannot read the pit modules.

Installing the OpenWay Riva Water Pit Module

Install the pit module using one of the following methods:

Pit Module Mounting Options

Through-Lid	The pit module mounts in lids with hole sizes from 1-3/4 inches to 2-inches. Installation requires the Pit Lid Mounting Kit.
Rod mount*	The pit module mounts on a 1/2-inch outside diameter rod.
Wall mount*	The pit module mounts to a wall or other vertical surface.

* **Important** Rod and wall mount installations require the Itron Pit Lid Mounting Kit.

For water pit boxes, the type of installation method is based on three factors: the location of the meter in the pit box, the lid material, and the current lid configuration. Itron recommends mounting the pit module in pit boxes with in plastic lids (or other composite materials) for optimum network performance. The pit modules are temperature rated from -20° C to +60° C. Do not install the pit module in locations that may exceed the temperature rating.



Caution Pit module positioning other than upright could negatively affect radio performance and battery life.



Warning Pit modules contain sensitive electronic components which can be damaged if the module is dropped from heights greater than 36 inches. Product warranty coverage is contingent on not exceeding this drop height limitation.



Warning Internal circuit card components are extremely sensitive to electrostatic discharge. Be careful not to touch any part of the meter body, register housing, or Riva 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.

Pit Module Mounting Accessories

Pit Module Mounting Accessories

Accessory	Part Number
Riva Rod Mount Adapter	MLD-1601-007
Riva Pit Lid Mounting Kit	CFG-1601-001
Cable Armor (see Appendix C for field retrofit installation instructions)	
5 foot cable thin-insulation (with protective cover and cable armor)	CFG-0151-006SS
5 foot cable thick-insulation (with protective cover and cable armor)	CFG-0151-010SS
5 foot cable armor for field retrofit	FAB-1302-001
pit module Universal Environmental Cap	MSC-0019-008
Itron Security Seal	MSC-0018-001



Caution Shield unconnected pit module ports on field installed modules with protective environmental covers. Do not leave an exposed connector in the field. Environmental caps employ multiple seals to increase cap life.

Pit Modules with Integral Connectors

If pit modules with integral connectors (ERW-1601-00X) and the registers are not installed at the same time, secure the protective environmental connector cover on the pit module using an Itron Security Seal (Itron part number MSC-0018-001). Cable ties are not shipped with the pit module, but can be ordered from Itron. Use the protective cover (on the pit module side) in the field for up to one year.



Warning If a three-port pit module is installed but the telemetry device is not attached, the environmental cap (MSC-0019-008) must remain in place on the blue connector (telemetry) to protect the connector from damage.

To install a Security Seal through the protective connector cover

1. Align the protective cover and connector security seal holes.
2. Insert the security seal pointed end through the security holes in the connector and protective cover.
3. Insert the pointed end of the security seal into the cap end and push until the seal locks.

Through Lid Installation

This section provides instructions to mount the pit module in a pit lid with a drilled, round 1-3/4-inch, 1-7/8-inch, or 2-inch hole.



Through Lid Mount Required Tools and Hardware

This mounting method requires the Pit Lid Mounting Kit.

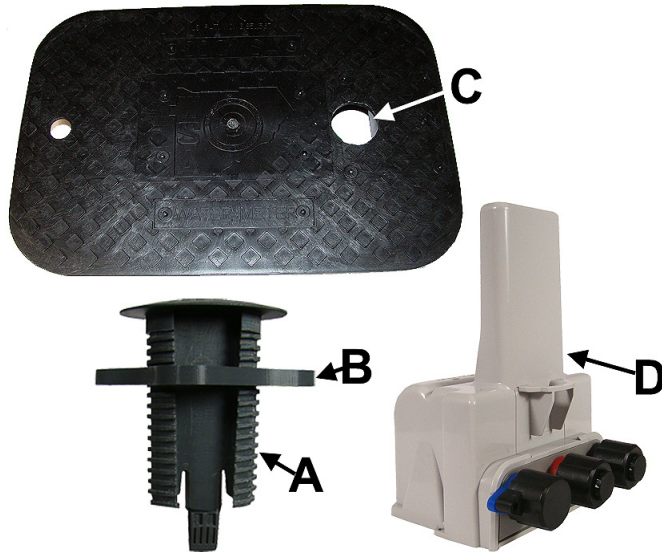
Pit Lid Mounting Kit (CFG-1601-001)



Note The Pit Lid Mounting Kit is not intended for applications involving vehicular traffic.

Installing the OpenWay Riva Water Pit Module

This section provides the instructions to install the pit module in a pit lid with a hole using the Pit Lid Mounting Kit (CFG-1300-004). Verify you have the following items to complete the installation.



- A Retainer clip
- B Pit lid with a pre-drilled hole
- C Retainer clip collar
- D OpenWay Riva Water Pit Module

To install the module in lids with holes using the Pit Lid Mounting Kit

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 the beveled edge of the clip collar is toward the top of the pit lid.

3. Align and insert the retainer clip tab into the retainer clip receptacle on the pit module housing.
4. Verify the clip locks into place in the housing.


Caution Carefully align the pit module through lid assembly. If the assembly is improperly aligned, the pit lid may not close.


Pit lid mounting installation is complete.

Rod Mount Installation

 **Important** Rod mount installation requires the Rod Mount Adapter. For more information, see [Pit Module Mounting Accessories](#) on page 9.

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

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

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

Caution Observe the following guidelines for mounting the pit module using the rod mount procedure:

- Pit module positioning other than upright could negatively affect radio performance and battery life.

Required Tools and Hardware

- Hammer
- 1/2-inch outside diameter rod (you may use either a square or round rod)*
- Tape measure
- Rod-driving tool (optional)
- Rod cutting tool

*Itron offers 12" (OEM-1006-001), 18" (OEM-1006-002), or 36" (OEM-1006-005) fiberglass mounting rods. Minimum order quantity is 100. For more information, see the *Itron Water Products Ordering Guide* (PUB-0063-001).

To install the pit module on a rod

1. Remove the pit lid. Inspect the area to make sure there are no buried cables, pipes, or other obstructions.
2. 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.
3. 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 the pit module is well supported and remains vertical.

Installing the OpenWay Riva Water Pit Module

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



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

- Drive the rod into the ground so the top of the rod is approximately 3-1/2 inches below the bottom of the pit lid.
 - If you cannot drive the rod in enough to equal the necessary spacing, cut the remaining rod length to the proper height using an abrasive cut-off tool.

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. Place the Riva module on the rod. Completely insert the rod into the pit module's rod mount hole. Do not force the pit module onto the rod. If the pit module does not slide freely on the rod, remove the pit module and examine the pit module rod hole and rod for burrs or obstructions.

Installing the OpenWay Riva Water Pit Module

7. You may secure the pit module to the rod with a self-drilling screw through the hole in the top of the pit module's rod mount cavity. The screw mounting hole is shown in the following product image.
8. Installation is complete when the pit module is perpendicular to the underside of the lid. The pit module must not contact the pit structure or lid.

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

Wall Mount Installation

Select a flat vertical mounting surface. Install the pit module in an upright position. Locate the pit module as high as possible in a water 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 pit module using the wall mount procedure:

- ERT module positioning other than upright could negatively affect radio performance and battery life.
- Do not use gel connectors in pit environments; use only inline connectors.

The pit module works accurately with Itron-approved cable type and lengths up to 300 feet.

Required Mounting Tools and Hardware

- Drill and drill bits appropriate for mounting location material.
- Common hand tools for the selected fastening method.
- #10 size pan head mounting screws appropriate for the wall or pit box material.

To install the pit module using the wall mount procedure

1. Select a vertical, flat surface in the pit box.
2. Position the pit module vertically so the top of the pit module is between 1 and 2-inches below the bottom of the lid.

Installing the OpenWay Riva Water Pit Module

3. Mark the location of the top mounting hole.



4. Drill a pilot hole in the pit box wall. Follow the screw manufacturer's recommendation for the pilot hole size.
5. 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 pit module mounting tabs.

6. Start a screw into the pilot hole. Using the top hole of the pit module, set the pit 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 pit module housing.

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

7. Holding the pit module in the upright position, drill the second pilot hole. Use the bottom mounting hole as a template.

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

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

Optional Riva Leak Sensor Installation

This section describes installation of the OpenWay Riva Leak Sensor in a OpenWay Riva Water Pit Module system.

The pit module stores 20 days of Riva Leak Sensor data. On the 21st day, the pit module begins to write over stored data in a first in, first out manner.

The pit module automatically detects the presence of connected Riva Leak Sensor. The pit module automatically detects the sensor within 22.5 minutes and begins reading the sensor data. To immediately detect the Riva Leak Sensor and begin reading data, perform a **Check ERT** with a handheld computer running FDM software.

The Riva Leak Sensor is used in conjunction with both indoor (basement) and outdoor (mounting on the exterior of the house) pit module installations. Riva Leak Sensors are mounted on a water service pipe or meter insetter (meter horn) and connect to the telemetry connector on the pit module. For more information, see [To connect the Riva Leak Sensor to the pit module](#) on page 17. The mounting bracket shipped with the Riva Leak Sensor accommodates an (up to) 1-1/2-inch OD pipe. An optional mounting bracket is available for pipe sizes (up to 2 1/2-inch OD).

Riva Leak Sensor Installation Equipment

For a list of Riva Leak Sensor installation equipment, refer to the *Water ERT Products Ordering Guide* PUB-0063-001.



Warning When the pit module is installed but the telemetry device is not attached, you must protect the blue port with the universal environmental cap (MSC-0019-008). If you disconnect the telemetry device from the pit module, the environmental cap must be replaced to protect the connector.

Pipe Preparation

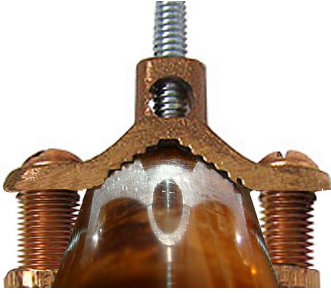
Clean any dust or dirt from the pipe to facilitate direct contact with the Riva Leak Sensor surface.

To install the Riva Leak Sensor on a pipe or meter insetter

1. Select a mounting location within 5-feet of the pit module.
2. Verify the pipe's mounting surface is free from dirt and debris.

Installing the OpenWay Riva Water Pit Module

3. Mount the sensor mounting clamp on the pipe on the water input side of the meter.



Caution Mount the Riva Leak Sensor on the water input side of the meter. Failure to follow this mounting requirement could result in errors in the leak detection data. Installation requires Itron mounting hardware. Repair costs and service charges relating to the use on non-compliant mounting hardware will be charged to the customer. Contact Itron Support for more information.

Do not mount the leak sensor on a pipe coupler, joint, or nut.

4. Turn the Riva Leak Sensor's mounting base onto the mounting bracket post.
5. Align the Riva Leak Sensor mounting lock pin with the pin receptacle on the Riva Leak Sensor mounting base and insert the sensor.
6. Turn the Riva Leak Sensor to lock the sensor into place.

Note For Riva Leak Sensor installations on pipes up to 2-1/2 inches, use the optional larger mounting bracket. For more information, see the *Water Products Ordering Guide* PUB-0063-001.

Connecting the Riva Leak Sensor to the Riva Water Module

After the pit module is installed in the desired location, connect the pit module to the Riva Leak Sensor.

To connect the Riva Leak Sensor to the pit module

Caution The Riva Leak Sensor must mount to the blue telemetry connector of the pit module. Connecting the sensor to the incorrect port will cause electrical damage to the Riva Leak Sensor and pit module.

1. Remove the environmental cap from the blue telemetry connector of the pit module.



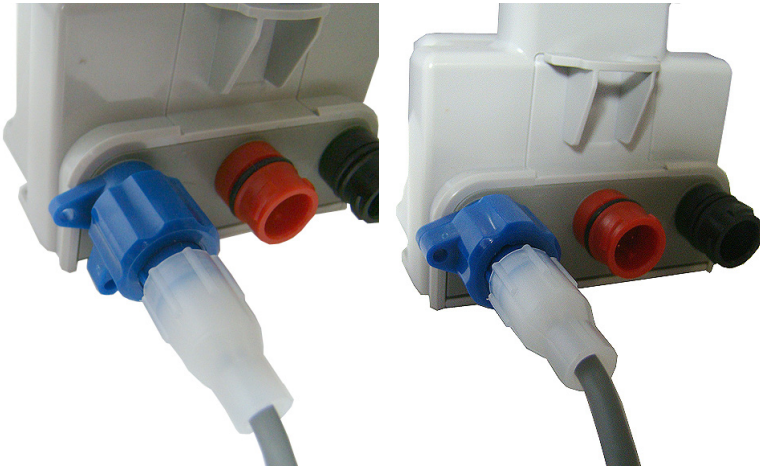
2. Remove the environmental cap from the leak sensor connector. Verify the connectors (the pit module telemetry connector and the leak sensor connector) are clean and dry.

Installing the OpenWay Riva Water Pit Module

3. Align the Riva Leak Sensor connector with the pit module's blue connector and insert.



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



Caution Do not force the connector ends together. While you hold the Riva Leak Sensor connector, engage the pit module connector by rotating the locking ring until both connectors securely connect. Twist only the connector locking ring, not the body of the connector. Twisting the connector body could damage the connector's pins.

To attach an Itron security seal through the connector security hole

1. Insert the pointed end of the security seal through the inline connector and the pit module connector security holes.



Installing the OpenWay Riva Water Pit Module

2. Insert the pointed end of the security seal into the capped end and push until the seal locks.



This completes the pit module and Riva Leak Sensor connections.

Optional Remote Water Disconnect Valve Installation

This section describes installation of a remote water disconnect valve in an OpenWay Riva water system.

The pit module automatically detects the presence of connected water disconnect devices. The pit module automatically detects the device 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.

The disconnect valve is used in conjunction with both indoor (basement) and outdoor (mounting on the exterior of the house) pit module installations. Water disconnect devices are mounted on a water service pipe or meter insetter (meter horn) and connect to the center telemetry connector (blue) on the pit module as described in [Installing the Remote Water Disconnect Valve](#) on page 19.

- ! **Note** Remote water disconnect operation requires an pit module with enhanced security enabled.

Installing the Remote Water Disconnect Valve

The remote water 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 pit module.

To connect the remote water disconnect valve to the pit module

Caution Remote disconnect valves must mount to Port B (middle telemetry blue port) of the module. Connecting the disconnect valve to the incorrect port will cause electrical damage to the disconnect valve and pit module.

Installing the OpenWay Riva Water Pit Module

1. Remove the environmental cap from the pit module's blue connector (B).



B. **Blue** connector: telemetry device connection

A. **Black** connector: register connection

2. Remove the environmental cap from the remote disconnect valve connector. Verify the connectors (the pit module's telemetry connector and the disconnect valve connector) are clean and dry.



3. Align the disconnect valve connector with the pit module's blue telemetry connector and push the valve connector into the pit module's connector.
4. Rotate the connector locking ring until the security holes align.

Caution Do not force the connector ends together. While you hold the disconnect valve's connector, engage the pit module's connector by rotating the locking ring until both connectors are securely connected. Twist only the connector locking ring, not the body of the connector. Twisting the connector body could damage the pit module and disconnect valve's connector pins.

To attach an Itron Security Seal through the connector security hole

1. Insert the pointed end of the security seal through the inline connector and the pit module connector security holes.
2. Insert the pointed end of the security seal into the capped end and push until the seal locks.

This completes the pit module and remote disconnect installation.

Using the Itron Cable Armor

This section describes the procedure for installing Itron cable armor in a field installation. The Itron cable armor provides a layer of protection for the module's cable jacket. Itron cable armor is available in five-foot sections.



Warning Itron cable armor is stainless steel and may have sharp edges. Use caution when you are installing the cable armor.



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

Required Materials

The following materials are required to install the Itron cable armor.

- 5-foot Itron cable armor
- Electrical tape
- (Optional) Scissors



To install the Itron cable armor

1. Remove the pit module from the pit.

Note If it is possible in your field installation, keep the pit module connected to the register.

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



Installing the OpenWay Riva Water Pit Module

3. Wrap the entire piece of electrical tape around the pit module cable near the inline connector.



4. Beginning over the installed electrical tape, twist the Itron cable armor onto the pit module cable using a right-handed twist.



Important You must twist—not wrap—the cable armor onto the pit module cable. Wrapping the cable armor can cause the stainless steel jacket to warp.



Warning You must begin twisting the cable armor over portion of the cable protected by the electrical tape. If you do not begin to twist the cable armor over the protected portion of the cable, a cut cable could cause an pit module/register communication failure.

5. Continue to twist the cable armor onto the pit module cable until the cable armor covers the entire cable.

Warning You must continue to twist the cable armor onto the cable protected by the electrical tape. If you do not twist the cable armor over the protected portion of the cable, you could initiate a cut cable and cause a pit module/register communication failure.

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

APPENDIX B

Using an Inline Connector

This section describes the pit module connections to the water meter register using the inline connector assembly. Follow the manufacturer's recommended procedure for installing the water meter register on the meter.

To connect the inline connector

Note If an inline connector is not used and the pit module is already connected to the water meter register, skip this step.

1. Remove the protective cover from the connector by twisting the two halves in opposite directions. Pull the halves apart.

Caution Verify the connector halves 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 cable is cut or nicked.

2. Connect the register cable to the pit module connector:
 - Holding the connectors by the black shells, rotate one end to align the keyed slots.
 - Push until snug.
 - Slide the black coupling nut over the O-ring. Make sure the O-ring stays seated. (If the O-ring does not stay seated, disconnect and repeat this step.)
 - Twist the register cable's black coupling nut to align the two tabs.
3. Install the security seal as shown. Push it until it snaps into place.

Note For future meter or pit module servicing, break the security seal by pulling the seal apart. The original protective connector covers can be reused if kept clean and dry. Install a new security seal after servicing either device. To order replacement security seals, see the *Water Products Ordering Guide* (PUB-0063-001).

Caution Shield connectors with protective environmental covers (see [Pit Module Mounting Accessories](#) on page 9). Do not leave an exposed connector in the field.

Environmental caps employ multiple seals to increase cap life. Environmental cap design allows utilities to install the pit module and install a Riva Leak Sensor at a future date.

APPENDIX C

Troubleshooting

The following information is provided to help you troubleshoot issues related to the OpenWay Riva Water Pit Modules.

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

Issue	Action
Cannot program the pit module.	Check the programming device and software version. Program pit module using the FC300 handheld computer running Field Deployment Manager (FDM) software v4.0 or higher.
Cannot read the pit module.	A pit module that is not programmed will not transmit an SCM or SCM+ message. Reprogram the pit module and perform a reread. If a pit module is not initially programmed, it will not bubble-up and listen for an SCM/SCM+ message.
The pit module is reporting an invalid read.	A pit module that has set the Register Error flag will cause an Invalid Read to display in the FDM Consumption field.
Marginal readability due to water pit module location (for example, an pit module deep inside a pit).	Consider reprogramming the pit module for Hard-to-read (H2R) mode. Programming the pit 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.	<i>Soft boot</i> the handheld by pressing and holding buttons A and B until the screen fades. Release the buttons and allow the handheld to reboot.

