



# OpenWay® Riva™ Remote Water Module Installation Guide

## Identification

OpenWay Riva Remote Water Module Installation Guide

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# Chapter 1 Important Safety and Compliance Information

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

## FCC Part 15 Rules

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.

### 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.

#### **Compliance Statement Canada**

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.

#### **Déclaration de Conformité**

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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.

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.

### **Modifications and Repairs**

To ensure system performance, this device and antenna shall not be changed or modified without the expressed approval of Itron. Per FCC rules, unapproved modifications or operation beyond or in conflict with these instructions for use could void the user's authority to operate the equipment.

## **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 100° Celsius (212° Fahrenheit), crush, expose to water, or incinerate the lithium battery.
- Keep the lithium battery away from children.
- Fire, explosion, and severe burn hazard.

## **Modifications and repairs**



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

## **Disconnecting power**



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

## Electromagnetic compatibility



**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.

## Electrostatic discharge



**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 water module.

## Drop height limitation



**Warning:** ERT 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.

# Chapter 2 About the OpenWay Riva Remote Module

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OpenWay Riva remote modules are high-power radio frequency transmitting modules that attach to water registers/meters to collect consumption usage and tamper data. The OpenWay Riva remote module is an IPv6-compliant endpoint designated to communicate over the ItronOpenWay Riva multi-purpose IoT solution; Itron Riva Network or the legacy ChoiceConnect network. The Riva Water module transmits in ChoiceConnect Mobile, ChoiceConnect Hard-to-Read Mobile, ChoiceConnect High Power Mobile, or OpenWay Riva Network mode.

The OpenWay Riva remote modules ship from the factory in Factory Mode which prevents unwanted radio transmissions during transit. After installation, the OpenWay Riva module automatically detects the attached register model eliminating the need to program the module. Over-the-air firmware downloads allow the utility access to the latest features without the need to visit each installation.

The remote water modules support protocols for a variety of major 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 remote water modules feature the following capabilities:

- Datalogging The Riva Water module stores 160 days of hourly data in network system mode.
- Leak Detection and Reverse Flow Detection. OpenWay Riva remote 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 provide 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 remote module with Itron Security Manager (ISM) enabled. To learn more about enabling enhanced security, see the Field Deployment Manager Endpoint Tools Mobile Application Guide (TDC-0934-XXX).

## OpenWay Riva remote module description

OpenWay Riva remote module description	Itron part number
10-inch flying lead	ERW-1601-002

## Related documents

Document description	Itron part number
<i>OpenWay Riva Water Remote Module Installation Guide</i>	TDC-1687-XXX
<i>OpenWay Riva Water Pit Module Installation Guide</i>	TDC-1666-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>Itron Mobile Radio Quick Reference Guide</i>	
<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.

## Itron Security Manager (ISM)

Users have the option of enabling enhanced security in remote water modules. Itron Security Manager (ISM) is a feature of the OpenWay Riva system that ensures certain water module commands are controlled through secure radio communications between the handheld computer or Mobile Collector and the remote water module.

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 OpenWay Riva remote 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 remote module security

Each OpenWay Riva remote 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 (FC200SR, FC300) that is configured with the corresponding security key for that particular OpenWay Riva remote module. Initial key exchange commands are secured using the utility factory key. For more information about programming the water module, see the FDM Endpoint Tools Mobile Application Guide (TDC-0934).

## Battery life

Powered by four non-replaceable, long-life lithium batteries, the OpenWay Riva remote module has an expected battery life of 20 years. OpenWay Riva water modules include a battery replacement alarm that helps utilities plan and manage field module replacements.

## OpenWay Riva remote module transmission modes

The OpenWay Riva water module is an IPv6 Wisun compliant device that operates in ChoiceConnect mobile or OpenWay Riva Network mode.

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

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

In OpenWay Riva Network mode, the module reports four interrogation cycles daily. Each interrogation collects six hours of interval and event data. The OpenWay Riva water module also sends a local access beacon message every 60 seconds that allows users to gather contingency readings locally when needed.

The OpenWay Riva water module uses the 908-924 MHz ISM frequency band and does not require an FCC license to read OpenWay Riva remote modules.

## Operating modes

The OpenWay Riva remote module has three standard operating modes.

### 1. Factory mode

- OpenWay Riva remote modules are shipped from the factory in factory mode.
- The module's transmitter is turned off.
- The module's receiver is bubbling-up to listen for a programming command.
- OpenWay Riva remote modules will attempt to read the register every hour.
- Register Error Detected and Register Error tamper flags may be set when a register is not connected.
- If the OpenWay Riva remote module reads a connected register, the module automatically moves to run mode.

### 2. Run mode

- OpenWay Riva remote modules normal operation mode.
- The module's transmitted message is dependent on its factory settings for standard consumption + messages (SCM+).
- For SCM+, the remote water module default bubble-up rate is 10 seconds.

### 3. Quiet mode

- Meter manufacturers can configure the remote water module for quiet mode after programming and direct mounting the remote water module in a factory.
- The remote water module is awakened from quiet mode and enters run mode in one of two ways:
  - Counting two pulses. The pulses are counted internal to the OpenWay Riva remote module while it is in quiet mode.
  - Receiving a two-way command, such as a **Read ERT** using FDM.

If a remote water module installed in quiet mode is not bubbling up SCM+ messages, it may be due to zero consumption on the remote water module, such as a vacant or vacation home. Initiate a two-way command (for example, perform a **Read ERT** with FDM) before removing the unit.

## Error and warning flags

For OpenWay Riva modules reporting in ChoiceConnect 100S mode.

### **Register Error Detected**

Register Error Detected indicates that the OpenWay Riva remote module is not communicating with the register/meter. The tamper flag automatically clears after the water 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 OpenWay Riva 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 water 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.

For OpenWay Riva modules operating in OpenWay Riva Network mode.

The Riva Water module reports the tampers available in ChoiceConnect systems as well as extended meter alarms provided by new solid-state and electronic meters. The extended alarms include:

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

# Chapter 3 Initializing and Connecting the OpenWay Riva Remote Module

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This chapter provides the instructions to initialize and connect the remote water module to the meter or register.

Requirements are based on the network system mode. The OpenWay Riva remote water module's auto-sensing technology eliminates the need to program the module at the time of installation. The module automatically detects the connected register type.

## Initializing, Programming, and Connecting the OpenWay Riva remote module



**Caution:** To obtain an immediate reading, initialize the OpenWay Riva remote module with an approved handheld computer. Failure to initialize the remote water module may delay the initial reading up to one hour.

- To initialize the OpenWay Riva remote module immediately, use 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)
  - FC300SR handheld computer
  - 900 MHz Belt Clip Radio
  - Itron Mobile Radio (IMR)
- For normal activation, connect the OpenWay Riva remote module to the water meter register. The water module polls for a register every hour. The OpenWay Riva remote module automatically activates after it detects a register.

## Programming

Consider the following when the OpenWay Riva remote module is programmed:

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

Use an FC200SR or FC300SR handheld, 900 MHz Belt Clip Radio, or Itron Mobile Radio running Field Deployment Manager (FDM) v4.0 or higher or FDM Tools v4.0 or higher

software and your utility's programming configuration file to program the OpenWay Riva remote module.

**Note:** Do not program the OpenWay Riva remote module until it is connected to the water meter register.

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

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



**Caution:**

- The FC200SR, FC300SR, 900MHz Belt Clip Radio, or Itron Mobile Radio are the only devices that support programming for the OpenWay Riva remote module endpoint.
- The OpenWay Riva remote module and programmer should be a minimum of 12-inches apart while programming.
- Do not place the programmer antenna directly on the OpenWay Riva remote module.

## Connecting the remote water module to an encoder-type register

Connect the wires from the remote water module to the register screw terminals according to the following table.

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

	Remote module wire color		
	Brown (data)	Gray (power/clock)	Yellow (ground)
Register manufacturer	Register screw color designator		
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 Input - and Out 4 -
Diehl Meter Hydrus (flying lead cable)	Green	White	Brown
Elster AMCO Invision, Scancoder, AquaMaster, AquaMaster III	Red	Green	Black
Elster AMCO SM 700 (Severn Trent), Q200 (Sensus protocol)	Green	Red	Black

	Remote module wire color		
	Brown (data)	Gray (power/clock)	Yellow (ground)
Register manufacturer	Register screw color designator		
Elster AMCO evoQ4 Mag, 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	Green	Red	Black
Metron Farnier OER	Green	Red	Black
Mueller (Hersey) Translator, SSR	Green	Red	Black
Neptune ProRead, ProRead Auto-Detect, E-Coder, ARB-V	Red	Black	Green
Performance ETR	Green	Red	Black
RG3 Tomahawk	Green	Red	Black
Sensus ECR, ICE, iPERL, SRII	Green	Red	Black
Siemens Mag Meter Mag8000CT-7ME6820 Mag8000-7ME6810	92	91	93
Zenner (Hendey) ETR	Green	Red	Black

## Connecting the remote module to a pulser-type register

Connect the remote water module cable to the register according to the following table.

	Remote module wire color		
	Brown (signal)	Gray (common)	Yellow (tamper)
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	COM
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 ERT module wires	

	Remote module wire color		
	Brown (signal)	Gray (common)	Yellow (tamper)
Register manufacturer	Register screw color designator		
Krohne IFC	Term B	Term H	Term B
RG3 Tomahawk	Green	Black	Green
Sensus PMM	Red	Black	Bare

\*Itron recommends terminating unconnected wires with a gel-cap connector to protect the bare wire end.

## Connecting the remote module using an extension cable

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

## Verifying OpenWay Riva remote module operation

Use one of the following programming devices to verify the remote water module is correctly recording consumption data.

- FC200SR handheld computer
- FC300SR handheld computer
- 900 MHz Belt Clip Radio
- Itron Mobile Radio

### Note:

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



**Caution:** Verifying the remote water module operation requires an FC200SR handheld computer, FC300 SR handheld computer, 900 MHz Belt Clip Radio, or Itron Mobile Radio running FDM v4.0 or higher. Legacy Itron handheld programming devices cannot read the OpenWay Riva remote module.

# Chapter 4 Mounting the OpenWay Riva Remote Module

 **Warning:** Internal circuit card components may be 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 electrostatic buildup, touch a grounded metal object such as the metal water pipe or an earth-grounded metal structure.

Install the remote water modules using one of the following mounting options:

OpenWay Riva remote module mounting options	
Pipe mount	The OpenWay Riva remote module mounts to a pipe near the meter (see Pipe Mount Installation). This option requires the Remote Mount Kit and the appropriate Pipe Mount Kit.
Remote mount	The OpenWay Riva remote module mounts to a flat surface and connects to the meter register with a cable up to 300 feet (see Remote Mount Installation). This option requires the Remote Mount Kit.
Direct mount to the meter register	The water module mounts directly to a meter register designed for OpenWay Riva remote module direct mounting. This installation does not require a mounting kit (see Direct-mounting the OpenWay Riva remote modules to the meter register).

 **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.

## Remote module mounting accessories

Remote module mounting accessories	
Accessory	Part Number
Remote mount kit (OpenWay Riva Remote Module with telemetry device)	CFG-1300-003
Pipe mount kit	
Pipe mount kit for pipe diameters up to 4"	CFG-0217-501
Pipe mount kit for pipe diameters between 3/4" to 1-3/4"	CFG-0217-503
Pipe mount kit for pipe diameters between 1-5/16" to 2 1/4"	CFG-0217-504

<b>Remote module mounting accessories</b>	
<b>Accessory</b>	<b>Part Number</b>
Cable armor (see Appendix B for field retrofit installation instructions)	CFG-0151-006SS
5 foot cable thin-insulation (with protective cover and cable armor)	CFG-0151-010SS
5 foot cable thick-insulation (with protective cover and cable armor)	FAB-1302-001
5 foot cable armor for field retrofit	
Direct mount screw pack	SCR-0010-005
Bulk 80 per bag	SCR-0010-004
122 per bag	SCR-0010-001

## Installing the module cable strain relief

After you complete the water module to register connections, 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.

These materials are required to install the cable strain relief:

- Remote mount kit
- CFG-1300-003, dual cable ports for register connection and telemetry device connection
- Side cutter pliers
- Gel connector crimping tool
- Cable tie gun
- Torx T-15 screwdriver

## Securing the remote module cable strain relief

1. Wrap the cable tie around the meter register or secondary connection cable.



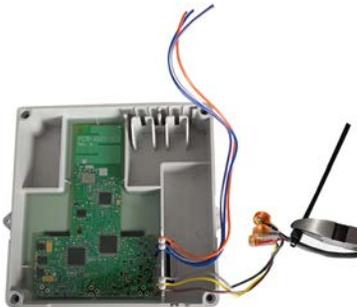
2. Insert the pointed end of the cable tie into the receptacle end of the cable tie with the ribbed edge facing in.
3. Pull the pointed end of the cable tie until the cable tie is hand-tightened.

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.



**Note:** If your cable tie gun is equipped with a dial to set the tightening pressure, set the pressure to ensure the cable tie is secure on the lead wire. After installation, the cable tie must not move on the register or secondary lead wire.

5. 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.



6. Place the cable connection into the remote water module housing with the cable ties to the inside.



## Attaching the backplate

After the connections are made to the register and optional telemetry device, attach the OpenWay Riva remote module's backplate. Mount the OpenWay Riva water module after the backplate is attached.

## Attaching the backplate

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



2. Route the register cable through the bottom backplate cable cutout and leak sensor cable through the top backplate cable cutout.



3. Align the remote module backplate with the mounting screw holes. Verify 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.



## Pipe Mount Installation

The OpenWay Riva remote module can mount on a pipe vertically, diagonally, or horizontally using a Pipe Mounting Kit and Remote Mount Kit (see OpenWay Riva Remote Module Accessories).

### Mounting the pipe bracket on a vertical pipe

**⚠ Caution:** A vertical mounting position is important to maximize RF performance. Mount the ERT module with the module's label arrow pointing up. *The module's arrow must never point to either side or upside down.* The module's tilt tamper functionality is designed to operate with the module installed vertically.

1. Remove the pipe bracket and band clamp from the Pipe Bracket Installation 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. The pipe bracket must be oriented as shown below.



4. Place the band clamp around the pipe. The band will loosely wrap 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.



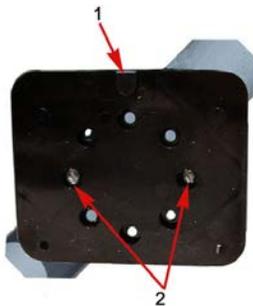
 **Caution:** The pipe bracket must fit firmly against the pipe to prevent slippage.

## Adapter plate mounting positions

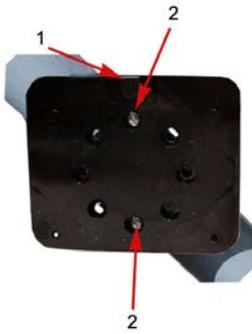
The installation procedure in the previous section shows how to mount the adapter plate on a vertical pipe.

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

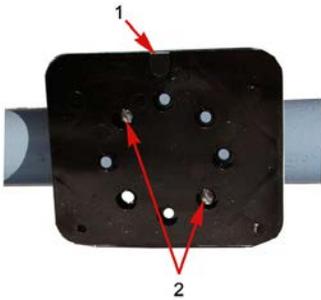
If the pipe is at a 45-degree angle up to the right, install the adapter plate with the mounting screws (2) as shown in the pictures below.



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



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



## Mounting the remote module on the adapter plate

1. Locate the two 1-inch remote water module mounting screws in the pipe mount kit.
2. Slide the remote water module back cover onto the adapter, pushing up to secure the lug adapter in the lug slot.



3. Install the two 1-inch remote water module mounting screws.



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

## Optional Riva Leak Sensor installation

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

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

The 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.

Riva Leak Sensors mount on a water service pipe or meter insetter (meter horn) and connect to the telemetry connector on the pit module. For more information, see Connecting the Riva Leak Sensor to the module. 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).

 **Caution:** If the OpenWay Riva pit module is installed to enable communications for the Riva Leak Sensor but a register is not connected, replace the register connector's cover (2) with the environmental cover removed from the blue telemetry connector (1) to protect the register connector.



## Connecting the Leak Sensor to the OpenWay Riva Water Remote Module

Connect the ERT modules flying lead wires to the Riva Leak Sensor (using gel cap connectors, see Using Gel Cap Connectors) matching wire colors to complete the three connections.



**Note:** If the ERT module will mount on the exterior of the house but the Leak Sensor is on a pipe on the interior, the Leak Sensor cable must run through a hole in the wall before connecting it to the ERT module.



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

### 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.

### Pipe preparation

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

### Installing the Leak Sensor

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

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

4. Align the Riva Leak Sensor mounting lock pin with the pin receptacle on the Riva Leak Sensor mounting base and insert the sensor.



5. 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 SET valve to the remote Riva water module

The SET valve connects to the remote Riva water module orange, blue, and purple/white wires.

### Completing the SET valve wire connections

- Connect the remote water module wires to the SET valve wires following the connections shown in the SET Valve/remote water module wire connections table.



SET valve to water module wiring			
Remote module wire color	Blue	Orange	Purple/white
SET shutoff valve wire color	Green	Red	Black

## Remote mount installation

Connect the remote water module to the register as described in [Initializing, Programming, and Connecting the OpenWay Riva Remote Module](#).

Using a back plate, create a template by drilling through a back plate lug slot to mark the position of the screw. Use the drilled back plate as your mounting template.

The arrow on the remote water module must point up when installation is complete.

## Installing the OpenWay Riva remote module on a flat surface

1. Select an installation location.
2. Using a back plate template, drill three pilot holes into the wall or other surface. The two bottom holes should be level.
3. 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.

## Mounting the OpenWay Riva Remote Module

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4. Slide the remote water module lug slot onto the mounting screw, pushing the remote water module upward until the screw head is all the way into the slot.



5. Screw the remote water module to the wall using the remaining two mounting screws.



6. 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.

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

## Direct-mounting the module to the meter register

Direct-mounting remote water modules to a meter register requires a register designed for that purpose. This section describes remote water module installation for the following direct mount registers:

- Badger ADE and RTR
- Elster/AMCO (ABB) Scancoder, InVISION, and Digital

**Warning:** Do not use the direct mounting method in a pit environment. Use a water module for pit environments. OpenWay Riva remote modules direct mounted in a pit environment are not covered by the Itron warranty.

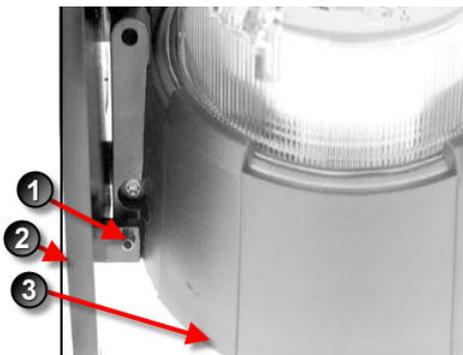
## Direct-mounting on the ABB Scancoder, InVision, or Digital Direct-Mount

**Note:** Verify you have an Elster/AMCO meter with a register designed for direct-mount remote water module.



**Note:** Always install the remote water module right side up with the arrow on the housing pointed upward. The register may or may not be mounted on the meter when performing the following steps.

1. Push the hollow pin (1) completely out of its location and separate the remote water module mounting bracket (2) from the meter register collar (3).



2. Strip 1/2-inch of insulation from the end of the brown, gray, and yellow wires.



3. Place the remote water module on the mounting bracket and route the yellow, gray, and brown wires through the opening.

**Note:** A gasket is not required.

4. Install four Torx-head mounting screws (Itron Part Number SCR-0010-005) as shown below. Hand-tighten each screw.
5. Connect the remote water module wires to the register screw terminals following the remote water module to the Elster/AMCO meter register wire connections. After the wires are connected, carefully tuck the connectors into the remote water module housing. Tighten all screws securely.

 **Caution:** Install the wires around the screws in a clockwise direction (as shown) or the wires may come out from under the screw heads as you tighten them. Also, verify insulation is *NOT* compressed under the screw head, or the wire may not make good contact.



6. Install the module and mounting bracket on the meter register adapter collar.
7. Replace the hollow pin (1) you removed in step 1.



## Direct-mounting to a Badger Direct-Mount register

**Note:** Verify you have a Badger meter with a register designed for direct mount OpenWay Riva remote modules.



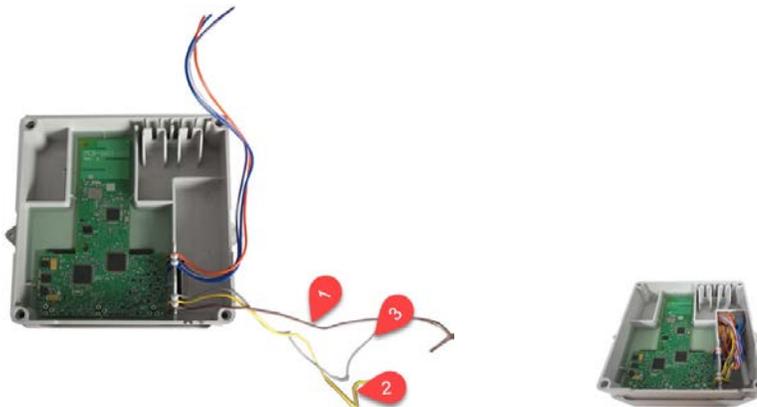
**Note:** Check the part number on the label to verify the module matches the meter. Always install the module with the arrow on the housing pointing upward. The register may or may not be mounted on the meter when performing the following steps.

1. The remote water module has three wires that connect to the register:

(1)	brown insulated wire
(2)	yellow insulated wire
(3)	gray insulated wire

**Note:** For an RTR register, tuck the unused yellow wire into the housing.

2. Connect the remote water module wires to the register using gel-cap connectors following the remote water module to the Badger ADE register wire connections, (see Connecting the OpenWay Riva remote module to a remote meter register). After the wires are connected, carefully tuck the connectors into the remote water module housing.



3. To wire the OpenWay Riva remote module to the RTR 2-wire register, connect the remote water module wires to the 2-wire register using gel-cap connectors. After the wires are connected, carefully tuck the connectors into the remote water module housing.
4. Place the remote water module on the register, ensuring the edge of the remote water module housing is seated properly around the perimeter of the register as shown below.



**Note:** A gasket is not required.

5. Install four Torx-head mounting screws (SCR-0010-005) and hand-tighten the screws.



**Warning:** Use Itron mounting screws (SCR-0010-005). Using the wrong mounting screws could crack the plastic module housing.

6. If you have not already done so, connect the register to the water meter and fully tighten the mounting screw (1) as directed by Badger Meter.



**Note:** Mount the register on the meter in one of four different positions with respect to the direction of water flow (refer to the manufacturer's installation directions).

7. If the standard Torx screw is used (1), a wire seal is not necessary.

If the optional slotted and drilled RTR screw is used, install a wire seal through the drilled screw from (1) to (2), or as specified by utility policy.

# Chapter 5 Using the Itron Cable Armor

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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 connection from the remote water module to install the cable armor, you must use an Itron handheld to reprogram the water module using FDM Endpoint Tools. Perform a **Check Endpoint** function (with FDM Endpoint Tools) after you reprogram the module to verify communication with the meter register.

## Installing the Itron cable armor

1. Remove the installed remote water module.

**Note:** Itron strongly recommends you keep the remote water 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 remote water module cable near the remote water module.



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

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

 **Warning:** You must begin wrapping the cable armor over portion of the cable protected by the electrical tape. If you do twist the cable armor onto the remote water module cable on the protected portion of the remote water module cable, you could damage the module's cable. A cut cable could cause an remote water module/register communication failure.

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



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

# Chapter 6 Troubleshooting

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This information will help you troubleshoot issues related to the OpenWay Riva Remote Module.

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

Issue	Action
Cannot program the OpenWay Riva remote module.	Check the programming device and software version. Program remote water module using the FC300 handheld computer running Field Deployment Manager (FDM) software v 4.0 or higher.
Cannot read the OpenWay Riva remote module.	A remote water module that is not programmed will not transmit an SCM+. Reprogram the remote water module and perform a reread. If a remote water module is not initially programmed, it will not bubble-up and listen for an SCM+.
The OpenWay Riva remote module is reporting an invalid read.	A remote water module that has set the Register Error flag will cause an Invalid Read to display in the FDM Consumption field.
Marginal readability due to the OpenWay Riva remote module location (for example, a remote water module deep inside a pit).	Consider reprogramming the remote water module for Hard-to-Read (H2R) mode. This increases the output to high power levels.  <b>Note</b> This 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.