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## **Water Solutions**

### **100W-R and 100WP-R Datalogging ERT Module Installation Guide**

## Identification

100W-R and 100WP-R Datalogging ERT Module Installation Guide  
11/10/2011 TDC-0951-005

## Copyright

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## Confidentiality Notice

The information contained herein is proprietary and confidential and provided subject to the condition that (i) it is held in confidence except to the extent required otherwise by law and (ii) it is used only for the purposes described herein. Any third party given access to this information is similarly bound in writing.

## Compliance Statement

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

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

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

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

This equipment complies with policies RSS-210 and RSS-GEN of the Industry Canada rules.

Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

## Compliance Statement Canada

Under Industry Canada 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.

## Déclaration de conformité

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

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

## Déclaration de Conformité

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.

## Trademark Notice

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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.

**Transportation Classification**

The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. When powered, ERT 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](mailto:TechnicalCommunicationsManager@itron.com)

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

**Contact**

- Internet: [www.itron.com](http://www.itron.com)
- E-mail: [support@itron.com](mailto:support@itron.com)
- Phone: 800 635 8725

# Contents

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<b>Chapter 1 Before You Begin .....</b>	<b>1</b>
Document Conventions .....	1
Document Purpose.....	1
How This Document is Organized.....	1
Related Documents.....	2
<b>Chapter 2 About the 100W-R and 100WP-R .....</b>	<b>3</b>
100W-R and 100WP-R Models.....	4
Battery Life .....	4
100W-R and 100WP-R Transmission Modes .....	5
100W-R Operating Modes.....	5
100WP-R Operating Modes .....	6
<b>Chapter 3 Initializing, Programming and Connecting the ERT Module .....</b>	<b>7</b>
Initializing the 100W-R .....	7
100W-R Encoder Start-up.....	7
Programming the 100WP-R .....	8
100WP-R Pulsar Start-up.....	8
Connecting the 100W-R to a Remote Meter Register .....	9
Connecting the 100WP-R to a Remote Meter Register .....	10
Verifying 100W-R and 100WP-R ERT Module Operation .....	10
<b>Chapter 4 Installing the 100W-R and 100WP-R ERT Modules .....</b>	<b>11</b>
100W-R and 100WP-R ERT Module Accessories.....	11
Installing 100W-R and 100WP-R Cable Strain Relief .....	11
Required Materials .....	12
Attaching the Backplate.....	14
Pipe Mount Installation .....	16
Optional Leak Sensor Installation .....	21
Connecting the Leak Sensor to the 100W-R and 100WP-R ERT Modules .....	22
Required Equipment .....	23
Pipe Preparation .....	23
Remote Mount Installation.....	27
Required Tools and Hardware .....	27
Direct-Mounting to the Meter Register .....	29

<b>Appendix A Using Gel-cap Connectors.....</b>	<b>37</b>
<b>Appendix B Troubleshooting .....</b>	<b>39</b>
<b>Index .....</b>	<b>40</b>

## Before You Begin

### Document Conventions

Convention	Example
Iron product part numbers are noted in parentheses.	To install the ERT module (ERW-1300-XXX), do the following steps.
Hypertext links are in blue.	For more information about 100W remote ERT module models, see <a href="#">100W-R and 100WP-R Models</a> on page 4.



**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 installation instructions for the 100W-R and 100WP-R ERT modules including step-by-step instructions for pipe mount, remote mount, and direct mount.



**Caution** Installing a remote ERT module or an integrated 100W ERT module and meter register in a water pit box will void the product warranty. Remote ERTs are designed for interior and exterior (on the side of buildings) installations only. Use a pit ERT module for pit-mount applications. (Refer to the *Water Endpoint Ordering Guide* PUB-0063-001).

### How This Document is Organized

This installation guide is organized with the following chapters:

Chapter	Description
1. Before You Begin	Information about this publication
2. About the 100W-R and 100WP-R	Overview of 100W-R and 100WP-R functionality.
3. Connecting, Initializing and Programming	Instructions to initialize the 100W ERT module and connect the ERT module to the register.
4. Installing the 100W-R and 100WP-R	Step-by-step ERT module installation instructions for: <ul style="list-style-type: none"> <li>• Pipe mount                             <ul style="list-style-type: none"> <li>• Optional Leak Sensor</li> </ul> </li> <li>• Remote mount</li> <li>• Direct mount</li> </ul>
Appendix A Using Gel-cap Connectors	Instructions for using gel-cap connectors to connect the remote ERT module to the register.
Appendix B Troubleshooting	Tips for troubleshooting 100W ERT module operation.

## Related Documents

<b>Document Description</b>	<b>Ittron Part Number</b>
<i>100W and 100G ERT Tamper Reference Guide</i>	TDC-1028-000
<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>Endpoint-Link® Programming Guide</i>	TDC-0744-XXX
<i>Water ERT Module Ordering Guide</i>	PUB-0063-001
<i>Water Meter Compatibility List</i>	PUB-0063-002
<i>mlogonline™ Network Leak Monitoring System User Guide</i>	TDC-0792-XXX



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

## About the 100W-R and 100WP-R ERT Module

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

The 100W-R and 100WP-R ship in Factory Mode. The ERT modules acquire and transmit meter register data within one hour following register connection. The ERT module transfers meter data immediately if the unit is initialized with a handheld computer during installation (see [Initializing, Connecting and Programming the ERT Module](#) on page 7).



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

The 100W-R and 100WP-R support protocols for a variety of meter manufacturer's registers. Refer to the *Water Meter Compatibility List* (PUB-0063-002), for the list of supported meters and registers.

100W-R and 100WP-Rs feature the following capabilities:

- **Leak Detection and Reverse Flow Detection.** 100W series ERT modules feature the same robust features as Itron's 60 series water ERT modules to provide Leak Detection and Reverse Flow Detection. For more information about Leak Detection and Reverse Flow Detection, see the Itron white paper [Detecting Leaks and Reverse Flow with 60 Series Endpoints](#).



**Note** The 100WP-R ERT module will not report reverse flow. Incremental encoded registers do not provide a distinguishing signal while flowing in reverse.

- **Communication Error Indicators.**

- **Last Good Read (LGR Flag).** Indicates a communication error with the register.

- 100W-R encoder ERT module

If this flag is set for 24 consecutive hours, it initiates a cut cable flag in the extended tampers.

The Last Good Read Flag automatically clears after the ERT module receives a successful read from the register.

- 100WP-R pulser ERT module

If the Last Good Read Flag is set two consecutive times, it initiates a Cut Cable Flag in the extended tampers.

The Last Good Read Flag automatically clears after the ERT module receives a successful read from the register.



**Note** A Last Good Read Flag may be an indicator of a damaged register.



- **Extended Tamper Flag** (retrievable with two-way communication).
  - **Low Battery Warning.** The 100W-R and 100WP-R ERT 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 ERT module. The low battery warning allows the utility to easily identify which ERTs are nearing end-of-life in a mixed population and gives the opportunity to schedule replacement.  
The low battery warning is a single flag set when the battery has less than 10% remaining capacity, typically 2 years life remaining. Battery life is evaluated daily at midnight.
- **Cut Cable Flag.**
  - 100W-R encoder ERT module. The Cut Cable Flag sets if the LGR Flag is active for 24 hours.
  - 100WP-R pulser ERT module. The Cut Cable Flag sets if the LGR Flag is active for two consecutive times.
  - The Cut Cable Flag remains active for 40 days in Mobile mode.
  - The Cut Cable Flag remains active for 24 hours in Fixed Network mode.

## 100W-R and 100WP-R Models

<b>100W Remote ERT Module Description</b>	<b>Itron Part Number</b>
100W-R Encoder Remote, 10-inch flying lead	ERW-1300-213
100W-R Encoder Remote with Leak Sensor, 10-inch flying lead	ERW-1300-214
100WP-R Pulser Remote, 10-inch flying lead	ERW-1300-215
100WP-R Pulser Remote with Leak Sensor, 10-inch flying lead	ERW-1300-216

## Battery Life

Powered by two non-replaceable, long-life lithium batteries, the 100W has an expected battery life of 20 years when the ERT module operates in default Mobile or Fixed Network Operating mode. If the 100W series ERT module is programmed for Hard to Read Mobile Mode, the battery life is reduced to 13 years. To proactively indicate the battery has reached a <10% useful battery life, a *Low Battery flag* is set to indicate impending battery failure. Battery life is 15 years for the 100WP-R when ERT module cable lengths exceed 150 feet.

## 100W-R and 100WP-R Transmission Modes

The 100W-R and 100WP-R ERT modules can be set to transmit in fixed network, mobile high power, mobile and handheld, or hard to read mobile and handheld mode.

- **Fixed Network Mode.** The 100W-R and 100WP-R ERT module transmits a high-powered NIM RF message every five minutes and a contingency SCM RF message every minute.
- **Mobile and Handheld Mode.** The 100W-R and 100WP-R ERT module transmits a medium-powered SCM RF message every 9 seconds.
- **(Optional) Mobile High Power Mode.** The 100W-R and 100WP-R ERT module transmits a high-powered SCM RF message every 60 seconds.
- **(Optional) Hard to Read Mobile Mode.** The 100W-R and 100WP-R ERT module transmits a high-powered SCM RF message every 30 seconds. *The hard to read mobile and handheld mode should only be used for exceptionally hard-to-read applications.*

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**Note** The battery life is significantly affected in hard to read mobile mode. You may use the 900 MHz Remote Antenna to increase reading range.

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An FCC license is not required to read 100W-R and 100WP-R ERT modules.

## 100W-R Operating Modes

### 1. Factory mode

- 100W-Rs ship from the factory in factory mode.
- The ERT module's transmitter is off.
- The ERT module's receiver bubbles-up to listen for a programming command.
- 100W-R encoder models 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 100W-R reads a connected register, the ERT module automatically moves to run Mode (100W-R only).

### 2. Run mode

- 100W-R normal operation mode.
- The 100W-R transmitted message is dependent on its factory settings or setting programmed with FDM for standard consumption messages (SCM) or network interval message (NIM).

For SCM (Mobile), the 100W default bubble-up rate is 9 seconds.

For NIM (fixed network), the 100W default bubble-up rate is five minutes. When the ERT module is set for NIM, the 100W-R transmits a contingency SCM message every minute. Program FN mode with a programming device to configure NIM mode.

### 3. Meter manufacturer quiet mode

- Meter manufacturers can configure the ERT module for quiet mode after initializing and direct mounting the 100W-R in the factory.
- The ERT module awakens from quiet mode and enters run mode in one of two ways:
  1. The 100W-R detects consumption at the top of the hour (last hourly interval  $>1$  or  $<-1$ ).
  2. The 100W-R receives a two-way command (for example, a **Read ERT** using FDM software).

## 100WP-R Operating Modes

The 100WP-R has three standard operating modes.

### 1. Factory Mode

- 100WP-Rs ship from the factory in factory mode.
- The 100WP-R's transmitter is off.
- The 100WP-R's receiver bubbles-up to listen for a programming command.
- Last Good Read and Extended Tamper Flags may be set when a register is not connected.
- You must program the 100WP-R with the initial consumption and the register type to properly move the ERT module to run mode and record consumption. You can program the 100WP-R in the field with FDM or in the factory using custom programming.

### 2. Run mode

- 100WP-Rs normal operation mode.
- The 100W transmitted message is dependent on its factory settings for standard consumption messages (SCM) or network interval message (NIM).
  - For SCM, the 100WP-R default bubble-up rate is 9 seconds.
  - For NIM, the 100WP-R default bubble-up rate is 6 minutes. When the ERT module is set for NIM, the 100WP-R transmits a contingency SCM message every minute. NIM mode is configured by programming NIM mode with a programming device.

### 3. Meter manufacturer quiet mode

- Meter manufacturers can configure the ERT module for quiet mode after programming and direct mounting the 100WP-R in a factory.
- The 100WP-R is awakened from quiet mode and enters run Mode in one of two ways:
  - Counting two pulses. The pulses are counted internal to the 100WP-R while it is in quiet mode.
  - Receiving a two-way command, such as a **Read ERT** using FDM.
- If an ERT module installed in quiet mode is not bubbling up SCM or NIM messages, it may be due to zero consumption on the ERT 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.

## Initializing, Programming, and Connecting the ERT Module

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This chapter provides the instructions to initialize and start up the 100W-R ERT module, program and start up the 100WP-R, and connect the 100W-R or 100WP-R ERT module.

### Initializing the 100W-R



**Caution** To obtain an immediate reading, initialize the 100W-R with an approved handheld computer. Failure to initialize the ERT module may delay the initial reading up to one hour.

- To initialize the 100W-R immediately, use one of the following handheld computers running Field Deployment Manager (FDM) version 1.0 or later.
  - FC200SR handheld computer (Itron part number FC2-0005-004 or FC2-0006-004)
  - FC300 with SRead
- For normal activation, connect the 100W-R to the water meter register. The ERT module polls for a register every hour. The 100W-R automatically activates after the ERT module detects a register.

### 100W-R Encoder Start-up

The 100W-R automatically:

- Detects the connected register type at the top of the hour, exits factory mode, and enters run mode (programming is not required for the 100W-R to initiate run mode in the default mobile mode).
- Detects an Itron Leak Sensor.

100W-R encoder programming is required to:

- Change the operation mode (for example, to change the ERT module from the default mobile mode to fixed network mode).
- Enter a Utility ID or Lock Type.
- To enter an E-Coder 8-digit driver.

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

- Generate an immediate register read.
- Align the 100W-R's time with the handheld's time.

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**Important** Periodically dock or cradle the handheld computer or mobile reader to keep the time current.

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- Verify communication with the Leak Sensor.
- Check for tamper flags.

## Programming the 100WP-R

Programming the 100WP-R requires one of the following handheld computers running Field Deployment Manager (FDM) version 1.0 or later.

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

For normal activation, connect the 100WP-R to the water meter register and program the ERT module with FDM.

## 100WP-R Pulsar Start-up

The 100WP-R enters run mode by completing programming with FDM. Programming sets the appropriate pulser parameters (initial consumption and Utility ID).

Itron strongly recommends performing a **Check ERT** with a handheld computer running FDM to verify the 100WP-R is operating correctly after installation. Performing a **Check ERT** will:

- Generate an immediate register read.
- Align the 100WP-R's time with the handheld's time.

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**Important** Periodically dock or cradle the handheld computer or mobile reader to keep the time current.

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- Verify communication with the Leak Sensor.
- Check for tamper flags.

## Connecting the 100W-R to a Remote Meter Register

Connect the wires from the 100W-R ERT module to the register screw terminals according to the following table.

Register Manufacturer	100W-R wire color		
	Brown (data)	Gray (power/clock)	Yellow (ground)
	Register screw color designator		
Elster AMCO Invision	R	GRN	BLK
Elster AMCO Scancoder	R	GRN	BLK
Elster AMCO evoQ4 (Q4000)	R	White	BLK
Hersey Translator	GRN	R	BLK
Badger ADE	GRN	R	BLK
Sensus ECR (all variants)	GRN	R	BLK
Sensus ICE	GRN	R	BLK
Metron Famier	GRN	R	BLK
Ittron (Actaris) Coder	GRN	R	BLK
Neptune ProRead E-Coder ARB-V	R	B	G
Performance ETR	GRN	R	BLK
SevernTrent SM700 SmartMeter (Sensus Protocol)	GRN	R	BLK

## Connecting the 100WP-R to a Remote Meter Register

Connect the 100WP-R wires from the ERT module to the register screw terminals according to the following table.

Register Manufacturer	100WP-R wire color		
	Brown (signal)	Gray (common)	Yellow (tamper)
	Register screw color designator		
Elster Digital	BLK	GRN	R
Itron (Actaris) Cyble Sensor (2-wire)	Either wire	Remaining wire must be connected to both ERT module wires	
Badger RTR	R	BLK	Green/bare
Elster V100	BLK	R	Blue
Sensus PMM	R	BLK	Bare

Connect the ERT module to the cable using gel-cap connectors (see [Using Gel Cap Connectors](#) on page 37).

## Verifying 100W-R and 100WP-R ERT Module Operation

Use one of the following handheld computers to verify the ERT module is correctly recording consumption data.

- FC200SR
- FC300 with SRead



### Caution

- Each handheld radio requires special setup and configuration parameters to successfully read and program 100W modules. Refer to the respective meter reading application for specific instructions.
- Do not use ReadOne Pro, FS2PN and FS3PN, or FC200R handhelds to read the 100WP-R. These readers do not operate their receivers long enough or at the right frequency to reliably capture a 100WP-R transmission.

Refer to the user guide for your programming device (see [Related Documents](#) on page 2) and data collection application for more information.

## CHAPTER 4

# Installing the 100W-R and 100WP-R ERT Modules

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Install the 100W-R and 100WP-R ERT modules using one of the following mounting options:

### 100W-R and 100WP-R ERT modules Mounting Options

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<b>Pipe Mount</b>	The ERT module mounts to a pipe near the meter (see <a href="#">Pipe Mount Installation</a> ). This option requires the Remote Mount Kit and the appropriate Pipe Mount Kit.
<b>Remote Mount</b>	The ERT module mounts to a flat surface and connects to the meter register with a cable up to 300 feet (see <a href="#">Remote Mount Installation</a> ). This option requires the Remote Mount Kit.
<b>Direct Meter Register Mount</b>	The ERT module mounts directly to a meter register designed for ERT module direct mounting. This installation does not require a mounting kit (see <a href="#">Direct-Mounting to the Meter Register</a> on page 29).

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## 100W-R and 100WP-R ERT Module Accessories

### 100W-R/100WP-R Mounting Accessories

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<b>Accessory</b>	<b>Part Number</b>
Remote Mount Kit (Encoder/Pulser only)	CFG-0771-021
Remote Mount Kit (Encoder/Pulser with Leak Sensor)	CFG-1300-003
Pipe Mount Kit	
pipes from 3/4 to 1 3/4 inches	CFG-0217-503
pipes from 1 5/16 to 2 1/4 inches	CFG-0217-504
pipes up to 4 inches	CFG-0217-501
Direct Mount Screw Pack	
Bulk	SCR-0010-005
80 per bag	SCR-0010-004
122 per bag	SCR-0010-001

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## Installing 100W-R and 100WP-R Cable Strain Relief

After you complete the ERT module to register or ERT module to register and Leak Sensor connections (for more information, see [Connecting the Leak Sensor to the 100W-R and 100WP-R ERT Modules](#)), install a cable tie to the meter cable (and Leak Sensor cable, if applicable) just below the exposed colored lead wires on the cable insulation. The cable tie performs as a cable strain relief to reduce the risk of destructive tension on the lead wires.

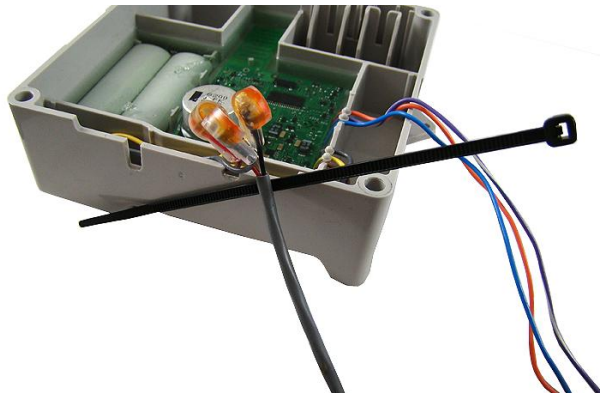


## Required Materials

- Remote Mount Kit
  - CFG-0771-021, single cable port for register connection
  - CFG-1300-003, dual cable ports for Leak Sensor and register connection
- Sidecutter pliers
- Gel connector crimping tool
- Cable tie gun
- Torx T-15 screwdriver

### ***To install the remote ERT module cable strain relief***

1. Wrap the cable tie around the meter register or Leak Sensor 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 hand tight. 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 is equipped with a red dial to set the cable tightening pressure of the gun.

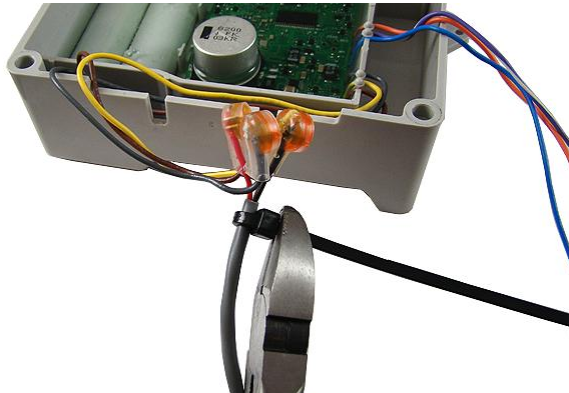


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**Note** If your cable tie gun is equipped with a dial to set the tightening pressure, set the pressure to ensure the cable tie is secure on the lead wire. After installation, the cable tie must not move on the register or Leak Sensor lead wire.

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4. If your cable tie gun does not have a clipping feature, remove the cable tie from the cable tie gun. Using a sidecutter pliers, remove the excess cable tie.



5. Place the cable connection(s) into the ERT module housing with the cable ties to the inside.



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**Note** The image shown above illustrates the dual cable strain relief for the register and Leak Sensor.

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## Attaching the Backplate

Select the appropriate remote mount kit for your 100W ERT module (see [100W-R and 100WP-R Accessories](#) on page 11). Attach the 100W ERT module's backplate before completing a Remote Mount or Pipe Mount installation.

### ***To attach an encoder/pulser only backplate***

1. Route the register cable through the single backplate cutout. Ensure the cable strain relief is inside the module housing and backplate assembly.



2. Align the ERT module backplate with the mounting screw holes. Verify the Itron logo and arrow point up.



3. Insert a backplate mounting screw in one corner and tighten two to three turns. Insert the remaining three screws, tightening a few turns.



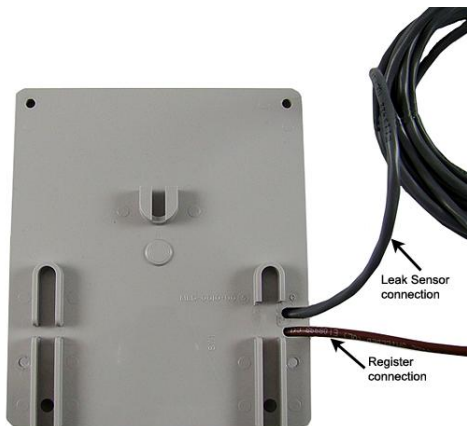
4. Completely tighten all the screws in an alternating fashion.

**To attach an encoder/pulsar and leak sensor 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 appropriate backplate cutout and the Leak Sensor cable through the remaining cutout.



3. Align the ERT module backplate with the mounting screw holes. Verify the Itron logo and arrow point up.



4. Insert a backplate mounting screw in one corner and tighten two to three turns. Insert the remaining three screws, tightening a few turns.



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

## Pipe Mount Installation

The ERT module can mount on a pipe vertically, diagonally, or horizontally using a Pipe Mounting Kit and Remote Mount Kit (see [100W-R and 100WP-R Accessories](#) on page 11).

### ***To mount the adapter plate on a vertical pipe***

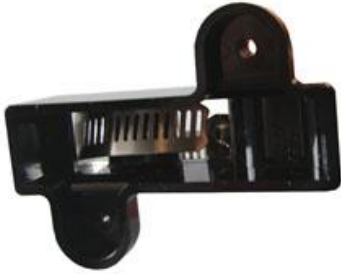
1. Take the pipe bracket and band clamp from the Pipe Mount Kit.



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



3. Push the end of the band through the hole in the pipe bracket.



4. Place the band clamp around the pipe. Push the end of the band through the hole in the band clamp and into the entrance to the screw assembly. Tighten the band clamp until you can push the end of the band into the hole in the pipe bracket.



5. Tighten the clamp screw three or four more turns to make sure the end of the band does not pop back out on this side of the pipe bracket. Verify the pipe clamp is in the final installation position on the pipe and completely tighten the band clamp screw.
6. Place the adapter plate on the pipe bracket. The adapter-plate screw boss goes into the pipe-bracket recess.



- Using the two shortest (1/2-inch) adapter-plate mounting screws from the Remote Mount Kit, connect the adapter plate to the pipe bracket using the screw holes shown below.



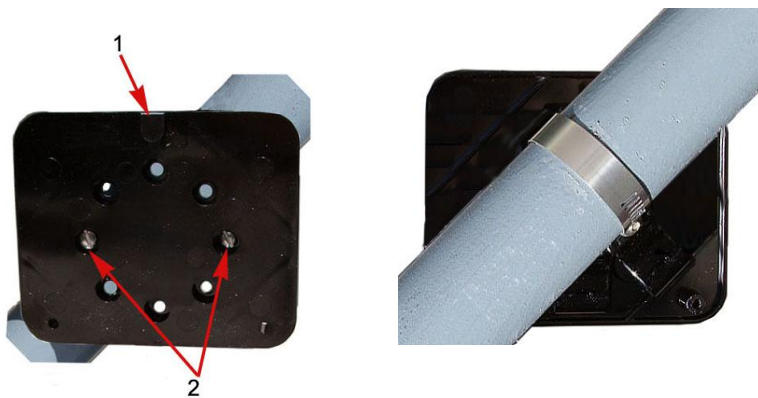
- Tighten both screws to 9 to 12 inch-pounds of torque.

***To mount the adapter plate in other positions***

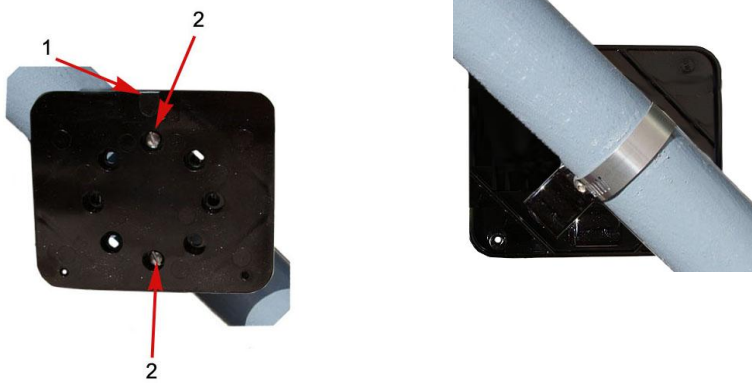
The installation procedure in the previous section shows how to mount the adapter plate on a vertical pipe.

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.

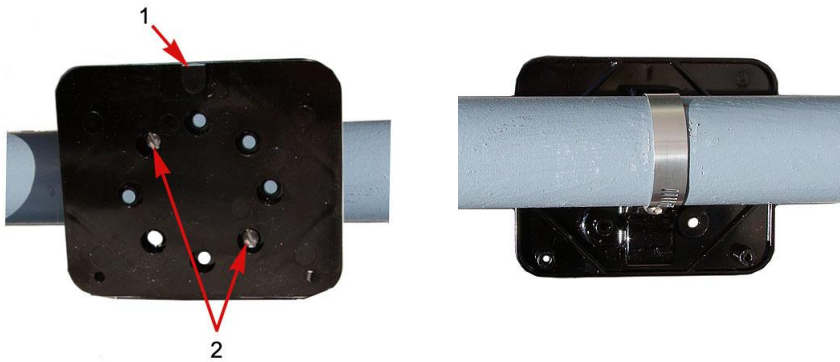
If the pipe is at a 45 degree angle up to the right, install the adapter plate with the mounting screws (2) as shown in the pictures below.



If the pipe is at a 45 degrees 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.



***To mount the 100W-R and 100WP-R ERT modules on the adapter plate***

1. Locate the two 1-inch ERT module mounting screws in the Pipe Mount Kit.
2. Slide the ERT module back cover onto the adapter, pushing up to secure the lug adapter in the lug slot.





3. Install the two 1-inch ERT module mounting screws.



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

**To install tamper seals and cable ties**

1. Using the two new tamper seals from the mounting kit, place a new tamper seal over each ERT module mounting screw.



2. Push both tamper seals all the way into place with a 1/4-inch nut driver or similar tool.



The final installation will resemble the image below after the tamper seals are installed.



---

**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.

---

3. Secure the cable to the meter pipe with a cable tie.



4. Push excess wire up between the back of the ERT module and the face of the adapter plate.



## Optional Leak Sensor Installation

Leak Sensors (LS) analyze water flow sound patterns to detect new, evolving, and pre-existing leaks. LS analysis data is uploaded to mlogonline™ Network Leak Monitoring for data analysis and accessed through a secure Internet portal unique to your utility. This section describes installation of the Leak Sensor (LS) in a 100W-R and 100WP-R ERT modules system.

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

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

The LS is used in conjunction with both indoor (basement) and outdoor (mounting on the exterior of the house) 100W-R and 100WP-R ERT modules installations. LS devices are mounted on a water service pipe or meter insetter (meter horn) and connect to the Leak Sensor connector on the ERT module as described in Connecting the Leak Sensor to the 100W-R and 100WP-R ERT Modules on page 22. The mounting bracket shipped with the 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).

## Connecting the Leak Sensor to the 100W-R and 100WP-R ERT Modules

Connecting a Leak Sensor to the 100W-R and 100WP-R ERT modules requires a Leak Sensor enabled ERT module. See [100W-R and 100WP-R Models](#) on page 4. Connect the ERT modules flying lead wires to the Leak Sensor (using gel cap connectors, see [Using Gel Cap Connectors](#) on page 37) matching wire colors to complete the three connections.



See [Optional Leak Sensor Installation](#) on page 21 for Leak Sensor mounting information.



**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.

## Required Equipment

Equipment	Itron Part Number	Description
Leak Detection Sensor	LDS-0001-001	LDS with bracket; 5-foot cable, and mounting bolt (fits up to 1-1/2-inch OD pipe).
Optional mounting bracket	CFG-0349-002	Mounting bolt fits up to 2-1/2-inch OD pipe.
100W-R Encoder Remote	ERW-1300-214	100W-R with Leak Sensor, 10-inch flying lead.
100WP-R Pulsar Remote	ERW-1300-216	100WP-R with Leak Sensor, 10-inch flying lead.



Leak Sensor

Standard mounting bracket

100W remote ERT module

Optional mounting bracket

## Pipe Preparation

Clean any dust or dirt from the pipe to facilitate direct contact with the LS surface.

### ***To install the Leak Sensor on a pipe or meter insetter***

1. Select a Leak Sensor mounting location. Mount the sensor on the water input side of the meter.

---

**Caution** The Leak Sensor must be mounted 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. Contract Itron Support for more information.

---

2. Verify the pipe's mounting surface is free from dirt and debris. Place the curved surface of the LS against the pipe.



3. Insert the mounting U-bolt over the pipe and into the LS mounting holes.

---

**Caution** Do not mount the Leak Sensor on a pipe coupler, joint, or nut.

---



4. Insert the mounting plate over the U-bolt's threaded screw ends. Attach the two wing nuts over the clamp screw ends and tighten the wing nuts until snug (to a minimum of 5-inch pounds) to prevent device rotation on the pipe. After the second wing nut is tightened, check the Leak Sensor to verify the device is snug. If the sensor moves, tighten the wing nuts until there is no movement.

---

**Caution** Do not tighten the Leak Sensor to more than 20 inch-pounds. Over-tightening could damage the Leak Sensor housing and/or the pipe.

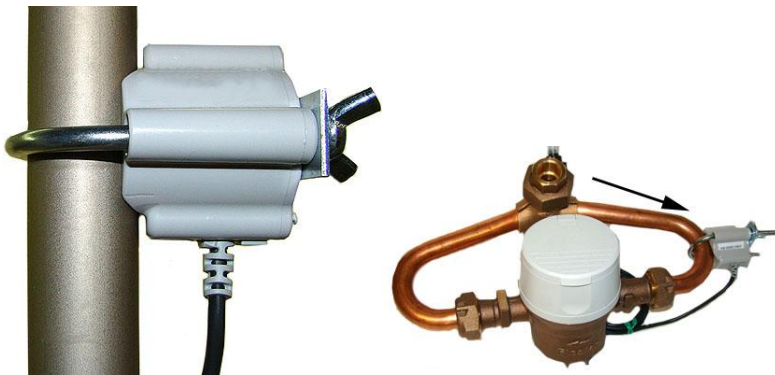
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---

**Note** Leak Sensor mounting orientation is not critical. Orient the sensor to best accommodate your installation. The most important installation practice is to mount the sensor securely to the pipe.

---



### **To install the Leak Sensor on a pipe (up to 2 1/2-inch OD)**

1. Select a Leak Sensor mounting location within 5-feet of the 100W ERT module.

---

**Note** Leak Sensor mounting orientation is not critical. Orient the Sensor to best accommodate your installation. The most important installation practice is to fasten the Sensor securely to the pipe.

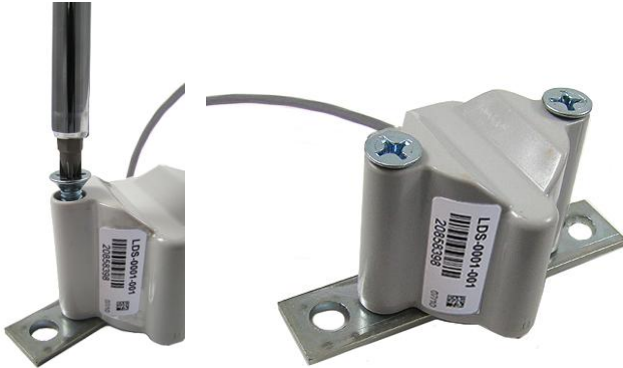
**Caution** The Leak Sensor must be mounted on the water input side of the meter. Failure to follow this mounting requirement could result in errors in the leak detection data. Installation requires Itron mounting hardware. Repair costs and service charges relating to the use on non-compliant mounting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

---

2. Insert the mounting plate screws into the holes on the Leak Sensor's curved surface.



3. Secure the mounting plate to the Leak Sensor.



4. Verify the pipe's mounting surface is free from dirt and debris. Place the curved surface of the LS against the pipe.

---

**Caution** Do not mount the Leak Sensor on a pipe coupler, joint, or nut.

---

5. Insert the U-bolt around the pipe and into the holes in the plate/Leak Sensor assembly. Secure the U-bolt with the wing nuts. Tighten the wing nuts until snug (to a minimum of 5-inch pounds) to prevent device rotation on the pipe. After the second wing nut is tightened, check the Leak Sensor to verify the device is snug. If the sensor moves, tighten the wing nuts until there is no movement.



---

**Caution** Do not tighten the Leak Sensor to more than 20 inch-pounds. Over-tightening could damage the Leak Sensor housing and/or the pipe.

---

## Remote Mount Installation

Connect the ERT module to the register as described in [Connecting, Initializing, and Programming the ERT Module](#) on page 7.

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 ERT module must point up when installation is complete.

## Required Tools and Hardware

Remote mount installation requires the following tools and hardware:

- Remote Mount Kit (CFG-0771-021 or CFG-1300-003) includes the back plate, tamper seals, and mounting screws
- Nut driver or similar tool
- Phillips screwdriver
- Drill and bits for mounting surface and screw size



**To install 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.



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



5. Screw the ERT 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.

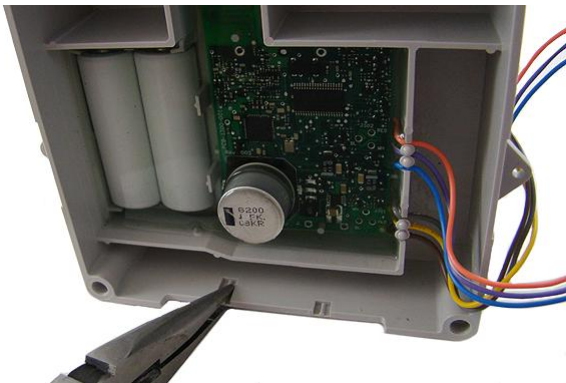
## Direct-Mounting to the Meter Register

Direct mounting ERT modules to a meter register requires a register designed for that purpose. This section describes 100W-R and 100WP-R installation for the following direct mount registers:

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



**Note** If you are installing an ERT module with Leak Sensor capability, use a needle-nose pliers to remove one of the ERT module's housing knock-outs to accommodate the Leak Sensor cable. If your meter register has a raised internal rim, remove the larger case knock-out. When you are installing a Leak Sensor with the 100W-R or 100WP-R, you must install cable strain relief prior to installing the ERT module. For more information, see [Installing 100W-R and 100WP-R Cable Strain Relief](#) on page 11.



**Warning** Do not use the direct mounting method in a pit environment. Use a pit ERT module for pit environments. 100W-R and 100WP-R ERT modules direct mounted in a pit environment are not covered by the Itron warranty.

**To install the 100W-R and 100WP-R ERT modules to a Badger Direct-Mount register**

---

**Caution**

Verify you have a Badger meter with a register designed for direct mount ERT modules.



Check the part number on the label to verify the module matches the meter.

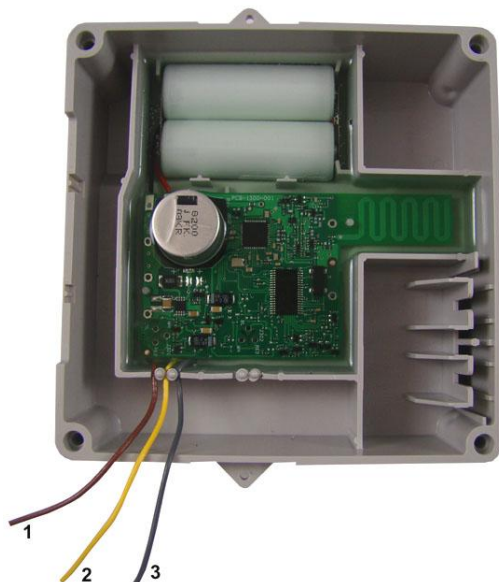
Always install the module with the arrow on the housing pointing upward.

---

**Note** The register may or may not be mounted on the meter when performing the following steps.

---

1. Direct-meter mounting requires a 100W-R ERT module for the Badger ADE register or a 100WP-R for the RTR register. Both ERTs have three wires:



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

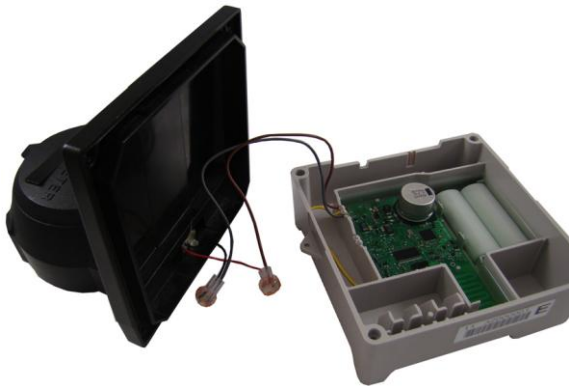
**Note** For an RTR register, tuck the unused yellow wire into the housing.

---

2. Connect the ERT module wires to the register using gel-cap connectors (see [Using Gel-cap Connectors](#) on page 37) following the 100W-R encoder to the Badger ADE register wire connections, (see [Connecting 100W-R to a Remote Meter Register](#) on page 8). After connecting the wires, carefully tuck the connectors into the ERT module housing.



3. To wire the 100WP-R to the RTR 2-wire register, connect the ERT module wires to the 2-wire register using gel-cap connectors (see [Using Gel-cap Connectors](#) on page 37). After connecting the wires, carefully tuck the connectors into the ERT module housing.
4. To connect the 100WP-R pulser to the RTR 2-wire register, see [Connecting the 100WP-R to a Remote Meter Register](#) on page 9. The ERT module's yellow wire is not used. Tuck the yellow wire back into the ERT module housing with the gel-cap connectors.



5. Place the ERT module on the register, ensuring the edge of the ERT module housing is seated properly around the perimeter of the register as shown below.



---

**Note** A gasket is not required.

---

6. Install four Torx-head mounting screws (SCR-0010-005) as shown below and hand-tighten the screws.



---

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

---

7. 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.

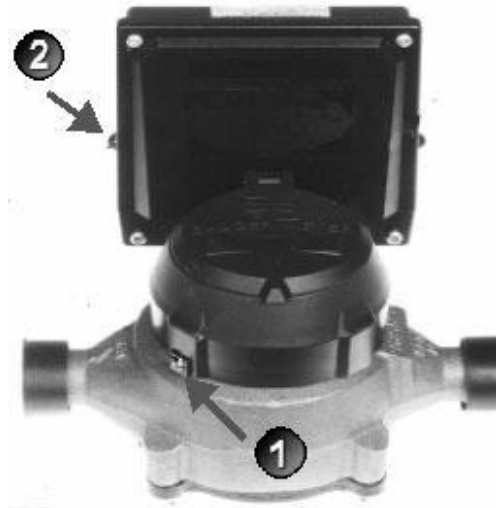


---

**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).

---

8. 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.



**To install the Elster/AMCO (ABB) Scancoder, InVISION, or Digital Direct-Mount**

---

**Caution**

Verify you have an Elster/AMCO meter with a register designed for direct mount ERT modules.

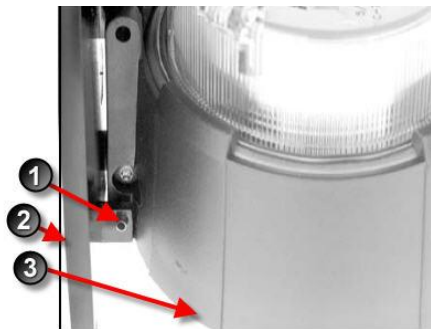


Always install the ERT module right side up with the arrow on the housing pointed upward.

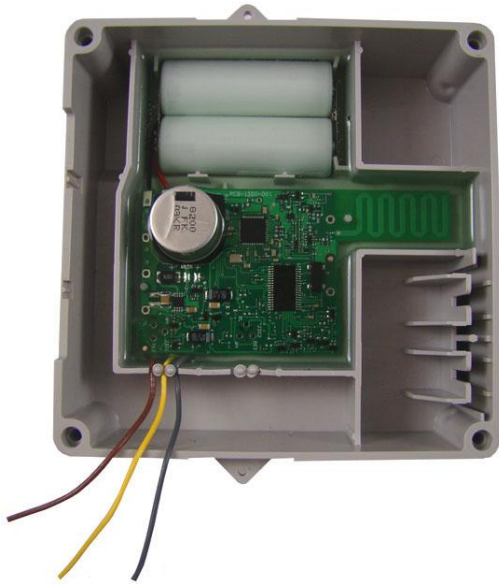
**Note** The register may or may not be mounted on the meter when performing the following steps.

---

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



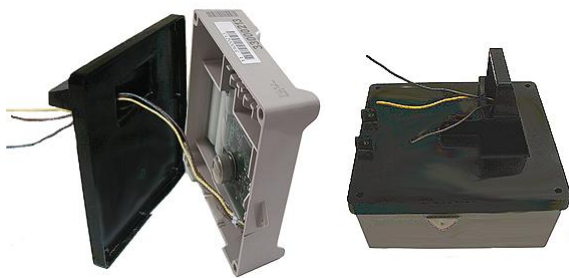
2. Installation requires a 100W-R ERT module for an InVISION or Scancode register. Installation for a Digital register requires a 100WP-R.



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



4. Place the ERT module on the mounting bracket and route the yellow, gray, and brown wires through the opening.



---

**Note** A gasket is not required.

---



5. Install four Torx-head mounting screws (Itron Part Number SCR-0010-005) as shown below. Hand tighten each screw.



6. Connect the ERT module wires to the register screw terminals following the 100WP-R pulser to the Elster/AMCO meter register wire connections, (see [Connecting 100WP-R to a Remote Meter Register](#) on page 9). After connecting the wires, carefully tuck the connectors into the ERT 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.



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



## APPENDIX A

# Using Gel-cap Connectors

---

This section describes connecting the 100W-R and 100WP-R ERT modules to the water meter register using gel cap connectors.

### Required Materials

- E-9R 3M® gel cap crimping tool
- Gel cap connectors



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

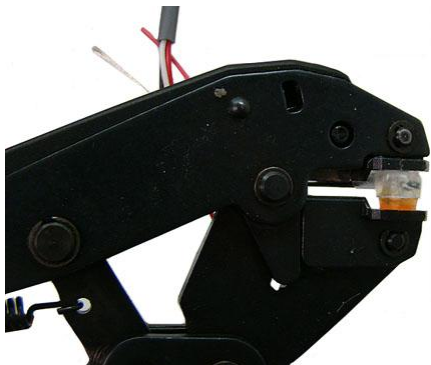


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**Caution** Do not strip insulation from the ends of the wires before inserting them into the connector.

---

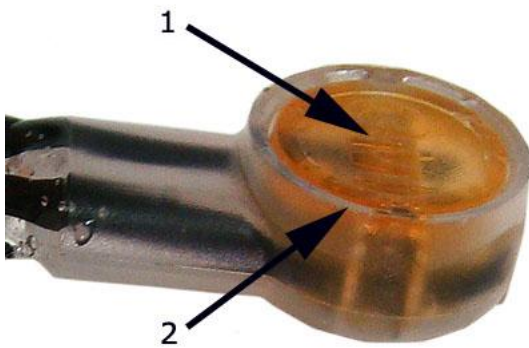
2. Carefully place the connector and wires into the jaws of the crimping tool. Make sure the wires remain fully inserted in the gel-cap connector.



3. Crimp the connector by squeezing the handles until the connector cap is fully seated. Continue to apply pressure for three seconds.



4. A connector is crimped properly when the top of the movable 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 Material Safety Data Sheets (MSDS).

---



## APPENDIX B

# Troubleshooting

---

This chapter provides the information to help you troubleshoot issues related to the 100W-R and 100WP-R ERT modules.

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

<b>Issue</b>	<b>Action</b>
Cannot program the ERT module.	Check the programming device and software version. Program ERT modules using the FC300 handheld computer running Field Deployment Manager (FDM) software.
Cannot read the ERT module.	An ERT module that is not programmed will not transmit an SCM. Reprogram the ERT module and perform a reread. If an ERT module is not initially programmed, it will not bubble-up and listen for an SCM.
The encoder ERT module is reporting an invalid read.	An encoder ERT module that has set the Last Good Read flag will cause an Invalid Read to display in the FDM Consumption field.
Marginal readability due to water ERT module location (for example, an ERT module deep inside a pit).	Consider reprogramming the ERT module for Hard-to-Read (H2R) mode. This increases the output power to Fixed Network levels. <b>Note</b> This mode will reduce battery life.
The ERT module in a Fixed Network is not reporting.	Perform a Check ERT and verify the ERT module is in FN mode. If the CCU's pathway is obstructed, consider including an 8-channel repeater. Systems that utilize Fixed Network v4.0 software and a CCU100 may require a Repeater 100.
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.

# Index

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## Symbols & Numbers

100WP-R Operating Modes • [i](#)  
100WP-R Pulsar Start-up • [i](#)  
100W-R and 100WP-R ERT Module Accessories  
• [i](#), [i](#), [i](#)  
100W-R and 100WP-R Models • [i](#), [i](#), [i](#)  
100W-R and 100WP-R Transmission Modes • [i](#)  
100W-R Encoder Start-up • [i](#)  
100W-R Operating Modes • [i](#)

## A

About the 100W-R and 100WP-R • [i](#)  
Attaching the Backplate • [i](#)

## B

Battery Life • [i](#)  
Before You Begin • [i](#)

## C

Connecting the 100WP-R to a Remote Meter  
Register • [i](#), [i](#), [i](#)  
Connecting the 100W-R to a Remote Meter  
Register • [i](#), [i](#)  
Connecting the Leak Sensor to the 100W-R and  
100WP-R ERT Modules • [i](#), [i](#)

## D

Direct-Mounting to the Meter Register • [i](#), [i](#)

## H

How This Document is Organized • [i](#)

## I

Initializing the 100W-R • [i](#)

Installing 100W-R and 100WP-R Cable Strain  
Relief • [i](#), [i](#)  
Installing the 100W-R and 100WP-R ERT  
Modules • [i](#)

## O

Optional Leak Sensor Installation • [i](#), [i](#)

## P

Pipe Mount Installation • [i](#), [i](#)  
Pipe Preparation • [i](#)  
Programming and Connecting the 100W-R and  
100WP-R • [i](#), [i](#), [i](#)  
Programming the 100WP-R • [i](#)

## R

Related Documents • [i](#), [i](#)  
Remote Mount Installation • [i](#), [i](#)  
Required Equipment • [i](#)  
Required Tools and Hardware • [i](#)

## T

Troubleshooting • [i](#)

## U

Using Gel-cap Connectors • [i](#), [i](#), [i](#), [i](#)

## V

Verifying 100W-R and 100WP-R ERT Module  
Operation • [i](#)