



# Water Solutions

## 100W/100W+ and 100WP/100WP+ Datalogging Water ERT Module Installation Guide

## Identification

100W/100W+ and 100WP/100WP+ Datalogging Water ERT Module Installation Guide  
07 November 2012 TDC-0909-006  
100W/100W+ and 100WP/100WP+ ERT module

## 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



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## Before You Begin

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### Document Conventions

| Convention                                           | Example                                                                                         |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Itron product part numbers are noted in parentheses. | To install the ERT module (ERW-1300-XXX), do the following steps.                               |
| Hypertext links are in blue.                         | See <a href="#">How The Document is Organized</a> on page 1 for document structure information. |



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



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



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

### Document Purpose

This document provides the installation instructions for the 100W/100W+ and 100WP/100WP+. Mounting options for the 100W/100W+ and 100WP/100WP+ ERT module include rod mount, wall mount, through-lid (remote antenna), and shelf-mount installation. For available model configuration, see [100W/100W+ and 100WP/100WP+ ERT Module Models](#) on page 4.

An optional Itron Leak Sensor is available for all three configurations to provide leak monitoring capability. 100W/100W+ and 100WP/100WP+ ERT module configurations provide an easy interface to several register types. The 20-inch cable variant allows meter manufacturers to mount the ERT module directly to their respective meter registers before delivery to the installer.



**Caution** Installing an integrated 100W/100W+ and 100WP/100WP+ ERT module and meter register in a water pit box reduces the ERT module's RF signal distance significantly. If read reliability is a problem, install a remote antenna or select a new installation method.

### How This Document is Organized

This document is organized into the following chapters:

| Chapter                                                     | Description                                                                                                                                |
|-------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Before You Begin                                         | Information about this publication.                                                                                                        |
| 2. About the 100W/100W+ and 100WP/100WP+ ERT Module         | Overview of 100W/100W+ and 100WP/100WP+ ERT module installation.                                                                           |
| 3. Initializing, Connecting, and Programming the ERT Module | Instructions to initialize the 100W/100W+ ERT module, program the 100WP/100WP+ ERT module, and connect the ERT modules to the water meter. |

| Chapter                                                  | Description                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4. Installing the 100W/100W+ and 100WP/100WP+ ERT Module | Step-by-step ERT module installation instructions for: <ul style="list-style-type: none"><li>• Rod mount</li><li>• Wall mount</li><li>• Base mount</li><li>• Shelf mount (kit CFG-1300-001)</li><li>• Through lid mount</li><li>• Optional Leak Sensor installation</li></ul> |
| 5. Optional Direct Connect Remote Antenna Installation   | Instructions for installing the optional remote antenna.                                                                                                                                                                                                                      |
| Appendix A Using an Inline Connector                     | Instructions for installing an inline connector.                                                                                                                                                                                                                              |
| Appendix B Using the Itron Splice Kit                    | Instructions for installing the Itron Splice Kit.                                                                                                                                                                                                                             |
| Appendix C Troubleshooting                               | Troubleshooting 100W/100W+ and 100WP/100WP+ ERT module operation.                                                                                                                                                                                                             |

## Related Documents

| Document Description                                                      | Itron Part Number |
|---------------------------------------------------------------------------|-------------------|
| <i>100 Series Modules and CENTRON Bridge Meter Tamper Reference Guide</i> | TDC-1028-XXX      |
| <i>Field Deployment Manager Endpoint Tools Mobile Application Guide</i>   | TDC-0934-XXX      |
| <i>Field Deployment Manager Field Representative's Guide</i>              | TDC-0936-XXX      |
| <i>900 MHz Belt-Clip Radio User's Guide</i>                               | TDC-0889-XXX      |
| <i>FC300 Getting Started Guide</i>                                        | TDC-0898-XXX      |
| <i>FC200 Series Getting Started Guide</i>                                 | TDC-0598-XXX      |
| <i>Water 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/100W+ and 100WP/100WP+ ERT Module

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

100W/100W+ and 100WP/100WP+ ERT modules ship in factory mode. After installation and programming, the ERT modules acquire and transmit meter register data. The ERT module transfers meter data immediately if the unit is initialized or programmed with a handheld computer during installation (see *Initializing, Connecting, and Programming the ERT Module*).

The ERT modules 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/100W+ and 100WP/100WP+ ERT modules are capable of reading 9-digit registers. The 100W/100W+ may be programmed to truncate down to eight-digit registers.

100W/100W+ and 100WP/100WP+ ERT modules feature the following capabilities:

- **Leak Detection and Reverse Flow Detection.** 100W/100W+ series ERT modules feature robust features that provide Leak Detection and Reverse Flow Detection. For more information about Leak Detection and Reverse Flow Detection, see the Itron white paper.
- **(Optional) Leak Sensor.** Itron Leak Sensors (LS) analyze water flow sound patterns to detect new, evolving, and preexisting water leaks. LS analysis data is uploaded to mlogonline Network Leak Monitoring for data analysis. Systems with optional LS devices access leak information through a utility-specific, secure mlogonline portal.

### Communication Error Indicators.

- **Last Good Read (LGR Flag).** Indicates a communication error with the register.
  - 100W/100W+ encoder ERT module  
If this flag is set for 24 consecutive hours, it initiates a cut cable flag in the extended tampers. The LGR Flag automatically clears after the ERT module receives a successful read from the register.
  - 100WP/100WP+ pulser ERT module  
If the LGR Flag is set two consecutive times, it initiates a Cut Cable Flag in the extended tampers. The LGR Flag automatically clears after the ERT module receives a successful read from the register.

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

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- **Extended Tamper Flag** (retrievable with two-way communication)
  - Low Battery Warning. 100W/100W+ and 100WP/100WP+ 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 ERT modules are nearing end-of-life in a mixed population and gives the opportunity to schedule replacement.

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**Note** 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.

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- **Cut Cable Flag**
  - 100W/100W+ encoder ERT module. The Cut Cable Flag sets if the LGR Flag is active for 24 hours.
  - 100WP/100WP+ pulser ERT module. The Cut Cable Flag sets if the LGR Flag is active 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/100W+ and 100WP/100WP+ ERT Module Models

| 100W/100W+ and 100WP/100WP+ ERT Module Description                                                                 | Iron Part Number |
|--------------------------------------------------------------------------------------------------------------------|------------------|
| 100W encoder, dual-port direct connect remote antenna and register integral connectors                             | ERW-1300-202     |
| 100W+ encoder, dual-port direct connect remote antenna and register integral connectors, ISM                       | ERW-1300-302     |
| 100W encoder, three-port direct connect remote antenna, Leak Sensor, and register integral connectors              | ERW-1300-203     |
| 100W+ encoder, three-port direct connect remote antenna, Leak Sensor, and register integral connectors, ISM        | ERW-1300-303     |
| 100W encoder, 5-ft. cable register connect, direct connect remote antenna integral connector                       | ERW-1300-205     |
| 100W+ encoder, 5-ft. cable register connect, direct connect remote antenna integral connector, ISM                 | ERW-1300-305     |
| 100W encoder 5-ft. cable register connect, direct connect remote antenna and Leak Sensor integral connectors       | ERW-1300-206     |
| 100W+ encoder 5-ft. cable register connect, direct connect remote antenna and Leak Sensor integral connectors, ISM | ERW-1300-306     |
| 100WP pulser dual-port direct connect remote antenna and register integral connectors                              | ERW-1300-208     |
| 100WP+ pulser dual-port direct connect remote antenna and register integral connectors, ISM                        | ERW-1300-308     |
| 100WP pulser, three-port direct connect remote antenna, Leak Sensor, and register integral connectors              | ERW-1300-209     |
| 100WP+ pulser, three-port direct connect remote antenna, Leak Sensor, and register integral connectors, ISM        | ERW-1300-309     |
| 100WP pulser, 5-ft. cable, direct connect remote antenna integral connector                                        | ERW-1300-211     |
| 100WP+ pulser, 5-ft. cable, direct connect remote antenna integral connector, ISM                                  | ERW-1300-311     |
| 100WP Pulser, 5-ft. cable, direct connect remote antenna and Leak Sensor integral connectors                       | ERW-1300-212     |
| 100WP+ Pulser, 5-ft. cable, direct connect remote antenna and Leak Sensor integral connectors, ISM                 | ERW-1300-312     |
| 100W encoder, direct connect remote antenna integral connector, 20-in. flying lead cable connect                   | ERW-1300-217     |
| 100W+ encoder, direct connect remote antenna integral connector, 20-in. flying lead cable connect, ISM             | ERW-1300-317     |

| 100W/100W+ and 100WP/100WP+ ERT Module Description                                                                                     | Itron Part Number |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 100W encoder, direct connect remote antenna integral connector, 20-in. flying lead cable connect, Leak Sensor integral connector       | ERW-1300-218      |
| 100W+ encoder, direct connect remote antenna integral connector, 20-in. flying lead cable connect, Leak Sensor integral connector, ISM | ERW-1300-318      |
| 100WP pulser, 20-in. cable register connect, direct connect remote antenna integral connector                                          | ERW-1300-219      |
| 100WP+ pulser, 20-in. cable register connect, direct connect remote antenna integral connector, ISM                                    | ERW-1300-319      |
| 100W pulser, 20-in. cable register connect, direct connect remote antenna, and Leak Sensor integral connectors                         | ERW-1300-220      |
| 100W+ pulser, 20-in. cable register connect, direct connect remote antenna, and Leak Sensor integral connectors, ISM                   | ERW-1300-320      |



**Note** The 100W/100W+ and 100WP/100WP+ ERT module works accurately with cable lengths up to 300 feet.

## 100W+ and 100WP+ ERT Module Security

The 100W+ or 100WP+ ERT module is a component of a ChoiceConnect system. ChoiceConnect system security applies to the RF communications between the handheld computer, Mobile Collector, or Fixed Network system and the ERT module. There are two fundamental security processes used in the ChoiceConnect system to ensure confidentiality and validity of the system communications.

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

As a component of the Itron ChoiceConnect solution, the 100W+ or 100WP+ ERT module supports the security model found in the ChoiceConnect solution for both reading and programming. If the 100W+ or 100WP+ ERT modules are shipped without ChoiceConnect security enabled, the utility can, at a later date, configure the ERT modules for security.

## Enabling 100W+ and 100WP+ ERT Module Security

When 100W+ and 100WP+ ERT modules ship from an Itron factory, each module contains a utility factory key. The presence of this utility factory key does not enable security. The installer enables 100W+ and 100WP+ ERT module security using an Itron programming device and programming commands. Initial key exchange commands are secured using the utility factory key. For more information about programming the 100W+ and 100WP+ ERT module, see the *FDM Endpoint Tools Mobile Application Guide* (TDC-0934).

## Battery Life

Powered by two non-replaceable, long-life lithium batteries, the 100W/100W+ and 100WP/100WP+ ERT modules have an expected battery life of 20 years when the ERT modules operate in default mobile or fixed network operating mode. If the 100W/100W+ and 100WP/100WP+ ERT module is programmed for hard to read mobile mode, the battery life is reduced to 12 years. To pro-actively indicate the battery has reached a <10% useful battery life, a *Low Battery Flag* is set to indicate a low battery warning and alert the utility of an impending battery failure.

## 100W/100W+ and 100WP/100WP+ ERT Module Transmission Modes

The 100W/100W+ and 100WP/100WP+ ERT module 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/100W+ and 100WP/100WP+ ERT module transmits a high-powered NIM RF message every six minutes and a contingency SCM+ RF message every minute.
- **Mobile and Handheld Mode.** The 100W/100W+ and 100WP/100WP+ ERT module transmits a medium-powered SCM+ RF message every 9 seconds.
- **(Optional) Mobile High Power Mode.** The 100W/100W+ and 100WP/100WP+ ERT module transmits a high-powered SCM+ RF message every 60 seconds.
- **(Optional) Hard to Read Mobile Mode.** The 100W/100W+ and 100WP/100WP+ 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 100W/100W+ and 100WP/100WP+ ERT module's battery life is significantly affected in hard to read mobile mode. You may use the 900 MHz Remote Antenna to increase reading range.

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An FCC license is not required to read 100W/100W+ and 100WP/100WP+ ERT modules.

## 100W/100W+ Operating Modes

The 100W/100W+ has three standard operating modes.

### 1. Factory Mode

- 100W/100W+s are shipped from the factory in factory mode.
- The ERT module's transmitter is turned off.
- The ERT module's receiver is bubbling-up to listen for a programming command.
- 100W/100W+ encoder models will attempt to read the register every hour.
- Last good read and cut tamper flags may be set when a register is not connected.
- If the 100W/100W+ reads a connected register, the module automatically moves to run mode.

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