OpenWay® Riva™ CENTRON® Singlephase Electricity Meter

Technical Reference Guide

Technical Communications

knowledge to shape your future

Identification

OpenWay® Riva™ CENTRON ® Singlephase Electricity Meter Technical Reference Guide
TDC-1704-001

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Suggestions

For more information about Itron or Itron products, see www.itron.com.

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

Contact

- Email: support@itron.com
- Internet: support.itron.com
- Telephone Itron Technical Support North America: 1-877-487-6602

For technical support contact information by region, go to www.itron.com and select your country and language.

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Chapter 1 Important Product and Compliance Information

This section provides important information about product warranty repairs and product compliance.

FCC Compliance

FCC Part 15, Class B
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/TV technician for help.

Changes or modifications to this device not expressly approved by Itron, Inc. could void the user's authority to operate the equipment.

Innovation, Science and Economic Development Canada (ISED)
This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareillage numérique de la classe B répond à la norme Canadienne sur le matériel brouilleur. L'opération est sujette aux deux conditions suivantes: (1) ce dispositif ne peut pas causer d'interférence nocive, et (2) ce dispositif doit accepter n'importe quelle interférence reçue, y compris les interférences pouvant entraîner un fonctionnement indésirable.

Under Innovation, Science and Economic Development Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Innovation, Science and Economic Development 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.

RF Exposure (FCC/ISED)
The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

Under ISED regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by ISED. 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.

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by ISED to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Professional Installation
These antennas are intended for professional installation by the integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which integrates this antenna.

Modification and Repairs
To ensure FCC compliance and system performance, this device, antenna, and/or coaxial assembly shall not be changed or modified without the express written approval of Itron. Any unauthorized modification will void the user’s authority to operate the equipment.

This device contains no user serviceable parts. Attempts to repair this device by unauthorized personnel may subject the person to shock hazard if removal of protected covers is attempted. Unauthorized repair will void the warranty and/or maintenance contract with your company.

Factory Repair of Meters

Itron recommends that all repairs be performed at the factory. Certain repairs may be performed by the user; however, unauthorized repairs will cause any existing warranty to be void.

Repair of Meters Under Warranty

If the meter is under warranty and has failed due to components or workmanship, then Itron, Inc. will repair the meter at no charge. A return authorization number must be obtained before the equipment can be sent back to the factory. Contact your Itron Sales Representative for assistance.

Repair of Meters Not Under Warranty

The same procedure as above applies. Itron will charge for the necessary repairs based on the failure.

Service Return Address
Itron, Inc. Customer Repair Department

313 North Highway 11 Dock C

West Union, SC 29696

Recycling Information

The product you have purchased may contain a battery (or batteries), circuit boards, and switches. The batteries are recyclable. At the end of the product's useful life, under various state and local laws, it may be illegal to dispose of certain components into the municipal waste system. Check with your local solid waste officials for details about recycling options or proper disposal.

Although polycarbonate is not a commonly recycled plastic, the recycling number for the polycarbonate inner and outer cover is seven (7).

Chapter 2 OpenWay® Riva™ Overview

The OpenWay Riva solution delivers scalable and inter operable headend software, a robust and secure IPv6 network comprising RF Mesh, PLC Mesh, and cellular endpoints and an integrated home area network designed to provide redundant two-way communications. Adaptive Communications Technology (ACT) enables each endpoint to communicate using either RF or PLC links with dynamic selection of the optimal path and modulation rates.

IPv6 Mesh

End-to-end implementation of the Cisco IPv6 reference design for field area networks (FAN) makes the OpenWay Riva solution capable of incorporating multiple networks, applications, and devices within a single communications architecture. The use of IPv6 standard protocols enables common application layer services over various wired and wireless communication technologies.

Two-way communications from the CGRs to the smart meters, HAN devices, DA devices and other smart grid devices are enabled through Itron's new and patented Adaptive Communications Technology (ACT). ACT combines both IPv6 RF and PLC communications technologies into a single, integrated communications module that delivers assured network connectivity at the highest possible speed.

OpenWay Operations Center (OWOC)

The OpenWay Operations Center (OWOC) acts as the centralized hub between the metering system and utility processes such as meter data management, billing, outage management, distribution automation, and load control. It manages high-volume, secure advanced metering, disconnect/connect, and demand response requests. The OWOC also manages device configuration attributes and firmware downloads directly to the endpoints.

Chapter 3 Meter Description

Meter Physical Description

The OpenWay CENTRON Riva Electricity meter features a support frame within the meter base. The support frame holds the circuit boards that provide the power, metrology, and metering applications. The base, support frame, and outer covers are polycarbonate.

Meter Components

Standard Nameplate

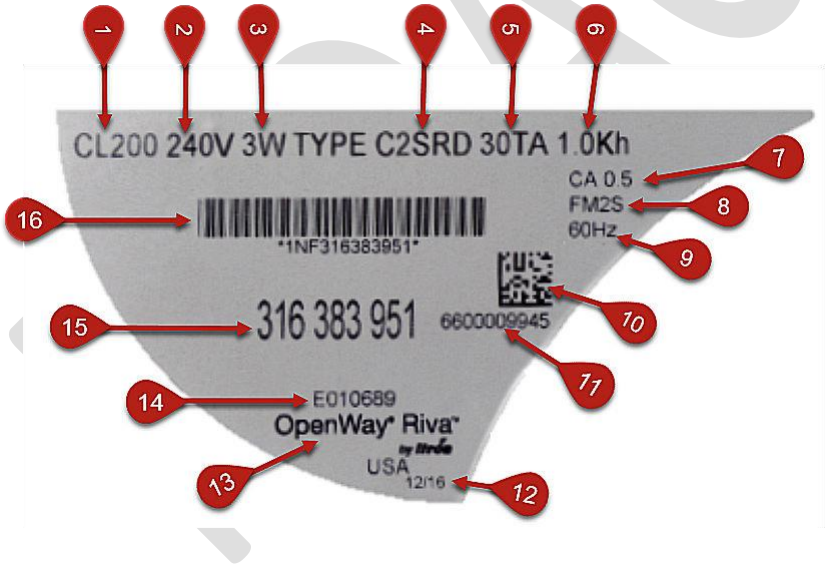

Illustration Callout #	Field	Notes
1	Meter Class	
2	Voltage	
3	Number of Wires	
4	Type Code	
5	Test Amps (current rating)	
6	Kh	Kh = ___ Wh/P

7	CA	Class Accuracy
8	Meter Form	
9	Frequency	
10	Itron 2D System Title Barcode	Used for Wi-Fi login
11	Itron Human Readable System Title	Used for Wi-Fi login
12	Date of Manufacture	Four digits - month/year
13	Itron Logo	
14	Customer Part Number	
15	Serial Number	
16	Meter Barcode	

Chapter 4 Installation

Safety

Meter installation must be compliant with the generally accepted technical rules for the installation of electrical and telecommunication equipment valid in your jurisdiction.

The electrical utility dictates the safety procedures for meter installations. Please check with the local electrical utility for these safety procedures.

Install the meter in accordance with the voltage and current specifications printed on the front panel and the wire and environmental specifications given in the installation information.

Do not install the meter if it is damaged.

Do not install the meter if it has been dropped or otherwise subjected to significant impact even if no damage can be seen.

Do not use the meter for primary protection purposes.

Unpacking and Inspection

Be sure you are working in a static-free environment; electrostatic discharge (ESD) can damage meter components.

Upon receipt:

- Check the condition of the packaging to ensure there was no damage during shipment.
- Verify that the packaging label matches the order.
- Inspect for obvious damage to the cover, base, and meter assembly.
- Compare the meter and register nameplates to the record card and invoice. Verify the type, class, voltage, form number, and other pertinent data.
- Verify that the Itron meter seals are in place.

As with all precision electronic instruments, the meter should be handled with care. Follow these precautions when handling the meter:

- Avoid damaging the meter base, cover, reset mechanism (if supplied), and optical connector (if supplied).
- When handling modules, grip the circuit board by its edges. Do not touch the liquid crystal display.
- Save the original packing materials.

Battery

The OpenWay Riva CENTRON meter contains a battery that powers the clock circuit during a power outage. The battery is permanently soldered to the module and is expected to last the life of the meter.

⚠ **Caution**: The product you have purchased contains a recyclable battery. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local area solid waste officials for details about recycling options or proper disposal.

Selecting a Site

The meter is designed and manufactured to be installed in an environment with an operating temperature range between -40°C and +85°C (-40°F to +185°F).

Chapter 5 Specifications

Electrical

Voltage Rating	120V, 240V
Operating Voltage	± 20% (60Hz)
Frequency	60 Hz
Operating Range	± 3 Hz

Radio Specifications

Output Power	500mW - 1 W
Frequency Ranges	902 - 928 MHz 870 - 876 MHz

Operating Environment

Temperature	-40°C to +85°C (-40°F to +185°F)
Humidity	0% to 95% non-condensing
Accuracy	± 0.5% @ unity power factor
Transient/Surge Suppression`	ANSI C62.45 - 2002; IEC 61000-4-4

Storage

Store the meter in a clean, dry (Relative Humidity < 50%) environment between -40°C to +85°C (-40°F to +185°F). Avoid prolonged storage (more than one year) at temperatures above +70°C (+158°F). Store the meter in the original packing material.

Technical Data

Meets applicable standards:

- ANSI C12.1 - 2008 (American National Standard for Electricity Meters - Code for Electricity Metering)
- ANSI C12.20 - 2010 (American National Standard for Electricity Meters - 0.2 and 0.5 Accuracy Classes)
- ANSI/IEEE C62.45 - 2002 (Guide to Surge Testing on Low-Voltage AC Power Circuits)
- ANSI MH 10.8 - 2005 Specification for Bar Code
- ANSI ASQZ 1.4 - 2008 Sampling Procedures and Tables for Inspection by Attributes
- IEC 61000-4-2 2008
- IEC 61000-4-4 2012
- IEEE C37.90.1 - 2004 SWC Surge Testing
- IEEE C65.42 2002 Recommended Practice on Surge Testing for Equipment Connected to Low Voltage (1000V or less) AC Power Circuits
- NEMA SG-AMI 1 - 2009 Requirements for AMI Meter Upgradeability

Shipping Weights

The following weight measurements are shown in kilograms and (pounds).

Packaging	Weight kgs(lbs)
4 Meters and Carton	4.958 (11.0)
120 Meter Pallet	149.685 (330.0)

Chapter 7 Metering Applications

Metering Applications

Meter Programming

The OpenWay Riva CENTRON meter allows for two programming/reconfiguring methods, locally using FDM Tools via wi-fi or remotely using the network.

OpenWay configurations are meter programs that control how the meter records billing data, displays information, and functions. The system of record for all configurations is the OpenWay Operations Center (OWOC). Meter configurations can only be created and edited through the OWOC. Configurations can be downloaded to the endpoints via the OWOC or locally via FDM Tools (for contingency only).

Chapter 8 Testing, Troubleshooting, and Maintenance

Testing

Recommended Energy Testing Procedures

Itron recommends using modern test boards with the latest software to test its electrical meters. Otherwise, erroneous readings could occur on light-load tests when the test sequence calls for a light-load test following a full-load or power-factor test. When proper testing equipment is not used, power-factor readings may also be in error when following a full-load test. The errors are always positive and may be a few percent for power-factor and even greater for light-load. The problem is aggravated on lower voltages and when using large test constants, Kt, similar to the typical Kh values of comparable induction meters.

Visual Indicators

The OpenWay Riva CENTRON meter is equipped with an Infrared (IR) Test Light Emitting Diode (LED) for testing meter accuracy. The LED is located on the front of the meter.

Annunciators

Load Indication/Direction Annunciator

The OpenWay Riva CENTRON meter is equipped with a Liquid Crystal Display (LCD) load emulation indicator. The Load Emulator follows the Infrared Test LED. For each pulse of the Test LED, the Load Emulator increments one segment. The operation of the Load Emulator is based on the bi-directional Wh energy.

The Load Emulator scrolls to the right when energy is being delivered and scrolls to the left when energy is being received.

Troubleshooting

Preventive Maintenance

No scheduled or preventive maintenance is necessary for the meter.

DANGER: Line potential may exist on the battery terminals. Follow these precautions:

- Never short-circuit batteries (such as by measuring current capability with an ammeter).
- Do not recharge batteries.
- Do not store or transport batteries in metal or other electrically conductive containers.
- Keep batteries separated. If stored in a container where they can contact each other, face them in the same direction to prevent short circuits.
- Dispose of batteries where they will not be punctured, crushed, or incinerated.
- Discard the battery using proper hazardous waste procedures.

Corrective Maintenance

Because of the high level of integrated packaging and surface-mount components, on-board component repairs are not recommended.