



OpenWay® Riva Intelis Gas Meter Installation Guide

Identification

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Chapter 1 Important Safety and Compliance Information

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

USA, FCC Part 15 compliance

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 installed to provide a separation distance of at least 20 centimeters (7.9 inches) from all persons to be compliant with regulatory RF exposure.

USA, FCC Class B-Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio or TV technician for help.

Modifications and Repairs

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

Canada, ISED compliance

Compliance Statement Canada

This device complies with Innovation, Science and Economic Development Canada (ISED) license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Innovation, Science and Economic Development Canada (ISED) regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Déclaration de Conformité

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

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)

This equipment complies with radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20 cm entre le radiateur et votre corps. Cet émetteur ne doit pas être co-localisées ou opérant en conjonction avec tout autre antenne ou transmetteur.

Electromagnetic compatibility



Caution: Use only approved accessories with this equipment. All cables must be high quality, shielded, and correctly terminated. Unapproved modifications or operation beyond or in conflict with these use instructions may void the authority's authorization to operate the equipment.

Intrinsic safety



Warning: Substitution of components may impair intrinsic safety.

Lithium battery



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°C Celsius (212°F Fahrenheit), crush, expose to water, or incinerate the lithium battery. Fire, explosion, and severe burn hazard.
- The battery used in this device may present a risk of fire or chemical burn if mistreated.
- Keep the lithium battery away from children.
- Batteries must not be replaced or modified in any way.

Transportation classification

The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. When powered, the Itron device is considered an operating transmitter and receiver and cannot be shipped by air. All product returns must be shipped by ground transportation.

Electrostatic discharge



Warning: Internal circuit components can be sensitive to electrostatic discharge. Before installation, discharge electrostatic buildup by touching a metal pipe or other earth-grounded metal object prior to touching the meter body, register housing, or Itron device.

Electrostatic ignition hazard



Warning: Verify the area is not hazardous when installing, servicing, cleaning, or touching the Itron device.

Device cleaning



Warning: Clean only with a damp cloth.

Do Not Drop



Warning: While Itron modules are designed to withstand a drop, dropping the module may damage the device and void the warranty.

Product notification



Warning: These instructions are suggested when Itron-approved utility or installer company-established valve installation procedures and practices are not available. The meter installation must comply with all state and local building and safety regulations as well as federal regulations including Section 192.353 of Title 49 of the Code of Federal Regulations. The two pertinent paragraphs of the code are:

- Each meter and service regulator, whether inside or outside of a building must be in a readily accessible location and be protected from corrosion and other damage.
- Each meter installed within a building must be located in a ventilated place and not less than 3 feet from any source of ignition or any source of heat which might damage the meter.

The use of this meter outside of the temperature range from -30° to 120° is not recommended. Direct customer inquiries as to the selection and application of gas meters to your local Itron sales representative or Itron Support.

- Itron does not endorse or warrant the completeness or accuracy of any third-party valve installation procedures or practices, unless otherwise provided in writing by Itron.
- Follow your company's standard operating procedures regarding the use of personal protection equipment (PPE).
- Adhere to guidelines issued by your company in addition to those given in this document when installing or repairing valves.
- This product, as of the date of manufacture, is designed and tested to conform to all governmental and industry safety standards as they may apply to the manufacturer.
- The purchaser and user of this product must comply with all fire control, building codes, and other safety regulations governing the application, installation, operation, and general use of this valve to avoid leaking gas hazards resulting from improper installation, startup, or use of this product.
- To ensure safe and efficient operation of this product, Itron strongly recommends installation by a qualified professional.

Chapter 2 The OpenWay® Riva Intelis Gas Meter

The OpenWay® Riva Intelis Gas Meter is a solid state static meter featuring built-in temperature conversion, an integrated shut off valve, and an integrated OpenWay Riva 500G communications module for extended datalogging capability. The Intelis meter supports the listed functionality.

- Ability to switch to network modes
- Perform local firmware download
- Support basic meter functionality. Basic metering functionality returns information for the listed parameters.
 - Utility ID
 - Index reading (single index)
 - Count rate
 - Index rollover
 - Pressure compensation
 - Security level
 - Output power
 - Bubble up rate

The Intelis meter is configured for Mobile Mode with support for a combined 100G and OpenWay Riva 500G population. This compact meter weighs about 4-1/2 pounds and mounts on existing meter footprints for easy meter installation and replacement of existing gas meters.

OpenWay Riva Intelis Gas Meter models

The Intelis gas meter is available in the listed types.

- Temperature compensated
- Non-temperature compensated

The Intelis meter is identifiable by a customer-specified serial number that allows the customer to audit their inventory of Intelis meters through a report from the OpenWay Collection Manager.

Intelis meter components

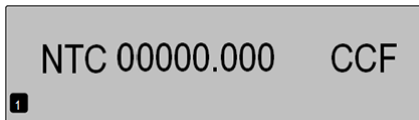
The Intelis residential gas meter features these components in a compact solid state meter.

- Integrated OpenWay Riva 500G communications for RF reading in Mobile Mode.
- An internal shut off valve.

OpenWay Riva Intelis Gas Meter LCD

The Intelis meter LCD provides a visual display through a liquid crystal display (LCD). The LCD:

- Displays a 5-digit plus three (in CCF) in NTC or TC measurement.
 - NTC meters display Vm.



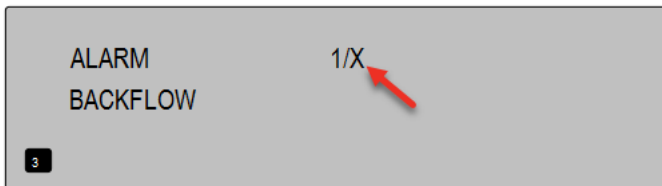
- TC meters display Vb.



- Displays different menu pages in a pre-defined sequence.
 - The time each menu page is active is configurable.
 - When the last menu page is reached, the process loops to the first menu page until the configured timeout is reached.

Note: Two additional menu pages provide overflow condition information and an interface to perform an LCD test. The LCD test is initiated by a long press. These additional menu pages are not a part of the normal sequence.

- Displays current alarms.



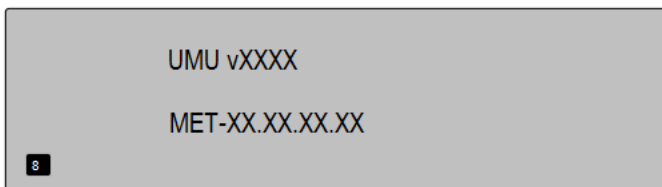
Note: X (1) indicates the number of currently active alarms. Before the display moves to the next menu page, all active alarms are displayed. If there are no alarms, *NO ALARM* displays.

Available alarms include:

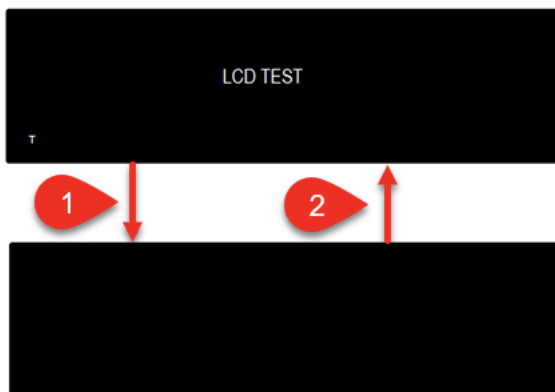
- Backflow
- Overflow
- Magnetic tamper
- Temperature
- Valve
- 123 (alarm code)
- Displays current volume consumption measured under an alarm condition.



- Menu 8. Displays the UMU and meter firmware versions.



- Menu T. Checkerboard test mode for a visual confirmation that the LCD is functioning correctly.



- 1. After 500 ms.
- 2. After 500 ms.

Integrated 500G ERT module

The integrated 500G radio-frequency (RF) gas ERT module is designed to operate in Mobile Mode and be read by ChoiceConnect handheld readers, mobile collection, or the Itron Mobile Radio connected to a user-supplied computer or Bluetooth device.

Note: The 500G communication functionality is dependent on the module's firmware version.

Internal shut off valve

The Intelis internal shut-off valve is located on the outlet of the meter. The shut off valve is a safety feature automatically triggered if the meter is configured for automatic shut off.

Note: It is mandatory that an on-site technician is at the meter to re-open the valve and ensure safe conditions before the flow of gas is resumed after an automatic shut off.

Auto disconnect configuration

The Intelis gas meter can be configured for an automatic shut off for the following event types.

- High flow. Configuration for a high flow event enables an automatic shut off if the high flow threshold is reached or exceeded.
- High temperature. Configuration for a high temperature enables an automatic shut off if the high temperature threshold is reached or exceeded.

Intelis meter specifications

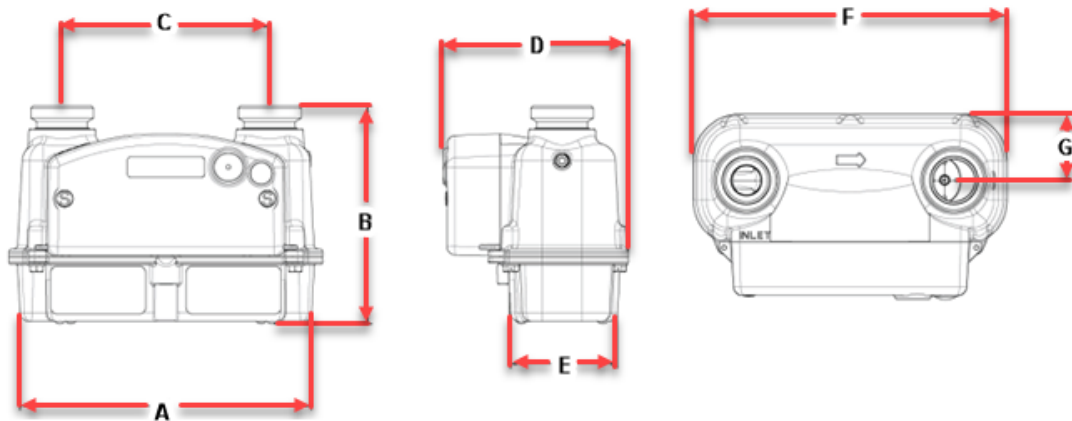
This section lists the OpenWay Riva Intelis Gas meter product specifications.

Specification	Specification value
Meter capacity	250 cubic feet per hour
Measurement principle	Ultrasonic time of flight
Gas type	Natural gas Type E, H, L
Hub center-to-center	6 inches
Hub size options	• 10LT • 20LT • 30LT • 1A/Standard • 1-1/4" • ISO G 1-1/4"
Meter MAOP	5 PSIG
Meter type	Temperature compensated (TC) or non-temperature compensated (NTC)
Intrinsically safe	UL Class I, Div 1
LCD displayed units	CCF (100 x cubic foot) or cubic meter
LCD resolution	00000.001 CCF (0.1 CF) or 00000.001 m ³
Accuracy	Class 1 and $\pm 0.5\%$ at room temperature
Case	Aluminum case with ASA 49 gray powder coat finish
Valve	Gate valve, maximum 0.035 CFH leakage rate (14% of pilot flow)
Pulse width	10 ms - 1000 ms (1 second)
Pulse weight (volume per pulse)	0.10 CF, 0.25 CF, 0.50 CF, 1.0 CF, 10 dm ³ , 50 dm ³
Operating temperature ratings	Measurement -30° F (-34° C) to +131° F (55° C) Valve -13° F (-25° C) to +131° F (55° C) 500G -40° F (-40° C) to +158° F (70° C)
Storage temperature ratings	Measurement -40° F (-40° C) to +131° F (55° C) Valve -40° F (-40° C) to +131° F (55° C) 500G -40° F (-40° C) to +158° F (70° C)

Specification	Specification value
Battery information	4 A cell Lithium manganese dioxide (LiMnO ₂) 'A' cell batteries, replaceable
Battery life	20 years for meter, 500G, and valve using recommended operating parameters
Pressure tap	1/8" NPT pipe plug pressure tap standard on meter outlet
Badging	Standard aluminum manufacturing and optional customer badge

Intelis meter dimensions

This section lists the Intelis meter dimensions.



A	B	C	D	E	F	G
8.4	6.3	6.0	5.5	3.1	9.1	1.9

Note: All dimensions are approximate.

Chapter 3 Installing the Intelis Meter

This section provides the Intelis meter installation information.



Warning: This product, as of the date of its manufacture, is designed and tested to conform to all governmental or industry safety standards then existing as well as may apply to the manufacturer. The purchaser and user of this product are warned that compliance with the manufacturer's instructions and procedures is required in order to avoid the hazards of leaking gas resulting from improper installation, start-up, or use of this product, and further, that all fire control, building codes, or other safety regulations established under public laws which regulate or govern the application, installation, operation, or general use of this product, should be complied with. In order to ensure the safe and proper operation of this product, the manufacturer recommends that a qualified technician install this product.

The Intelis meter must be installed with the inlet to the left, the outlet to the right, the meter in a horizontal position and with the LCD facing out.



Prior to start-up

Read the meter badge data regarding maximum allowable operating pressure and capacity flow rate to be sure the meter meets the installation requirements.

Sight across both swivel flanges or test with a suitable bar to determine that they are nominally in the same plane and will not cause excessive strain on the meter or piping when the connection nuts are tightened.

Start-up

1. Blowout the service lines before the meter is installed to ensure no dirt, debris, or liquids of any kind will be carried into the meter when the gas is flowing in the line.
2. Place a new connection washer (gasket) on each swivel pilot.

3. Support the meter so that both hubs are against the connection washers and run the connection nuts down hand tight.
4. In an alternating fashion, tighten the nuts to the appropriate torque for the connection size.
5. Prior to turning on the gas in a new installation, check the meter's downstream system to ensure that all connections are leak free or that the downstream valve, if one is present, is closed.

Note: It is well worth the time checking connections to avoid an inadvertent and dangerous gas stream in the atmosphere.

6. Open the upstream and downstream valves very slowly to prevent any pressure surges into or out of the meter.



Caution: Avoid high differential pressure across the meter. Abnormal differential pressures can damage internal meter components.

7. Crack each valve open for a few seconds and then slowly-over a period of 10 seconds ($\frac{1}{4}$ PSIG systems)-turn the valve to the $\frac{1}{4}$ open position and then to the full open position.



Caution: It is a good practice to pressurize the meter with the inlet valve so the meter runs forward. Locked off gas in a downstream section of a high pressure system could damage a meter with a reverse stop if the outlet valve from the meter is opened first.

8. After the meter is pressurized, apply a soap solution or other good leak detecting liquid to the connections to check for leaks.

The Intelis meter capacity and pressure loss test

The Intelis meter capacity and pressure loss test confirms the meter's operating capacity.

Chapter 4 Proving and Calibrating the Intelis Meter

This section provides information about the Intelis meter proving, testing, and calibrating process.

Warning: Follow your company's standard operating procedures regarding the use of personal protection equipment (PPE). Adhere to guidelines issued by your company in addition to those contained in this document when proving meters.

The Intelis meter Test Mode and a proving station are used to confirm the calibration and accuracy of the meter.

Note: Test Mode is used in a meter shop or by a regulatory body. Some meter configuration is required for the meter to communication with the prover type.

Proving the Intelis meter requires attaching the prover cable between the meter and the proving station. After the accuracy of the meter is confirmed or calibration is complete, the proving cable is removed and the meter returns to normal operation.

Note: Temper meters unpackaged and uncapped in the proving area for 24 hours prior to the testing. Some configuration of the meter is necessary for the prover station type. This configuration is completed using the FDM configuration file.

Proving accessory	Itron part number
Intelis prover cable	CFG-7100-001

Prover types

There are a variety of prover types that can be used to prove the Intelis meter. Two interface options are shown in the following illustrations. For your specific prover, see the documentation for your prover type.

The screenshot shows a proving interface for an Intelis meter. It includes several input fields with redacted values (represented by '?????') for 'Reason Removed Number', 'Customer Name Number', 'Manufacturer Number', 'AMR Number', and 'Index Reading'. There are also buttons for 'TC', 'ENGLISH', '%PROOF', '2-RATE', 'INTEST', 'MAG', and 'Switch to AMS'. A numeric keypad with digits 1-9, 0, and function keys like 'SPACE', 'ALPHA', 'BACK SPACE', and 'ENTER' is present. At the bottom, there are 'EXIT' and 'SELECT METER TYPE' buttons. The top right corner displays the date and time: 'Tue Oct, 26 10:07:32'.

The screenshot shows a 'Setup Menu' interface with a list of numbered configuration items. The items include:

- 1. Operator number: 1
- 2. Exercise cycle duration: 20 sec.
- 3. Leak test duration: 15 sec.
- 4. Index/Internal test revs: Index 1 revs, Internal 1 revs
- 5. Index/Internal volume: Index 0.5 cu ft/rev, Internal 3.0 revs/cu ft
- 6. Flow rates (Natural Gas cfh): Open 525
- 7. Proving method?: Internal
- 8. Display method?: Proof
- 9. Open limits: InTest 99.0 to 101.0, OutTest 99.0 to 101.0
- 10. Check limits: InTest 99.0 to 101.0, OutTest 99.0 to 101.0
- 11. Delta limit: InTest 0.5, OutTest 0.05
- 12. Check diff limits (in w/c): 0.00 to 0.50
- 13. Tangent adjustment: Check Adj 6.0
- 14. TC or Non-TC?: Non-TC
- 15. InTest or OutTest?: InTest
- 16. Meter model: Intelis TC
- 17. Prover Setup Menu: Choose a Menu item number then Press 'Enter' or Press 'Esc' to exit.
- 18. Exit Prover Program.

 Additional settings like 'Monitor peak?', 'Check Adj Ratio', and 'Stroke Adj' are also visible on the right side of the menu.

Proving operations

Proving the Intelis meter involves the following tasks.

1. Configuring Test Mode.
2. Entering Test Mode.
3. Recording prover consumption.
4. Exiting Test Mode.
5. Adjusting the calibration.

Configuring Test Mode

Test Mode configuration is completed using Field Deployment Manager (FDM) in one of two ways.

- By loading the meter configuration from the FDM server using FDM mobile client.
- By entering the parameters directly into the FDM mobile client which are then sent to the meter.

The FDM configuration file must contain the listed information to complete the Test Mode configuration. After the meter receives the proper Test Mode configuration parameters, FDM is used to perform a **Get** of the attributes to display the value types.

1. Set the pulse weight.
2. Set the pulse width.
3. Set the Test Mode maximum time.

Entering Test Mode

Entering Test Mode is accomplished using either the FDM mobile client or through the magnet in the head of the prover cable. The default is for the Intelis meter to enter Test Mode after the prover cable pick up head magnet is detected. After the Intelis moves to Test Mode, the following steps occur.

1. The Intelis logs an **Entering Test Mode** event.
2. The Intelis enters Test Mode.



Caution: If the meter is operating in prover mode with a flow rate greater than 3.6 CCF (360 cf) per hour with a pulse weight of 0.1 cf (the firmware default setting) and a pulse width of 1000 ms, the pulse output will always be high. This is because the meter is outputting a pulse every 1 second and the pulse width is also 1 second. As the pulse weight is decreased and the pulse width is increased, the meter moves to 100% duty cycle. Reprove the meter by beginning with a Qreal setting of 360 cfh (10194.064 lph) and the pulse width set at 1000 ms. Measure the pulse output.

3. The Intelis meter index is reset to a zero reading.
4. The Intelis meter starts an optical pulse output.

5. The Intelis meter LCD moves to Test Display Mode.

Note: When the Intelis meter is in Test Display Mode, FDM can be used to confirm the meter is in Test Mode.

Recording prover consumption

While the Intelis meter is in Test Mode, the listed operations occur.

1. The Intelis meter records the Test Mode consumption in the index registers.
2. The Intelis meter continues to output an optical pulse.

Note: While the Intelis is in Test Mode, the LCD refresh rate is more frequent than when the meter is operating in Normal Mode.

3. The Intelis meter continues to update the normal volume registers.

Exiting Test Mode

The Intelis meter exits Test Mode after it receives a command from the FDM mobile client, after the proving cable head is removed from the meter, or when the Test Mode timeout is reached. The following operations occur when the Intelis exits Test Mode.

1. The Intelis meter logs an Exiting Test Mode event.
2. The Intelis meter ends the optical pulse output.
3. The Intelis meter LCD returns to normal display mode.

Note: Perform a **Get** to verify the Intelis meter is no longer in Test Mode.

Adjusting the Intelis meter calibration

Adjusting the Intelis meter begins when FDM sends the FDM configuration file that contains the parameters used by the Intelis to calculate correction factors for the flow rates.

Note: The FDM configuration file values are not the correction factors but parameters that are the result of the Test Mode ran in the utility meter shop.

The FDM configuration file initiates the following calibration operations.

1. The Intelis meter enters a *Calibration in Progress* state.
2. The Intelis meter calculates correction factors for the assigned flow rate to meet the calibration parameters.
3. The Intelis meter sends the correction factors to the internal measurement device which then, calibrates itself.
4. The Intelis meter logs a **Meter Calibrated** event.
5. The Intelis meter moves to a *Calibration Not in Progress* state.

Note: Perform a **Get** to confirm the status of the calibration process.

Chapter 5 OpenWay Riva Intelis Gas Meter Maintenance

This section describes maintenance to keep the OpenWay Riva Intelis Gas Meter operating at optimum performance.