Intelis Gas Meter Installation Guide

Technical
Communications

knowledge to shape your future

Identification

Intelis Gas Meter Installation Guide

8 March 2019

TDC-1782-002

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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 spectrum 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 spectrum compliance

Compliance Statement Canada	Déclaration de Conformité
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.	Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
Under Innovation, Science and Economic Development Canada (ISED) regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.	Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

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 do it 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.

Australia, ACMA spectrum compliance

When this device is sold and shipped to Australia, it is configured and labeled accordingly to be compliant with ACMA Standards for the Radio, EMC and RF Exposure. This includes standard AS/NZS 4268 RF spectrum standard for frequency and power out.

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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 212°Fahrenheit (100°C Celsius), 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.

Transportation classification

The Federal Aviation Administration prohibits operating transmitters and receivers on all commercial aircraft. When powered and not in Factory ship mode, 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 meters are designed to withstand a drop, dropping the meter may damage the device, impact the meter accuracy, and void the warranty.

Product notification

Warning: These instructions are not intended to replace any utility or company-established meter installation procedures. These instructions are provided for additional information when the Intelis Gas Meter is installed. The meter installation must comply with all country, 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. 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 Intelis Gas Meter is rated for the following operating and storage temperature ranges. Use of the meter outside of the listed temperature ranges is not recommended.

- Operating ranges:
  - 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 range:
  - -40° F (-40° C) to +158° F (70° C)

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 meter 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 meters.
- 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 meter to avoid leaking gas hazards resulting from improper installation, start-up, or use of this product.
- To ensure safe and efficient operation of this product, Itron strongly recommends installation by a qualified professional.

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Chapter 2 Intelis Gas Meter

The Intelis Gas Meter is a solid state ultrasonic meter featuring an internal safety shut-off valve, built-in temperature conversion, and an integrated 500G communications module. The meter supports the listed functionality.

- High flow alarm with optional automatic valve shutoff.
- High temperature alarm and optional automatic valve shutoff.
- Air detection.
- Reverse flow detection.

The Intelis Gas Meter can be configured for Mobile Mode or OpenWay Riva Network Mode. This compact meter weighs only 4-1/2 pounds and mounts well within existing meter footprints for easy meter installation and replacement of existing gas meters.

Note: OpenWay Riva Network Mode functionality will be available in a future Riva release.

Related documents

For more information about the Intelis Gas Meter and compatible system architecture documentation, see your product's documentation.

Document	Itron part number
Intelis Gas Meter Technical Reference Guide	TDC-1805-XXX
Intelis Gas Meter Ordering Guide	PUB-1309-000
Intelis Gas Meter Specification Sheet	101584-SP-XX
Intrinsic Safety Control Drawing Index Module Replacement Intelis Gas Meter	TDC-0908-009
OpenWay® Operations Center Collection Manager Device Interface Guide	TDC-7083-XXX
Itron Security Manager User Guide	TDC-1380-009
Field Deployment Manager Tools Configuration Guide	TDC-1711-XXX

Document	Itron part number
Field Deployment Manager Tools Application Guide	TDC-1713-XXX
Field Deployment Manager Field Representative's Guide	TDC-1714-XXX

Intelis Gas Meter models

The Intelis Gas Meter is available in the listed types.

- Temperature compensated
- Non-temperature compensated

Intelis Gas Meter components

The Intelis Gas Meter features these components in a compact solid state meter.

- Intelis Gas Meter index
  - The index contains the integrated 500G communications module, battery pack, and the liquid crystal display (LCD). The LCD provides a visual display of consumption, alarm messages, and status information. For information about LCD operation, see The Intelis Gas Meter LCD on page 15.
- An internal shutoff valve
- Ultrasonic measuring unit (UMU)
- Inlet and outlet tube
- Dust trap and filter
- Die cast aluminum case
- Steel hubs

Internal safety shutoff valve

⚠ **Caution**: It is mandatory that a technician be on site at the meter to re-open the valve and ensure safe conditions before the flow of gas is resumed after a valve has been closed.

The Intelis Gas Meter shutoff valve is located in the outlet of the meter. The automatic shutoff valve is a safety feature automatically triggered if the meter is configured for automatic shut off for high flow or high temperature events. The valve can also be shut off through an RF command over the Mobile or OpenWay Riva Network.

Automatic shutoff 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 in a configurable window of time.

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

Note: For more information about high flow and high temperature event configuration, see the FDM documentation. For document information, see Related documents on page 6.

Integrated 500G communications module

The integrated 500G RF communications module is designed to operate in either Mobile or OpenWay Riva Network Mode. When the Intelis Gas Meter is operating in Mobile Mode, it may be read by ChoiceConnect handheld readers, mobile collection, or the Itron Mobile Radio connected to a user-supplied computer or Bluetooth device. When the meter is operating in OpenWay Riva Network Mode, it is read by the OpenWay Riva Network. For compatible Itron reading and programming devices, see the Intelis Gas Meter Technical Reference Guide (TDC-1805-XXX).

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

Intelis Gas Meter specifications

This section lists the Intelis Gas Meter product specifications.

Specification	Specification value
Meter capacity	250 CFH at ½ w.c. / 7.1 m^3/h @0.125 kPa
Measurement principle	Ultrasonic time of flight
Accuracy	Class 1 and ±0.5% at room temperature
Meter type	Temperature compensated (TC) or non-temperature compensated (NTC)
Hub center-to-center	6 inches (152.4 mm)
Hub size options	• 10LT • 20LT • 30LT • 1A/Sprague standard • 1-1/4", 1" Pittsburgh • ISO G 1-1/4"
Meter MAOP	5 PSIG (35 kPa)
Valve	Actuated swing valve, maximum 0.035 CFH (1 L/H) leakage rate
LCD displayed units	CCF (100 x cubic foot) or cubic meter
LCD resolution	00000.001 CCF (0.1 CF) or 00000.001 m^3
Case	Aluminum case with ASA 49 gray powder coat finish
Weight	4.5 lbs (2.0 kg)
Gas type	Natural gas Type H, E, L (per EN 437) Reference gases G20, G21, G23, G25, G26, G27

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Specification	Specification value
Component materials	• UMU (ultrasonic measuring unit): polybutylene terephthalate (PBT) and polycarbonate (PC) • Valve plastics: PBT • Inlet and outlet tubes: polyoxymenthylene (POM)
Intrinsically safe	For use in Class I, Division 1, Group D hazardous locations. Temp Code T1 -40°C ≤ Ta ≤ +70°C IECEx UL 18.0144X Ex ia IIA T1 Ga
Regulatory	FCC: Part 15.247, Part 15.249 (programming) FCC ID: EWQINTELISG Innovation, Science, and Economic Development Canada (ISED): RSS-247 and RSS-210 (programming) IC: 864D-INTELISG Measurement Canada: Pending
Operational	All Intelis Gas Meters operate without the need for an FCC or ISED license Frequency: 902-928 MHz ISM band Program frequency: 908-923.8 MHz
Australia	ACMA AS/NZS 4268 Frequency: 915-928 MHz ISM band Program frequency: 916-926.8 MHz
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	-40° F (-40° C) to +158° F (70° C)
Battery information	4 Lithium manganese dioxide (LiMnO2) '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
Test pulse weight (volume per pulse)	0.10CF, 0.25CF, 0.50CF, 1.0CF, 10dm^3, 50dm^3
Test pulse width	10 ms - 1000 ms (1 second)
Minimum compatible collection software	FCS v4.1 FDM Tools v4.1.1

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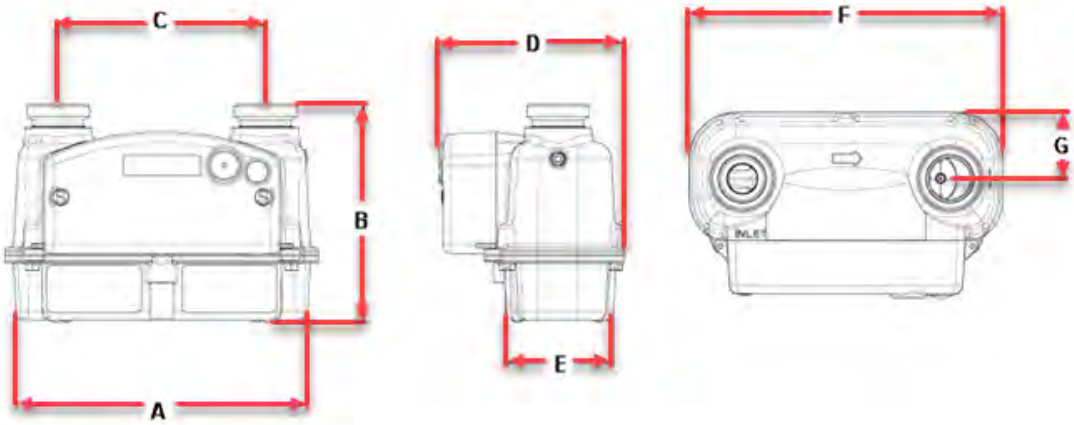
Specification	Specification value
	ISM v3.6 (if using enhanced security) Itron Mobile v1.5 Mobile Collection v3.8.2
Standards	Designed in compliance with ANSI B109.1, ANSIB109.0 (draft), and Measurement Canada PS-G-06

Intelis Gas Meter dimensions

This section lists the Intelis Gas Meter dimensions. Dimensions are listed in Imperial and Metric units.



A	B	C	D	E	F	G
8.4 inches	6.4 inches	6.0 inches	5.4 inches	3.1 inches	9.1 inches	1.9 inches
214.4 mm	161.9 mm	152.4 mm	138.3 mm	78.6 mm	230.6 mm	48.8 mm

Note: B dimension can vary with different hubs options. (20LT is shown).

Chapter 3 Installing the Intelis Gas Meter

This section provides the Intelis Gas 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 they may apply to the manufacturer. The purchaser and user of this product are warned that compliance with all country, state, and local codes 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 Gas 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. INLET and a flow arrow are marked on the Intelis Gas Meter casing.

Note: These instructions assume the gas is turned off, the previous gas meter is removed (when the Intelis Gas Meter is replacing an existing installation), piping tests are completed, and all safety requirements are met.

Prior to start-up

Note: The Intelis Gas Meter is shipped from the factory with the shutoff valve in the open position. Verify the valve is open prior to installing the meter. Confirm the open valve icon is displayed on the LCD display and that the valve closed icon is not displaying .

Perform a visual check of the inside of the meter outlet to also verify the shutoff valve is open.

Before the Intelis Gas Meter start-up:

- Read the meter badge data regarding maximum allowable operating pressure (MAOP) and capacity flow rate to be sure the meter meets the installation requirements.
- Sight across both swivel flanges or test with a suitable level to determine that the flanges 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 nut washer (gasket) on each connect nut or meter hub.
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. 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.
6. Open the upstream and downstream valves very slowly to prevent any pressure surges into or out of the meter.

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

7. Alternate cracking open the upstream and downstream valves for a few seconds and then slowly-over a period of 10 seconds (¼ PSIG systems)-turn the valve to the ¼ open position and then to the full open position.
8. After the meter is pressurized, apply a soap solution or other good leak detecting liquid to the connections to check for leaks.
9. Test the meter to verify the meter is registering the gas flow.
   1. Press the button to activate the LCD.
   2. Observe the LCD display and look for usage to increase.

      Note: If the LCD does not display any expected consumption, investigate the installation. If necessary, change out the meter.
10. Perform a shadow or lock-in test following company or utility procedures.
11. After the Intelis Gas Meter installation testing is complete, purge all air from the gas line including the piping section.

    ⚠ **Warning**: Never allow gas to discharge into a confined space or area where there are ignition sources unless precautions are in place to eliminate potential hazardous conditions.

    It is possible to get air detection alarms during Intelis Gas Meter installation due to installation setups, gas pressure, flow rates, pipe length, and general installation practices. Air detection alarms during installation should be ignored.

    A rapid flow rate change can cause a temporary flow measurement hard failure alarm. For example, a flow measurement hard fail alarm could occur during installation, Test Mode (proving the meter), external leak test (water tank test), or other rapid flow rate change situations. The alarm will display on the LCD and as long as it is temporary (and not continuously in the flow measurement hard fail alarm state), is acceptable behavior. If the flow measurement hard fail alarm remains active and does not clear, remove the meter and return it to Itron for evaluation.

Removing or installing the pipe plug

This section provides the steps to remove or re-install the pipe plug.

Removing the pipe plug

- Using a 3/16" hand-driven Allen wrench, remove the pipe plug.

Installing the pipe plug

1. Clean any debris from the pipe plug and inspect it for any damage or deformation. Replace the pipe plug if any defects or wear are found.
2. Apply new sealant to the leading 3 to 4 threads of the pipe plug.

   Note: Itron recommends RectorSeal #5 sealant.
3. Using a 3/16" hand-driven Allen wrench, begin tightening the pipe plug into the threads, using care not to cross-thread or remove the sealant during the process.
4. Tighten the pipe plug. Do not exceed 50 inch-pounds torque (5.6 Newton Meters).
5. Leak test following your utility's leak test procedure.

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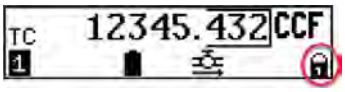
Chapter 4 Intelis Gas Meter LCD Operation

This section provides information about the Intelis Gas Meter LCD.

The Intelis Gas Meter LCD

This section describes the Intelis Gas Meter LCD menus that are displayed in a pre-defined order (1-8).

Note: The Intelis Gas Meter ships in a sealed (locked) state.



Additionally, there are two screens that display in response to an overflow or test condition.

Note: The 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. The LCD normal mode is off. A button press will activate the LCD. Each menu page is active for 6 seconds before the LCD advances to the next menu page. When the last menu page is reached, the process loops to the first menu page until the configured timeout is reached.

Note: A button press will also advance the LCD to the next menu page.

LCD menu	LCD display	Description
1.	• TC meter display in Imperial units. • NTC meter display in Imperial units. • TC meter display in Metric units. **Note**: All menu displays can be configured for Imperial or Metric units. The remaining displays are shown in Imperial units.	The LCD displays with 5 digits to the left of the decimal and 3 to the right of the decimal (in cubic feet x 100 [Imperial] or m3 [Metric] dependent on customer configuration). The primary index (Menu 1) will be either TC or NTC measurement based on the meter configuration.

LCD menu	LCD display	Description
2.	AL 04567.891 CCF 2	Displays current index volume measured under an alarm condition.
3.	ALARM 001/003 Air in Pipe 3	Displays active alarms. **Note**: In the illustration, 001 indicates the number of the current displayed alarm while 003 indicates the total number of alarms. Before the display moves to the next menu page, all active alarms are displayed. If there are no alarms, *NO ALARM* displays. For more information about the Intelis Gas Meter display events and alarms, see Intelis Gas Meter LCD display alarms on page 17. ALARM 000/000 NO ALARM 3
4.	Date:10/02/2018 Time:12:34:56 4	Local date and time. The local date is formatted as configured. The date and time are adjusted by the local time zone and DST configuration.
5.	Conv.factor:0.9876 Gas Temp: 80.5 F 5	Current gas temperature and conversion factor. This is the gas temperature from the temperature sensor in the UMU.
6.	0.000 CF/H Test: 00000.0000 CCF 6	Test mode. Flow rate and volume.
7.	PCOMP: 1.0000 7	Pressure compensation.
8.	• R LNF: Register Legal Non-Fixed Firmware; R LF: Register Legal Fixed Firmware R LNF:12.34.56.78 R LF:12.34.56.78 8 • E LNF: Encoder Legal Non-Fixed Firmware; E NL: Encoder Non-Legal Firmware	Firmware versions. The display cycles through three screens to display the six Intelis Gas Meter firmware versions. The firmware version types are displayed on the three LCD display menus.

LCD menu	LCD display	Description
	E LNF:00.10.00.00 E NL:00.09.05.00 • E LF: Encoder Legal Fixed Firmware; UMU: Ultrasonic Measurement Unit CRC E LF:00.01.00.00 UMU CRC:98FC8D63	

Intelis Gas Meter LCD display alarms

The Intelis Gas Meter reports the following alarms on the LCD. Active alarms are logged. Events that create alarms are logged with a start and an end time. Users may cross check alarms over the network or with a device loaded with FDM Tools. For more information, see Cross checking Events with FDM.

LCD event or alarm	Description
ALARM 001/010 Reverse Flow detect.	Reverse flow detect. The meter is currently detecting reverse flow; gas flowing from out to in. The reverse flow event is an alarm for utilities that alert them about possible tampering. If a reverse flow is detected, the meter may be installed backwards.
ALARM 002/010 Ext. High Flow detect.	Ext. high flow detect. The meter detected flow that exceeded the customer configured or Itron configured high flow threshold of 500 CFH over 5 counts (about 10 seconds).
ALARM 003/010 High Temp. detect.	High temp detect. The meter detected that the temperature exceeded the customer configurable high temperature threshold.
ALARM 004/010 Air in Pipe detect.	Air in pipe detect. The meter detected air in the meter. The air in pipe alarm will be set to ‘ready to detect’ state after measuring more than 1.4 CFH (40 L/H). The speed of sound of the gas being measured is periodically compared to the speed of sound of air to determine if an air in pipe alarm/event is triggered. The minimum flow rate was chosen to reduce nuisance air in pipe alarms upon initial installation. Intelis is rated as Class 1 (+/-1% accuracy) for Natural Gas Type H, E, L for reference gases G20, G21,G23, G25, G26 and G27 which includes gas compositions with up to 13% propane. It should be noted that during

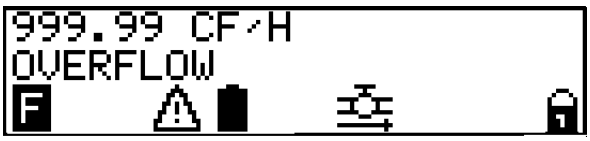
LCD event or alarm	Description
	propane peak shaving, for example, higher concentrations in propane or nitrogen can occur which are outside these reference gases. This can result in the speed of sound for the gas composition being closer to that of the speed of sound of air, which could result in a false indication of air detection. For this reason, air detect alarms/events should be compared to incidences of propane peak shaving along with typical homeowner gas usage and reverse flow detection before considering further action for suspect tampering.
ALARM 005/010 Time Sync	Time sync. The meter detected that its time significantly differs (5 minutes or greater difference) from the network time.
ALARM 006/010 Flow Meas. Hard fail.	Flow meas. hard fail. The meter detected that the flow measurement sensor failed. The preconfigured meter Qlmax of 500 CFH (14.2 m3/h) was exceeded. This condition is a recoverable error with a start and end event recorded. **Important**: A rapid flow rate change can cause a temporary flow measurement hard failure alarm. For example, a Flow measurement hard fail alarm could occur during installation, Test Mode (proving the meter), external leak test (water tank test), or other rapid flow rate change situations. The alarm will display on the LCD and as long as it is temporary (and not continuously in the Flow measurement hard fail alarm state), is acceptable behavior. If the Flow measurement hard fail alarm remains active and does not clear, remove the meter and return it to Itron for evaluation.
ALARM 007/010 Flow Meas. OOR detect.	Flow meas. OOR detect. The meter detected flow that is outside the physical range of the measurement sensor.
ALARM 008/010 Gas temp OOR detect.	Gas temp OOR detect. The meter detected that the maximum (133° F/56° C) or minimum (-31° F/-35° C) temperature range was exceeded. This condition is a recoverable error with a start and end recorded.
ALARM 009/010 Flow Sens. Meas. Error	Flow sens. meas. error. The meter detected that a flow sensor measurement error occurred. This is an unrecoverable error. **Important**: If the Flow Sens. Meas. Error remains active and does not clear, remove the meter and return it to Itron for evaluation.

LCD event or alarm	Description
ALARM 010/010 Transducer Error 3	Transducer error. The meter detected that its ultrasonic transducers experienced an error. This is an unrecoverable error. **Important**: If the Transducer Error remains active and does not clear, remove the meter and return it to Itron for evaluation.

Additional LCD screen displays

The LCD displays two additional screens in an overflow or test event.

- Overflow. This screen displays if the meter reaches an overflow condition.



- Display test. This screen displays after a long button press of 4.8 seconds. The test provides a visual confirmation that the LCD is functioning correctly.

Intelis Gas Meter LCD display icons

The Intelis Gas Meter LCD display provides the following menu icons as a visual indications of status information.

Display icon	Icon definition
Meter status icons	
	Battery level • Battery is greater than or equal to 80% • Battery is greater than 40% and less than 80% • Battery is greater 10% and less than 40% • Battery is less than 10% **Note**: Battery life is checked every 12 hours and the icon is updated accordingly. The battery icon flashes when the battery reaches 5% remaining power.
⚠	The meter has an active alarm.

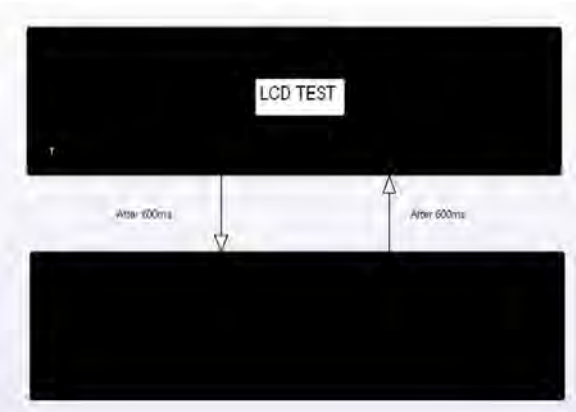
Display icon	Icon definition
	The meter is in Factory Ship Mode. **Note**: The truck icon clears when the Intelis Gas Meter is moved to an operational mode.
	Closed padlock icon. The meter is sealed. The lock icon clears when the meter is unsealed.
Shutoff valve status icons	
	The shutoff valve is open.
	The shutoff valve is closed.
	Shutoff valve is in armed state. The shutoff valve opening is actuated by pressing the button for 2 seconds and releasing it. **Important**: If the Intelis Gas Meter LCD button is pressed too long, the LCD Test screen appears. LCD TEST T A technician should ensure the installation premise is safe by ensuring there is no flow downstream of the meter prior to opening the valve. Prior to pressing the button to open the valve, the technician must check the LCD to verify there are no alarms. If any alarms are present, investigate and remediate them prior to opening the valve.

Performing an LCD test

The Intelis Gas Meter LCD Test is used to confirm the LCD display is functioning properly and that there are no non-displaying pixels that could lead to misinterpretation of a value.

- Hold down the meter button longer than 4.8 seconds (long press).

  The long press initiates the LCD test. After the long press, the display turns black for 600ms. After 600ms, the screen displays LCD TEST again.



Chapter 5 Proving the Intelis Gas Meter

This section provides information about proving the Intelis Gas Meter. Meteorological proving allows users to test the Intelis Gas Meter accuracy. Temper meters unpackaged in the proving area for 24 hours prior to the testing.

⚠ **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 Gas Meter Test Mode and a prover station are used to confirm the accuracy of the meter.

Note: The Intelis Gas ultrasonic meter is highly accurate and sensitive to air flow. The meter displays registration to 0.001 CCF. The meter sensitivity makes it possible to see the index incrementing even with the hub caps in place.

The prover station captures and counts pulses. Each pulse reflects a specific volume (pulse weight) of gas. Pulse width is a length of time for the pulse. Both pulse width and pulse weight are configurable parameters using FDM. The Intelis Gas Meter pulse weight must match the prover setup as described in this section's proving instructions.

Note: The Intelis Gas Meter cannot be programmed (configured) or calibrated while the meter is in Test Mode. You must exit Test Mode to program or configure the meter. Attempting to program or configure parameters while the meter is in Test Mode will result in a *temporary error*. If the valve icon is blinking, the meter is unable to go into Test Mode. Wait a few minutes and try again.

Test Mode is used in a meter shop or by a regulatory body. Some meter configuration and prover setup are required for the prover to properly interpret the meter pulses. Meter configuration is completed using FDM. Proving the Intelis Gas Meter requires attaching the pulse output prover cable between the meter and the proving station. After the test is complete, the proving cable is removed and the meter returns to normal operation.

Important: A rapid flow rate change can cause a temporary Flow measurement hard failure alarm. For example, a Flow measurement hard fail alarm could occur during installation, Test Mode (proving the meter), external leak test (water tank test), or other rapid flow rate change situations. The alarm will display on the LCD and as long as it is temporary (and not continuously in the Flow measurement hard fail alarm state), is acceptable behavior. If the Flow measurement hard fail alarm remains active and does not clear, remove the meter and return it to Itron for evaluation.

Proving accessory	Itron part number
Honeywell SNAP pulse output prover cable	CFG-7100-100
Measurement Systems pulse prover cable	CFG-7100-500
Energy Economics (EEI) pulse prover cable	CFG-7100-400
Can-Tronics pulse prover cable	CFG-7100-200

Proving accessory	Itron part number
Itron BPG SONICAL SN G6 pulse prover cable	CFG-7100-700
Intelis Gas Meter proving stand	FIX-7100-001

Intelis Gas Meter Test Mode

You must exit Test Mode to program Test Mode parameters. Attempting to program Test Mode parameters while the meter is in Test Mode will result in a *temporary error*. Test Mode configurable parameters include:

- Pulse width. Default pulse width is 150 ms.
- Pulse weight. Default pulse weight is 0.25 cf/pulse.
- Maximum Test Mode time. Default is 1 hour.

  Important: The default Test Mode time is 1 hour. The Intelis Gas Meter will automatically time out after 1 hour in Test Mode whether there is activity or not.

Test Mode configuration can be completed at the factory at the time the meter is manufactured. Parameters are configured in one of three ways:

- Through a custom programming file.
- Through programmed default configuration.
- In the field using FDM Tools.

Note: Refer to the instructions for your prover type in the following sections for the recommended Test Mode pulse width and pulse weight parameters.

Entering Test Mode

Entering Test Mode is accomplished using either the FDM mobile client or through the magnet in the prover connection end of the prover cable. After the Intelis enters Test Mode, the following steps occur.

1. The Intelis Gas Meter logs an **Entering Test Mode** event.
2. The Intelis Gas Meter enters Test Mode.
3. The Intelis Gas Meter Test Mode index is reset to a zero reading.
4. The Intelis Gas Meter starts an optical pulse output.

   ⚠ **Caution**: There are some parameters that could result in the Intelis Gas Meter constantly pulsing (such as a small pulse weight and a long pulse width with a high flow rate.) Adjust the pulse width, the pulse weight, or flow rate as needed.

5. The Intelis Gas Meter LCD moves to Test Display Mode.

Recording Test Mode consumption

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

1. The Intelis Gas Meter records the Test Mode consumption in the Test Mode index register.
2. The Intelis Gas Meter continues to output an optical pulse.

   Note: While the Intelis Gas Meter is in Test Mode, the LCD refresh rate is more frequent than when the meter is operating in Normal Mode.
3. The Intelis Gas Meter continues to update the normal volume registers.

Exiting Test Mode

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

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

   Note: Check the LCD display to verify the Intelis Gas Meter is no longer displaying Menu 6: Test Mode.

Prover types

The Intelis Gas Meter compatible prover types are listed. See the procedure for your prover type. For questions about your specific prover type, see the manufacturer's prover documentation.

Prover type
Honeywell SNAP
Measurement Systems
Energy Economics (EEI)
Can-Tronics
Itron BPG SONICAL SNG6

Proving the Intelis Gas Meter using the Honeywell SNAP proving system

This section provides the information to set up an Intelis Gas Meter using a Honeywell SNAP proving system.

Note: Proving the Intelis Gas Meter requires Honeywell SNAP prover software .NET X.Y.

Temper meters unpackaged in the proving area for 24 hours prior to testing. If tempering is not possible, complete steps 1-9 of Tempering the meter by exercising on page 24. If the meters are tempered, continue to Setting up the prover on page 25.

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.

Adjust the proving table to accommodate the height of the Intelis Gas Meter. If necessary, use the Intelis Gas Meter prover stand (Itron part number FIX-7100-001). Place the prover stand on the prover table and set the meter on the stand.

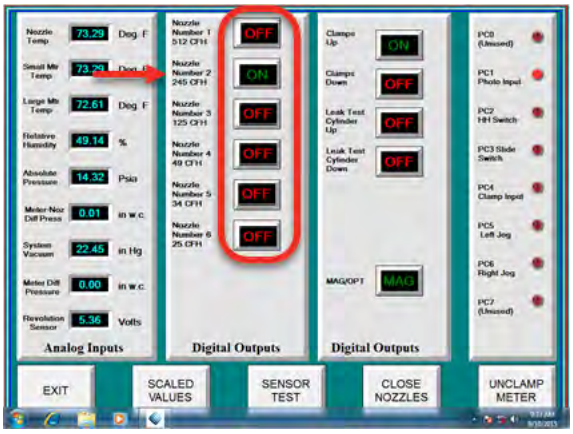
Itron recommends these Intelis Gas Meter Test Mode parameter settings for the Honeywell SNAP proving system:

- Test Mode pulse weight: 0.25 CF
- Test Mode pulse width: 150 ms

Tempering the meter by exercising

1. Log on to the prover as a **Supervisor**.
2. Select **Special Functions**.
3. Select **Diagnostics** (local).
4. After the Diagnostics screen opens, clamp the meter in place by pressing **Clamp** in the lower right screen corner.
5. Press the clamp buttons on both sides of the SNAP prover.
6. After the Intelis Gas Meter is clamped to the prover, turn on the appropriate nozzles in the center of the screen to exercise the meter.

   Note: Typically, Nozzle Number 2-245 CFH is used to exercise the Intelis Meter.



   Exercise the meter for 10 to 15 minutes prior to proving the meter.

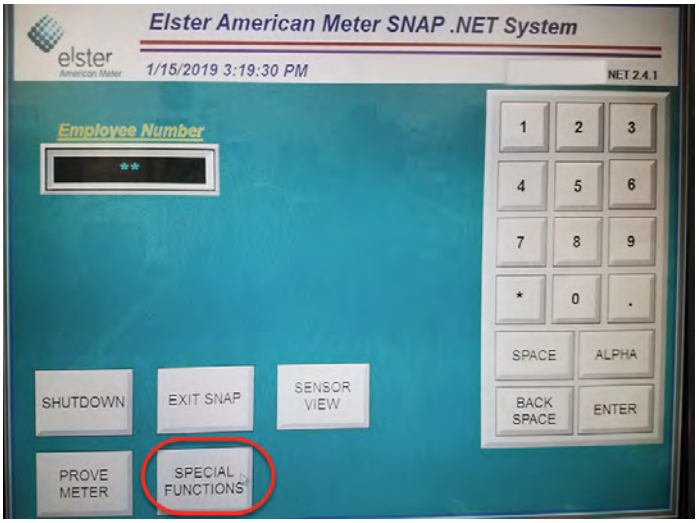
7. Select **Close Nozzles**.
8. Unclamp the meter.
9. Exit Special Functions.

Setting up the prover

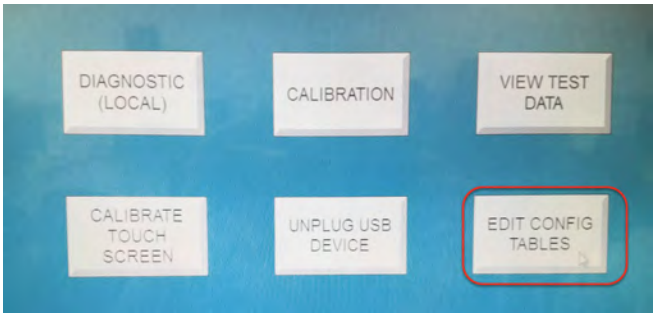
1. If you have not previously done so, log on to the prover.

   Note: If you are proving an Intelis Gas Meter for the first time on the prover or if you are changing proving parameters for the Intelis Gas Meter, you must log on as a Supervisor. To set up Itron Intelis Gas Meter and ITRON-RTY for the first time, follow steps 2 through 10.

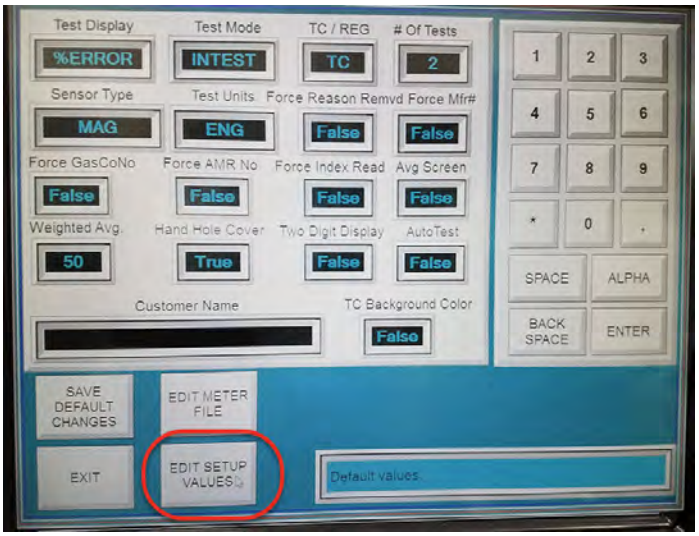
2. Select **Special Functions**.



3. Select **Edit Config Tables**.

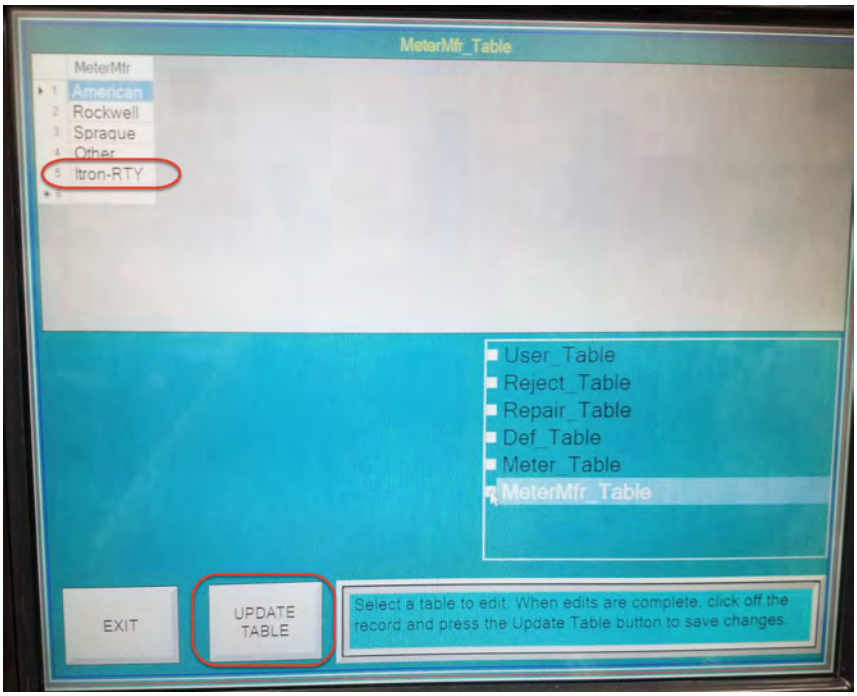


4. Select **Edit Setup Values**.



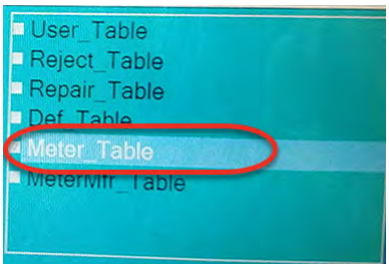
5. Select the **MeterMfg_Table** checkbox.

6. Click in the next available (open) row in the top left table and enter **ITRON-RTY** for the meter manufacturer. Click off of the table and select **Update Table**.

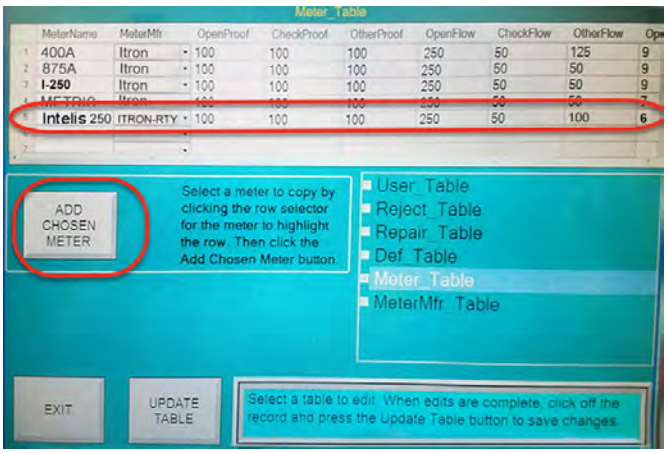


Important: If Itron, Actaris, Sprague, or other is listed, it is still necessary to add a new manufacturer name specifically for the Intelis Gas Meter. Itron suggests using ITRON-RTY following the steps listed below. The MFR Type must have the RTY suffix to allow setting and saving the revs desired for any given test and flow rate. Without the RTY suffix, the settings will not be saved.

7. Select **Meter_Table** checkbox.

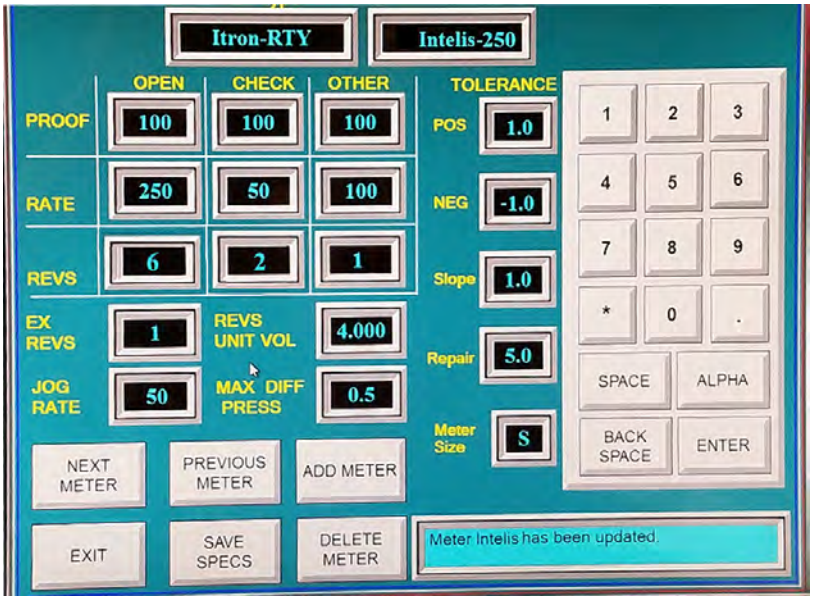


This step allows you to copy an existing meter setup and modify it to create the new Intelis Gas Meter (for example, choose I-250, Itron). Select a similar meter's row. Follow the Meter-Table instructions: Click on the next open/empty row. To complete the addition, click off of the table and select **Add Chosen Meter**. The following illustration shows the successful copy of the I-250 meter to create the Intelis 250 **MeterName**, ITRON-RTY **MeterMfr**.



8. Update the parameters in the table.
   - MeterName: Intelis 250
   - MeterMfg: ITRON-RTY
   - Open proof: 100
   - Check proof: 100
   - Other proof: 100
   - Open flow: 250 (or the setting required by your utility)
   - Check flow: 50 (or the setting required by your utility)
   - Other flow: 100
   - Open revs: 6
   - Check revs: 2

- Other revs: 1
- Exercise revs: 1
- Revs unit volume: 4
- Jog rate: 50
- Max press diff: 0.5
- Miscellaneous customer-specific parameters as required (covered in Step 9)

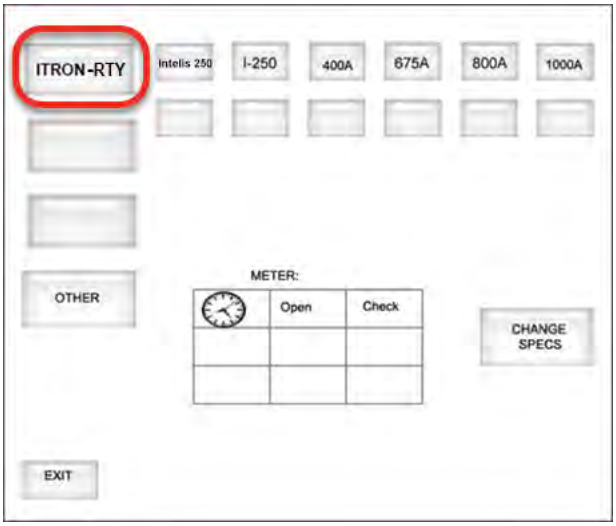


9. Verify or enter the **TOLERANCE** values for **POS**, **NEG**, **Slope**, **Repair**, and **Meter Size**. These settings (values) are customer-specific.

10. Click off the table and select **Update Table**.
11. Select **Exit**, select **Exit**.

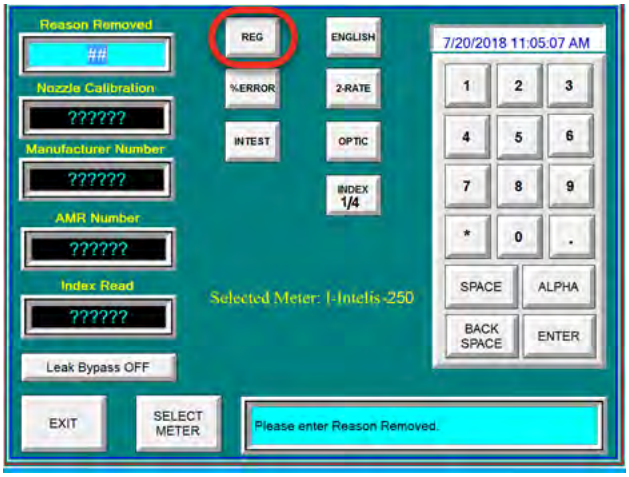
Proving the Intelis Gas Meter

1. Select **Prove Meter**.
2. Select the meter manufacturer (ITRON-RTY).

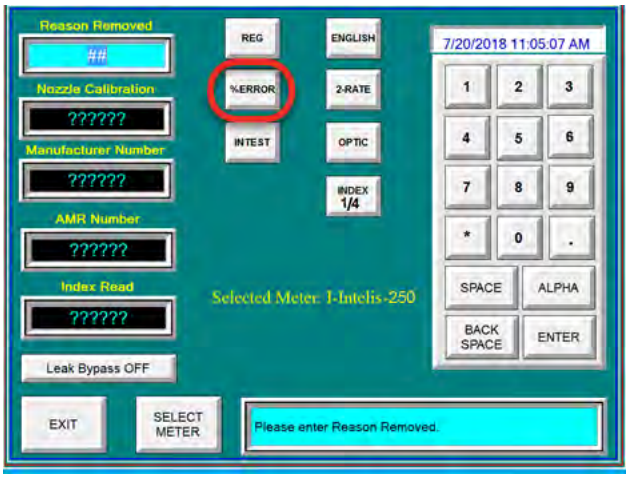


3. Select Intelis 250.
4. Select the correct mode for your meter (TC or NTC).

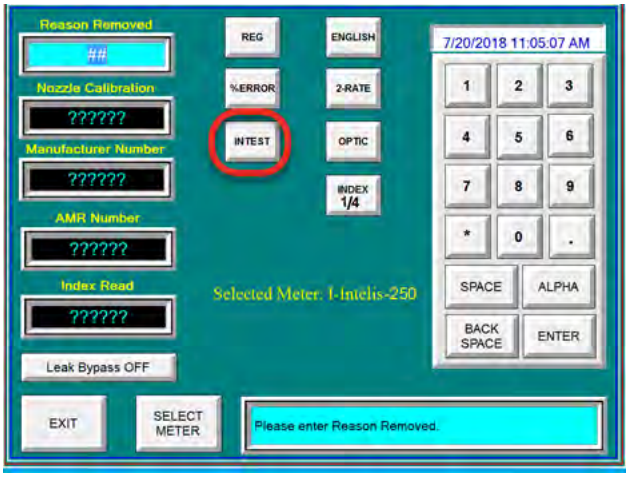
   Note: REG is equivalent to NTC.



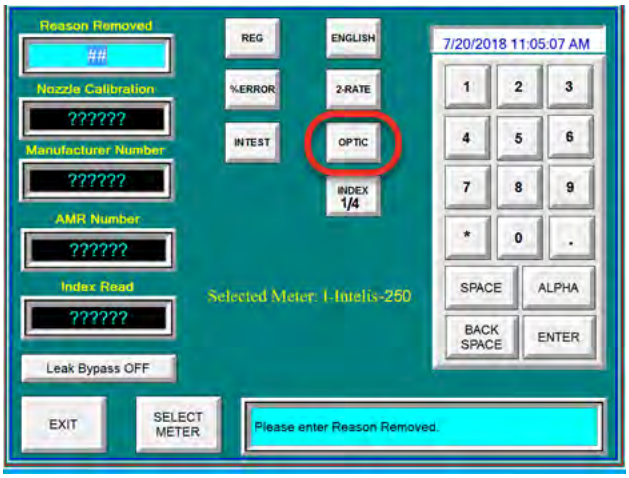
5. Select the meter results mode (% error, % accuracy, % proof).



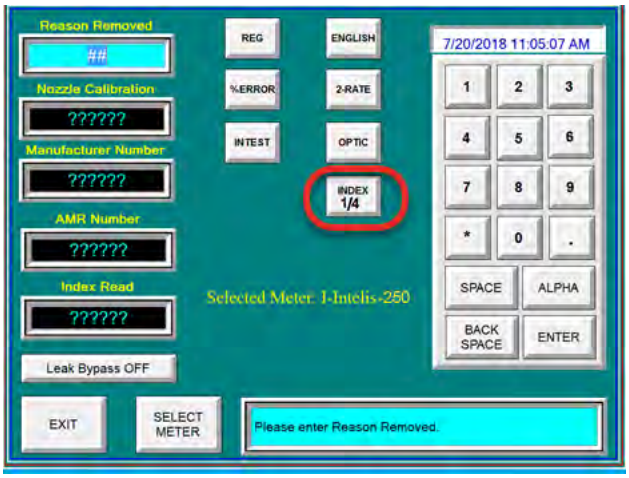
6. Select the test mode (intest, outtest).



7. Select the optic test method (optic, mag).

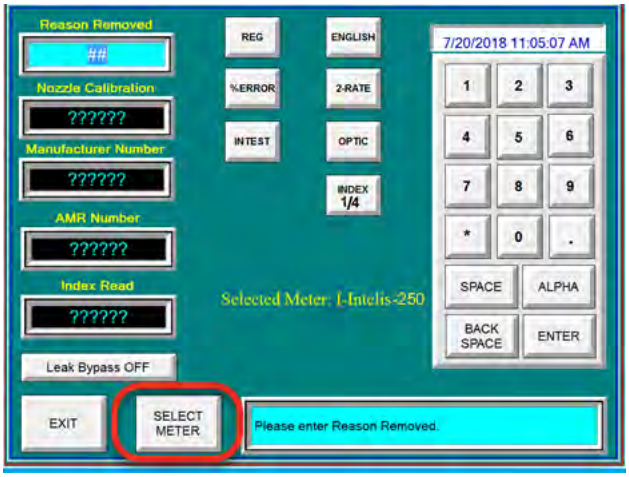


8. Select the correct Index (volume per pulse) setting (Imperial, ¼ CF; Metric, 10 dm3).



Note: To reduce cycle time, contact the prover manufacturer to request a 0.10 CF per pulse option added. Testing has shown acceptable results with settings as low as 4 pulses on open and 1 on check but Itron recommends more pulses to obtain better results.

9. Click **Select Meter** to advance to the next screen.



10. Connect the SNAP pulse prover cable end (Itron part number CFG-7100-100) to the J4 (1) optical sensor port typically on the top of the SNAP prover electronic enclosure, next to the meter temperature probe port.

11. Connect the Intelis Gas Meter end of the SNAP pulse prover cable to the Intelis Gas Meter optical port by firmly pressing the aluminum round threads of the cable into the port. Begin by positioning the cable at the 4:30 o'clock position. Tighten the cable to the 6:30 o'clock position.

Note: The Intelis Gas Meter will automatically go into Test Mode (Menu 6) when the pulse prover output cable is connected.

12. Start the proving test by clicking **RUN** on the SNAP prover.
13. Verify the LED blinks (pulses) when the air begins to flow through the meter.

Proving the Intelis Gas Meter using the Measurement Systems proving system

This section provides the information to set up an Intelis Gas Meter using a Measurement Systems proving system.

Note: Proving the Intelis Gas Meter requires Measurement Systems prover software. See the Measurement Systems prover documentation for version requirements.

Temper meters unpackaged and uncapped in the proving area for 24 hours prior to testing. If tempering is not possible, complete steps 1-8 of Temper the meter by exercising the meter on page 33. If the meters are tempered, continue to Setting up the Measurement Systems prover on page 34.

⚠ **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.

Adjust the proving table to accommodate the height of the Intelis Gas Meter. If necessary, use the Intelis Gas Meter prover stand (Itron part number FIX-7100-001). Place the prover stand on the prover table and set the meter on the stand.

Note: The Measurement Systems application software on the Measurement Systems proving system provides touch screen functionality. You may prove the Intelis Gas Meter using the Measurement Systems Prover screen or a traditional mouse-click to complete the steps.

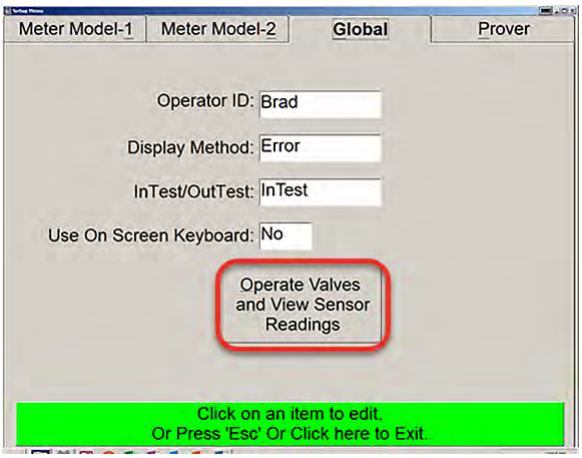
Itron recommends these Intelis Gas Meter Test Mode parameter settings for the Measurement Systems proving system:

- Test Mode pulse weight: 0.10 CF
- Test Mode pulse width: 150 ms

Temper the meter by exercising the meter

1. Open the Measurement Systems Proving System application software.
2. Select **Meter Setup** to exercise the meter.

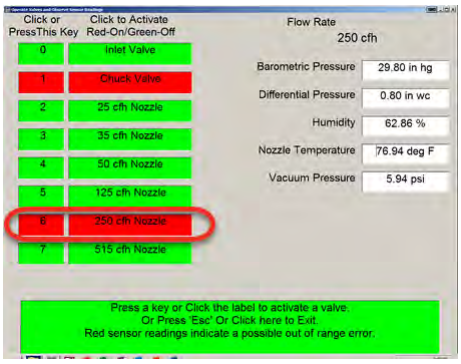
3. Select the **Global** tab > **Operate Valves and View Sensor Readings**.



4. From the Operate Valves and Observe Sensor Readings screen, press the **1** key or **Chuck Valve** to clamp the meter in place.

5. After the Intelis Gas Meter is clamped to the prover, turn on the appropriate nozzle in the center of the screen to exercise the meter.

   Note: Nozzle 6-250 is typically used for the Intelis Gas Meter.

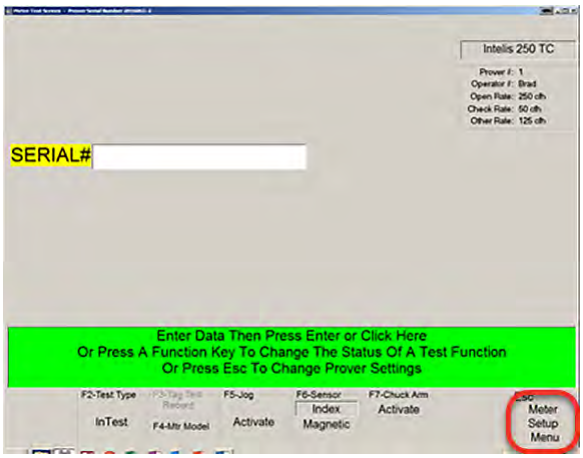


   Exercise the meter for 10 to 15 minutes before proving the meter.

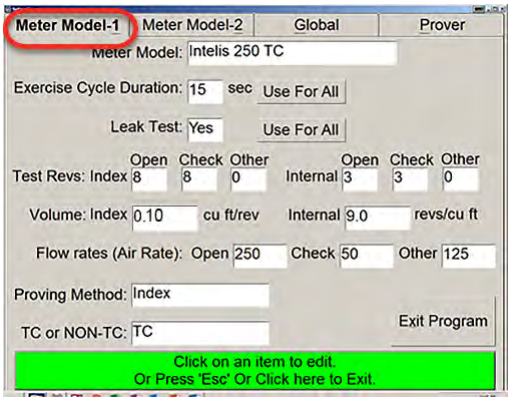
6. Close the nozzle.
7. Unclamp the meter by pressing the **Chuck Valve** button.
8. Exit **Operate Valves and Observe Sensor Readings**.

Setting up the Measurement Systems prover

1. Open the MMS prover application.
2. Select **Meter Setup Menu**.

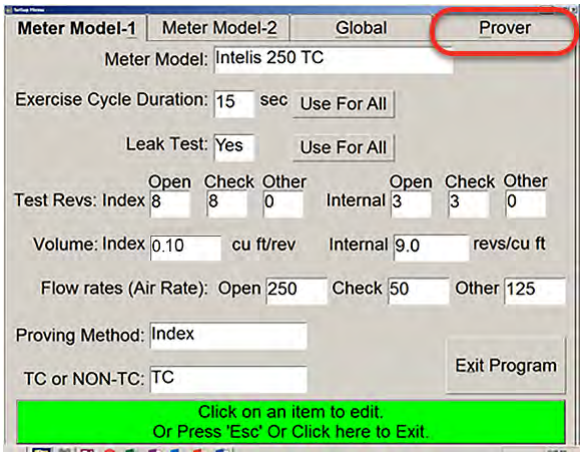


3. Select the **Meter Model-1** tab.

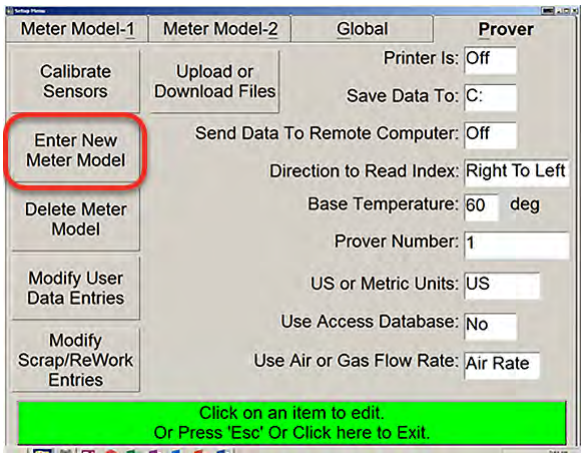


4. Select the meter model. If the Intelis 250 or Intelis 250 TC are set up in the MMS prover, go to step 10. If the Intelis 250 or Intelis 250 TC is not listed, continue to step 5.
5. Select the **Prover** tab.

   Note: To access the Prover tab, you will be asked for a password. Contact Measurement Systems if you do not have a password.

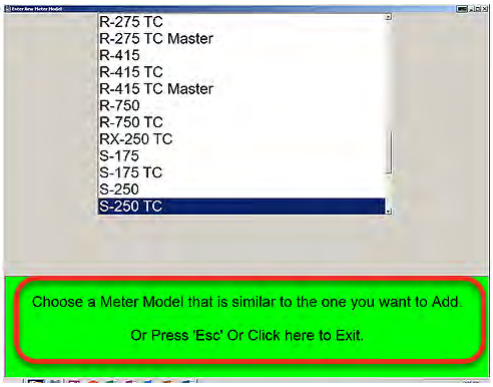


6. Select **Enter New Meter Model**.

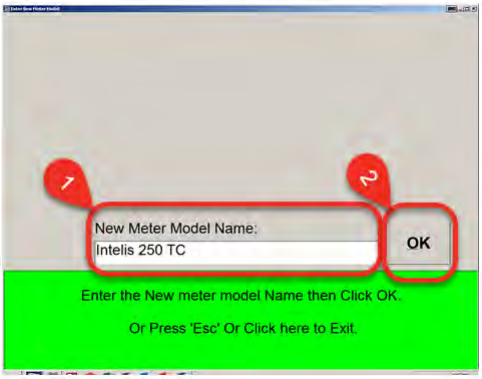


7. Select an existing meter model similar to the new meter as a template. Itron recommends using the S-250 for an Intelis 250 gas meter and an S-250 TC for the Intelis 250 TC gas meter. Select the green bar on the bottom of the screen to use the selected meter as the starting point.

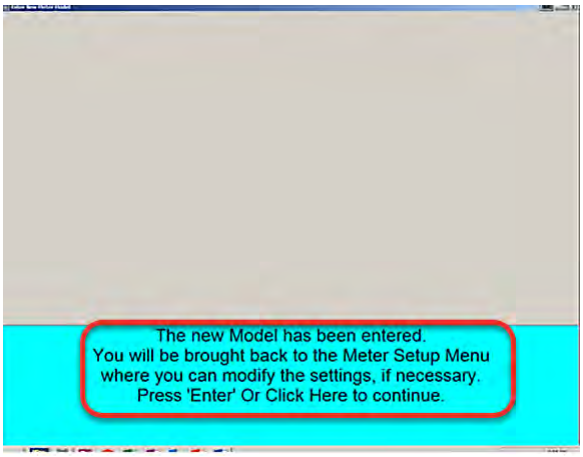
   Note: Measurement Systems uses the lack of TC at the end of the meter name to designate a non-TC meter, for example; an S-250 is an Itron I-250 CFH non-TC meter and an Intelis 250 would designate an Intelis 250 CFH non-TC meter.



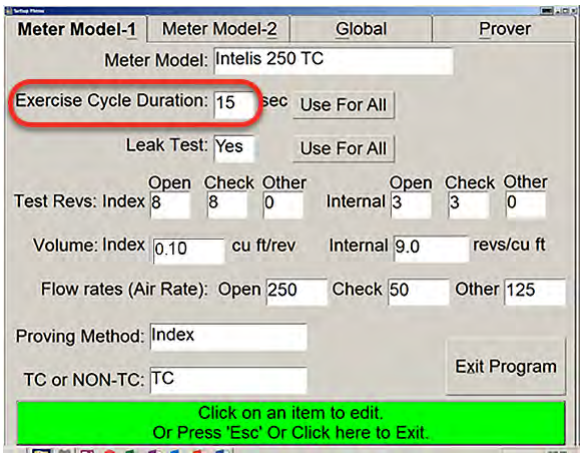
8. Enter the new meter name in the **New Meter Model Name** text box (1) and click **OK** (2).



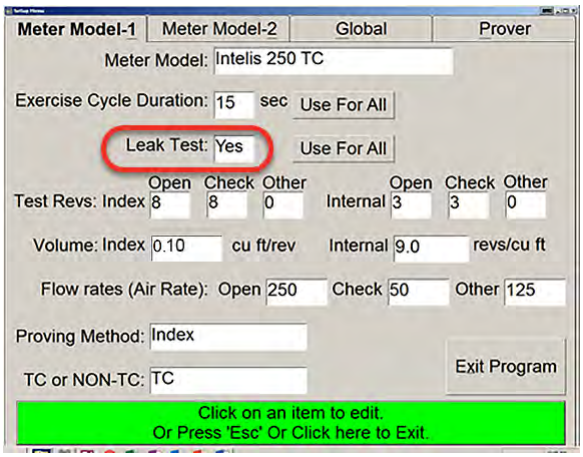
9. Press **Enter** or click the blue bar at the bottom of the screen to go back to the meter setup menu.



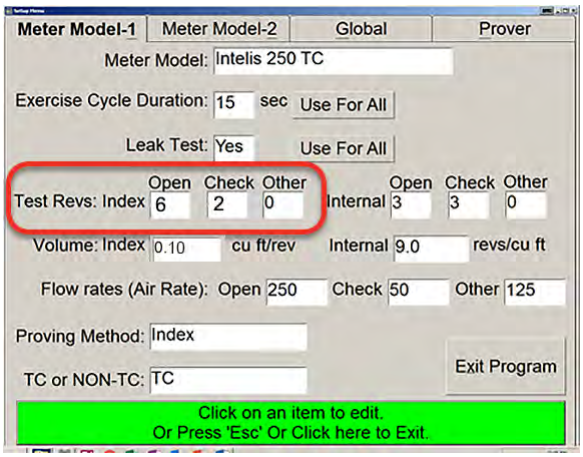
10. Select the **Exercise Cycle Duration**. The Intelis Gas Meter Exercise Cycle Duration is typically 15 seconds.



11. Set **Leak Test** to Yes.



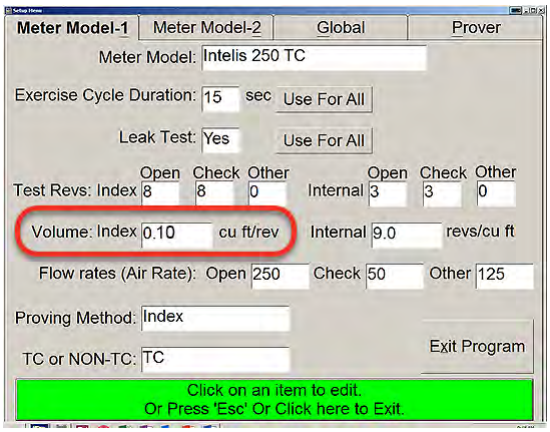
12. Verify or enter **Test Revs: Index Open, Check, Other** settings. Itron recommended settings are listed.
    - Open: 6
    - Check: 2
    - Other: 0



Note: Testing has shown acceptable results with settings as low as 4 pulses on open and 1 on check but Itron recommends more pulses to obtain better results.

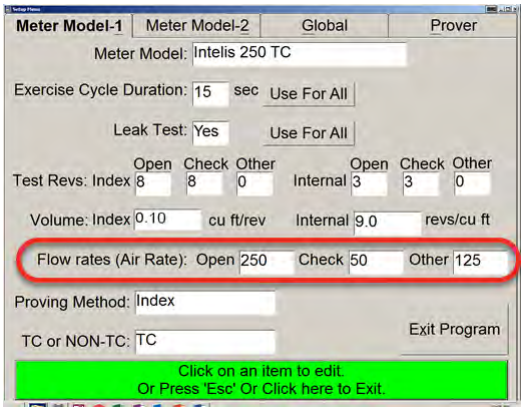
13. Select the **Volume: Index** setting. The Volume: Index setting is the recommended volume per pulse. Itron recommended settings are listed.
    - Imperial setting: 0.10 cu ft/rev
    - Metric setting: 0.01 m3/rev

Note: Intelis Gas Meter volume per pulse is in dm3; 10dm3 = 0.01 m3.



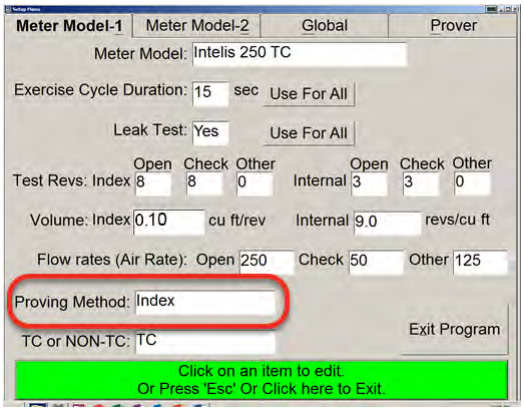
14. Verify or enter **Flow rates (Air Rate): Open, Check, Other** settings. Itron recommended typical settings are listed. For metric flow rates: choose from the flow rate dropdown list options. These convert the Imperial (CFH) flow rates to Metric (CMH). The *Other* flow rate is not required if the *Test Revs: Index-Other* is set to 0.
    - Open: 250

- Check: 50
- Other: 125

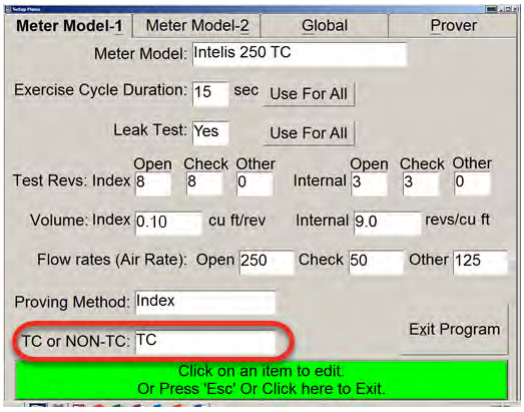


Important: Required Open and Check flow rates may be different than those shown here.

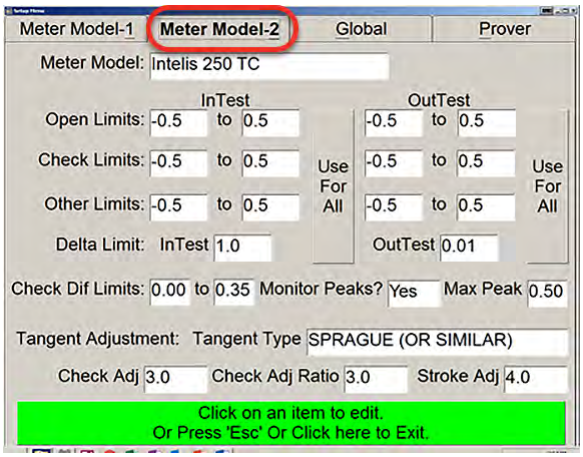
15. Select the **Proving Method**: Index. The options are Index or Magnetic.



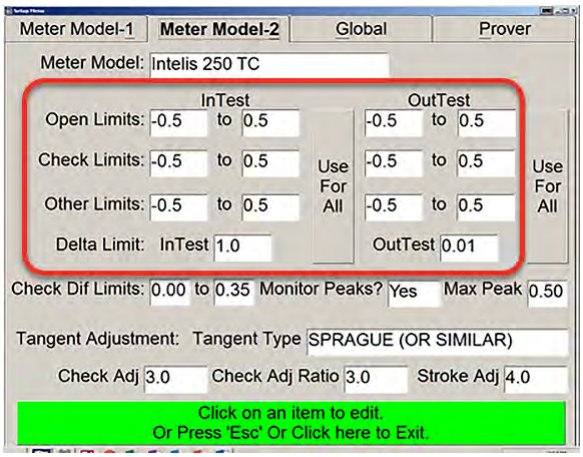
16. Select the mode for your meter. Available options are TC or NON-TC.



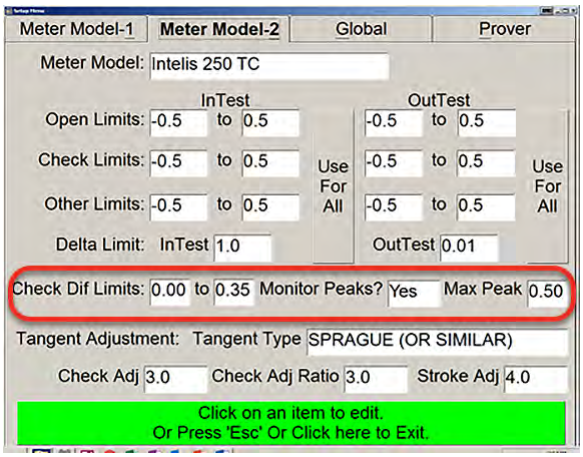
17. Select the Meter Model-2 tab.



18. Verify or enter the InTest and OutTest limit values for **Open Limits, Check Limits, Other Limits,** and **Delta Limit**. The Open, Check, Other, and Delta Limit settings (values) are customer-specific.

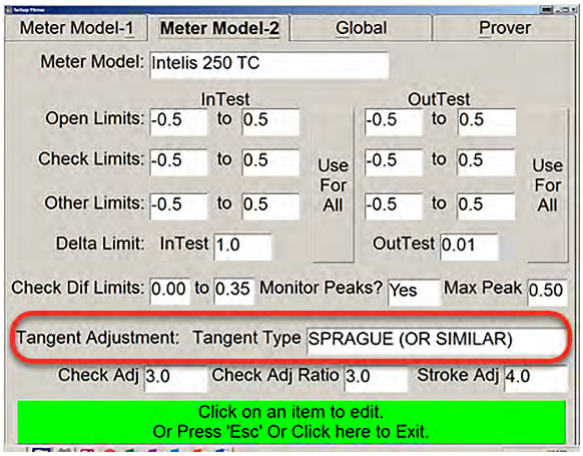


19. Verify or enter the limit values for **Check Dif Limits, Monitor Peaks?,** and **Max Peak**. The Check Dif Limits, Monitor Peaks? and Max Peak settings (values) are customer-specific.

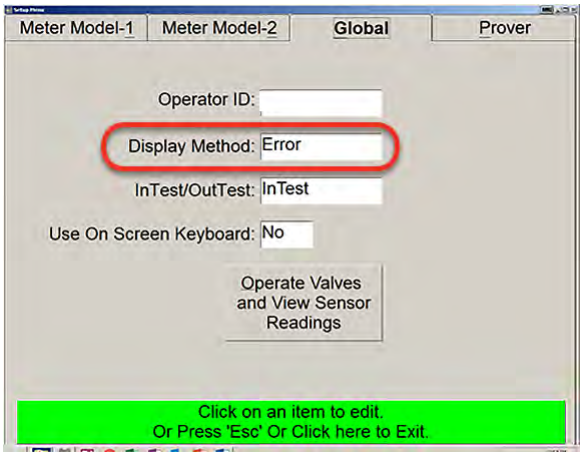


20. Verify or enter **Tangent Adjustment: Tangent Type**.

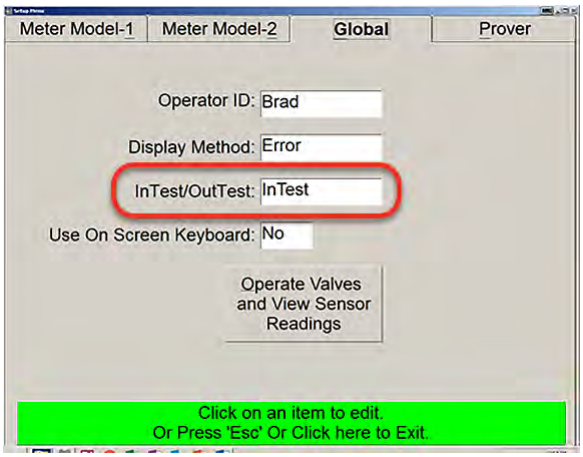
    Note: The Tangent Adjustment: Tangent Type setting can be any non-blank value. The Tangent Adjustment: Tangent Type value is not used to prove the Intelis Gas Meter.



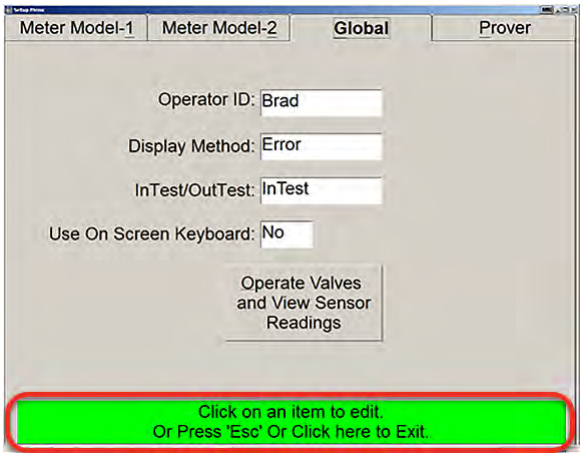
21. Select the **Global** tab and **Display Method** for your meter results. Display Method options are listed.
    - Error
    - Accuracy
    - Proof



22. Select **InTest/OutTest**. The options are InTest or OutTest.



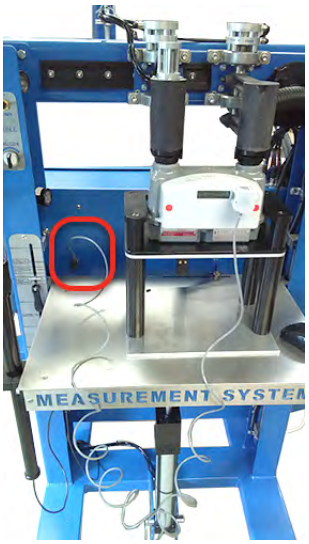
23. Press or click the green bar at the bottom of the screen to exit the Meter Setup Menu.



Proving the Intelis Gas Meter

1. Connect the Measurement Systems pulse prover cable (Itron part number CFG-7100-500) to the port on the left side of the Measurement Systems prover.

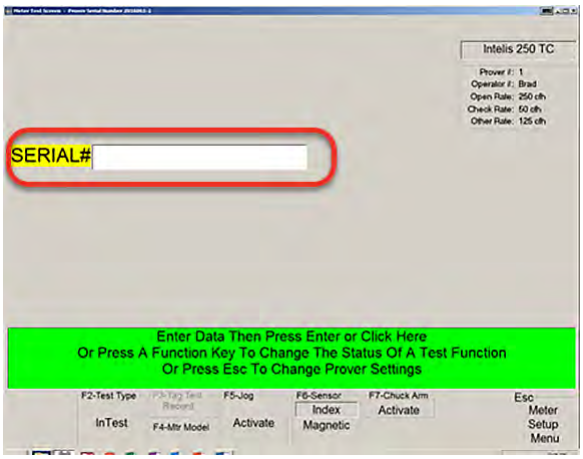
   Note: If your Measurement Systems prover does not look like the illustration, contact Measurement Systems for an adapter cable to connect the Measurement Systems pulse prover cable to your prover.



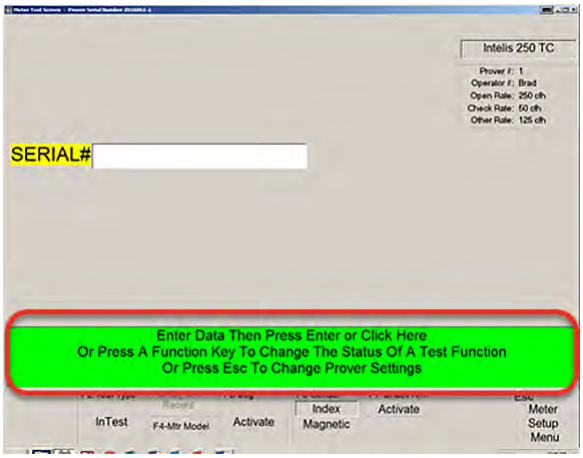
2. Connect the Intelis Gas Meter end of the Measurement Systems pulse prover cable to the Intelis Gas Meter by firmly pressing the aluminum round threads of the cable into the port. Begin by positioning the cable at the 4:30 o'clock position. Tighten the cable to the 6:30 o'clock position.

   Note: The Intelis Gas Meter automatically goes into Test Mode (Menu 6) after the cable is properly connected to the optical port.

3. Enter the Intelis Gas Meter serial number.



4. Press or click the green bar on the bottom of the screen to begin the Measurement Systems proving test.



5. Verify the LED blinks (pulses) when the air begins to flow through the meter.

Proving the Intelis Gas Meter using the Energy Economics (EEI) proving system

This section provides the information to set up an Intelis Gas Meter using an EEI proving system.

Note: Proving the Intelis Gas Meter requires Energy Economics prover software.

Temper meters unpackaged in the proving area for 24 hours prior to testing. If tempering is not possible, complete steps 1-5 of Temper the meter by exercising the meter on page 44. If the meters are tempered, continue to Setting up the EEI prover on page 46.

⚠ **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.

Adjust the proving table to accommodate the height of the Intelis Gas Meter. If necessary, use the Intelis Gas Meter prover stand (Itron part number FIX-7100-001). Place the prover stand on the prover table and set the meter on the stand.

Itron recommends these Intelis Gas Meter Test Mode parameter settings for the EEI proving system:

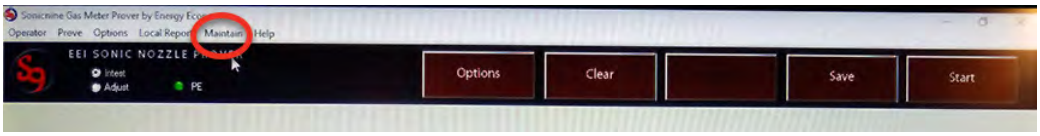
- Test Mode pulse weight: 0.10 CF
- Test Mode pulse width: 150 ms

Temper the meter by exercising the meter

1. Log on to the EEI prover application.

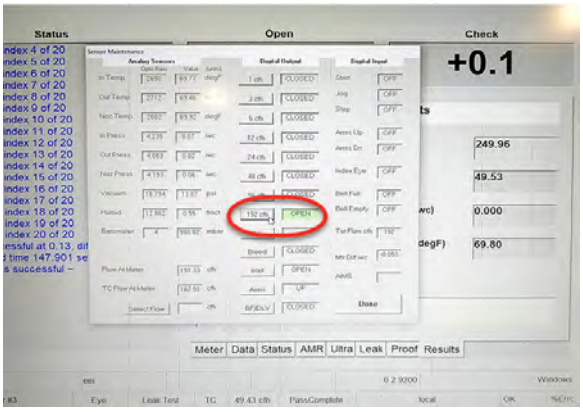
Note: Logging on to the EEI prover application requires maintenance level security.

2. Select **Maintain** > **Sensor Maintenance**.

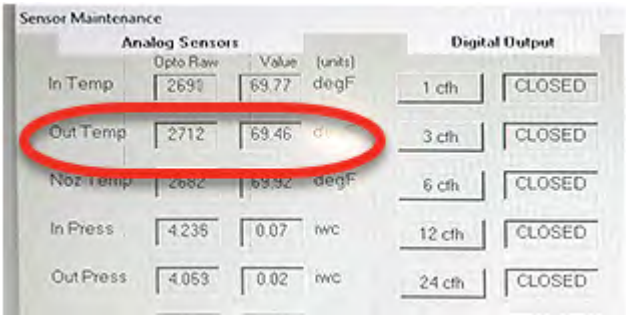


3. Clamp the Intelis Gas Meter to the prover and turn on appropriate nozzles in the center column of the Sensor Maintenance window to exercise the meter.

   Note: Nozzle **192 CFH** is typically used to exercise the Intelis Gas Meter.



4. Exercise the meter for 10 to 60 minutes until the **Out Temp** value does not vary by more than 0.2° F within a minute.



5. Close the nozzle.

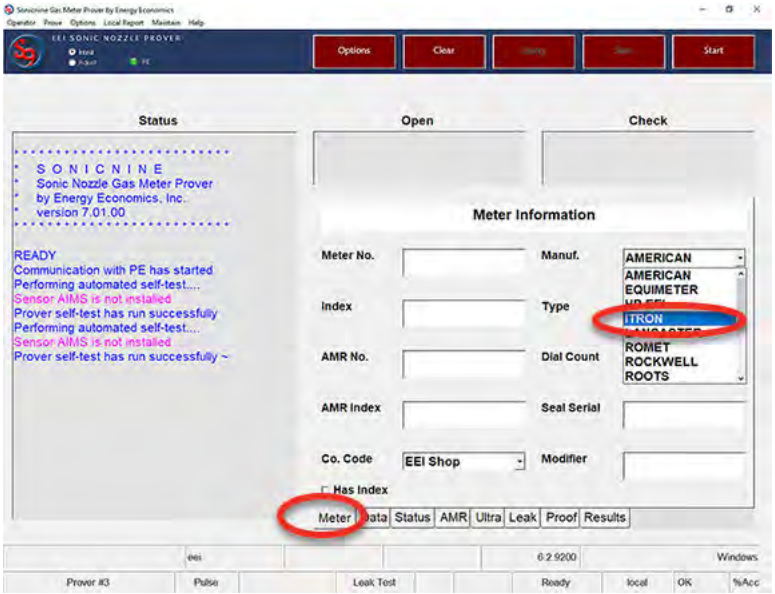
6. Unclamp the meter.
7. Exit the Sensor Maintenance window by clicking **Done** in the lower right corner of the window.

Setting up the EEI prover

1. Log on to the EEI prover application.

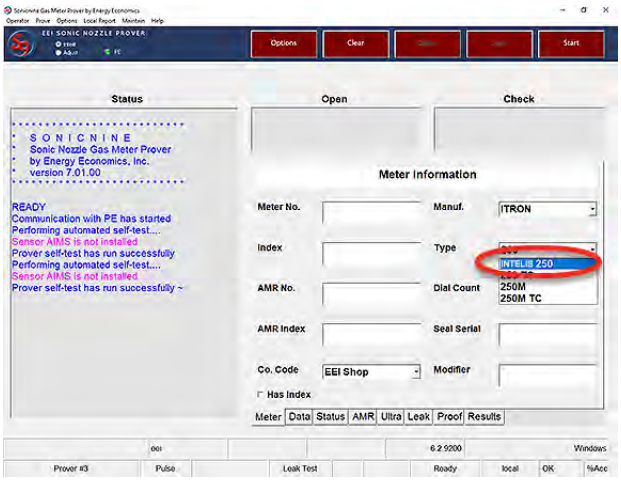
2. Clamp the Intelis Gas Meter to the EEI prover.
3. Select the **Meter** tab and choose **ITRON** from the **Manuf** drop-down list.

   Important: If **ITRON** is not in the Manuf. drop-down list, contact EEI Prover Systems for help in adding **ITRON** to your EEI Systems Prover.



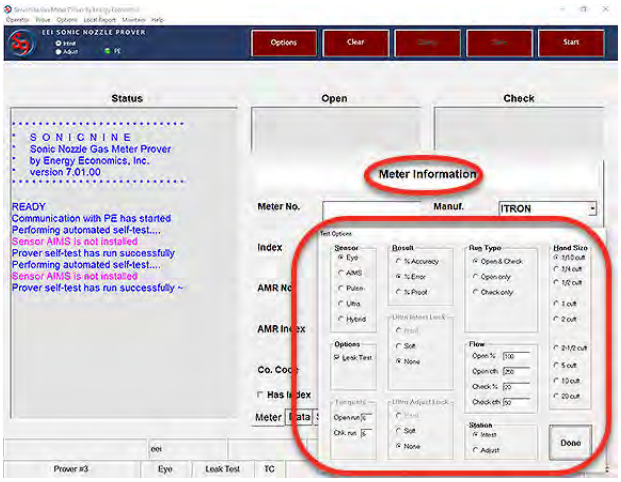
4. Select **Intelis 250**, **Intelis 250 TC**, or the name for the Intelis Gas Meter designated by your company from the **Type** drop-down list.

   Important: If the correct Intelis Gas Meter type is not in the **Type** drop-down list, contact EEI Prover Systems for help adding the correct meter type to your EEI Systems Prover.

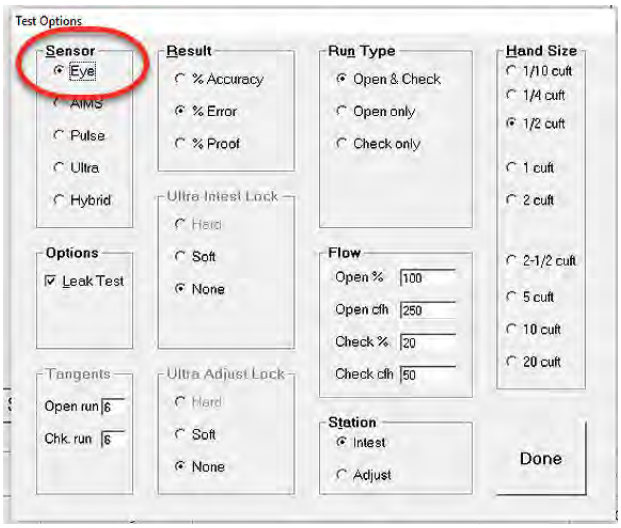


5. Click the **Options** tab.

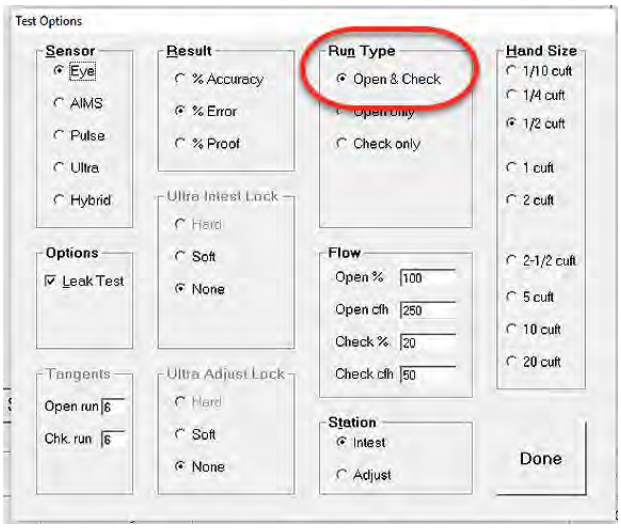
The **Meter Information** > **Test Options** window opens.



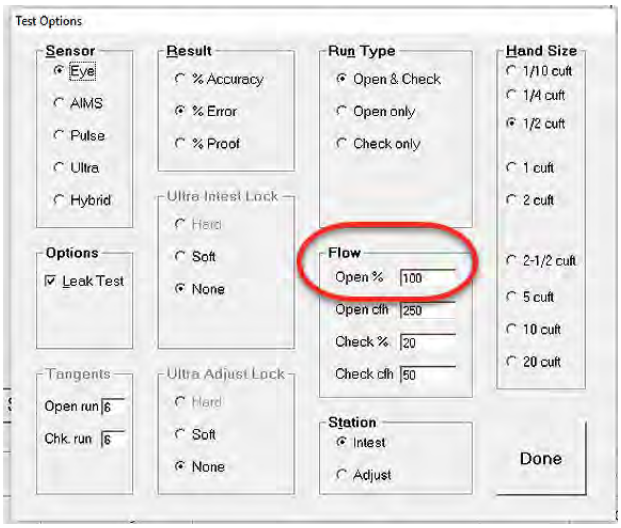
6. Select **Eye** for the Test Options **Sensor**.



7. Select **Open & Check** for the **Run Type** Test Options.

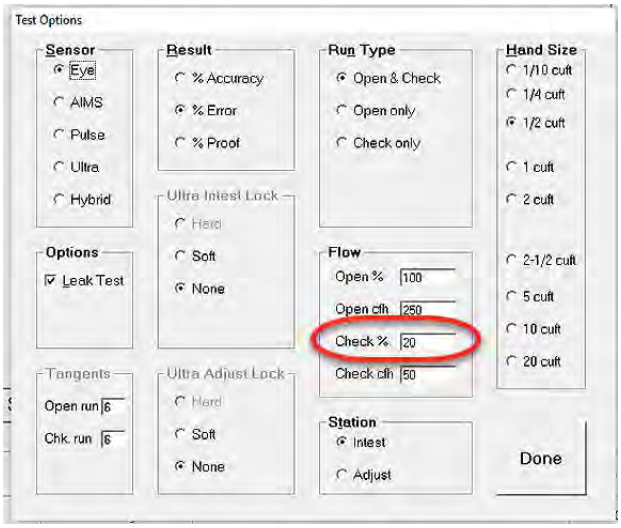


8. Enter 100 for **Flow** > **Open %**.



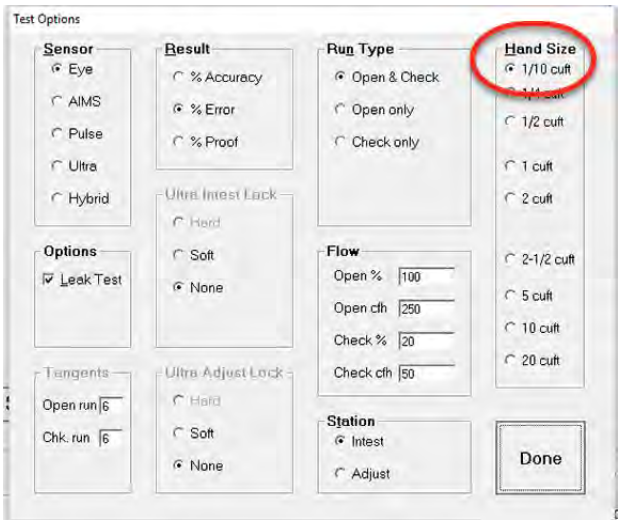
Important: Required Open flow rates may be different than those shown here.

9. Enter 20 for **Flow** > **Check %**.



Important: Required Check flow rates may be different than those shown here.

10. Select **1/10 cuft** for **Hand Size**.



11. Click **Done** to complete the **Meter Information** > **Test Options** and close the window.

Note: All other settings (Tangents, Ultra Intest Lock, Ultra Adjust Lock and Station) on the Test Options window are not relevant for the Intelis meter

Proving the Intelis Gas Meter

1. Connect the EEI pulse prover cable (Itron part number CFG-7100-400) to the EEI prover index eye connector.

2. Connect the Intelis Gas Meter end of the EEI pulse prover cable to the Intelis Gas Meter by firmly pressing the aluminum round threads of the cable into the port. Begin by positioning the cable at the 4:30 o'clock position. Tighten the cable to the 6:30 o'clock position.

   Note: The Intelis Gas Meter automatically enters Test Mode when the pulse output cable is connected to the meter.

3. Press the EEI prover's green button to begin the proving test.

4. Verify the LED blinks (pulses) when the air begins to flow through the meter.

Chapter 6 Adjusting the Intelis Gas Meter Calibration

Intelis Gas Meters are calibrated at the factory prior to shipment. FDM is used if it is necessary to recalibrate the meter. For more information about calibrating the Intelis Gas Meter using FDM, see the *FDM Field Service Representatives Guide*. For documentation information, see Related documents on page 6. Sending new calibration values using FDM initiates the following calibration operations.

1. Run the meter on a prover.
2. Exit Test Mode.
3. Enter the prover station results values into FDM.

   Note: The Intelis Gas Meter must be unsealed to adjust the meter calibration.
4. Wait for the meter to complete calibration.
5. Enter Test Mode.
6. Re-prove the meter to verify the calibration.
7. Exit Test Mode.

To adjust the calibration of an Intelis Gas Meter

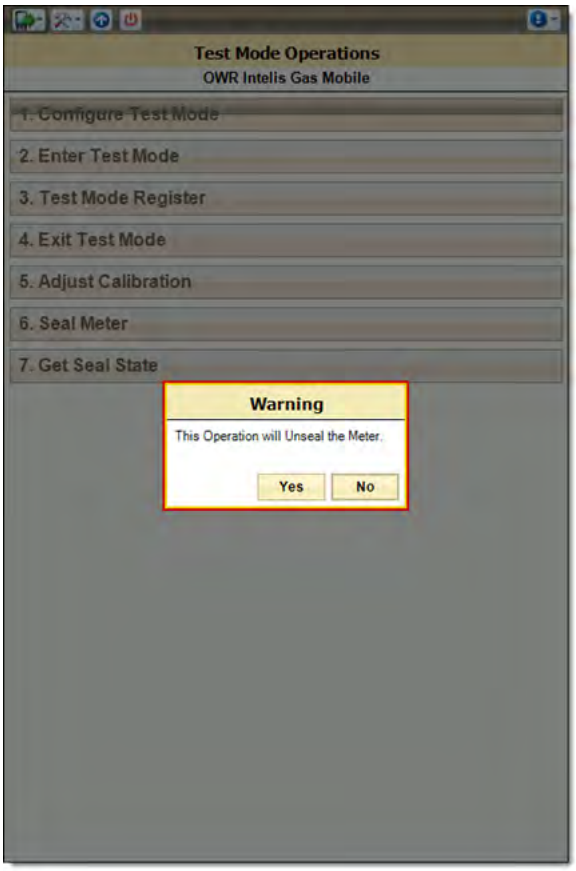
Before you perform the Adjust Calibration command, you are required to run the meter on a prover station. This determines the meter's accuracy, and the results are used during the Adjust Calibration workflow. Before you start the Adjust Calibration command, review all information in the sections that follow.

Note: The meter must be out of test mode to perform the Adjust Calibration command. If the meter is in test mode, perform the Exit Test Mode command before you start this procedure.

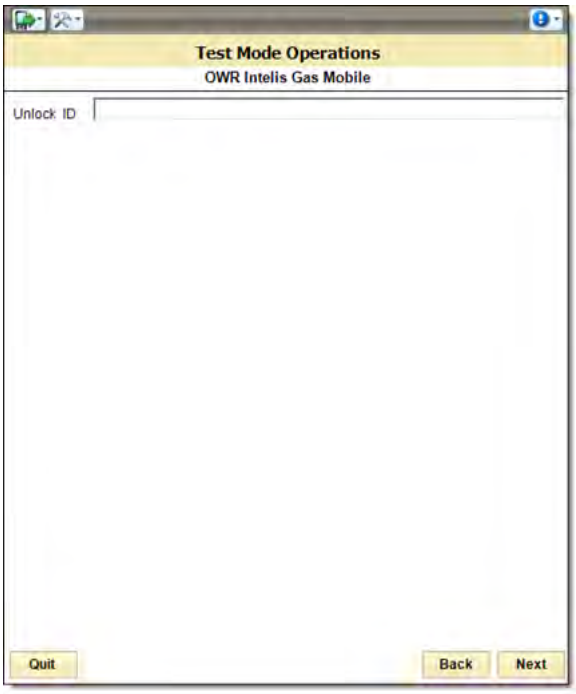
Part of this Adjust Calibration workflow includes unsealing the meter. After you complete this workflow, you must use the separate Seal Meter command to re-seal the meter.
If the meter is operating in mobile mode, you must know the meter's Unlock ID to complete the Adjust Calibration command.

1. From the **Tools** menu, select **OWR Intelis Gas**.
2. Select **Test Mode Operations**.
3. Select **Adjust Calibration**.

   A warning message appears indicating that Adjusting Calibration will unseal the meter.

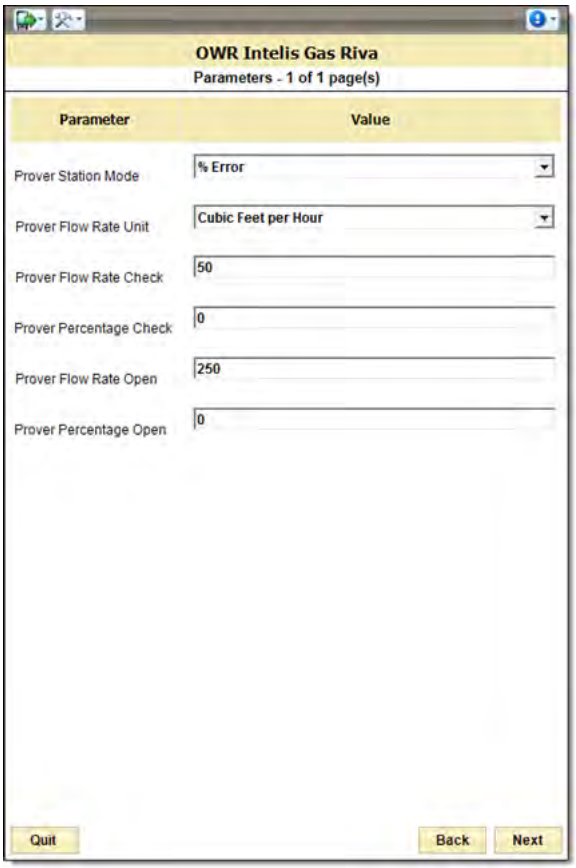


4. Select **Yes**.
5. *(Mobile endpoint mode only)* If you are prompted to enter the Unlock ID, enter the Unlock ID.



6. Select **Next**.

   The Parameters screen appears.



To demonstrate an example of adjusting the calibration, a sample prover station test results is displayed below and is provided as a reference.

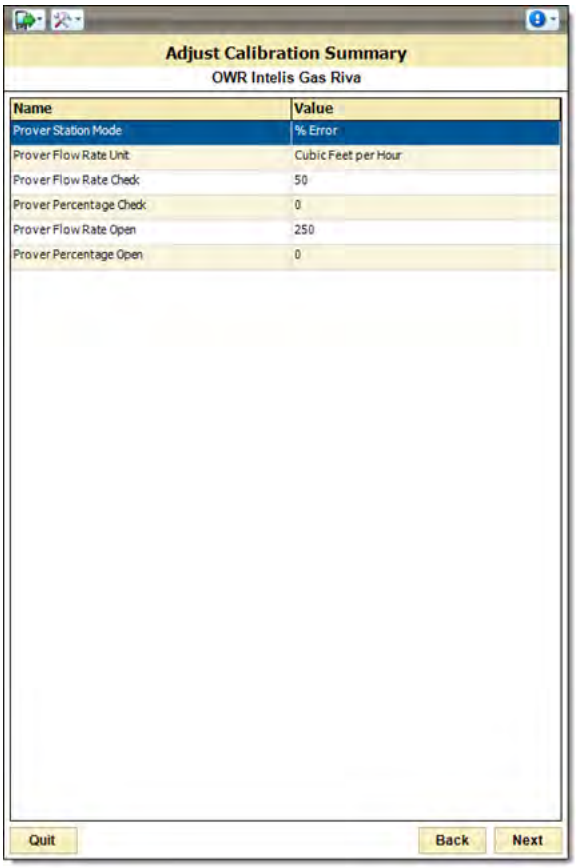
OPEN (250 CFH)	CHECK (50 CFH)
-0.3	+0.7

Use the following settings to adjust the meter calibration as it relates to your test results:

- **Prover station mode**. Use the drop-down menu to select the % in which your prover station results are expressed:
  - *(Example selection)* % Error
  - % Accuracy
  - % Proof
- **Prover flow rate unit**. From the drop-down menu, select the flow rate unit:
  - *(Example selection)* Imperial (cubic feet per hour)
  - Metric (cubic meters per hour)
- **Prover flow rate check**. Enter the prover station check flow rate. This is typically 20-35% of the meter capacity. *(Example entry 50 CFH)*
- **Prover percentage check**. Enter the value from the test mode screen for the meter's check result. *(Example entry +0.7)*.
- **Prover flow rate open**. Enter the prover station open flow rate. This is typically 80-100% of the capacity. *(Example entry 250 CFH)*.
- **Prover percentage open**. Enter the value from the prover screen for the meter's open result. *(Example entry -0.3)*.

7. Select **Next**.

   The Adjust Calibration Summary appears so that you may review your parameter changes.

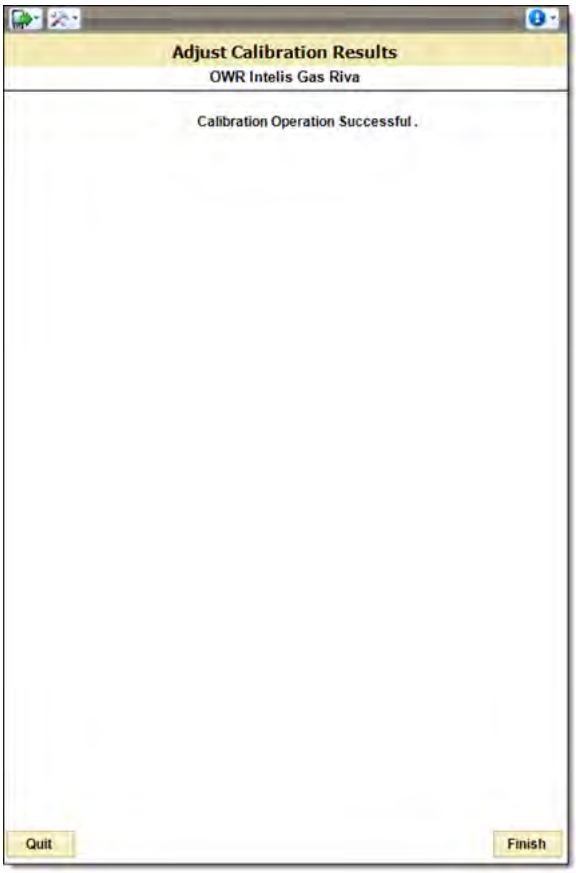


8. Select **Next**.
   A progress bar indicates that the meter's calibration is being adjusted.

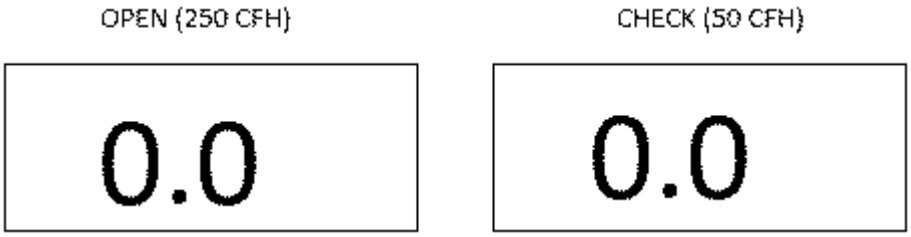
The meter uses the entered values to calculate the required calibration parameters to a target of one of the following, depending on your selected prover station mode:

- **% Error**. 0% open, 0% check
- **% Accuracy**. 100% open, 100% check
- **% Proof**. 100% open, 100% check

9. Click **Quit** or **Finish** to return to the Tools screen.



10. *(Recommended)* Rerun the meter on the prover station to verify the meter calibration. It is expected that you see the results that match the following example:



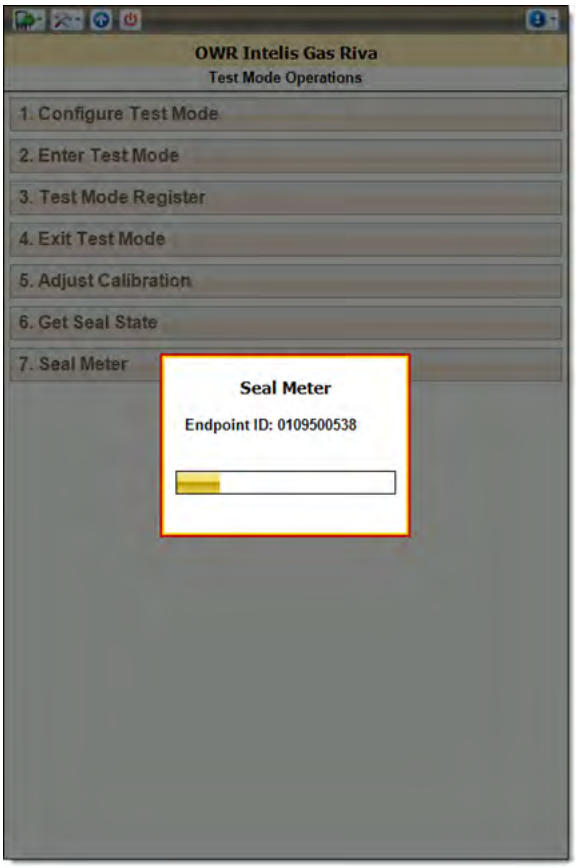
If the accuracy results are not as expected, repeat the calibration steps.

Note: Prover station accuracy is estimated to be +/- 0.15-0.25%.

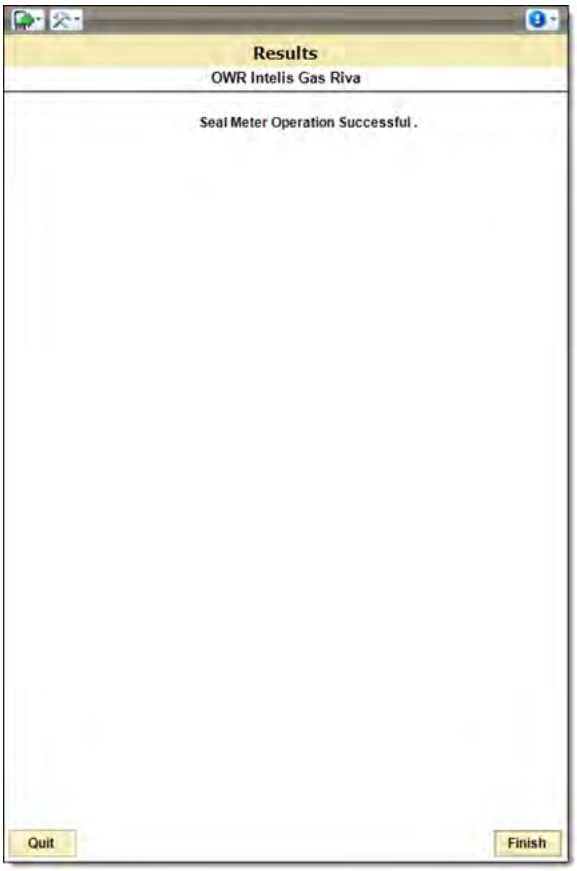
To seal an Intelis gas meter

1. From the **Tools** menu, select **OWR Intelis Gas Riva**.
2. Select **Test Mode Operations**.
3. Select **Seal Meter**.

   A progress bar indicates that the meter is sealing.



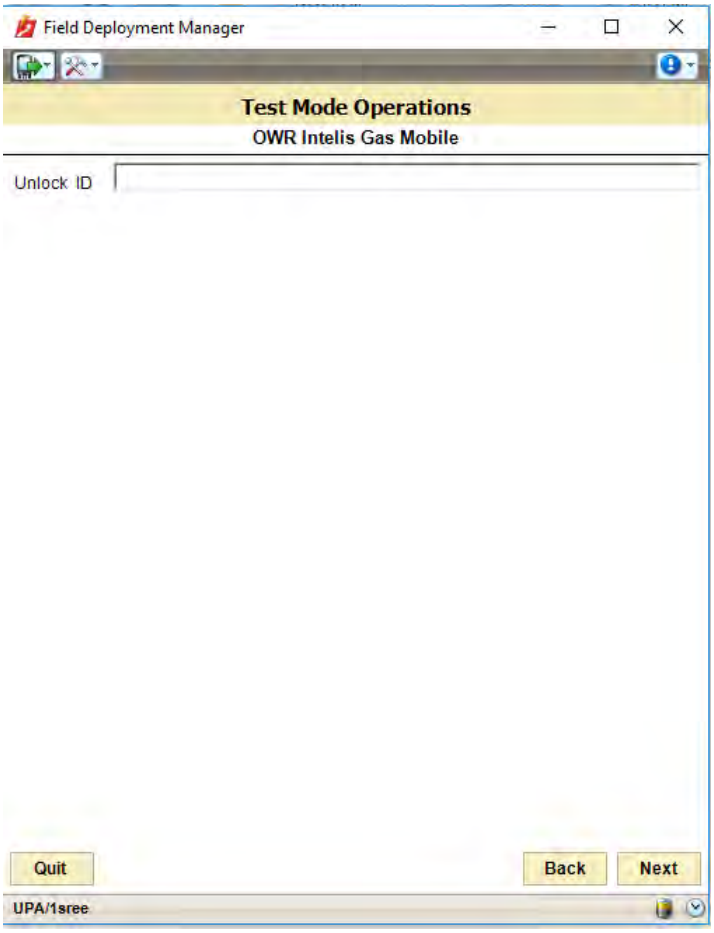
The Seal Meter Operation Successful screen indicates that the meter is sealed.



4. Select **Finish** to return to the Tools screen.

To unseal an Intelis gas meter's UMU

1. From the **Tools** menu, select **OWR Intelis Gas Riva**.
2. Enter the **Endpoint ID**.
3. Select the **Endpoint Mode**.
   - Mobile
4. Select **Next**.
5. Select **Test Mode Operations**.
6. Select the Utility ID.
7. Click **Next**.
8. Select **Adjust Calibration** for a device with a Seal State of Sealed.
   A warning message appears indicating that Adjusting Calibration will unseal the meter.
9. Select **Yes**.
10. *(Moblie endpoint mode only)* Enter the Unlock ID.



a) Select **Next**.

The Adjust Calibration screen appears.

11. Click **Quit** or **Finish** to return to the Tools screen.

Chapter 7 Intelis Gas Meter Index Replacement

⚠ **Warning**: The Intelis Gas Meter index assembly is a static sensitive device. Avoid contact with the feed through connector pins on the index assembly. It is important to take ESD precautions when the index assembly is replaced. To ensure the Intelis Gas Meter retains consumption data, switch the Intelis Gas Meter to Factory Ship Mode prior to index replacement.

Index replacement instructions are included with each shipment of replacement indexes (*Intrinsic Safety Control Drawing Index Module Replacement Intelis Gas Meter* TDC-0908-009).

⚠ **Caution**: After an index assembly is replaced, you must perform a valve operation to place the automatic shut off valve in the desired state using FDM Tools. If the desired valve state is open, send an FDM Tools **Reconnect** command. Conversely, if the desired state is closed, send an FDM Tools **Disconnect** command. The Intelis Gas Meter index may only be replaced using the UL classified replacement index kit (Itron part number ERG-7100-105).

Replacing the Intelis Gas Meter index assembly

Important: Program the integrated 500G communications prior to replacing the index. The illustrations in these instructions do not show the gas pipes connected to the meter. Perform an LCD Test prior to replacing the index assembly with the new index to verify the display is working properly. For more information, see Performing an LCD test on page 20.

Pictures and definitions

Component or tool		Itron part number
Original index		ERG-7100-005
Intelis Gas Meter index replacement kit		ERG-7100-105
Intelis meter		MTR-7100-005
Badge and UL classification **Note**: There are two badge options: red TC or blue NTC		
Required Tools:		

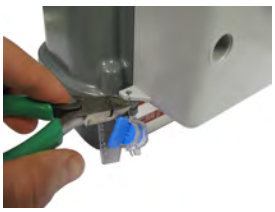
Component or tool		Itron part number
Phillips (size 1 or 2) slot-head (flat bladed sized 6-10 screwdriver)		
(*Optional*) Awl		
Hammer or mallet		
(*Optional*) Diagonal cutters		
Torque screwdriver (6-15 in-lbs) Phillips sizes 1-2 or slot-head sizes 6-10		

Pre-Check

Warning: Do not attempt to remove meter from gas pipes or adjust/modify/damage gas pipes/gas pipe connections in any way. Step replacement pictures do not show the gas pipes connected to the meter. Ensure area is not hazardous (i.e. free of potentially ignitable atmospheres) before replacing the index, or installing, servicing, cleaning, or touching the index/meter. On the new index, be careful not to bend or disturb the two red and two black wires that connect the batteries to the PCB. If the wires are physically moved/disturbed on the new index, it cannot be installed on the meter.

Locate and verify the meter assembly and replacement packaging are marked as follows: On the metal gas meter, find the badge that contains the UL mark, and verify the UL mark in the MTR-7100-005 badge & UL Classification pictures above are correct (cULus mark with File number E323571 as above), and verify the following required text: “Intelis for use in Hazardous Locations only as to Intrinsic Safety”. On the original index (ERG-7100-005), verify the required text marked on the housing: “Model Intelis Gas Meter”. On the packaging of the new index (ERG-7100-105), find and verify the following required information: same cULus mark as in the "MTR-7100-005 badge & UL Classification pictures above" (not including E323571 beside the mark), and text “Intelis Replacement Index Kit for use in Hazardous Locations only as to Intrinsic Safety E323571; Model ERG-7100-105”.

1. If your meter installation has one or more security wires included between the original index and the meter on one or both sides’ seal wire locations, cut the wire(s) with a diagonal cutter.



   Note: the security wire may appear physically different from the image; security wire types are dependent on the utility installation.
2. On the original index, break the (red) tamper seals and remove them. A hammer/mallet and a screwdriver/awl may be used to accomplish this. Insert the screwdriver or awl until it touches the tamper seal, then apply pressure into the tamper seal and twist the tool to break the tamper seal enough to remove it, without damaging the enclosure or other

parts of the original index/meter/gas pipes. Do not use a power tool. Carefully pull the tamper seal out of the hole, hooking it with the tool if necessary.

3. There are two screws holding the original index onto the meter located behind the tamper seals just removed. Unscrew both screws while holding the original index. Do not discard the screws.

4. Firmly and slowly pull the original index straight away from the meter.

5. Align the new index’s screw holes with the screw holes of the meter (oriented as shown in the following image). Slowly align the new index with the meter until it contacts the meter. Gently push the new index onto the meter so that the 6-pin connectors from the meter and the new index fully engage. The new index should be flush with the meter.

6. Use the screws from the original index to attach the new index to the meter. Tighten the screws by hand with a Phillips or slot head screwdriver to a torque between 6 and 15 inch-pounds.
7. Ensure the head of the screws secure to the index housing. If torque monitoring is available, torque the screws to 6-15 inch-pounds.
8. Install the two new tamper seals (included with the new index) in the two tamper seal holes on the new index's front face, pushing them firmly into each hole. On each tamper seal, there is a raised letter “S” that is part of the plastic. Make sure this “S” is pointing out of the screw hole, so that it is visible after installation. The replacement procedure is complete.