



# Intelis Gas Meter

## Transforming Gas Metering

Given advances in solid state metering and the integration of RF (radio frequency), Itron is now able to offer an exceptionally compact and feature-rich ultrasonic residential gas meter with an internal shutoff valve in every meter. The Intelis Gas Meter combines multiple products in one unique, compact package delivering smart metering with high flow sensing + temperature sensing + 500G communications + shutoff.

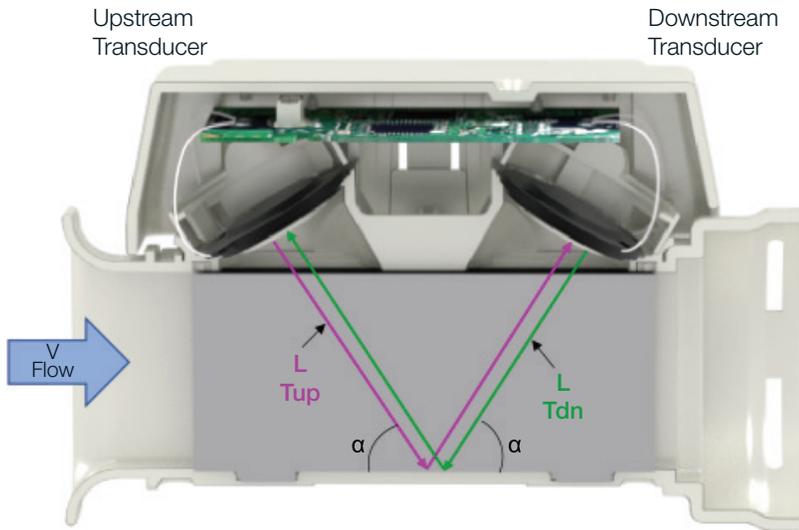
At only **4 ½ pounds**, the Intelis Gas Meter is the lightest residential gas meter available in the North American market. Intelis has 6" center-to-center hub connections so field retrofits are easily accomplished. Intelis builds on the OpenWay Riva 500G ERT Module, enabling the option for mobile mode or network mode, allowing flexible and migratable operation in AMR or AMI environments. In addition, Intelis is equipped with an **internal shutoff valve** on the outlet of every meter. Intelis delivers distributed intelligence to gas metering by

providing the ability to self-monitor and shut off the flow of gas during a high flow incident, independent of operator involvement or the RF reading topology, similar to the function of an excess flow valve. Leveraging Intelis as part of a smart gas communication platform enables utilities to automatically make intelligent decisions across the gas distribution network, delivering opportunities for operational savings and enhanced customer and employee safety by potentially preventing an explosion.

### Key Features

- » Compact size
- » Integrated shutoff valve
- » High flow alarm
- » Air detection alarm
- » High temperature alarm
- » Embedded 500G communications
- » +/- 0.5% accuracy at room temperature
- » UL Class I, Division 1
- » Retrievable TC and NTC volume
- » Whisper quiet operation

## Ultrasonic single path with two transducers



L = length of path between transducers

Tup = time from transducer upstream to downstream

$$T_{up} = \frac{L}{C + \cos \alpha * V}$$

Tdn = time from transducer downstream to upstream

$$T_{dn} = \frac{L}{C - \cos \alpha * V}$$

C = speed of sound

$$C = \frac{L}{2} * \frac{T_{up} + T_{dn}}{T_{up} * T_{dn}}$$

V = velocity

$$V = \frac{L}{2 * (\cos \alpha)} * \frac{T_{dn} - T_{up}}{T_{up} * T_{dn}}$$

Volume = Velocity \* cross sectional area of the measurement channel \* time

## ULTRASONIC MEASUREMENT PRINCIPLE

Ultrasonic meters are state of the art technology and have been around for many decades, dating back to their introduction in the 1960's and commercial applications in the 1970's in Japan. Technology advancements have made them more affordable for the residential market. Europe and Asia are currently leading residential solid state installations.

Time of flight single path measurement method utilizes two transducers, one is upstream and one downstream of the gas flow. One transducer will emit an ultrasonic signal and the other will sense it, then the process will reverse. The difference in time for the ultrasonic signals

to travel upstream versus downstream and the length between them is used to determine the velocity. Flowrate multiplied by time provides the volume. With gas flowing through the meter, the signal takes a shorter time to travel in the direction of gas flow and longer against it. At no flow conditions, the transit time is the same in the upstream and downstream directions.

## INTELIS GAS METER FEATURES

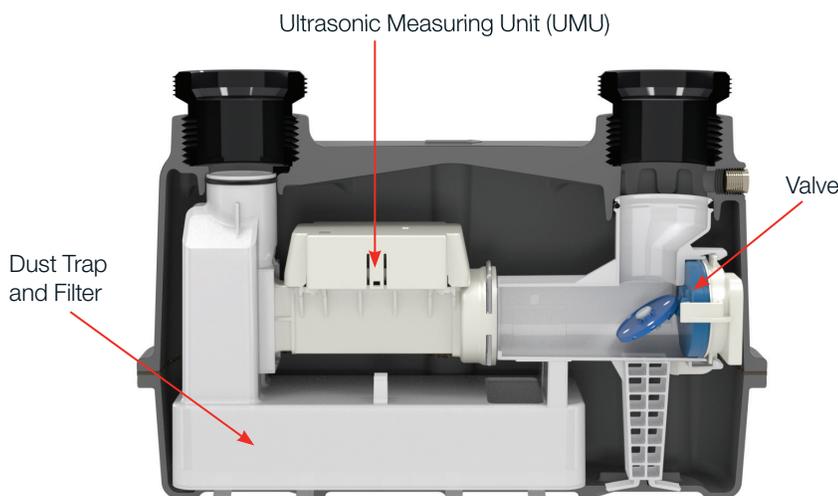
A safety feature with a **high flow alarm** and an **integrated valve** that acts similar to an excess flow valve is standard in every Intelis meter. With an internal high flow alarm that is configurable by the utility, a threshold can be set in the meter indicative of an open fuel line downstream

of the meter. This high flow event automatically triggers the shutoff valve to close, potentially preventing an explosion and property damage or even loss of life. This safety feature is a key demonstration of intelligence at the meter and will work in both mobile and network mode. It is mandatory to be on-site at the meter to re-open the valve to ensure safe conditions.

An **air detection alarm** can be triggered notifying the utility that air was detected in the meter. This can be used for potential tampering information, for example if the meter was removed from installation.

**Reverse flow detection** function will determine if gas is flowing from the outlet to inlet instead of in the standard operating direction. An alarm will be logged and this can be used for potential tampering information.

## A Look Inside Intelis



Intelis Gas Meter is an impressive 70% size reduction of the traditional diaphragm meter.

A **high temperature alarm** can be utilized to notify of a potential fire or other dangerous conditions and optionally the valve can be programmed to close upon high temperature detection.

The **500G communications** utilizes an IPv6 open standards that offers the most flexibility in RF reading options of any Itron gas module. It is designed to be read under Itron's OpenWay Riva multi-purpose Internet of Things (IoT) network or by legacy ChoiceConnect handheld and mobile readers. With new features for IoT operation like firmware download, sub hourly interval data and extended data storage, the

integrated 500G communications offers additional value while continuing to offer the highest in reliability, accuracy, battery life, security standards and intrinsic safety that you have come to expect from the industry leader in gas modules.

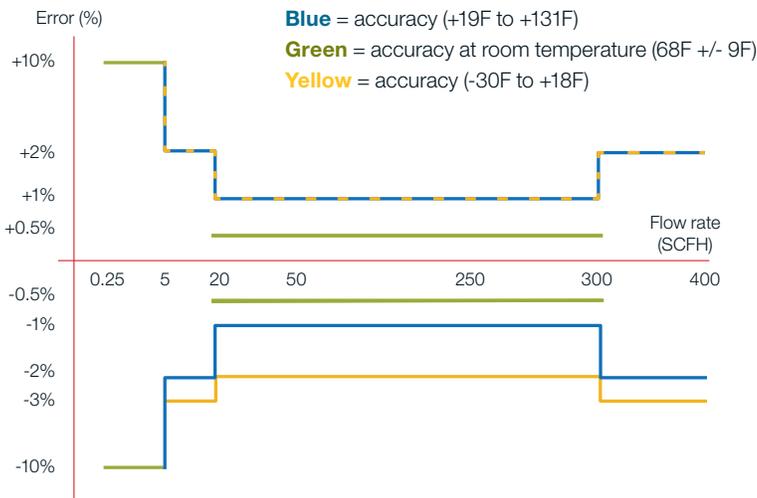
This smart meter features on-board **self-diagnostics** including monitoring of transducer failure, remaining battery capacity and gas temperature.

Itron continues its long-standing tradition of superb battery life performance. The entire meter package has a **20-year battery life** including the meter, 500G and valve when using recommended parameters.

Intelis includes a **secondary retrievable index** read. A NTC meter has the ability to retrieve through AMR/AMI the TC volume to aid utilities in analysis purposes.

The **accuracy** of Intelis is designed to meet applicable requirements in ANSI B109.1 as well as ANSI B109.0 draft and Measurement Canada PS-G-06 Class 1. In addition, Intelis will achieve **+/- 0.5%** at room temperature from 20-300 SCFH. There are no moving parts for ultrasonic measurement, therefore it is highly unlikely to lock-up due to contamination or freezeups within the gas stream. The meter is less likely to drift over time.

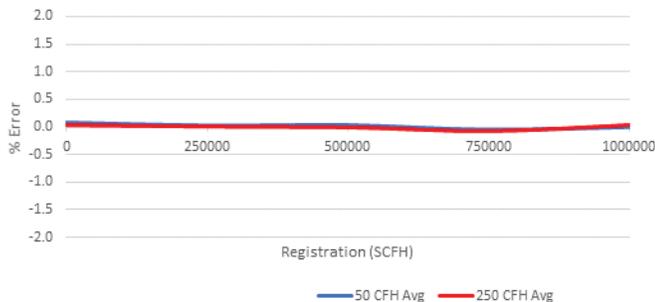
### % Error vs Flow Rate



The accuracy of Intelis is Class 1. Specifically this is +/- 1% from 20 CFH to 300 CFH from +19F to +131F. In addition, it will achieve +/- 0.5% at room temperature. Note: Graph is not to scale.

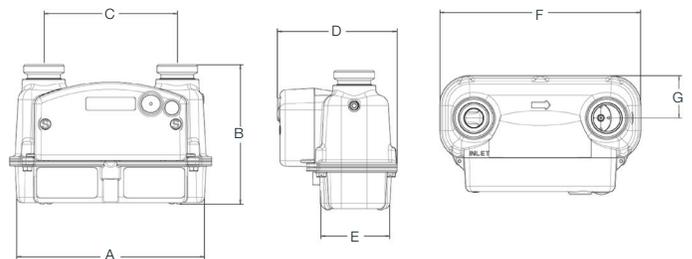
Flow rate definitions	
Pilot Flow	0.25 CFH (0.007 m³/h)
Qmin	5 CFH (0.14 m³/h)
Qt	20 CFH (0.57 m³/h)
Qmax	250 CFH (7.1 m³/h)
1.2Qmax	300 CFH (8.5 m³/h)
Qr	400 CFH (11.3 m³/h)

### Accelerated Life Test



The accelerated life test of Intelis is stable and the open (250 CFH) and check (50 CFH) track tightly.

### DIMENSIONS



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

## PACKAGING CONFIGURATION

	Meters per Layer	Layers per Pallet	Meters per Pallet	Pallet Dimensions (inches) LxWxH	Total Pallet Weight (lbs) estimate	FTL (full truck load) # pallets	FTL Total Meters
6-pack	24	6	144	48 x 40 x 44.5	698	52	7488

## SPECIFICATIONS

Meter Capacity	250 CFH at 1/2" WC / 7.1 m <sup>3</sup> /h @ 0.125 kPa	Intrinsically Safe	Highest rating of UL Class I, Division 1
Measurement Principle	Ultrasonic time of flight	<b>Operating Temperature Ratings</b>	
Accuracy	Class 1 and +/- 0.5% at room temperature	Measurement	-30F (-34C) to +131F (55C)
Meter Type	TC or NTC	Valve	-13F (-25C) to +131F (55C)
Hub Center-to-Center	6" (152.4mm)	500G	-40F (-40C) to +158F (70C)
Hub Size Options	10LT, 20LT, 30LT, 1A, 1 1/4", ISO G 1 1/4"	<b>Storage Temperature Rating</b>	
Meter MAOP	5 PSIG (35 kPa)	Measurement/Valve/500G	-40F (-40C) to +158F (70C)
Valve	Actuated swing valve, maximum 0.035 CFH (1 L/H) leakage rate	Battery Information	4 Lithium Manganese Dioxide (LiMnO <sub>2</sub> ) 'A' cell batteries, replaceable
LCD Displayed Units	CCF (100 x cubic feet) or cubic meter	Battery Life	20 years for meter, 500G and valve using recommended parameters
LCD Resolution	00000.001 CCF (0.1 CF) or 00000.001 m <sup>3</sup>	Pressure Tap	1/8" NPT pipe plug pressure tap standard on outlet of meter
Case	Aluminum case with ASA 49 gray powder coat finish	Badging	Standard aluminum manufacturing and optional customer badge
Weight	4.5 lbs (2.0 kg)	Test Pulse Weight (volume per pulse)	0.10CF, 0.25CF, 0.50CF, 1.0CF, 10dm <sup>3</sup> , 50dm <sup>3</sup>
Gas Type	Natural Gas Type H, E, L (per EN 437) Reference gases G20,G21,G23,G25,G26,G27	Test Pulse Width	10ms - 1000 ms (1 second)
<b>Component Materials</b>		Minimum Software Required	FCS v4.1 FDM Tools v4.1.1 ISM v3.6 (if using Enhanced Security) Itron Mobile v1.5 Mobile Collection v3.8.2
UMU (ultrasonic measuring unit)	PBT + PC (Polybutylene terephthalate + Polycarbonate)	Standards	Designed in compliance with ANSI B109.1, ANSI B109.0 (draft) and Measurement Canada PS-G-06
Valve Plastics	PBT (Polybutylene terephthalate)		
Inlet & Outlet Tubes	POM (Polyoxymethylene)		

## Additional Information

Intelis Gas Meter Technical Reference Guide: TDC-1805

Intelis Gas Meter Installation Guide: TDC-1782

Intelis Gas Meter Ordering Guide: PUB-1309-000

FDM V4.1.1 Field Service Representatives Guide: TDC-1714

500G specifications sheet: 101510SP

OpenWay Riva Next Generation IoT Solution: 101493MP



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