Intelis™ Gas Meter

Transforming Gas Metering

Given advances in solid state metering and the integration of RF (radio frequency), Itron is pleased to offer the Intelis Gas Meter, an exceptionally compact and feature-rich ultrasonic solid-state residential gas meter with integrated radio frequency communications, temperature sensing, and internal safety shutoff valve.

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 Itron's latest RF communications 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 **safety 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 safety shutoff valve with a precision seal that exceeds ASME B16.33 gas tightness guidelines

» High flow alarm

» Air detection alarm

» High temperature alarm

» Embedded RF communications

» +/- 0.5% accuracy at room temperature

» UL Class I, Division 1

» Retrievable TC and NTC volume

» Whisper quiet operation

» Measurement Canada approved: AG-0642

Ultrasonic single path with two transducers

Upstream Transducer

Downstream Transducer

V Flow

L Tup

L Tdn

α   α
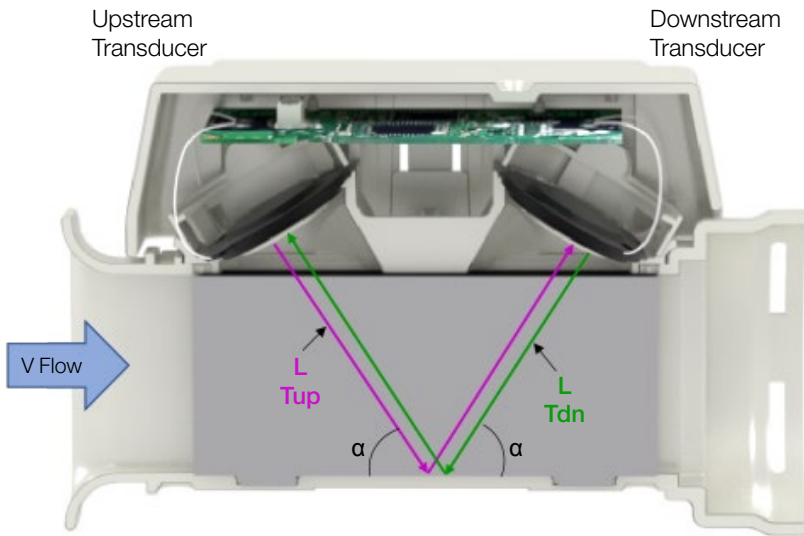
L = length of path between transducers

Tup = time from transducer upstream to downstream

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

Tdn = time from transducer downstream to upstream

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

C = speed of sound

$$C = \frac{L}{2} * \frac{Tup + Tdn}{Tup * Tdn}$$

V = velocity

$$V = \frac{L}{2 * (\cos \alpha)} * \frac{Tdn - Tup}{Tup * Tdn}$$

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

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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. Velocity multiplied by the cross sectional area of the measurement channel and time provide 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.
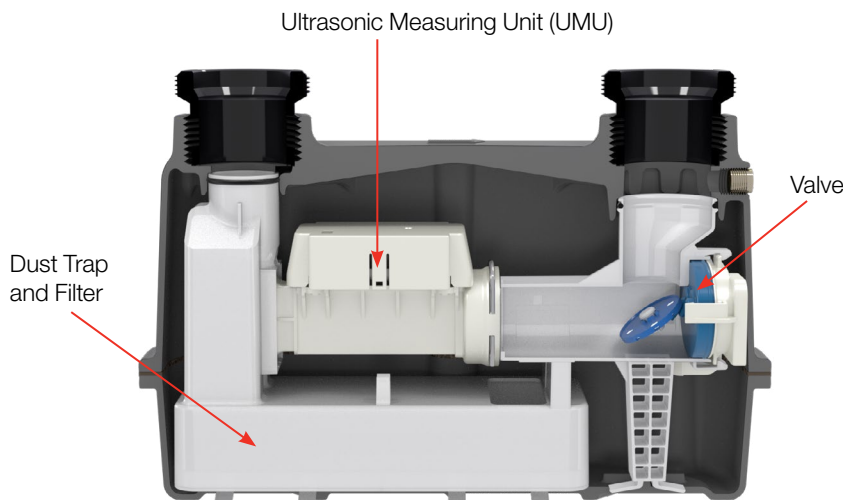
INTELIS GAS METER FEATURES

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

Ultrasonic Measuring Unit (UMU)

Valve

Dust Trap and Filter

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 Intelis Gas meter offers the most flexibility in **RF reading options** of any Itron gas module. It is designed to be read by legacy ChoiceConnect™ handheld and mobile readers and also under Itron's OpenWay® Riva and Gen5™ Industrial Internet of Things (IIoT) networks. With new features for IoT operation like firmware download, sub hourly interval data and extended data storage, the integrated RF 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, RF communications and valve when using recommended parameters.

Intelis includes a **secondary retrievable index** read. An NTC meter has the ability to retrieve through AMR/AMI the TC volume and vice versa, 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

Blue = accuracy (+19F/-7.2C to +131F/55C)
Green = accuracy at room temperature (68F/20C +/- 9F/5C)
Yellow = accuracy (-30F/-34.4C to +18F/-7.8C)

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	300 CFH (8.5 m³/h)
Qr	400 CFH (11.3 m³/h)
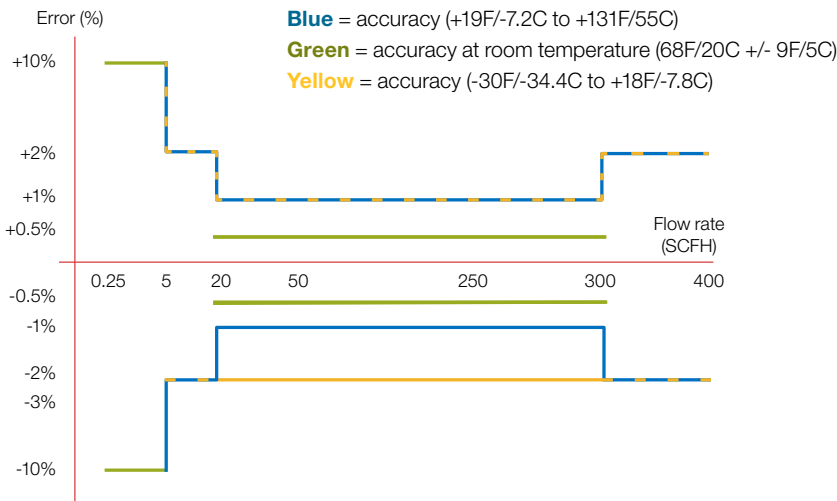
The accuracy of Intelis is Class 1. Specifically this is +/- 1% from 20 CFH to 300 CFH from +19F/-7.2C to +131F/55C. In addition, it will achieve +/- 0.5% at room temperature. **Note: Graph is not to scale.**
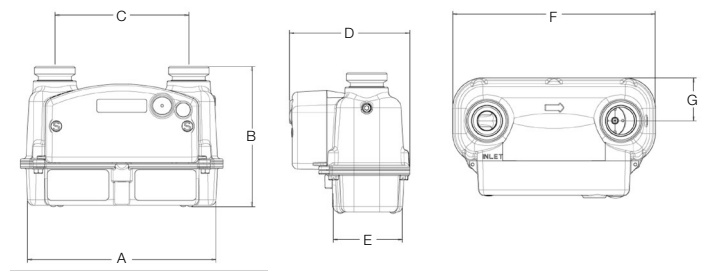
Accelerated Life Test
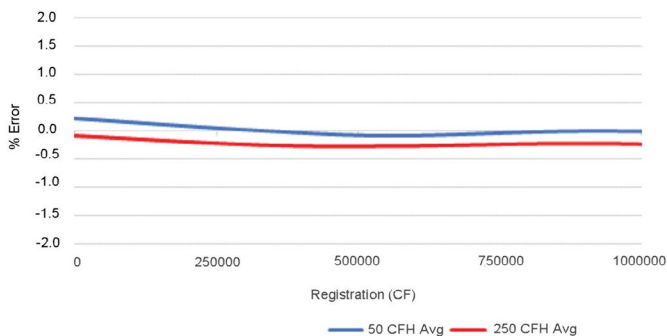
The accelerated life test of Intelis is stable and the open (250 CFH) and check (50 CFH) track tightly.

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

*Dimensions for 20LT

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	36	5	180	50 x 39 x 43	890	44	7,920
Bulk-pack	30	6	180	48 x 35 x 44.5	870	45	8,100

SPECIFICATIONS

General Specifications

Meter Capacity	250 CFH at 1/2" WC / 7.1 m³/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" (152.4mm)
Hub Size Options	10LT, 20LT, 30LT, 1A, 1 ¼", ISO G 1 ¼", 1" BS746
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 feet) or cubic meter
LCD Resolution	00000.001 CCF (0.1 CF) or 00000.001 m³
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
Battery Information	4 Lithium Manganese Dioxide (LiMnO2) 'A' cell batteries, replaceable
Battery Life	20 years for meter, RF and valve using recommended parameters
Badging	Standard aluminum manufacturing and optional customer badge
Test Pulse Weight (volume per pulse)	0.10CF, 0.25CF, 0.50CF, 1.0CF, 10dm³, 50dm³
Standards	Designed in compliance with ANSI B109.1 and ANSI B109.0 (draft). Meets Measurement Canada PS-G-06, approval AG-0642.
Intrinsically Safe per UL 913	Highest rating of UL Class I, Division 1

Component Materials

UMU (ultrasonic measuring unit)	PBT + PC (Polybutylene terephthalate + Polycarbonate)
Valve Plastics	PBT (Polybutylene terephthalate)
Inlet & Outlet Tubes	POM (Polyoxymethylene)

Operating Temperature Ratings

Measurement	-30°F (-34°C) to +131°F (55°C)
Valve	-13°F (-25°C) to +131°F (55°C)
RF Communications	-40°F (-40°C) to +158°F (70°C)
LCD	-40°F (-40°C) to +185°F (85°C)*

Storage Temperature Rating

Measurement/Valve/RF	-40F° (-40°C) to +158F° (70°C)

Software

Minimum Software Required for Mobile and Riva** Network	Field Collection System (FCS) v4.2.4 Field Deployment Manager (FDM) Tools v4.2 (v4.3.1 if LSCD) Itron Mobile v2.3 Mobile Collection v3.8.2
Minimum Software Required for Gen5 Network	Gen3, 4, 5 CPD hardware running UtilOS v5.0 FCS v4.3.1 with Itron Mobile v2.5 FDM Tools v4.3 Itron Security Manager (ISM) v4.2 UtilityIQ® v4.15

* Electro-optical characteristic and optical performance is affected during high temperature operation (approximately 176°F/80°C to 185°F/85°C) and low temperature operation (approximately -22°F/-30°C to -40°F/-40°C). Performance recovers under normal temperature range.

** Refer to GSR5.0 Compatibility Matrix for OpenWay Riva Network Software Required: INF-7220-000

Related Documents

Intelis Gas Meter Technical Reference Guide (815-0119-00)
Intelis Gas Meter Proving and Setup Guide (815-0154-00)
Intelis Gas Meter Ordering Guide (815-0335-00)
Field Deployment Manager (FDM) Mobile Application Guide

500G specifications sheet (101510SP)
550G specifications sheet (101742SP)
OpenWay® Riva Next Generation IoT Solution (101493MP)

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