

Q.Sonic[®] plus

Ultrasonic flow meter for
natural gas custody
transfer measurement

- Six-paths
- Wide pressure and velocity range
- Advanced diagnostics
- Unrivalled repeatability

Engineering
Confidence



Elster engineers the vital connections for safe and reliable natural gas transfer and measurement

Today's natural gas industry demands reliable metering technologies for less overall uncertainty. Ultrasonic meter technology can reliably deliver accuracy figures down to 0.1% within the controlled laboratory conditions of a calibration facility. However, operators need to feel confident that the meter will retain accuracy levels when it is installed in the field, and critically, will it continue to measure natural gas accurately after several months or years?

The advanced metering technologies of the Q.Sonic® plus is the next generation of ultrasonic flow meter technology and our response to the industry's demands. The patented design of the Q.Sonic® plus eliminates the need for extensive commissioning, installation and health checks and is designed with intelligent healthcare diagnostics, including real-time monitoring and trending of flow profile factors, swirl angles, asymmetry, turbulence and other real-world metering conditions.

The Q.Sonic® plus is about what matters most to you every day: measuring your gas flow safely, reliably, accurately and without worries. It is why the Q.Sonic® plus is engineering confidence.

Engineering Confidence

Engineered to set the new standard for the industry, the Q.Sonic® plus delivers unsurpassed levels of performance, capability and dependability.

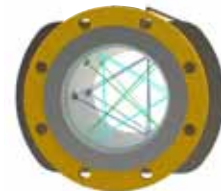
The patented six-path technology enables detailed flow profile measurement, superb noise immunity, unrivaled pressure and velocity abilities and advanced diagnostics designed to reinforce confidence and support improved gas balance.



The heart of the Q.Sonic® plus

The heart of an ultrasonic flow meter is based upon three fundamental aspects: strong crisp signals, exacting transit time measurements and the ability to measure the flow profile within the meter.

1. The first element - sending strong signals reliably through gas. State-of-the-art titanium-encapsulated transducers combined with highly efficient impedance matching technology, deliver high-power signals that propagate well in gases.
2. The second element - exacting calculations. The key operating principle of an ultrasonic flow meter is the measurement of time of flight. Advanced, digital signal processing techniques deliver solid signal detection and accurately measure time of flight even in dynamic, real-world conditions of high flow, low pressure, and high turbulence.
3. The third element - detailed flow profile measurement. An ultrasonic flow meter's goal is to accurately measure the volume of gas moving through the meter. As gas flow entering a meter distorts and swirls, the meter's ability to detect and measure the distorted, swirling gas flow becomes the critical factor inhibiting its real-world performance. The patented six-path configuration of the Q.Sonic® plus enables the measurement of swirl and asymmetry and results in unsurpassed profile recognition and diagnostics.



The Q.Sonic's patented symmetrical layout of four double-reflection swirl paths and two single-reflection paths are key to accurate real-world flow measurement.



Powerful modular electronics

The Q.Sonic® plus introduces our new modular hardware and software platform. Featuring an explosion-proof touch screen interface backed by an excess of processing capability, this new platform will be featured in many future Elster-Instromet devices.

Unrivalled repeatability and integrity

1. Electronics with high processing power and fast update rates, detect and measure the smallest changes immediately with unrivalled repeatability.
2. The real-time operating system, integral to the Q.Sonic® plus, is trusted by the aircraft industry as it is regarded as one of the most secure systems in the world.
3. A variety of additional functionalities can be realized by installing the latest applications - "apps" compatible with the Q.Sonic® plus.

Electronics

- Enhanced update rate
- Unrivalled repeatability
- PTZ volume conversion
- Multi product platform
- Real-time operating system
- Modular system (Apps)
- Flexible connections
- VDSL modem long distance
- One free slot (Hart, FF, IS input)
- Flame proof Ex-d enclosure

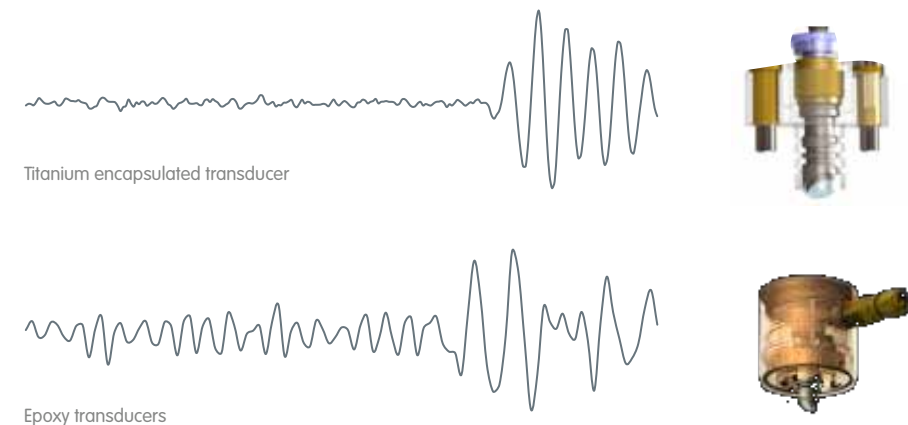


Engineering Transducers

Passion for transducer ingenuity

Elster-Instron's newly engineered transducers enable a number of the Q.Sonic® plus enhancements:

1. Intrinsically safe design enables convenient field service in hazardous areas
2. Clean and strong signals allow for low pressure, high velocity and challenging applications
3. Intelligent design and a unique six-path configuration provides greater detailed flow profile measurement in a smaller 3D meter body
4. Fully encapsulated in high-grade titanium for enhanced corrosion resistance
5. Simplified construction allows for transducers to be replaced without depressurizing the entire system



Signal comparison at 8" Q.Sonic at atmospheric air conditions



Benefits

- Titanium-encapsulated
- Highly efficient
- Auto draining
- Corrosion resistant
- Intrinsically safe Ex-i
- Excellent SNR and shape



Ultrasonic titanium encapsulated transducer

Engineering Configurations

Path configurations

Q.Sonic technology is well-known for its unique arrangement of ultrasonic measurement paths. A patented combination of two double reflection paths (swirl paths) and one to three single reflection paths (axial paths).

Unmatched profile recognition and diagnostics with new path layout

The Q.Sonic® plus advances its traditional reflection path technology with a new six-path configuration. This patented path configuration enables the measurement of swirl and asymmetry with detail and precision unmatched by other path configurations. The resulting profile recognition and diagnostics enable the meter to maintain custody-transfer accuracy with less-than-ideal flow conditioning.

Patented six-path layout

- Detailed flow profile measurement
- Proven reflective technology
- Four swirl and two axial paths
- Symmetrical path layout
- Diagnostics



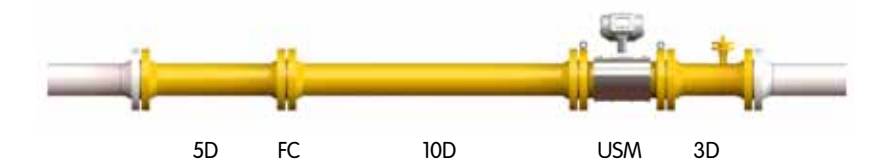
Field configurations

Without flow conditioner



The standard Q.Sonic® plus configuration consists of a 10D upstream pipe and a 3D downstream section combined with temperature point to meet the legal metrology requirements. Pressure will be connected to the meter body.

With flow conditioner



To further eliminate risk from the measurement and exceed standard metrology requirements, a flow conditioner can be applied to isolate the Q.Sonic® plus from unknown upstream flow disturbances as recommended by AGA9. Optimal results are obtained once the meter is calibrated as one complete package, including the flow conditioner and 10D upstream piping.

Engineering Diagnostics

Advanced diagnostics at your fingertips

The Q.Sonic^{® plus} is engineered to deliver vital system measurements accurately and reliably at all times, whether operators are in the office or in the field. The meter's full-color touch screen display and our PC-based diagnostic software, with its featured one-click service pack, place powerful diagnostics at your fingertips. This easy-to-use, explosion-proof graphical interface provides direct access to: diagnostics (including turbulence), parameter changes and a clear overview of measurement data.

SonicExplorer[®] is a revolutionary software package developed to provide comprehensive, proactive healthcare monitoring of the Q.Sonic^{® plus} diagnostics. This software and the meter's internal diagnostics were developed to protect the

integrity of large metering transactions and your investment. SonicExplorer[®] detects changes early, before they can develop into serious issues that may impact measurements. Additionally, the long term stability of the ultrasonic meter can be monitored, including: system integrity, calculation of physical properties like velocity of sound, density, superior calorific value and more.

SonicExplorer[®] includes a one-click service pack. Should any doubt arise regarding the performance or health of the Q.Sonic^{® plus}, the one-click 'Service Pack' feature of SonicExplorer[®] automatically collects all relevant data such as ultrasonic signals, diagnostics and parameterization, and puts it into a single '.zip' file that is ready to send to the factory for detailed analysis.

Benefits

- Healthcare
- One click service pack
- Touch screen
- Turbulence indicator



Engineering Integrated Metering Solutions

Expertise and applications

Our meters and systems are applied all over the world, in every segment of the natural gas sector - on shore and off shore, conventional and unconventional, across the entire gas value chain.

Functionality

Fiscal metering
Custody transfer
Allocation metering
Flow control

Fluid

Natural gas
Industrial gases
Shale gas
Gas to liquid
Coal methane bed
Deep gas
Tight gas

Our customer base includes major industries that use natural gas as a fuel or raw material, like power stations, refineries, petrochemical plants and the GTL industry.

Advantages of our ultrasonic gas flow meters

- No pressure drop
- Wide turn down ratio 100:1
- Bi-directional flow
- No moving parts
- Very low cost of ownership
- Insensitive to contamination
- Interfaces with major flow computer manufacturing
- Transducer replacement without recalibration
- Designed in the spirit of ISO17089-1

Applications

- LNG industry
- Gas processing plants
- In-plant metering
- Power plants
- Shale gas
- Underground natural gas storage
- Custody transfer measurement
- Measurement and regulation stations
- Gas compressor control



Turn-key solutions that offer you peace of mind

Elster-Instromet designs and supplies client-specific systems for the measurement and regulation of gas. As an Original Equipment Manufacturer (OEM) we create synergy by combining our own components within an integrated system.

From simple single-stream installations to complex stations that measure millions of cubic meters of gas passing through at high pressure. This is precisely where we offer added value, by taking complete responsibility for the entire process of product and system engineering. From concept to completion, with visible results:

- Keeping responsibility and risk with one single party
- Lowering measurement uncertainty
- Maximizing reliability of measurement results
- Supported by global services

We offer peace of mind - maximum measuring accuracy with minimum risk and maintenance costs. This is the strength of Integrated Metering Solutions.



ISS plus Supervisory Software



SM-RI-2 meter



EnCore FC1 Flow computer



ENCAL 3000 Gas Chromatograph

A powerful combination

Elster's turbine meters set the standard in world-class calibration capability and are the result of many years of experience and our passion for ingenuity. The new features of our latest generation of SM-RI-2 turbine meters marry the reliability of combining two, independent measuring principles with unrivalled accurate gas flow measurement.

The combination of ultrasonic meter and turbine meter technologies delivers a powerful system due to the new SM-RI-2 turbine meter features:

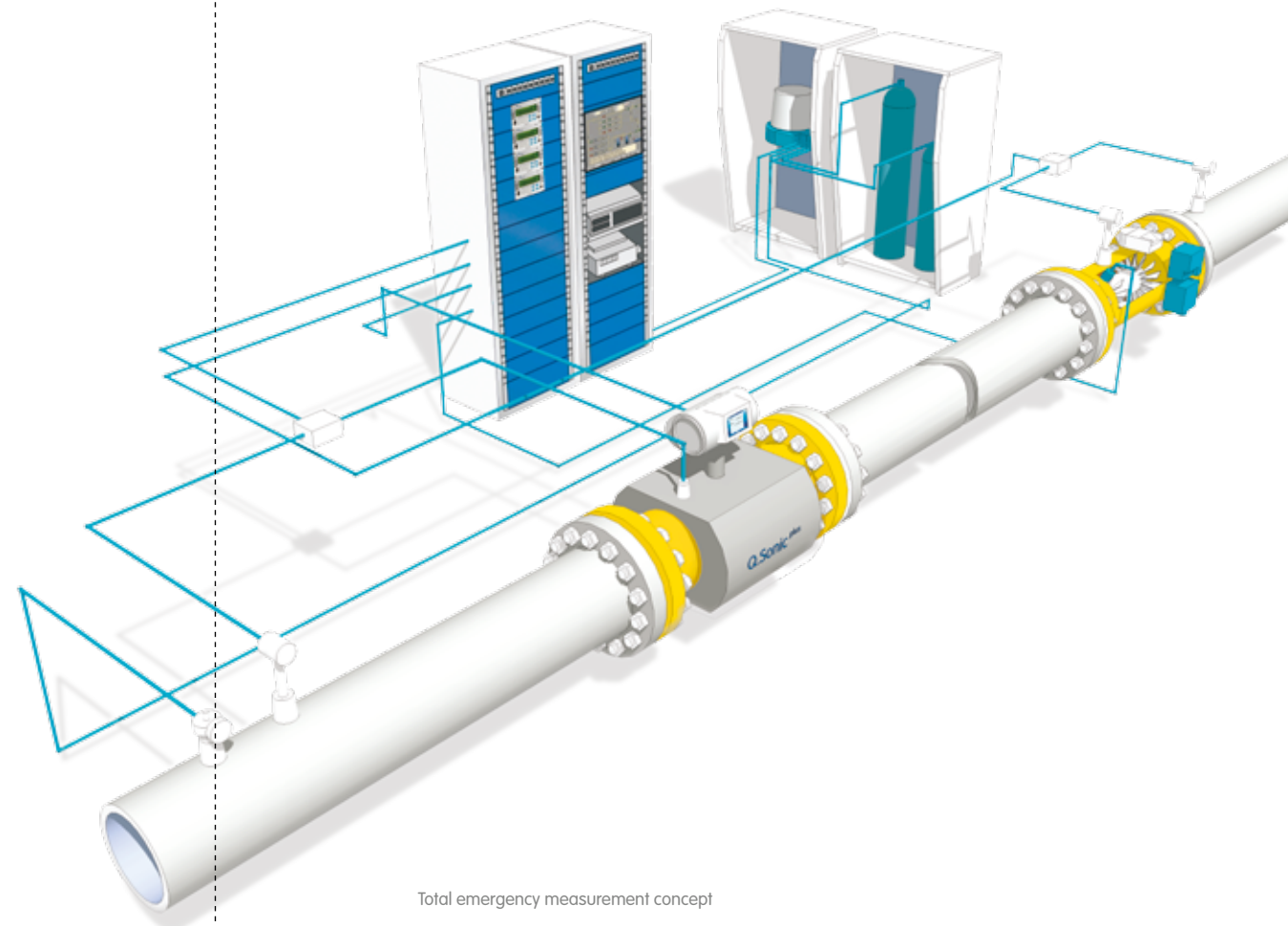
- Bi-directional measurement
- Reduced pressure drop
- Increased flow capacity (matching that of Q.Sonic® plus)
- Optional automatic lubrication
- TurbinScope® allows for in-situ performance analysis

Dual redundancy gives operators new-found confidence in multi-metering technologies that is lacking in the conventional limitations of a single technology. Operators are also guaranteed minimum maintenance costs with an optional automatic lubrication system, as well as the TurbinScope®, which analyses the turbine meter's performance in-situ.

Technical data

Sizes	3 to 56", DN 80 to 1400
Pressure	1 barg to 150 barg
Temperature	-40 °C to 80 °C
Repeatability *	0.05%
Typical uncertainty *	0.1% (after calibration and linearization)
Noise Suppression	Real-time CMB (Coded Multiple Burst)
Power	24VDC, 10 to 20W
Approvals / compliant	MID, OIML R137-1, AGA9, ATEX, IECEx, FM, CSA
Ingress protection	IP66, NEMA 4X
Interfaces	RS232 / 485, Ethernet, VDSL, USB
Body materials	LTCS, stainless steel
Electronics Enclosure	Copper free aluminum, stainless steel

* Relative to lab



Total emergency measurement concept

Elster

Elster (NYSE: ELT) is one of the world's largest gas, electricity and water measurement and control providers. Its offerings include advanced metering, integrated systems and utilization, distribution monitoring and control, networking and software solutions, communications and services designed to deliver operational efficiency and improved services. Its products and solutions are widely used by utilities in the traditional and emerging Smart Grid markets.

Elster has one of the most extensive installed revenue measurement bases in the world, with more than 200 million metering devices deployed over the course of the last 10 years. It sells its products and services in more than 130 countries across electricity, gas, water and multi-utility applications for residential, commercial and industrial, and transmission and distribution applications.



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