

ULTRASONIC FLOWMETER USM GT400-3P

The ultrasonic meter USM GT400-3P from RMG delivers high accuracy and reliability at low costs on field proven three path technology.



A 3-PATH METER - BUILT FOR PROCESS MEASUREMENT APPLICATIONS

The popularity of using large volume gas ultrasonic meters (USMs) for fiscal applications has significantly increased over the past two decades. Line sizes from 3" to greater than 30" are very common today. This gain in popularity can be attributed to its many competitive advantages over traditional measurement devices such as turbine and orifice meters.

As RMG technologically evolves with the times, so have our ultrasonic meters. Clients have valued our technology for more than two decades in downstream applications.

Research has identified how upstream/midstream applications, where gas quality isn't ideal, would greatly benefit from RMG's USM technology.

Clients are sometimes reluctant to use ultrasonic technology because they believe liquids, along with hazardous components like sour gas, will cause premature transducer failure. They also don't understand that the right ultrasonic design can reduce uncertainty when liquids are present.

With RMG's transducer technology, liquids and sour gas are not an issue.

Clients continue searching for alternatives to orifice metering. RMG has responded to this need by developing a new

generation of gas ultrasonic meter, the GT400-3P, to specifically target these difficult and challenging applications.



There are many advantages in using RMG's 3-Path ultrasonic technology over the many orifice meter disadvantages. Following are just a few...

RMG GT400-3P Advantages

- No venting of natural gas with its associated hazards and emissions is required
- Rangeability easily exceeds 100-1 with much lower uncertainty
- USM diagnostics provide numerous benefits over orifice metering (Speed of Sound, Path Velocity, & Turbulence to name a few)
- One line size smaller USM can be used for the same maximum flow rate
- An overall smaller and shorter metering package helps reduce cost and saves space
- USMs lend themselves to remote monitoring thus helping reduce field visits
- Pressure reducing valves near the GT400-3P meter is not a problem for RMG's technology

Orifice Disadvantages

- High maintenance - periodic plate changes require regular site visits - thus high OpEx
- Periodic plate replacements, either due to damage or flow rate changes, further increases O&M costs
- Plate inspection requires venting of green-house gases, and potentially hazardous sour gas
- Plate inspection results in total loss of primary measurement, and thus billing adjustments are required
- Orifice metering has a much higher uncertainty than RMG's GT400-3P uncalibrated ultrasonic meter
- Orifice meters significantly over-register when liquids are present, and have no diagnostic indicators
- Orifice meter rangeability is far less than the USM, and uncertainty increases at lower flow rates
- Orifice permanent pressure losses may result in additional compression which increases O&M

To demonstrate just how well the new RMG GT400-3P USM performs when liquids are present, RMG had independent tests performed on a 4" Schedule 80 meter versus a 4" orifice meter at the CEESI Wet Gas Multiphase Test Facility in February 2022. The **GT400-3P** was tested without using

a flow conditioner to eliminate traditional pressure losses experienced with orifice measurement. During these tests, CEESI also collected data on 4" dual-chamber orifice meter with flow conditioning.

TECHNICAL SPECIFICATION

Technical Data	
Gases	Pipeline quality natural gas, raw natural gas up to a gas volume fraction of 0.980, natural gas / H ₂ -mixtures, air
Measurements	Volume flow, totalized volume, velocity of gas, speed of sound
Sizes	DN 80-200 / 3", 4", 6", 8" (ANSI 600); consult RMG for sizes > 8".
Path configuration	3 direct paths; 3 planes
Measurement uncertainty (from Q_t to Q_{max})	Dry calibration with Nitrogen acc. AGA 9: +/-1.0 % (dry gas) +/-2.0 % (wet gas / GVF = 0.99)
Repeatability	+/- 0.1%
Operating pressure range	1 bar (14.5 psi)..... 100 bar (1450 psi); flanges ANSI class 600
Ambient temperature	-40°C (-40°F) to +55°C (131°F)
Gas temperature range	-40°C (-40°F) to +80°C (176°F)
Operating relative humidity	up to 95% condensing
Power supply	24 V/DC +/-10 % ; 7 W typically
Hazardous area approvals	ATEX: Ex II 2G Ex de IIB + H ₂ T6; IECEx: Ex de IIB + H ₂ T6 Gb CSA: Class I, Div 1, Groups B, C, D T6
Metrological approval	Measurement Canada (pending)
Applied Standards	AGA 9, ISO 17089, OIML 137-2012
Outputs	0/4-20 mA (galvanically isolated, programmable, load resistor: max. 400 Ohm, U_{max} =16 V) 2 x HF output with fmax = 5 kHz, Namur or Open Collector 2 x programmable digital output 3 x serial interface RS 485 / Modbus. Ethernet via external module.
Transducer frequency	120 kHz for Size 8" (DN 200) 200 kHz for Sizes ≤ 6" (DN 150)
RMGView ^{USM} diagnostics software	Visualization, flow data, diagnostics, configuration, parameter changes, export/import of parameters and data
Protection	IP66
Meter body material	Casted steel; CS ASME A352 gr LCC
Material electronics housing Color/Finish	Aluminum cast Blue (RAL 5002) and metallic silver (RAL 9006)
Installation outside	With weather protection cover and sun roof
Remarks	Consult RMG for special requirements

Technical data is subject to change without notice.



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