Panametrics

PanaFlow™ XMT1000

Liquid flow ultrasonic transmitter

The XMT1000 is a new, cost-effective ultrasonic flow transmitter that builds on Panametrics flow expertise and on years of reliable performance from its XMT868i predecessor. It offers state-of-the-art flow measurement capability in a rugged, locally-mounted or remote-mounted transmitter certified for use in hazardous areas. It brings a new level of performance with improved accuracy, configurable inputs and outputs, and multiple ultrasonic transducer path options.

PANA054DS Rev. 10

Liquid flow measurements for a wide range of applications

- Hydrocarbon liquids
- Crude oil
- Lubricating oil
- Diesel fuel oil
- Solvents
- Liquefied natural gas (LNG)
- Water and wastewater
- Distilled water
- Hot/chilled water
- Chemicals
- Beverages

Non-intrusive, reliable, and accurate flow measurement

The PanaFlow XMT1000 comes from a long line of proven ultrasonic flow meters from Panametrics. It shares all the advantages of ultrasonic flow measurement, no moving parts to wear, no filters or strainers, no maintenance requirement, no pressure drop, and no drifting or required periodic calibration.

Its on-board digital signal processor (DSP) provides proprietary digital signal coding and correlation detection routines, automatic adjustment to changing fluid properties, and dynamically-configured operating software to simplify programming.

The XMT1000 offers:

- Improved accuracy of 0.3% of reading
- One, two or three-channel operation
- Four configurable inputs/outputs for analog or digital communication
- Suitability for a wide range of pipe sizes and materials
- SIL configuration available

Improved programming capability

The XMT1000 introduces a magnetic six-button keypad to allow safe programming and diagnostics verification in your hazardous (classified) location. There is no need to open the case to use a PC to program, eliminating the cost and time associated with obtaining hot work permits, and there is no need for an additional handheld programmer. Just touch the glass of the XMT1000 with the magnetic wand to change any parameter setting.

If you prefer your PC interface, the PanaFlow XMT1000 comes standard with MODBUS RS485 connectivity, providing full access to the meter's diagnostics and programming using PanaView Plus software. PanaView Plus also provides continuous logging capability of up to 10,000 points with 26 parameters logged per point.

Multi-channel, multi-path options reduce costs and improve performance

The XMT1000 may be configured as a one-channel, two-channel or three-channel meter for measurement flexibility. It also offers one, two or three ultrasonic transducer paths. A single path can provide cost effective flow measurement while multiple paths improve flow measurement accuracy and repeatability and add redundancy.

## Automatically adjusts to changing fluid properties

Standard in all PanaFlow XMT1000 transmitters, our unique Automatic Tracking Window™ (ATW™) feature ensures accurate flow measurements even when fluid properties are unknown or changing. ATW dynamically sweeps the receiver window whenever the sound speed of the fluid changes. This powerful feature lets you measure flow when the fluid sound speed is unknown, or is changing.
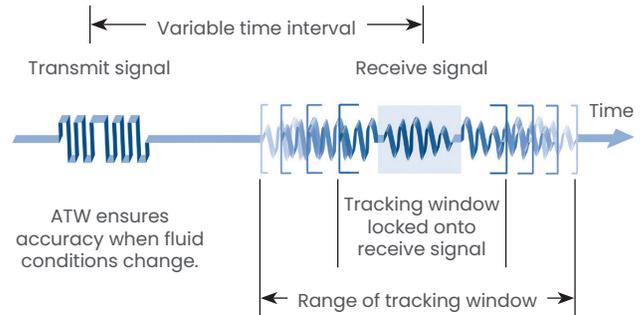
PanaFlow XMT1000 flow transmitter uses transit-time flow measurement technique

The transit time flow measurement method utilizes two transducers to serve as both ultrasonic signal generators and receivers. When mounted on a pipe, they are in acoustic communication with each other. In operation, each transducer functions as a transmitter, generating a certain number of acoustic pulses, and then as a receiver for an identical number of pulses. The time interval between transmission and reception of the ultrasonic signals is measured in both directions. When the liquid in the pipe is not flowing, the transit-time downstream equals the transit-time upstream. When the liquid is flowing, the transit-time downstream is less than the transit-time upstream.

The difference between the downstream and upstream transit times is proportional to the velocity of the flowing liquid, and its sign indicates the direction of flow.
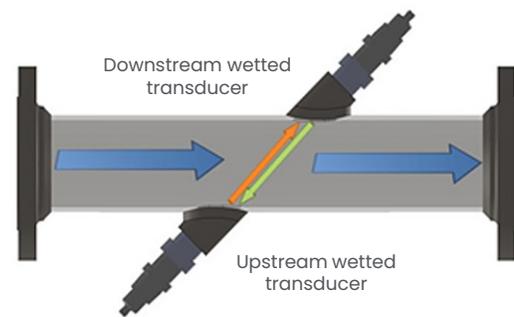
Wetted transducers

The XMT1000 can be used with a variety of wetted systems including the PanaFlow system. The PanaFlow system offers a fully integrated flow meter solution that includes the XMT1000 electronics, flow cell, and transducers, which simplifies installation.

The PanaFlow XMT1000 can be used with other PanaFlow systems or may be configured as a custom meter solution with wetted transducers to meet specific application needs.

Technical
Specifications

Operation and performance

Fluid types	Acoustically conductive fluids, including most clean liquids, and many liquids with entrained solids or gas bubbles. Maximum void fraction depends on transducer, interrogation carrier frequency, path length and pipe configuration.
Transducer types	All liquid wetted and clamp-on transducers
Pipe sizes	Standard: 0.5in (15mm) to 84in (2100 mm) Optional: >84in (2100 mm), consult factory
Data logging	Storage standard on meter, up to 10,000 flow data points with up to 26 parameters per data point
Measurement parameters	Volumetric flow, mass flow, flow velocity and totalized flow
Flow accuracy (velocity)	Up to ±0.3% of reading (achievable when supplied with a complete flow meter system and process calibration). Accuracy depends on pipe size, installation and number of measurement paths. The accuracy statement assumes measurement of a single phase homogeneous liquid with a fully developed symmetrical flow profile passing through the meter. Applications with piping arrangements that create an asymmetrical flow profile may require extended piping straight runs and/or flow conditioning for the meter to perform to this specification.
Repeatability	±0.1% to 0.3% of reading
Range (bidirectional)	−40 to 40 ft/s (−12.2 to 12.2 m/s)
Meter turndown	400:1

Electronics

Enclosure	Powder coated aluminum (copper free) or stainless steel
Dimensions (standard)	• Weight: 10 lb (4.5 kg) • Size (D x H x W): 8.40 in. x 6.42 in. x 5.87 in. (213.4 mm x 163.1 mm x 149.1 mm)
Channels	One, two or three-channel options
Display	128 x 64 mono-color LCD display, configurable for single or dual measurement parameters
Keypad	Built-in magnetic, six-button, lockable keypad
Standard outputs	• One 4 to 20 mA isolated output, 600 Ohm maximum load, NAMUR NE43 • One additional output, may be configured as either a pulse or frequency output

Optional input/output	• One 4 to 20 mA (SIL) isolated output, 600 Ohm maximum load, NAMUR NE43 (required for SIL installation) • Two additional 4 to 20 mA isolated outputs, 600 Ohm maximum load, NAMUR NE43 • One or two 4 to 20 mA isolated inputs, 24-VDC loop power, NAMUR NE43 • One or two isolated, three-wire RTD (temperature) inputs, −148°F to 662°F (−100°C to 350°C), 100 Ohm or 1000 Ohm platinum • One or two isolated, four-wire RTD (temperature) inputs, −148°F to 662°F (−100°C to 350°C), 100 Ohm or 1000 Ohm platinum
Digital interfaces	• Standard: RS485/Modbus® • Optional: HART® 7.0 protocol, with 4 dynamic variables, includes one additional 4 to 20 mA analog output • Optional: Foundation Fieldbus® FISCO, LAS capable with 5 AI blocks and a PID block
Power supplies	Universal 100-240 VAC 50/60 Hz ±10% or 12 to 28 VDC Note: For DC-powered meters, Class 2 rated supplies must be used for the line power
Power consumption	15W maximum, typically <7W Inrush current: 25 A maximum @ 100 µs 15 A maximum @ 1 ms
Temperature range	Operating Temperature: -40°F to 149°F (-40°C to 65°C)* *Maximum ambient temperature of 140°F (60°C) with foundation fieldbus option selected. Storage Temperature: -67°F to 167°F (-55°C to 75°C)
Optional PC software	PanaView Plus software for added functionality
Certifications	• **US/CAN:** Class I, Division 1, Groups B, C, D; Class I, Zone 1, Ex d IIC T6; • **ATEX/IECEx:** Ex d IIC T6 FISCO outputs (pending) Ta = −40°C to +60°C, Type 4X • ECAS certification • Taiwan certification • China certification • India certification • Japan certification

PanaFlow XMT1000 part number

	– B	– C	– D	– E	– F	– G	– H	– I	– Z	(Description)
XMT1000 XMT1000LC										**Model:** XMT1000 liquid ultrasonic flow meter XMT1000 transmitter - clamp-on
	1 2 3 4									**Measurement paths:** 1 Path w/ MCX connectors (wetted only) 2 or 3 Path w/ MCX connectors 1 Path with flying leads 2 Path with flying leads
		AC DC								**Input power:** AC Power supply 100-240 VAC DC Power supply 12-28 VDC
			0 1							**Conformal coating:** No conformal coating With conformal coating
				AL SS						**Enclosure:** Powder coated AL enclosure 316 stainless steel enclosure
					00 01 02 03 04 05 06 07 08 09 SL					**Optional inputs/outputs** 2AOs,2AIs 2AOs,1AI,1RTD-PT100, 3 wire 2AOs,2RTDs-PT100, 3 wire 2AOs,1AI,1RTD-PT100, 4 wire 2AOs,2RTDs-PT100, 4 wire 2AOs,1AI,1RTD-PT1000, 3 wire 2AOs,2RTDs-PT1000, 3 wire 2AOs,1AI,1RTD-PT1000, 4 wire 2AOs,2RTDs-PT1000, 4 wire 2AOs,2RTDs-PT1000, 4 wire 1AO (SIL)
						1 2 AE TW CN IN RU JP				**Certifications** US/CAN Cl 1, Div 1, Grp BCD T6 IECEx/ATEX Exd IIC T6 Gb IP66 UAE ECAS CERTIFICATION TAIWAN TS CERTIFICATION CHINA NEPSI CERTIFICATION INDIA CCOE CERTIFICATION EAC CERTIFICATION JAPAN HAZARDOUS CERTIFICATION
							0 1 2			**Optional digital communications** None HART with 4 dynamic variables Foundation Fieldbus
								0		**Frequency** Standard
									0 S	**Special** None Special
XMT1000	– 2	– AC	– 0	– SS	– 00	– 1	– 2	– 0	– 0	(example part number string)

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