Panametrics

Datasheet

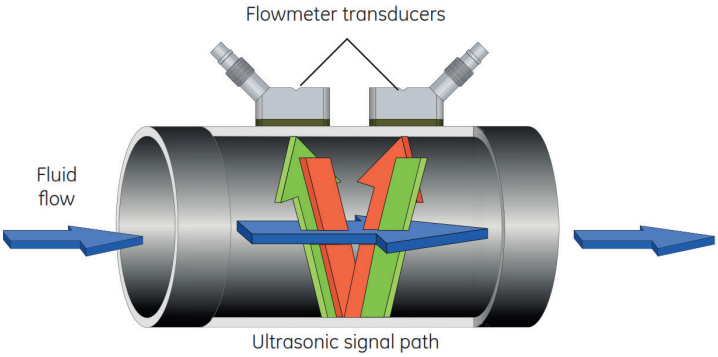
PanaFlow LC

Panametrics ultrasonic clamp-on liquid flow meter for process applications

The PanaFlow LC is the latest generation in permanent clamp-on ultrasonic flow meters for process applications from Panametrics' line of ultrasonic meters. It capitalizes on the superior performance of its predecessor, the Digital Flow XMT868, but includes improved signal processing and performance.

PANA029DS Rev. 14

Panametrics clamp-on flow ultrasonic

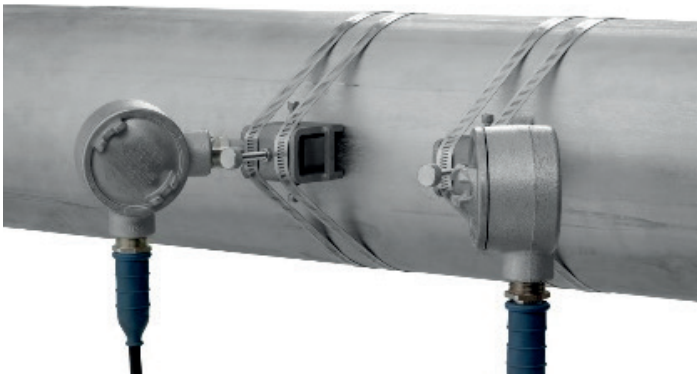


With transit time flow measurement, two transducers serve as both ultrasonic signal generators and receivers. When mounted on a pipe, they are in acoustic communication with each other, meaning the second transducer can receive ultrasonic signals transmitted by the first transducer and vice versa.

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 transit time interval between the transmission and reception of the signal 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 in transit times is proportional to the velocity of the flowing liquid, and its sign indicates the direction of flow.

With a clamp-on installation, the transducers are mounted onto the outside of the pipe instead of being in direct contact with the flowing fluid. A clamp-on installation has many advantages over traditional installations including:

- No process shutdown to install transducers
- No cutting into the pipe to install the flowmeter
- No additional flanges or welding required before installing the flowmeter
- Install at any time since the process does not need to be shutdown saving project management time
- No maintenance with a solid couplant installation since the transducers are not exposed to the process fluid



Advantages

- Wide selection of transducers suitable for many applications
- Hazardous area certification
- Improved accuracy and repeatability through enhanced signal processing
- HART and Foundation Fieldbus digital protocols
- Wider flow range to handle more diverse flow measurements
- Velocity, volumetric, mass, and totalizer flow rate measurements
- Based on legacy Panametrics technology for reliable flow measurements.

Applications

- Suitable for hazardous area environment with either an explosionproof or flameproof design for vital process environments
- Designed for most refinery or chemical liquids including hydrocarbon liquids, crude oil, lubricating oils, refined hydrocarbon oils, solvents, chemicals, water, sea water, and more
- Suitable for most pipe sizes and materials, both lined or unlined
- Optional SIL certified configuration for safety critical applications

Next generation XMT1000 transmitter

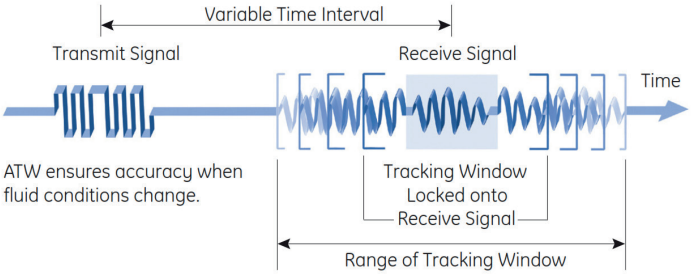
The XMT1000 is a new, cost-effective ultrasonic flow transmitter that builds on Panametrics flow expertise and on years of reliable performance from its XMT868i predecessor. It offers state-of-the-art flow measurement capability in a rugged remote mounted transmitter certified for use in hazardous areas.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

Key improvements to the XMT1000 include:

- Faster signal processing
- Latest HART and Foundation Fieldbus protocol
- PanaView Plus Software
- 1, 2, or 3 path measurements
- Improved rangeability
- New and improved diagnostics
- Optional SIL certification

Automatically adjusting 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.



Technical Specifications

Operation and performance

Fluid types	Liquids: acoustically conductive fluids, including most clean liquids, and many liquids with small amounts of entrained solids or gas bubbles.
Flow measurement	Patented Correlation Transit-TimeTM model
Pipe sizes	0.75 in to 300 in (20 mm to 7.5 m)
Pipe wall thickness	Up to 4 in (100 mm); consult factory for other wall thicknesses
Pipe material	All metals and most plastics. Consult Panametrics for concrete, composite materials, and highly corroded or lined pipes.
Accuracy	• ±1% of reading: >=2 in/50 mm, >1 ft/s (0.3 m/s) • ±2% of reading: <2 in/50 mm, >1 ft/s (0.3 m/s) • ±0.5% in field calibration possible Installation assumes a fully developed, symmetrical flow profile (typically 10 diameters upstream and 5 diameters downstream of straight pipe run). Final installation accuracy is a function of multiple factors including pipe centricity, installation accuracy, and others.
Repeatability	±0.2% of reading typical
Range (bidirectional)	0.1 to 65.6 ft/s (0.03 to 20 m/s)
Measurement cycle	3 Hz typical (adjustable to 10 Hz)
Measurement parameters	Velocity, volumetric, mass, total flow
Channels	1, 2, or 3 channels
Optional PC software	PanaView Plus Software

XMT1000 flow transmitter

Enclosure	Powder coated aluminum (copper free) or stainless steel NEMA 4X/IP66 & IP67 rating
Specifications	• 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) • Mounting: 2 in. pipe or wall mount
Hazardous area rating	US/CAN: Class I, Division 1, Groups B, C, D; Class I, Zone 1, Ex d IIC T6; ATEX/IECEx: Ex db IIC T6 Gb; Ta = -45° C to +65° C, IP66/67 ATEX/IECEx: Ex db [ia Ga] IIC T6 Gb; Ta = -45° C to +60° C, IP66/67 (FISCO option)
Temperature range	• Operating: -40° F to 149° F (-40° C to +65° C)* • Storage: –67° F to 167° F (–55° C to 75° C) *Maximum ambient temperature is 60° C (140° F) when foundation fieldbus option selected.
Display	128 x 64 mono-color LCD display, configurable for single or dual measurement parameters.
Keypad	Built-in magnetic, six-button, lockable keypad
Standard inputs/outputs	• One 4 to 20 mA isolated output, 600 Ohm maximum load • 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 communication	• 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
Power consumption	15W maximum, Typically <7W Inrush current: 25 A maximum @ 100 µs 15 A maximum @ 1 ms

Clamp-on ultrasonic flow transducers

C-RS transducer

Frequency: 0.5, 1, or 2MHz
Materials: Stainless steel and plastic
Rating: IP66 with junction box
Temperature (process):
-40° C to 150° C (-40° F to 302° F)
Hazardous Area:
US/CAN: Class I, Division 1, Groups B, C, D
ATEX: Ex md IIC T6
IECEx: Ex md IIC T6 Gb

Contact Panametrics for additional certifications.

C-RS HT Transducer

Frequency: 0.5 or 1 MHz
Materials: Stainless steel and plastic
Rating: IP66/IP68 with junction box
Temperature (process):
-40° C to 230° C (-40° F to 446° F)
Hazardous area:
US/CAN: Class I, Division 1, Groups B, C, D
ATEX/IECEx: Ex md IIC T6

Contact Panametrics for additional certifications

C-ET transducer

Frequency: 0.5, or 1 MHz
Materials: Stainless steel and plastic
Rating: IP66 with junction box
Temperature (process):
-200° C to 400° C (-328° F to 752° F)
Hazardous Area (from C-RS transducer)
US/CAN: Class I, Division 1, Groups B, C, D
ATEX: Ex md IIC T6
IECEx: Ex md IIC T6 Gb

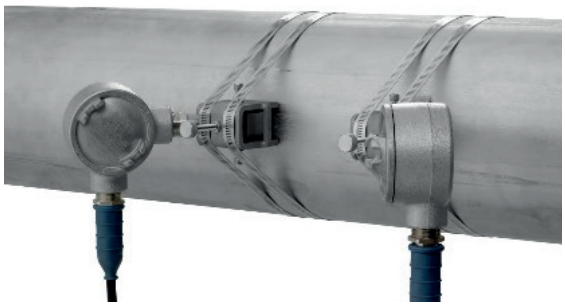
Contact Panametrics for additional certifications.

Clamping fixtures

Strap Clamping Fixture (SCF)

Stainless steel transducer yoke
Stainless steel strapping
Alignment bar for proper alignment

Note: CFG fixture used for small pipe C-RS transducer installation.

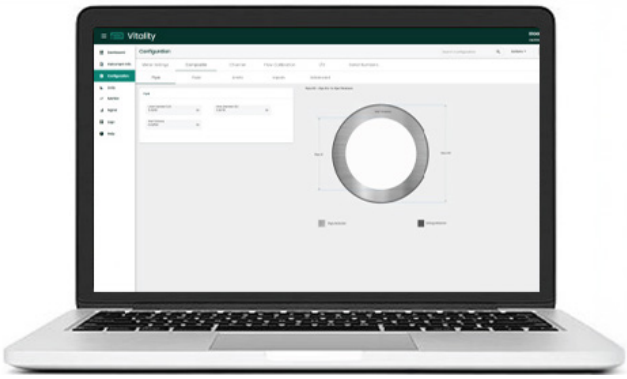


Transducer cable

RG62 coaxial cable
Available in standard, armored, burial, and submersible types (contact us for details)
Available in lengths up to 1000 ft (300 m)

PC interface software

If you prefer your PC interface, the PanaFlow XMT1000 comes standard with 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..



Ordering information for PanaFlow LC system

1. Order XMT1000 transmitter

Model type

XMT1000LC	XMT1000LC Transmitter for clamp-on

Measurment paths

2	3 Path (MCX)
3	1 Path (FL)
4	2 Path (FL)

Input power

AC	100 to 240 VAC
DC	12 to 28 VDC

Conformal coating

0	No conformal coating
1	Conformal coating

Enclosure

AL	Powder coated aluminum enclosure
SS	316 stainless steel enclosure

Input/output

00	No additional input/outputs
01	Additional two AO, two AI
02	Additional two AO, two AI, one RTD (PT100-3 wire)
03	Additional two AO, two AI, one RTD (PT100-4 wire)
04	Additional two AO, two AI, one RTD (PT1000-3 wire)
05	Additional two AO, two AI, one RTD (PT1000-4 wire)
06	Additional two AO, two RTD (PT100-3 wire)
07	Additional two AO, two RTD (PT100-4 wire)
08	Additional two AO, two RTD (PT1000-3 wire)
09	Additional two AO, two RTD (PT1000-4 wire)
SL	Additional one AO/SIL output

Certifications

1	US/CAN CI 1, Div 1, Grp BCD T6
2	IECEx/ATEX Exd IIC T6 Gb IP66
AE	ECAS certification
TW	Taiwan certification
CN	China certification
IN	India certification
JP	Japan certification

Digital communication

0	No additional communication
1	HART
2	Foundation fieldbus

Frequency

0	Standard frequency

Special

0	None
S	Special

XMT1000LC– 3 – AC - 1 - AL - 00 - 1 - 1 - 0 - 0 (Example configuration)

2. Order transducer and fixture system

Model type

XMTXP XMT1000LC transducer system

Transducer and fixture system

R05	0.5MHz C-RS with SCF fixture
R10	1MHz C-RS with SCF fixture
R20	2MHz C-RS with SCF fixture
R20S	2MHz C-RS with CFG fixture
R05HT	0.5MHz C-RS high temperature with SCF fixture
R10HT	1MHz C-RS high temperature with SCF fixture

Certification and junction box type

00	No junction box
AX	US/CAN aluminum junction box
EX	ATEX/IECEx aluminum junction box
UXSS	US/CAN/ATEX/IECEx stainless steel junction box

Pipe outer diameter

< >	Value of pipe outer diameter

Pipe unit of measurement

IN	Pipe size - inches
MM	Pipe size - millimeters

Calibration documentation

0	None
1	Standard calibration certificate
2	ISO17025 laboratory calibration certificate
SL1	Calibration cert (SIL meter)
SL2	ISO17025 Calibration cert (SIL meter)

Special

0	None
S	Special

XMTXP	**-**	**R10**	**-**	**EX**	**-**	**300**	**-**	**MM**	**-**	**1**	**-**	**0**	**(Example part number)**

3. Order flowmeter cable

Model type
FC Model number

Cable type
HAZCOAX Transducer cable for conduit
ARCOAX SWA armored cable
ARFIRECOAX SWB armored cable
ARARCTCOAX Arctic SWA armored cable

Cable length
< > Length of cable

Cable units
FT Feet
M Meters

Front connection
FL150 Flying leads

Front thread
0 No cable gland
075HAZLOC 3/4in cable gland
M20HAZLOC M20 cable gland
075HAZLOCBG 3/4in cable gland
M20HAZLOCBG M20 cable gland

End connection
BNC75 BNC for standard transducers
BNC33JC BNC (ARFIRECOAX) for standard transducers

End thread
0 No cable gland
075HAZLOC 3/4in cable gland
M20HAZLOC M20 cable gland

Material
0 No cable gland
NPB Nickel plated brass
SS 316 stainless steel

Special
0 None
S Special

FC - ARFIRECOAX - 10 - M - FL150 - 075HAZLOC - BNC75 - M20HAZLOC - NPB - 0 (Example part number)

4. Order options

Item	Description
XMT-129M2509	PanaFlow LC three path kit (aluminum enclosure with ATEX/IECEx certification)
XMT-130M6695	PanaFlow LC three path kit (stainless steel enclosure with ATEX/IECEx certification)
XMT-129M2509-02	PanaFlow LC three path kit (aluminum enclosure with US/CAN certification)
XMT-130M6695-02	PanaFlow LC three path kit (stainless steel enclosure with US/CAN certification)
XMT-132M4308	Wireless HART kit for the XMT1000 transmitter

PANA029DS_R14 (03/2026)