PanaFlow LC

Panametrics Ultrasonic Clamp-On Liquid Flow Meter for Process Applications

Introducing the PanaFlow LC

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.

PanaFlow LC Advantages

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

PanaFlow LC 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 hydrocarbons oils, solvents, chemicals, water, sea water, and more.
- Suitable for most pipe sizes and materials, both lined or unlined.

Panametrics Clamp-On Flow Ultrasonic

Flowmeter transducers

Fluid flow

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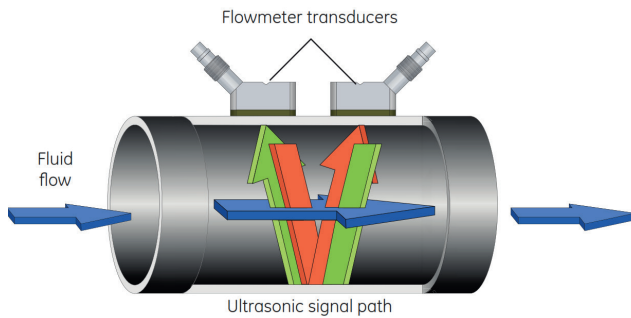
With transit time flow measurement, two transducers serve as both ultrasonic signal generators and receivers. When mounted on a pipe, they are in acoustic communication with each other, meaning the second transducer can receive ultrasonic signals transmitted by the first transducer and vice versa.

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 to 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.
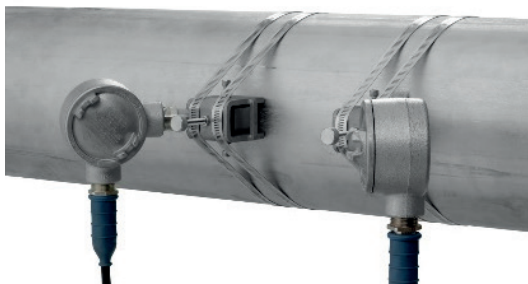
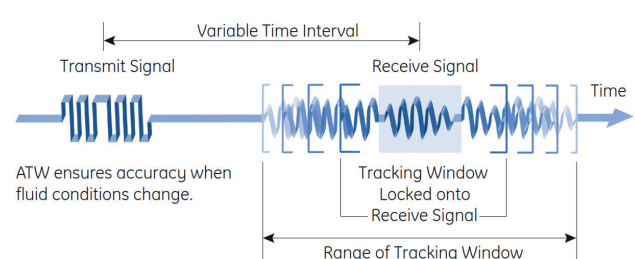## Next Generation XMT1000 Transmitter

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 & Foundation Fieldbus protocol
- Vitality PC Software
- 1, 2, or 3 path measurements
- Improved rangeability
- New and improved diagnostics

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.

Variable Time Interval

Transmit Signal   Receive Signal   Time

ATW ensures accuracy when fluid conditions change.

Tracking Window Locked onto Receive Signal

Range of Tracking Window

PanaFlow LC 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-Time™ 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, Energy, Total Flow

Channels

1, 2, or 3 channels

Optional PC Software

Vitality™ PC Software

XMT1000 Flow Transmitter

Enclosure

Epoxy-coated aluminum or stainless steel
NEMX 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;
Class I, Division 2, Groups A, B, C, D;
Class I, Zone 2, Ex nA IIC
ATEX/IECEx: Ex d IIC T6 FISCO outputs
Ta = -40° C to +60° C, Type 4X

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.

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-PT Transducer

Frequency: 0.5, 1, or 2 MHz
Materials: Stainless steel and plastic
Rating: IP66 with junction box
Temperature (Process):
  -20° C to 210° C (-4° F to 410° F) US/CAN
  -20° C to 184° C (-4° F to 363° F) ATEX
Hazardous Area:
US/CAN: Class I, Division 1, Groups B, C, D
ATEX: 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)
Materials: Stainless steel and plastic
Rating: IP66 with junction box
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.
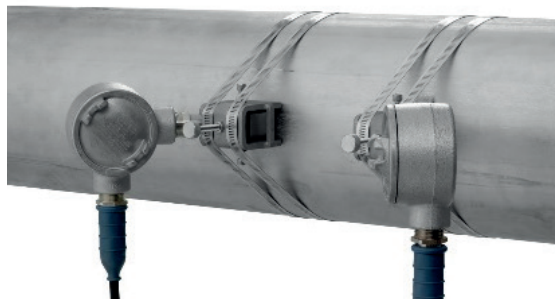
Clamping Fixture

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 (330 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 Vitality™ software. Vitality also provides continuous logging capability of up to 10,000 points with 26 parameters logged per point.
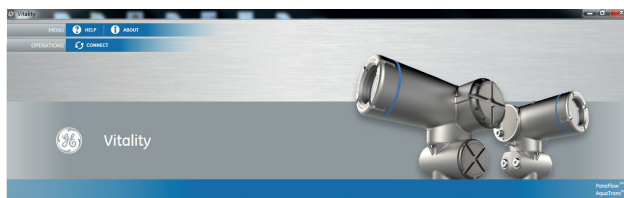
Ordering Information for PanaFlow LC System

1. Order XMT1000 Transmitter

Model Type

XMT1000LC   XMT1000LC Transmitter

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

Condormal Coating

0   No conformal coating
1   Conformal coating

Enclosure

AL   Powder coated Aluminum enclosure
SS   316 Stainless Stell 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)

Certifications

1   US/CAN CI 1, Div 1, Grp BCD T6
2   IECEx/ATEX Exd IIC T6 Gb IP66

Frequency

0   Standard Frequency

Special

0   None
S   Special

XMT1000 – 3 – AC – 1 – AL – 00 – 1 – 0 – 0   (Example Part Number)

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
P05   0.5MHz C-PT with SCF fixture
P10   1MHz C-PT with SCF fixture
P20   2MHz C-PT with SCF fixture
R20S   2MHz C-RS with CFG fixture

Certification & Junction Box Type
00   No junction box
AC   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

Special
0   None
S   Special

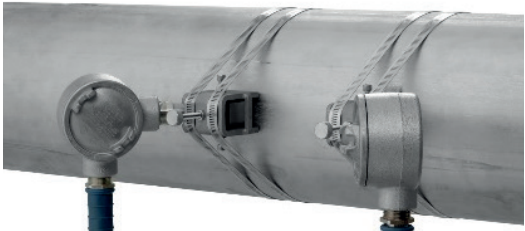XMT1000 – R10 – EX – 300 – MM – 1 – 0   (Example Part Number)

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   No conformal coating
M   Conformal coating

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

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Baker Hughes

920-698A