

DigitalFlow™ ISX878

Panametrics Liquid Flow Ultrasonic Transmitter

Applications

The DigitalFlow ISX878 is an intrinsically safe, loop-powered, full-featured clamp-on ultrasonic flow transmitter system for flow measurement of:

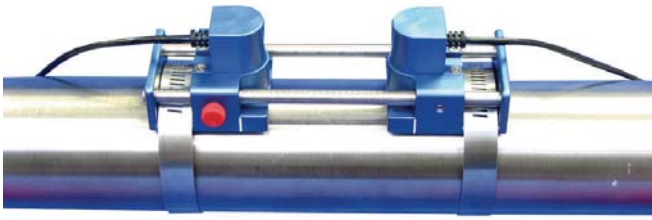
- Hydrocarbon liquids
- Petroleum products
- Lubricating oils
- Diesel fuel oil
- Chemicals
- Other liquids

Features

- Intrinsically safe
- Loop-powered
- Low power consumption
- Suitable for pipe sizes from 1/2 in to 20 in (13 mm to 500 mm) diameter
- Six button keypad
- Large integral display
- Simple meter and transducer installation and setup
- Velocity, volumetric and totalized flow
- Economical non-intrusive flow measurement



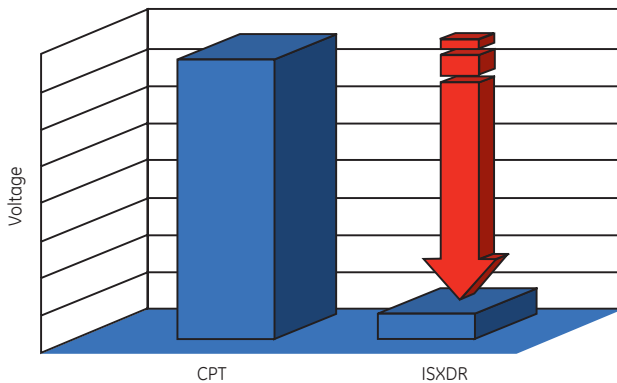
The DigitalFlow ISX878 ultrasonic flow transmitter combines the simplicity of a loop-powered meter installation with proven, advanced clamp-on ultrasonic flow transmitter technology. It provides customers with an economical solution for flow measurement in pipes up to 20 in (500 mm).



Small pipe transducers for 1/2 in to 4 in pipes

Intrinsically Safe

The DigitalFlow ISX878 provides a low cost solution for non-intrusive liquid flow measurement in your hazardous locations. The DigitalFlow ISX878 is able to achieve an intrinsically safe rating by significantly reducing the amount of energy required to drive the ultrasonic transducers. Reducing the drive voltage by a factor of 10 could only be made possible through advancements in the ultrasonic transducers. The new ISXDR transducers are considerably more efficient than our previous piezoelectric models that led the market over the past two decades.



Lower Cost of Ownership

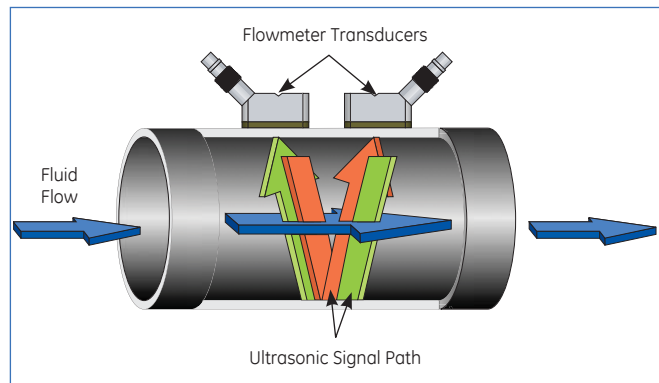
Intrinsic safety reduces installation costs by eliminating the need for heavy explosion-proof junction boxes and conduit. The reduced power usage also allows the DigitalFlow ISX878 to be a loop-powered device, which saves on installation costs. This becomes more important where hazardous locations have significantly higher costs for running power cables for an AC or DC unit. The DigitalFlow ISX878 uses an available twisted pair of instrument cables, fed through a safety barrier, to power the unit. Since the meter clamps onto the outside of the pipe, there is no need to shut down a line to install the meter or to service it. The robust electronics and transducers have no moving parts to break or wear down, so annual maintenance can be significantly reduced, if not entirely eliminated.

Two-Path Model

An optional second channel provides the capability to obtain two-path averaging of the flow measurement, at a single point for increased accuracy.

Uses the Transit-Time Flow Measurement Technique

The Correlation Transit-Time™ technique uses a pair of transducers with each transducer sending and receiving coded ultrasonic signals through the fluid. When the fluid is flowing, signal transit-time in the downstream direction is shorter than in the upstream direction; the difference between these transit-times is proportional to the flow velocity. The DigitalFlow ISX878 measures the time difference and uses programmed pipe parameters to determine flow rate and direction.



Transit-time flow measurement technique

ISX878 Specifications

Operation and Performance

Fluid Types

Acoustically conductive fluids, including water and most hydrocarbon liquids. Maximum void fraction depends on transducers, interrogation carrier frequency, path length and pipe configuration.

Pipe Sizes

- 1/2 in to 1.5 in (13 mm to 40 mm): ISXDR-408
- 1 in to 4 in (25 mm to 100 mm): ISXDR-407
- 2 in to 12 in (50 mm to 300 mm): ISXDR-410
- 8 in to 20 in (200 mm to 500 mm): ISXDR-409

Pipe Materials

All metals and most plastics. Consult GE for concrete, composite materials, and highly corroded or lined pipes.

Flow Accuracy (Velocity)

- 0.5% of reading (achievable with process calibration)
- Pipe ID ≥ 6 in (150 mm); $\pm 1\%$ to 2% of reading typical
- Pipe ID ≤ 6 in (150 mm); $\pm 2\%$ to 5% of reading typical

Accuracy depends on pipe size and whether measurement is one-path or two-path.

Repeatability

$\pm 0.1\%$ to 0.3% of reading

Range (Bidirectional)

-40 ft/s to 40 ft/s (-12.2 m/s to 12.2 m/s)

Rangeability (Overall)

400:1

Specifications assume a fully developed flow profile (typically 10 diameters upstream and 5 diameters downstream of straight pipe run) and flow velocity greater than 1 ft/s (0.3 m/s).

Measurement Parameters

Volumetric flow, totalized flow and flow velocity

Electronics

Flow Measurement

Patented Correlation Transit-Time mode

Enclosure

Epoxy-coated aluminum weatherproof Type 4X/IP67

Dimensions (h x w x d)

8.8 in x 8.2 in x 3.6 in (220 mm x 210 mm x 90 mm)

Weight

3.9 lb (1.77 kg)

Display

128 x 64 pixel LCD graphic display

Keypad

Six button external keypad

Power Supply

15 to 30 VDC loop power

Power Consumption

700 mW maximum

Memory

FLASH memory; field upgradable

Operating Temperature

-4°F to 140°F (-20°C to 60°C)

Storage Temperature

-4°F to 158°F (-20°C to 70°C)

Standard Inputs/Output

One 4 to 20 mA on power loop

Recommended Safety Barrier

28 VDC, 300 Ω , 93 mA for 4 to 20 mA

Digital Interface

RS232

European Compliance

System complies with EMC Directive 89/336/EEC

Clamp-On Flow Ultrasonic Transducers Transducer Cable

Operating Temperature

- ISXDR-407 and 408: -4°F to 250°F (-20°C to 120°C)
- ISXDR-409 and 410: -4°F to 300°F (-20°C to 150°C)

Integral transducer cable up to 100 ft (33 m) with transducers

Mounting

Stainless steel strap

Certifications

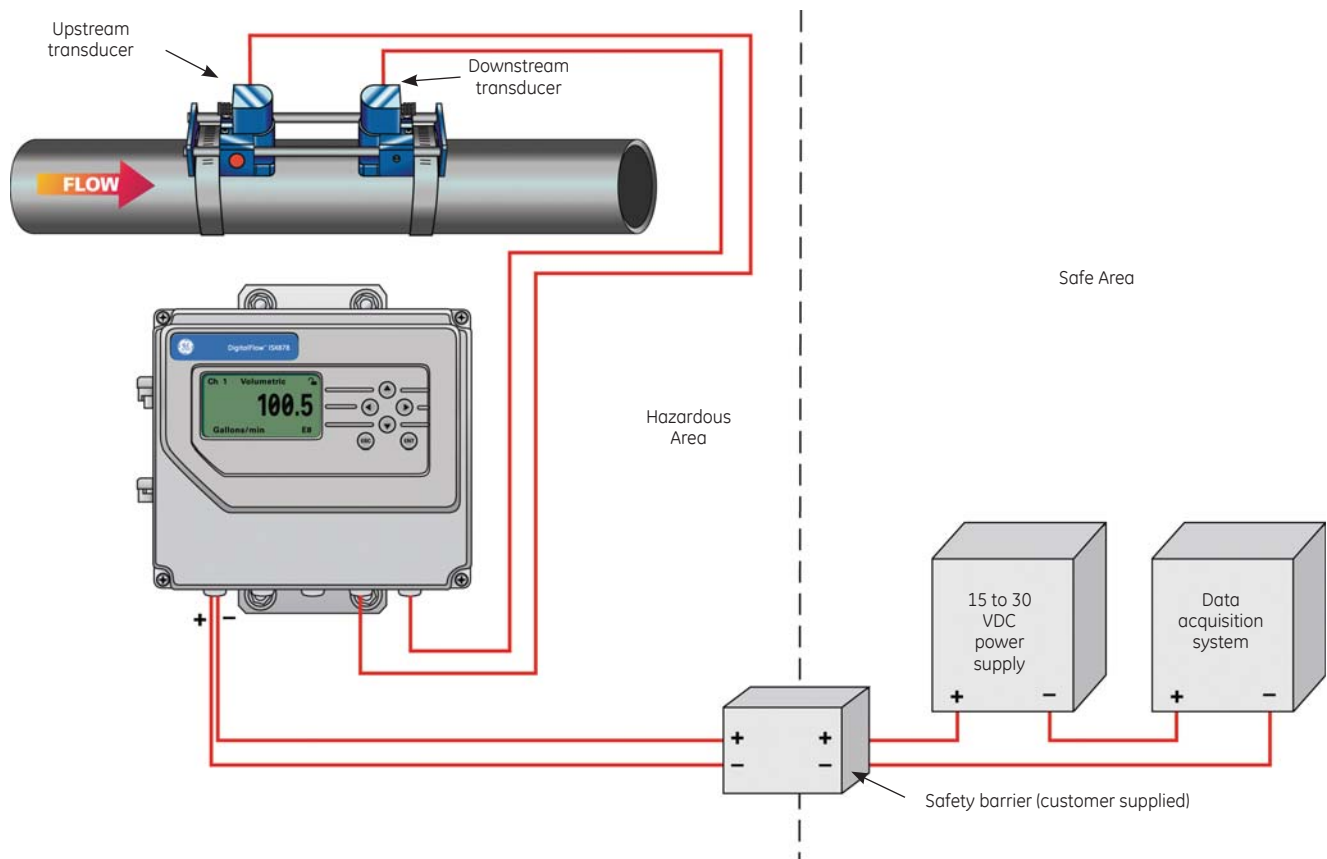
Intrinsically safe

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FM: Intrinsically Safe, Class I, II, III, Division I, Group A, B, C, D, E, F, & G T4 Intrinsically Safe, Class I, Zone 0, AEx ia IIC T4

Ex ia IIC T4 Install per 752-258

T ambient: -20°C to 60°C Type 4X, IP 66



Schematic of loop-power, intrinsically safe installation



N4271



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920-135B