

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

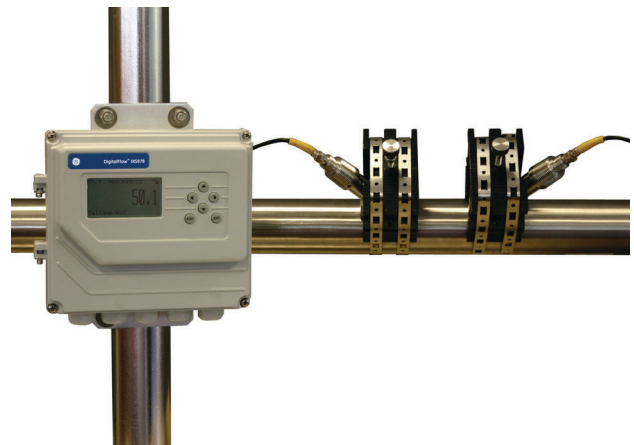
Features

- Intrinsically safe
- Loop-powered
- Low power consumption
- Suitable for pipe sizes from 1/2 in to 16 in (15 mm to 400 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

DigitalFlow™ ISX878

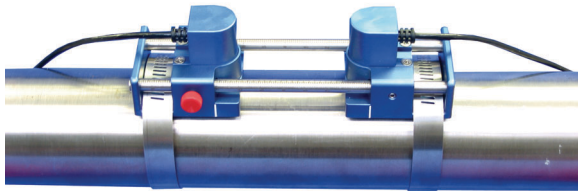
Panametrics Liquid Flow Ultrasonic Transmitter

DigitalFlow ISX878 is a Panametrics product. Panametrics has joined other GE high-technology sensing businesses under a new name—GE Industrial, Sensing.



GE Sensing

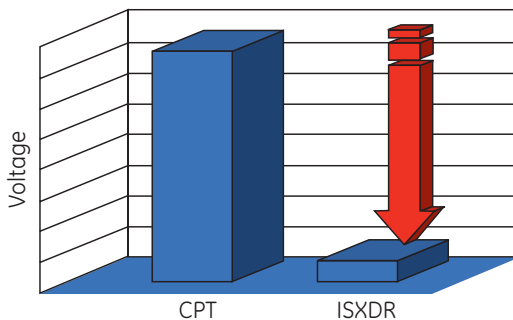
The DigitalFlow ISX878 ultrasonic flow transmitter combines the simplicity of a loop-powered meter installation with proven, advanced clamp-on ultrasonic flow transmitter technology. It provides customers with an economical solution for flow measurement in pipes up to 16 in (400 mm).



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

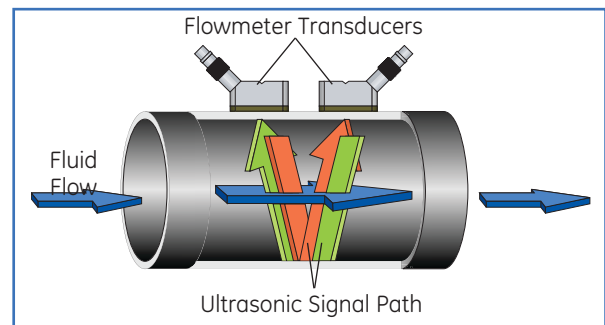
DigitalFlow ISX878 to be a loop-powered device, which saves on installation costs. This becomes more important where hazardous locations have significantly higher costs for running power cables for an AC or DC unit. The DigitalFlow ISX878 uses an available twisted pair of instrument cables, fed through 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 16 in (15 mm to 400 mm) and larger

Pipe Wall Thickness

Up to 0.5 in (13 mm)

Pipe Materials

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

Flow Accuracy (Velocity)

- 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. Accuracy to $\pm 0.5\%$ of reading may be achievable with process calibration.

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

ISX878 Specifications

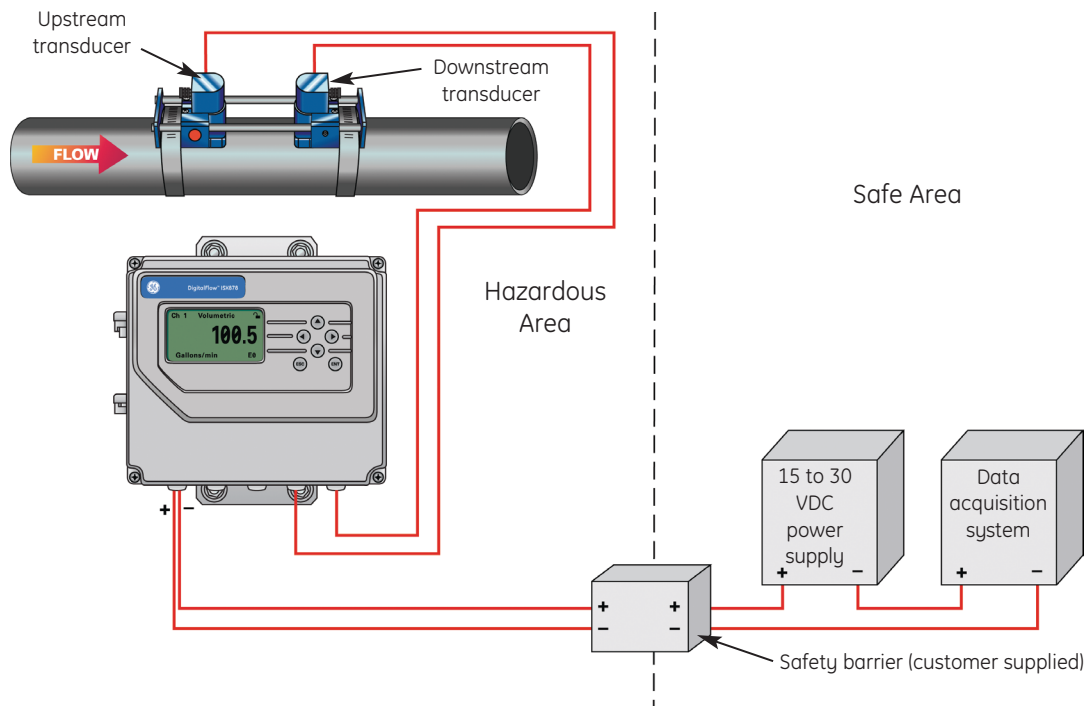
Clamp-On Flow Ultrasonic Transducers Transducer Cable

Temperature Range
-40°F to 194°F (-40°C to 90°C)

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

Mounting
Stainless steel strap

Certifications
Intrinsically safe
Ex II 1 G EEx ia IIC T4



Schematic of loop-power, intrinsically safe installation



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