

DigitalFlow™ GS868

Panometrics Ultrasonic Steam Mass Flowmeter



Applications

The DigitalFlow GS868 steam ultrasonic flowmeter is a complete ultrasonic flow metering system that measures saturated or superheated steam for:

- Heating, ventilating and air conditioning (HVAC)
- Pneumatic power systems
- Food and beverage industry
- Water purification and distillation
- Chemical and petrochemical industries
- Electric power generation
- Steel industry
- Public works
- Manufacturing

Features

- Bidirectional
- No moving parts
- No pressure drop
- Wide rangeability with 1500 to 1 turndown ratio
- Non-obstructive flow measurement
- Tolerance to dirty streams
- Low maintenance
- Suitable for high temperatures
- Two-path measurement available for maximum accuracy



GE imagination at work

Panometrics Ultrasonic Steam Mass Flowmeter

The DigitalFlow GS868 steam ultrasonic flowmeter is designed to measure the mass flow rate of saturated or superheated steam. It offers a unique combination of no pressure drop, wide rangeability, ease of installation, low maintenance and high accuracy in a full-feature flowmeter package.

The DigitalFlow GS868 Flowmeter Uses the Correlation Transit-Time™ Technique

Compact ultrasonic transducers are installed in the pipe or duct, one upstream of the other. The transducers send and receive ultrasonic pulses through the steam. The meter measures the difference between the upstream and downstream transit times, and uses digital signal processing, advanced signal processing and correlation detection to calculate velocity and volumetric flow rate. Mass flow is calculated from the input of temperature and pressure and the built-in steam tables.

No Pressure Drop, Low Maintenance

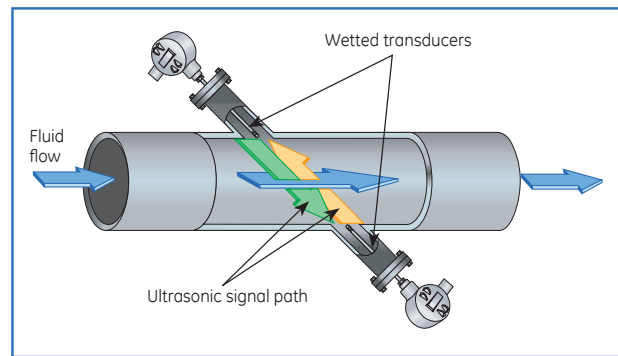
In addition to the standard single-channel model, an optional two-channel model provides enhanced accuracy when measuring two paths on a single pipe. It can also be used to measure a single path on two pipes.

Low Operational Costs

Conventional steam flowmeters cause a permanent pressure drop and have limited rangeability, wasting time and money. Since the DigitalFlow GS868's transducers do not obstruct the flow, they generally do not cause any pressure drop. The DigitalFlow GS868 has no parts that foul or collect debris, and no moving parts to wear out. As a result, it requires no lubrication, cleaning or other routine maintenance.

Digital and Analog Output Options

The DigitalFlow GS868 flowmeter makes it easy to send the data where it needs to go, through the standard digital output, standard or optional analog outputs, or optional alarms. All outputs are conveniently set up and calibrated from the keypad or from a computer using PanaView™ PC-interface software.



Transit-time flow measurement technique

Wide Range of Pipe Sizes and Flow Conditions

With its broad range of measurement velocities and its ability to measure flow in any pipe from small to very large, one DigitalFlow GS868 meter does the job of several conventional meters. It handles pipes from 2 in to 48 in (50 mm to 1200 mm) in diameter and velocities from 0.1 to 150 ft/s (0.03 to 46 m/s)—in either direction—in saturated or superheated steam.

For maximum accuracy, use a two-channel meter to measure along two different paths at the same location.

A two-channel meter can also measure the flow in two separate pipes for additional cost savings.

Convenient Installation

Straightforward installation is another advantage of the DigitalFlow GS868. The flowmeter system consists of one or two pairs of transducers, preamplifiers and an electronics console. The transducers can be installed as part of a flowcell, or installed directly into the existing pipeline. The electronics console can be up to 500 ft (150 m) from the transducers. Local and remote programming and output options allow the DigitalFlow GS868 to fit in any process.

Steam Flow Data and Diagnostics

In addition to velocity, volumetric and mass flow data, the DigitalFlow GS868 also provides diagnostic parameters such as transit times and sound speed, to aid in set-up and troubleshooting. Any of this data can be easily printed, logged, sent to an analog or digital output, or read in numeric or graphic format on the dual window display.

GS868 Specifications

Operation and Performance

Fluid Types

Saturated and superheated steam

Pipe Sizes

2 in to 48 in NB (50 mm to 1200 mm DN)

Pipe Materials

All metals. Consult GE for other materials.

Flow Accuracy (Velocity)

±1% to 2% of reading typical

Accuracy depends on pipe size and whether measurement is one-path or two-path. Accuracy to ±0.5% of reading may be achievable with process calibration.

Repeatability

±0.2% to 0.5% of reading

Range (Bidirectional)

-150 to 150 ft/s (-46 to 46 m/s)

Rangeability (Overall)

1500:1

Specifications assume a fully developed flow profile (typically 20 diameters upstream and 10 diameters downstream of straight pipe run) and flow velocity greater than 3 ft/s (1 m/s).

Measurement Parameters

Mass flow, standard and actual volumetric flow, totalized flow, and flow velocity

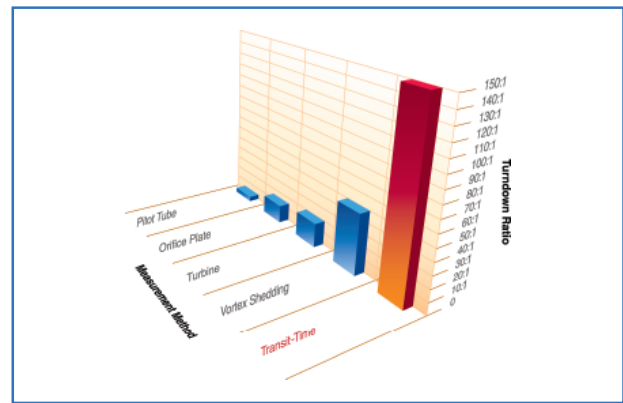
Electronics

Flow Measurement

Patented Correlation Transit-Time mode

Enclosures

- Standard: Epoxy-coated aluminum weatherproof Type 4X/IP66, FM/CSA Class I, Division 2, Groups A,B,C&D
- Optional: Stainless steel, fiberglass, explosion-proof, flameproof, ISSep 03ATEX113



Transit-time flow measurement technique

Dimensions

Standard: Weight 11 lb (5 kg), size (h x w x d) 14.24 in x 11.4 in x 5.12 in (362 mm x 290 mm x 130 mm)

Channels

- Standard: One channel
- Optional: Two channels (for two pipes or two-paths)

Display

Two independent software-configurable 64 x 128 pixel backlit LCD graphic displays

Keypad

39-key tactile-feedback membrane keypad

Power Supplies

- Standard: 100 to 130 VAC, 50/60 Hz or 200 to 265 VAC, 50/60 Hz
- Optional: 12 to 28 VDC, ±5%

Note: For DC-powered meters, Class 2 rated supplies must be used for the line power.

Power Consumption

20 W maximum

Operating Temperature

-4°F to 131°F (-20°C to 55°C)

Storage Temperature

-67°F to 167°F (-55°C to 75°C)

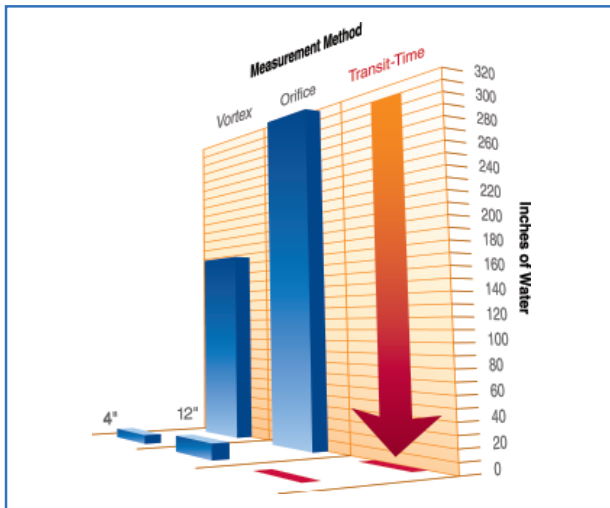
Standard Inputs/Outputs

Two 0/4 to 20 mA isolated outputs, 550Ω maximum load Namur NE043 compliant

Optional Inputs/Outputs

There are six additional slots available for any combination of the following I/O boards:

- Analog outputs: each with four isolated 0/4 to 20 mA outputs, 1 k Ω maximum load
- Analog input board with two isolated 4 to 20 mA inputs and 24 V loop power
- RTD input board with two isolated, three-wire, RTD inputs; span -148°F to 662°F (-100°C to 350°C); 100 Ω
- Totalizer/frequency outputs:
 - Totalizer mode: Pulse per defined unit of parameter
 - Frequency mode: Pulse frequency proportional to magnitude of parameter (e.g., 10 Hz = 1 ft³/h)
- Alarm relays:
 - General purpose
 - Hermetically sealed



Permanent pressure loss by flowmeter type

| | | |
|--------------------------------|--------------------------|---|
| 4 in (100 mm) vortex shedding | 8.28 in H ₂ O | { Saturated steam flow 100 ft/s, 4 in Sch 40, 40 psig (2.7 bar) |
| 4 in (100 mm) orifice plate | 14.1 in H ₂ O | |
| Transit-time | 0.05 in H ₂ O | |
| 12 in (300 mm) vortex shedding | 186 in H ₂ O | { Saturated steam flow 100 ft/s, 12 in Sch 160, 300°F (148°C) |
| 12 in (300 mm) orifice plate | 318 in H ₂ O | |
| Transit-time | 0.0 in H ₂ O | |

Digital Interfaces

- Standard: RS232
- Optional: RS485 (multiuser)
- Optional: Modbus[®] RS485 or TCP protocol
- Optional: Ethernet
- Optional: OPC server
- Optional: Foundation fieldbus



Site Parameter Programming

Menu-driven operator interface using keypad and “soft” function keys

Data Logging

Memory capacity (linear and/or circular type) to log over 43,000 flow data points

Display Functions

- Graphic display shows flow in numerical or graphic format
- Displays logged data and diagnostics

European Compliance

Complies with EMC Directive 89/336/EEC, 73/23/EEC LVD (Installation Category II, Pollution Degree 2) and PED 97/23/EC for DN<25

Wetted Ultrasonic Flow Transducers

Temperature Ranges

Overall range -190° to 450°C (-310° to 842°F)

Pressure Ranges

- Standard: 0 to 2700 psig (1 to 187 bar)
- Optional: 3480 psig (240 bar) maximum

Transducer Materials

- Standard: Titanium or stainless steel

Transducer Mounting

Flanged port: spool piece or cold tap

Area Classifications

- Standard: Weatherproof Type 4/IP65
- Optional: Explosion-proof Class I, Division 1, Groups C&D
- Optional: Flameproof Ex d II 2 G EEx d IIC T6

Additional Options

PanaView PC-Interface Software

The DigitalFlow GS868 communicates with a PC through a serial interface and Windows[®] operating systems. Consult the manual for details on sites, logs and other operations with a PC.



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