

# PanaFlow™ Meter System

## Panametrics Ultrasonic Flowmeter

### Applications

The PanaFlow meter is a complete ultrasonic flowmeter system for liquid or gas applications. It can be used for applications such as:

- Liquefied Natural Gas (LNG)
- Natural gas
- Fuel gases
- Hydrocarbon liquids
- Hydrocarbon gases
- Specialty gases
- Water
- Saturated steam
- Superheated steam
- Solvents
- Weak acids



### Features

- Complete meter body with integral reinforced transducer ports and transducers
- Optional explosion-proof/flameproof electronics pre-mounted and pre-wired
- Available in one-path or two-path configurations
- No moving parts
- No pressure drop
- Fast, simple installation
- Suitable for a wide range of temperatures and pressures
- Bidirectional



## Ensures Reliable, Safe Performance

Ultrasonic flowmeter technology offers a number of benefits, including no pressure drop, high-temperature and high-pressure limits, and flow measurement without obstruction. Wetted systems typically provide higher accuracy than clamp-on systems, but installation can be complicated and difficult. If they are not installed with precision and close attention to detail, reliability and accuracy may not meet the product specifications. With the new PanaFlow meter system, the assembly work is done at the factory. The necessary components are already installed, so all the user needs to do is bolt the end flanges into place.

One- or two-path configurations are available for liquids, gases or steam. PanaFlow systems are built to tightly controlled dimensional tolerances, so accuracy is better than  $\pm 1$  percent for most pipe sizes, path configurations and flow velocities.

## Fast and Easy Installation

The integrated PanaFlow meter system is fast and easy to install because components are already installed in the meter body. A PanaFlow meter body is composed of a length of carbon steel or stainless steel pipe with flanged ends and transducer ports rated to the application's pressure requirements, and either one or two pairs of pre-installed ultrasonic transducers. The system is factory assembled and tested to ensure that it meets strict quality control standards.

## Local or Remote Electronics

GE offers several electronics packages that can be mated with the PanaFlow meter system. For local electronics that are factory-installed on the meter body, select the DigitalFlow XMT868 for liquid applications or the DigitalFlow XGM868 for gas applications. It is not recommended to mount electronics on applications above 149°F (65°C). Other electronics platforms are also available for remote locations. (Please refer to flowmeter electronics data sheets for instrument specifications.)

All electronics packages ordered with PanaFlow meter systems are programmed with setup information based on your application, so the system is ready to use as soon as the meter body is installed. When remote electronics are used, transducer cabling must be run between the PanaFlow meter system and the flowmeter electronics. When local electronics are integrated with the system the transducer wiring is already complete, further simplifying the field installation.

## Two-Path Configurations Provide Even Greater Accuracy

PanaFlow meter systems are available in a two-path configuration for pipe sizes from 6 to 24 inches, allowing interrogation of two diametrical paths across the flow profile. Each path provides a velocity value, and averaging the two values further improves accuracy to  $\pm 0.5$  percent for many meter body sizes.



A two-path PanaFlow meter system

## Designs for Small Pipe Sizes

Flow measurement in small pipes with flowcells that are bolted or welded into a pipeline may produce inaccurate results. The PanaFlow meter system, however, achieves very high accuracy in pipe sizes as small as 2 inches (50 mm) in diameter because the meter body is precision machined.



Three-inch PanaFlow meter system

# PanaFlow Specifications

## Operation and Performance

### Fluid Types

- Liquids: Acoustically conductive fluids, including most clean liquids, and many liquids with entrained solids or gas bubbles.
- Gases: All acoustically conductive gases
- Saturated and superheated steam

### Pipe Sizes

2 in to 24 in (50 mm to 600 mm)

### Pipe Materials

- Stainless steel (316 SS)
- Carbon steel

## Wetted Flow Accuracy (Velocity)

| Pipe Size in (mm)    | Velocity Range ft/s (m/s) | Accuracy, Volumetric Flow (% of reading) Single Path | Dual Path |
|----------------------|---------------------------|--|-----------|
| 2 to 4 (50 to 100)   | 1.5 to 3.0 (0.5 to 1.0)   | ±1.5%  | -         |
|                      | >3.0 (>1.0)               | ±1.0%  | -         |
| 6 to 24 (150 to 600) | 1.5 to 3.0 (0.5 to 1.0)   | ±1.5%  | ±1.0%     |
|                      | >3.0 (>1.0)               | ±1.0%  | ±0.7%     |

Assumes a fully developed flow profile (typically 10 diameters upstream and 5 diameters downstream of straight pipe run for liquids and 20 diameters upstream and 10 diameters downstream of straight pipe run for gases or steam) and single-phase fluids with constant viscosity. Applications with piping arrangements that induce swirl (e.g., two out-of-plane elbows) may require additional straight run or flow conditioning. Accuracy of ±0.5% may be attainable for most meter sizes and applications with process calibration. Dual-path meters are not recommended for wet or saturated steam.

### Repeatability

- Liquids: ±0.1 to 0.3% of reading
- Gases: ±0.2 to 0.5% of reading

### Range (Bidirectional)

See Installation Requirements Table

### Rangeability (Overall)

- Liquids: 400:1
- Gases: 150:1

### Measurement Parameters

Dependent upon meter electronics used. Please refer to individual flowmeter electronics product data sheets.

## Wetted Ultrasonic Flow Transducers

### Temperature Ranges

- Liquids, normal temperatures: -310°F to 600°F (-190°C to 315°C)
- Liquids, high temperatures: -310°F to 1,112°F (-190°C to 600°C)
- Gases, normal temperatures: -60°F to 300°F (-50°C to 150°C)
- Gases, high temperatures: -60°F to 500°F (-50°C to 260°C)
- Gases, extended temperatures: -310°F to 842°F (-190°C to 450°C)

### Pressure Range

- Liquids: Up to maximum allowable flange operating pressure at temperature or 3480 psi (240 bar)
- Gases: 0 to 2700 psig (1 to 187 bar)
- Gases, extended temperatures: Minimum process pressure required is typically 100 psi (6.9 bar), depending on fluid density

### Transducer Materials

- Standard, liquids and extended-temperature gases: 316L stainless steel
- Standard, gases: Titanium
- Optional: Other materials available on request

### Meter Body Materials

- 316 Stainless steel
- Carbon steel

### Area Classifications

- Explosion-proof Class I, Division 1, Groups C&D; Flameproof Ⓢ II 2 G EEx d IIC

## Transducer Cables

- Integrated cables: Potted mineral insulated cable or armored cable with ATEX-certified cable glands (for use in Europe)
- Nonintegrated: Please refer to individual flowmeter electronics product data sheets.

# PanaFlow Dimensions

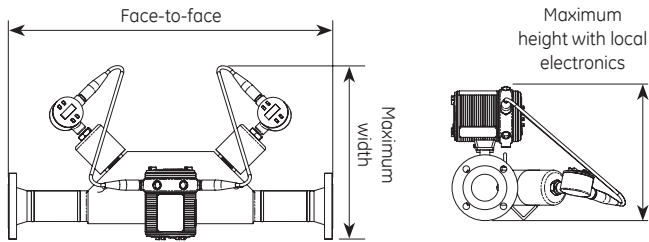
| Pipe Size in (mm) | Design Reference | Face-to-Face in (mm) | Maximum Height* in (mm) |               | Maximum Width* in (mm) |               | Maximum Weight† lb (kg)<br>ACFM (m³/hr) in (mm) |               | Maximum Flow lb (kg) |                 |
|-------------------|------------------|----------------------|-------------------------|---------------|------------------------|---------------|---|---------------|----------------------|-----------------|
| 2 (50)            | A                | 35.0 (890)           | 14 (335)                |               | 21 (535)               |               | 175 (80)  |               | 400 (1600)           | 200 (400)       |
| 3 (75)            | A                | 37.0 (940)           | 16 (405)                |               | 23 (585)               |               | 220 (100)                                       |               | 900 (3500)           | 500 (800)       |
| 4 (100)           | B                | 39.0 (990)           | 18 (460)                |               | 25 (635)               |               | 190 (90)  |               | 1600 (6000)          | 800 (1400)      |
|                   |                  |                      | <b>1 Path</b>           | <b>2 Path</b> | <b>1 Path</b>          | <b>2 Path</b> | <b>1 Path</b>                                   | <b>2 Path</b> |                      |                 |
| 6 (150)           | C or D           | 42.5 (1080)          | 20 (510)                | 30 (765)      | 43 (1095)              | 30 (765)      | 310 (140)                                       | 360 (165)     | 3600 (13,600)        | 1800 (3100)     |
| 8 (200)           | C or D           | 42.5 (1080)          | 23 (585)                | 30 (765)      | 43 (1095)              | 30 (765)      | 425 (195)                                       | 470 (215)     | 6200 (23,600)        | 3100 (5300)     |
| 10 (250)          | C or D           | 42.5 (1080)          | 24 (610)                | 30 (765)      | 43 (1095)              | 30 (765)      | 420 (190)                                       | 475 (215)*    | 9800 (37,200)        | 4900 (8400)     |
| 12 (300)          | C or D           | 48.0 (1220)          | 27 (685)                | 34 (865)      | 49 (1245)              | 34 (865)      | 540 (245)                                       | 590 (270)*    | 14,100 (53,400)      | 7100 (12,000)   |
| 14 (350)          | C or D           | 48.0 (1220)          | 28 (710)                | 34 (865)      | 49 (1245)              | 34 (865)      | 690 (315)                                       | 730 (335)*    | 17,200 (65,100)      | 8600 (14,600)   |
| 16 (400)          | C or D           | 52.0 (1321)          | 31 (790)                | 37 (940)      | 53 (1345)              | 37 (940)      | 810 (365)                                       | 855 (390)*    | 22,800 (86,200)      | 11,400 (19,400) |
| 18 (450)          | C or D           | 52.0 (1321)          | 33 (840)                | 37 (940)      | 53 (1345)              | 37 (940)      | 985 (450)                                       | 1030 (470)*   | 29,100 (110,300)     | 14,600 (24,800) |
| 20 (500)          | C or D           | 57.5 (1460)          | 35 (890)                | 41 (1045)     | 58 (1475)              | 41 (1045)     | 140 (520)                                       | 1230 (560)*   | 36,300 (137,300)     | 18,200 (30,900) |
| 24 (600)          | C or D           | 61.0 (1550)          | 38 (965)                | 44 (1120)     | 62 (1575)              | 44 (1120)     | 44 (1120)                                       | 1120 (510)    | 52,900 (200,300)     | 26,500 (45,100) |

\* Approximate minimum-clearance height and width, including electronics, based on largest system configuration

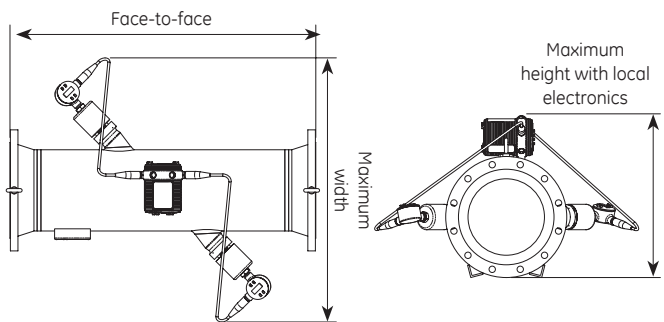
† Approximate weight, including electronic and 600-lb flanges except where marked \* for 300-lb flanges and \*\* for 150-lb flanges. Consult GE for DIN or JIS flanged systems.

## Pipe Size Design Reference

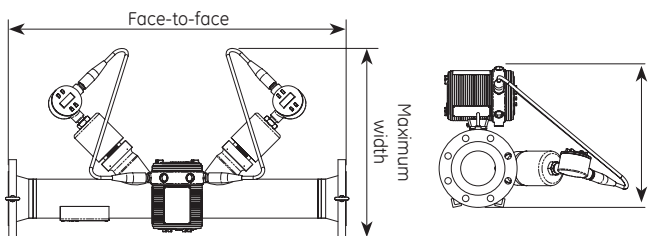
Design Reference A: 2 in to 3 in (50 mm to 80 mm) pipes



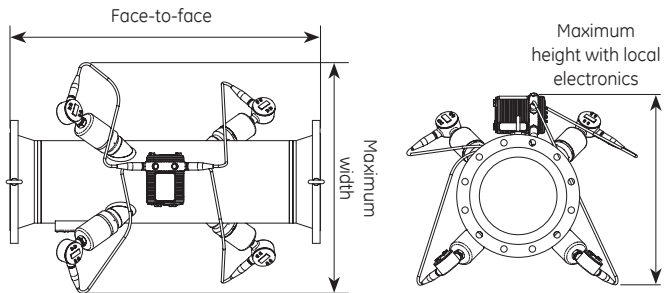
Design Reference C: 6 in to 24 in (150 mm to 600 mm) pipes, 1 path



Design Reference B: 4 in (100 mm) pipes



Design Reference D: 6 in to 24 in (150 mm to 600 mm) pipes, 2 path



[www.gesensinginspection.com](http://www.gesensinginspection.com)