



## **TRANSPORT® PT868 FLOWMETER** *OPTIONS AND SPECIFICATIONS*

### ***TRANSPORT FLOWMETER OPTIONS, ACCESSORIES AND SPECIFICATIONS.***

The TransPort PT868 Portable Liquid Flowmeter is a complete portable ultrasonic flow metering system with options and accessories to meet all your flow metering needs. It's the only ultrasonic flowmeter that is available with two built-in measurement technologies, the standard transit-time mode and the optional TransFlection® mode, to cover the spectrum from ultra-clean water to difficult multi-phase flow applications. Other options and accessories include: single-channel and two-channel models; a variety of wetted and clamp-on transducers, clamping fixtures and flowcells; resistance temperature devices (RTDs) and other accessories for energy flow measurement; an ultrasonic pipe-wall thickness transducer; a thermal printer with accessories; custom PC-interface software; and a variety of power supplies and accessories.

### ***STANDARD MODEL PT868 WITH TRANSIT-TIME MODE.***

The standard PT868 comes configured for single-channel, transit-time mode flow metering. Transit-time is a very versatile method that is suitable for most clean liquids, and the TransPort flow-

meter expands its use to include many fluids with entrained solids and gas bubbles. To extend the benefits of the transit-time method to more difficult applications, the PT868 uses a patented acoustic signal-coding technique that greatly increases its signal-to-noise ratio. This allows the PT868 to make accurate, drift-free flow measurements in many two-phase flows containing gas bubbles, liquid droplets, or entrained solids where conventional transit-time meters fail.

### ***MODEL PT868R WITH NEW TRANSFLECTION MODE.***

The new PT868R is a dual-mode flowmeter featuring both transit-time and TransFlection mode flow metering. Panametrics' new TransFlection ultrasonic flow metering technology is available exclusively from Panametrics. This patented technique was developed for flow measurements in multiphase fluids such as raw sewage, sludge, slurries, tar sands, oil-water-gas mixtures, acoustically attenuating liquids, and other demanding applications.

### ***DUAL-CHANNEL MODEL 2PT868.***

The TransPort 2PT868 flowmeter is also available as a two-channel model for flow applications requiring two simultaneous flow measurements with

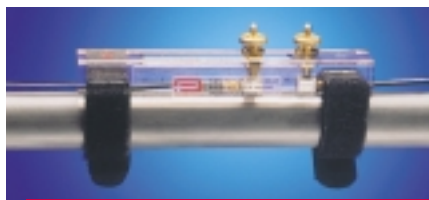


*The TransPort flowmeter is the smallest, lightest, full-featured transit-time flowmeter available.*

one meter. The two measurement points can be on different pipes, or at two locations on the same pipe. Either clamp-on or wetted transducers can be used at either location. The dual-channel TransPort flowmeter can also be set-up for two-path flow measurement at a single location for enhanced accuracy. No matter how it's used, this model continuously measures the selected flows on both channels, as well as the sum, the difference, and the average of those two channels.

# The PT868, The Ultimate Portable Liq

**FLOW TRANSDUCERS, CLAMPING FIXTURES, AND FLOWCELLS.** With over 20 years experience in ultrasonic flow measurement, Panametrics has what you need for virtually any flow measurement application. The TransPort flowmeter can be used with all Panametrics ultrasonic liquid flow transducers, clamping fixtures and flowcells.



*Small-pipe clamping fixture with nonintrusive transducers ensures no leaks, corrosion or contamination.*

A wide variety of clamp-on and wetted transducers are available with different operating frequencies, materials of construction, operating temperatures, sizes, area classifications (standard or hazardous), and operating principles (e.g., shear wave and longitudinal wave) to meet your requirements.

To hold clamp-on transducers in contact with the pipe, a variety of clamping fixtures are available to accommodate different pipe and transducer sizes, and the desired fixture attachment method (e.g., chain; metal strap; VELCRO® straps; and magnetic, bolt-on, or weldable steel yoke with metal banding). Our universal clamping fixture includes ruled slide-tracks to simplify transducer spacing for accurate flow measurements. There's even a special small-pipe clamping fixture with miniaturized transducers to

simplify the flow measurements on 1/2- to 2-inch lines.

The TransPort PT868 flowmeter can also be used with flowcells or spool-pieces—precision-machined pipe sections with wetted transducers already in place—for improved accuracy or special situations such as flow measurement in very small tubing (e.g., 1/8 inch). For wetted transducer accuracy with portability, Pan-Adapta® precision-machined pipe plugs can be threaded into pipe couplings or tees, letting you install and remove wetted transducers without interrupting the process or emptying the pipe.

Please contact Panametrics for assistance in choosing the best transducers, fixtures, or flowcells for your application.



*Dual RTD transmitter and RTDs.*

## **OPTIONAL ENERGY MEASUREMENT EQUIPMENT.**

The TransPort flowmeter combines proven ultrasonic flow measurement with precise RTD temperature measurement to determine the energy flow rate in liquid heating and cooling systems. The TransPort flowmeter, with optional energy equipment, extends the benefits of ultrasonic flow measurement to energy measurement. These benefits include measurement of flow

and temperature without pipe penetration for pipes from 1/2 to 200 inches in diameter with liquid temperatures from -20°C to 260°C. The TransPort flowmeter is designed for energy measurement in water and water/glycol systems. Consult Panametrics for use with other liquid systems.

Every TransPort flowmeter comes equipped with a built-in 16-V supply for loop-powered RTD temperature sensors, as well as all necessary circuitry and software to make energy flow rate measurements. To complete the system, Panametrics offers a variety of optional components. These include clamp-on and wetted RTD temperature sensors and a dual RTD transmitter that directs loop power from the TransPort flowmeter to the RTDs. This transmitter accepts raw RTD inputs and provides 4- to 20-mA temperature inputs back to the TransPort flowmeter. These components can be purchased separately, or as part of a turnkey solution.

## **OPTIONAL PIPE WALL THICKNESS GAGE TRANSDUCER.**

Pipe-wall thickness is a critical parameter used by the TransPort flowmeter for clamp-on flow measurements. The more accurately the pipe-wall thickness is known, the more accurate the flow measurements can be. Panametrics offers a thickness gage option that allows accurate wall thickness measurement from outside the pipe. The thickness gage option includes an ultrasonic thickness transducer, transducer cable, metric or nonmetric calibration block, and a bottle of transducer couplant.

# Liquid Flowmeter—From Panametrics.



*The TransPort flowmeter with optional pipe wall thickness gage transducer.*

Just plug the thickness transducer cable into the flow transducer inputs and you are ready to make wall thickness measurements. Enter a pipe material into the TransPort flowmeter, spread a small amount of couplant onto the pipe, place the tip of the transducer on the pipe surface, and the TransPort flowmeter automatically displays the wall thickness. It's that easy!

## ***OPTIONAL THERMAL PRINTER AND ACCESSORIES.***

When you need a permanent record of your work, live measurements, logged data, and site parameters can be sent to a variety of printers by connecting the printer directly to the RS232 serial communications port of the TransPort flowmeter. Data can be printed in tabular "numeric" format or in graphic "strip chart" format. The TransPort flowmeter supports the SEIKO® Instruments DPU-411 Type II Thermal Printer, EXTECH® Instruments MiniSerial Printer 42, KODAK® Diconix 150 Plus (with serial interface option), SYNTTEST®

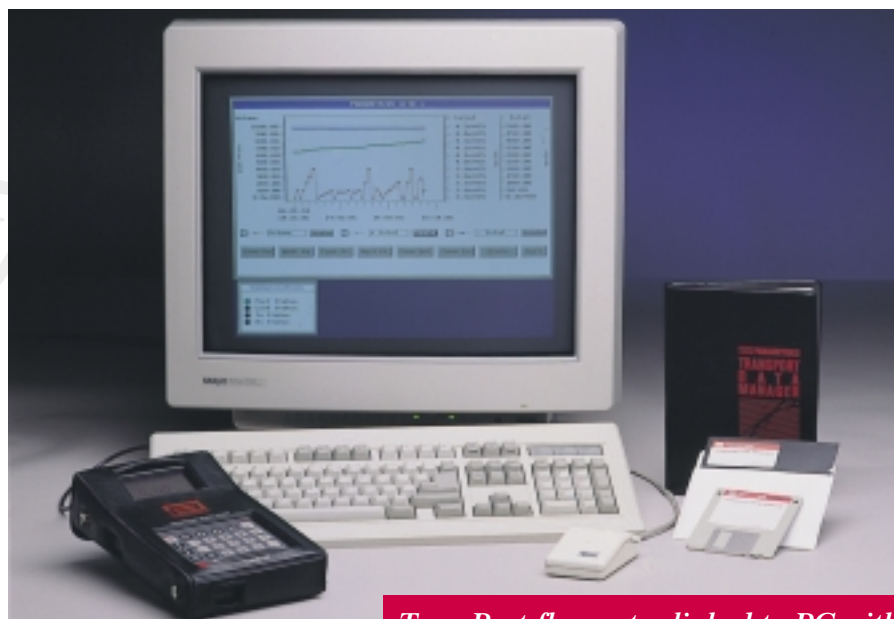
Corporation SP410 Miniature Thermal Printer, and EPSON® printers or printers with compatible command sets.

For your convenience, the SEIKO® Instruments DPU-411 printer complete with rechargeable battery pack, paper, and printer cable is available directly

from Panametrics. Other available options include: serial-parallel converters for use with parallel printers; 6-ft and 12-ft cables with the TransPort flowmeter connector and 25-pin male "D-style" connector (compatible with most printers); 5-roll packs of thermal paper; and replacement battery packs for the DPU-411.

## ***OPTIONAL INSTRUMENT DATA MANAGER™ PC-INTERFACE SOFTWARE PACKAGE.***

Instrument Data Manager (IDM™) software is a custom package developed by Panametrics to link your TransPort flowmeter to your PC. IDM's pop-up menus make it easy to upload site or calibration data from the flowmeter for verification or storage. Stored site and calibration data can also be downloaded to one or more flowmeters, thus eliminating the need to program multiple flowmeters. With IDM, live measurements or logged data may be viewed or graphed on your PC monitor



*TransPort flowmeter linked to PC with Instrument Data Manager software.*





**SEIKO® DPU-411**  
*Type II printer.*

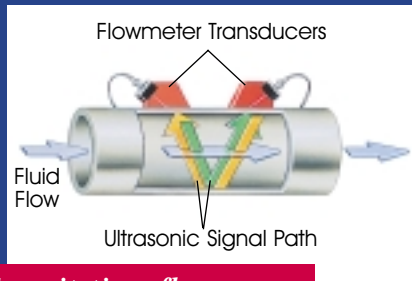
and stored in PC memory. You can also export data to spreadsheets, word processors, database management, or other software packages for graphing, reporting, or for further analysis. In addition, since it provides access to virtually all TransPort flowmeter keyboard functions, IDM lets you operate your flowmeter remotely from your PC. See the IDM data sheet for details.

**OPTIONAL POWER SUPPLIES AND ACCESSORIES.**

Every TransPort flowmeter comes with a built-in rechargeable battery pack and a charger/power supply for AC power operation and recharging. Three charger/power supplies, each with a LEMO® connector (to the TransPort flowmeter), are available: 100 to 130 VAC with American wall plug; 200 to 260 VAC with European wall plug, and 240 VAC with U.K. wall plug. An external battery pack, with a 120- or 240-VAC charger, power cable, and carrying case is available for long-term battery operation. In addition, an external battery charger, the FC-12, is available to charge a separate spare battery pack in two to three hours.

## The TransPort Flowmeter Offers Two Modes To Ensure Accurate Measurements.

The TransPort Flowmeter is the only ultrasonic flowmeter available with two measurement technologies built-in so you can measure flow in fluids from ultraclean water to aerated liquids, oil-water-sand mixtures, and even raw sewage.

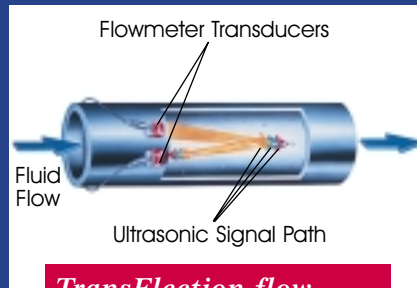


**Transit-time flow measurement technique.**

The 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 TransPort flowmeter measures this time difference and uses programmed pipe param-

eters to determine flow rate and direction.

The TransFlection technique also uses two ultrasonic transducers, but that's where the similarity to the transit-time technique ends. TransFlection mode uses one transducer to shoot thousands of grouped ultrasonic pulses in very rapid succession. The pulses bounce off scatterers in the fluid (bubbles, solids, or liquid droplets) and are received by the other transducer. Each received pulse group represents a "snapshot" of the flow. By comparing all snapshots, objects that do not "appear" to move with the flow are averaged out of the measurement of the TransPort flowmeter then determines flow rate and direction by analyzing the movement of the remaining objects in successive snapshots.



**TransFlection flow measurement technique.**

# Flowmeter—From Panametrics.

## OVERALL SPECIFICATIONS.

### Hardware Configuration:

#### Channel Options:

Single channel.  
Dual channel (for 2 pipes or 2 paths on a single pipe).

#### Mode Options:

Transit-time.  
Transit-time plus TransFlection.

#### Dimensions:

Size: 5 x 9 x 2.3 in.  
(12.7 x 22.9 x 5.8 cm).  
Weight: 2.2 lb (1 kg).

### Flow Accuracy:

#### Transit-Time Mode:

##### Pipe diameter (ID) > 6 in. (150 mm):

Velocity > 1 ft/s (> 0.3 m/s), 2% of reading typical; 0.5 to 1% of reading with calibration. See note.

Velocity ≤ 1 ft/s (≤ 0.3 m/s), ± 0.03 ft/s (± 0.01 m/s). See note.

##### Pipe diameter (ID) ≤ 6 in. (150 mm):

Velocity > 1 ft/s (> 0.3 m/s), 2 to 5% of reading typical. See note.

Velocity ≤ 1 ft/s (≤ 0.3 m/s), ± 0.15 ft/s (± 0.05 m/s). See note.

#### TransFlection Mode:

##### Pipe diameter (ID) 2 in. (50 mm) and larger:

Velocity > 1 ft/s (> 0.3 m/s), ± 5% of reading typical; ± 2% of reading with calibration. See note.

Note: Specifications assume a fully developed flow profile. Accuracy for both modes depends on pipe size.

### Range:

#### Transit-Time Mode:

–40 to 40 ft/s (–12.2 to 12.2 m/s).

#### TransFlection Mode:

–1 to –30 ft/s (–0.3 to –9.1 m/s).

1 to 30 ft/s (0.3 to 9.1 m/s).

± 1 to 15 ft/s (0.3 to 4.6 m/s).

### Rangeability:

#### Transit-Time Mode:

400:1.

#### TransFlection Mode:

30 to 1.

### Repeatability:

#### Transit-Time Mode:

Wetted transducers:

± 0.2% of full scale.

Clamp-on transducers:

± 0.2 to 0.5% of full scale.

#### TransFlection Mode:

Clamp-on transducers:

± 0.5% of full scale.

### Energy Accuracy:

The accuracy of the energy measurement is a combination of the accuracy of the associated flow and temperature measurements.

#### Transit-Time Mode:

1% of reading typical for calibrated systems.

#### TransFlection Mode:

2% of reading typical for calibrated systems.

### Fluid Types:

#### Transit-Time Mode:

Acoustically conductive fluids, including most clean liquids and many with entrained solids or gas bubbles. Maximum void fraction depends on transducer, interrogation carrier frequency, path length and pipe configuration.

#### TransFlection Mode:

Multiphase fluids, including raw sewage, sludge, slurries, tar sands, oil-water-gas mixtures, acoustically attenuating liquids and other demanding applications.

## ELECTRICAL SPECIFICATIONS.

### Internal Batteries:

#### Batteries:

4 C-size NiCd high-energy rechargeable batteries.

#### Battery Life, Transit-Time Mode:

6 to 8 h of continuous operation typical.

#### Battery Life, TransFlection Mode:

3 to 4 h of continuous operation typical.

#### Recharge Time:

16 to 20 h using external charger.

### Power Supply:

#### Input:

100/120/200/260 VAC ± 10%,  
50/60 Hz, 5 W maximum.

#### Output:

12 VDC unregulated.

Note: The PT868 may also be powered or charged by any regulated DC source that provides spike-free voltage of 10 to 28 VDC.

### Environmental:

#### Operating Temperature:

14° to 122°F (–10° to 50°C).

#### Storage Temperature:

14° to 122°F (–10° to 50°C).

Note: To ensure maximum battery life, storage temperature exceeding 95°F (35°C) is not recommended for long periods of time.

### Operating Modes:

#### Flow Measurement:

Transit-time mode with clamp-on or wetted flow transducers.

TransFlection mode with clamp-on flow transducers.

### Energy Measurement:

To calculate energy flow rate, use the external loop-powered RTD transmitter (2CHRT).

### Input/Output Specifications:

#### Keypad:

30-key tactile feedback membrane keypad.

#### Display:

64 x 128 pixel LCD graphic display with backlight.

#### Printer/ Terminal:

One RS232 port for printer, terminal or PC.

#### Analog Input:

Two 4- to 20-mA analog inputs with switchable 16-V supply for loop powered temperature transmitters.

#### Analog Output:

Two 0/4- to 20-mA current outputs (550 Ω max. load).

#### Acoustic:

One pair of LEMO® coaxial transducer connectors.

#### Cable & Length:

Cable length 25 ft (8 m) standard.  
Up to 1000 ft (305 m) optional with extension cables.

## OPERATIONAL SPECIFICATIONS.

### Site Parameter Programming:

Menu driven operator interface using keypad and "soft" function keys.

On-line help functions including pipe tables.

Storage for saving parameters for up to 20 sites.

### Data Logging:

Memory capacity to log over 43,000 flow data points.

Keypad programmable for log units, update times, start and stop time.

### Totalizers:

Forward and reverse with stopwatch timer.

### Display Functions:

Graphic display shows flow in numeric or graphic format.

Also displays logged data.



**Printer Output:**

Supports several thermal and impact printers.  
Output data in numeric or graphic ("strip chart") format.

**TRANSDUCER SPECIFICATIONS.****Wetted Ultrasonic Flow Transducers:****Temperature Range:**

Standard: -40° to 212°F (-40° to 100°C).

Optional (overall range): -310° to 932°F (-190° to 500°C).

**Pressure Range:**

Standard: 0 to 3000 psig (0.1013 to 20 MPa).

Optional: Higher pressures on request.

**Materials:**

Standard: 316 SS.

Optional (for isolating Pan-Adapta® Plugs): Titanium, Hastelloy, Monel, Duplex, CPVC, PVDF and others.

**Process Connections:**

Standard: 1-inch NPTM or 3/8-inch NPTM.

Optional: RF flanged, socket weld, fuse bond and others.

**Mounting:**

Spoolpiece, hot tap or cold tap.

**Housing:**

Standard: None.

Optional:

Weatherproof (NEMA 4, IP65).

Explosionproof (Div I, Class I, Group C & D).

Flameproof (EEx d IIC T4 to T6).

Submersible.

**Clamp-On Ultrasonic Flow Transducers:****Temperature Range:**

Standard: -40° to 140°F (-40° to 60°C).

Optional (overall range): -310° to 572°F (-190° to 300°C).

**Mounting:**

SS Chain or strap, welded or magnetic clamping fixtures.

**Housing:**

Standard: None.

Optional:

Weatherproof (NEMA 4, IP65).

Explosionproof (Div I, Class I, Group C & D).

Flameproof (EEx d IIC T4 to T6).

Submersible.

Note: Transducers (wetted and clamp-on), spoolpieces and clamping fixtures for special applications are available. Consult Panametrix for details.

**Temperature Transducers:**

Loop powered 3-wire platinum RTDs; Clamp-on and wetted (thermowell) types are available.

**Accuracy:**

0.15°C, wetted RTDs (matched pairs).

**Range:**

-4° to 500°F (-20° to 260°C).

**PIPE SIZE & MATERIALS.****Wetted Transducers:****Materials:**

All metals and most plastics. (Consult Panametrix for concrete, glass, and cement.)

**Pipe Sizes, Transit-Time Mode:**

Inside diameter (ID) 0.04 to 200 in. (1 mm to 5 m) and larger.

**Clamp-On Transducers:****Materials:**

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

**Pipe Sizes, Transit-Time Mode:**

Outside diameter (OD) 0.5 to 200 in. (12.7 mm to 5 m) and larger.

**Pipe Sizes, TransFlection Mode:**

Outside diameter (OD) 2 to 200 in. (5 cm to 5 m).

**Pipe Wall Thickness:**

Up to 3 in. (76.2 mm).

**AVAILABLE OPTIONS.****Flow Measurement Configurations:**

Standard: Transit-time mode.

Optional:

Transit-time and TransFlection modes (PT868-R).

2-channel version (2PT868).

**Energy Equipment:**

Dual RTD transmitter; two 4- to 20-mA transmitters with input for 3-wire RTD (100 Ω Pt) and terminals for 4- to 20-mA output; and 6-ft cable.

**Fast Charger Module:**

External fast charger module for charging spare battery packs with standard power supply/charger. 2- to 3-h charge time.

**Thickness Measuring Mode:****Transducer:**

Panametrix dual element transducer.

**Pipe Thickness Range:**

0.05 to 3 in. (1.3 to 76.2 mm).

**Pipe Materials:**

Most standard metal and plastic pipe materials.

**Accuracy:**

± 1% typical or ± 0.002 in. (± 0.05 mm).

**Display Resolution:**

0.001 in. (0.025 mm).

**Thermal Exposure:**

Continuous operation to 37°C (100°F). Intermittent operation to 260°C (500°F) for 10 sec followed by air cooling for 2 min.

**Printer Option:**

Thermal printer with rechargeable battery, 6-ft cable and 120-VAC or 240-VAC charger.

**PC Interface Software:**

Instrument Data Manager (IDM) software links PT868 with computer or PC. Includes 3.5-in. diskettes, interconnection cable (please specify type), and manual.

**PANAMETRICS****MAIN OFFICES:**

ISO 9001  
CERTIFIED



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