



### Description



The **BSUF-TTPR Portable Clamp-on Ultrasonic Flow meter** provides abundant capabilities for accurate liquid flow measurement from outside of a pipe. It utilizes state-of-the-art technologies on ultrasonic transmission /receiving, digital signal processing and transit- time measurement. The proprietary signal quality tracking and selfadapting technologies allow system to optimally adapt to different pipe materials automatically.



The flow meters of the BSUF-TTPR family are carefully designed so that their user-interfaces are self-explanatory and their operation is simple and easy. The unique clamp-on fixture design makes the installation very simple and no special skills or tools are required.

Due to the non-invasive nature of the clamp-on technology, there is no pressure drop, no moving parts, no leaks, no risk of contamination, no risk of corrosion, no pressure dependency.

Also, available to print real time and timed print over 20 pre-set measuring result.

Clamp on Transducer	Mounting bracket Transducer
	
<ul style="list-style-type: none"> <li>• No need to cutoff water, no pressure loss.</li> <li>• Measuring range: DN25~DN6000</li> <li>• Fluid temperature: -30°C~160°C</li> </ul>	<ul style="list-style-type: none"> <li>• No need to cutoff water, no pressure loss.</li> <li>• Measuring range: DN25 ~DN6000</li> <li>• Fluid temperature: -30°C~160°C</li> <li>• Improve installation accuracy, simplify installation process.</li> </ul>

### Features

- Cost effective and versatile
- High accuracy, better than 1.0% read
- Noninvasive, no moving parts, no pressure drop, no maintenance
- Easy and economical installation, no pipe cutting
- Wide measurement range, 0.03~40ft/s (0.01~12m/s)
- Wide pipe size range, 1/ 2~80 inches (DN 15~2000mm)
- Suitable for all commonly used pipe materials
- Signal quality tracking and self-adjusting capabilities
- automatically match transducer to pipe materials
- Velocity, volumetric and totalized flow display
- Thermal printer function, Signal value, rate, total, date, time etc.
- Ideal for both clean and opaque liquid flow measurements,
- In fact, most any liquid containing less than 5% total suspended solids (TSS) or aeration.
- Bi-directional. Totalizer for net, positive and negative flow display



## Applications

The BSUF-TTPR flow meters are ideal for flow measurement at portable locations. Their non-invasive nature makes them indispensable in applications such as chemical liquid processing, hygienic process monitoring, high-pressure flow measurement, etc. Benefited from our advanced digital signal processing technology, the flow meter works reliably in both clean and opaque liquid flow.

Examples of applicable liquids are:

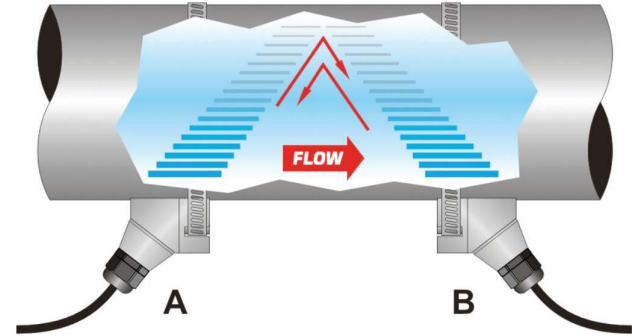
- Water, including hot water, chilled water, city water, sea water, etc.
- Secondary sewage, waste treatment, etc.
- Oil, including lubricating oil, diesel oil, fuel oil, etc.
- Chemicals, including alcohol, acids, etc.
- Solvents
- Beverage, food and pharmaceutical processors where non-contact is a must.
- HVAC, energy measurement system, etc.

DESCRIPTION	SPECIFICATION
<b>Liquid Types</b>	Virtually most any liquid containing less than 5% total suspended solids (TSS) or aeration.
<b>Power</b>	Built-in rechargeable Ni-MH rechargeable battery, provide over 20 hours of continuous operation.
<b>Velocity</b>	0.03...40ft/s(0.01...12m/s), bi-directional
<b>Signal Outputs</b>	<b>Current output:</b> 4...20mA - <b>3 channel 4-20mA input</b> Impedance 0...1k ohms, accuracy 0.1% <b>OCT output:</b> pulse signal for, flow rate, total flow (positive, negative and net flow) and one relay
<b>Display</b>	LCD with backlight. 2 x 20 letters. Display flow rate, total flow (positive, negative and net flow), velocity, time, etc.
<b>Units</b>	English (U.S.) or metric
<b>Enclosure</b>	Protection Class : IP54
<b>Temperature</b>	-20°C to 60°C for display
<b>Communication Interface</b>	RS-485 – MODBUS
<b>Transducer</b>	Automatically record the following information: The instrument working status of the last 64 days
<b>Line Sizes</b>	(Std) 2 to 40 inches [50 to 1000 mm] pipe I.D, 12-80 inches (300- 2000 mm) and 1/2" to 2 inches (15...50 mm)opt.
<b>Transducer to Transmitter Distance</b>	Shielded transducer cable. Standard length 20 (6m). Can be extended to 990 (300 m).
<b>Weight</b>	BSUF-TTPR 0,25 kg
<b>Repeatability</b>	Better than 0.5% read
<b>Accuracy</b>	Better than 1.0 % read for velocity above 1.0 ft/s
<b>Response Time</b>	0.5s
<b>Pipe Material</b>	All metals, most plastics, fiber glass, etc., allow pipe liner.
<b>Straight Pipe Section</b>	Section Longer than 8D, where D is pipe diameter. If a pump is near, the straight pipe section following the pump should be >15D.
<b>Power Consumption</b>	1,5 W



### Measuring Principle

BSUF-TTPR transit time flow meters utilize two transducers, shown as elements A and B in Figure 1, which function as both ultrasonic transmitters and receivers. The transducers are clamped on the outside of a closed pipe at a specific distance from each other. (The transducers can be mounted in V-mode as shown in Figure 1, W-mode where the sound transverses the pipe four times, or in Z-mode where the transducers are mounted on opposite sides of the pipe. This selection is based on pipe and liquid characteristics.) The flow meter operates by alternately transmitting and receiving a frequency modulated burst of sound energy between the two transducers. The burst is first transmitted in the direction of fluid flow and then against fluid flow. Since sound energy in a moving liquid is carried faster when it travels in the direction of fluid flow (downstream) than it does when it travels against fluid flow (upstream), a differential in the times of flight will occur. If the fluid is not moving, the time of flight difference will be zero and the flow meter will indicate zero flow. The sound time of flight is accurately measured in both directions and the difference in time of flight is calculated. The liquid velocity (V) inside the pipe can be related to the difference in time of flight (dt) through the following equation:  $V = K \cdot D \cdot dt$ , where K is a constant and D is the distance between the transducers.



Reflect-Mode Configuration  
Transit Time

### Optional Transducers and Mounting Brackets

Types	Picture	Spec.	Model	Measure range(mm)	Temperature	Size
Clamp on		Small	TS-2	DN15~100	-30~90°C	42×25×32mm
		Medium	TM-1	DN50~700	-30~90°C	69×39×44mm
		Large	TL-1	DN300~6000	-30~90°C	97×54×53mm
High temperature clamp on		Small	TS-2-HT	DN15~100	-40~160°C	45×25×32mm
		Medium	TM-1-HT	DN50~700	-40~160°C	64×39×44mm
		Large	TL-1-HT	DN300~6000	-40~160°C	97×54×53mm
Mounting bracket clamp on		Small	HS	DN15~100	-30~90°C	318×59×85mm
		Medium	HM	DN50~300	-30~90°C	568×59×85mm
		Extended	EB-1	DN300~700	-30~90°C	188×59×49mm
High temperature mounting bracket clamp on		Small	HS-HT	DN15~100	-40~160°C	318×59×110mm
		medium	HM-HT	DN50~300	-40~160°C	568×59×110mm
		extended	EB-1-HT	DN300~700	-40~160°C	188×59×49mm

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