

## TRANSIT-TIME ULTRASONIC FLOWMETER “HANDHELD PORTABLE”

### Description

The **BSUF-TTHH Handheld Clamp-on Ultrasonic Flowmeter** is one of the most powerful flowmeters available for liquid measurement. The utilization of our proprietary ultrasonic signal processing, transit-time measurement and signal quality tracking technologies allows the flowmeter to measure liquid flow rate from outside of a pipe reliably and accurately.

The BSUF-TTHH flowmeter is carefully designed so that it is very compact and easy to use. A user can use hand to hold as well as to operate the flowmeter main unit. The user-interface is self-explanatory and very easy to follow. Besides, the unique clamp-on fixture design makes the installation very simple and no special skills or tools required. Due to the non-intrusive nature of the clamp-on technique, there is no pressure drop, no moving parts, no leaks and no contamination.

### Features

- Cost effective and versatile
- High accuracy, better than 1.0% read
- Handhold design for main unit, light weight
- Compact enclosure. Portable case for all accessories.
- Wide flow measurement range, from -12 to 12m/s (-40 to 40ft/s)
- Velocity, volumetric and totalized flow display
- Bi-directional. Totalizer for net, positive and negative flow display.
- Wide pipe size range, from DN 10 to 6000mm (3/8 to 240 inches)
- Suitable for all commonly used pipe materials.
- Rechargeable battery for 20 hours of operation.
- Built-in data logger.
- Self-explanatory user interface, easy to operate.
- PC software for data download and real-time data display.
- Signal quality tracking and self-adjusting capabilities automatically match transducer to pipe material
- Ideal for both clean and opaque liquid flow, in fact, most any liquid containing less than 5% total suspended solids (TSS) or aeration. aeration or 10.000 mg/l



### Applications

The BSUF-TTHH flowmeter is ideal for flow surveys and closed pipe applications where non-invasive measurement of liquids is required. Benefited from our advanced digital signal processing technology, the handheld flowmeter 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.*
- *Sewage and drainage water with small particle quantity.*
- *Oil, including crude oil, lubricating oil, diesel oil, fuel oil, etc.*
- *Chemicals, including alcohol, acids, etc.*
- *Solvents.*
- *Beverage and food processors.*
- *HVAC hot and cool water, water/glycol solutions.*
- *Water and waste treatment.*
- *Power plants (nuclear power plants, thermal & hydropower plants), heat energy boiler feed water.*
- *Energy consumption supervision and water conservation management*
- *Metallurgy and mining applications (e.g., acid recovery)*
- *Marine operation and maintenance*
- *Pulp and paper*
- *Pipeline leak detection, inspection, tracking and collection*
- *Energy measurement and balancing*
- *Network monitoring*

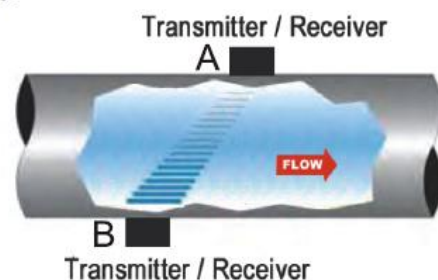
## Specifications

DESCRIPTION	SPECIFICATION
<b>Liquid Types</b>	Virtually most any liquid containing less than 5% total suspended solids (TSS) or aeration.
<b>Power</b>	3 AAA Ni-H built-in batteries .When fully recharged, it will last over 10 hours of operation .100V-240VAC for the charger
<b>Velocity</b>	-12 to 12m/s (-40 to 40ft/s), bi-directional
<b>Display</b>	4x16 Alphanumeric Character,7-digit totals for net ,positive and negative flow respectively
<b>Units</b>	English (U.S.) or metric
<b>Enclosure</b>	IP65(NEMA 4X) for transmitters and IP68 for sensors
<b>Temperature</b>	-40°C to 121°C (175°C opt.)
<b>Communication Interface</b>	RS-232C
<b>Datalogger</b>	Built in data logger can store over 2,000 lines of data
<b>Line Sizes</b>	(Std) 2 to 40 inches [50 to 1000 mm] pipe I.D, 12-240 inches (300- 6000 mm) and 3/8” to 4 inches (10...100 mm)opt.
<b>Housing Material</b>	Flame retardant ABS .Suitable for normal and harsh environment
<b>Weight</b>	Main unit 1.2lbs(538g) with batteries, total portable case & accessories, 5.0kg.
<b>Repeatability</b>	Better than 0.2% read
<b>Accuracy</b>	Better than 1.0 % read (better than %0,2 F.S.) for velocity above 1.0 ft/s
<b>Response Time</b>	0-999 seconds, user-configurable
<b>Pipe Material</b>	All metals, most plastics, fiber glass, etc., allow pipe liner.
<b>Case Dimensions</b>	7.9" 3.6" 1.3" (200mm 90mm 30mm)

## Measuring Principle

BSUF-TTHH 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.

### Z method



**Ordering**

Type			Description
BSUF-			Ultrasonic Flowmeter
	TTHH		Hand-held Portable
		BS1	Small sensor DN10...DN100
		BM1	Middle sensor DN40...DN1000
		BL1	Large Sensor DN200...DN6000
		BHTS1	Small sensor ,High Temp.up to 175°C
		BHTM1	Middle sensor ,High Temp.up to 175°C
		001	Small and Middle sensors
		002	Middle and Large sensors
		003	Small,Middle and Large sensors
		011	Small and Middle High Temp.Sensors
			XX
			Cable Length

*Example* : BSUF-TTHH-002-20  
 Portable hand-held ultrasonic flowmeter with middle and large sensors as 20 m signal cable



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