# Z-TRAUQ INC.
# clamp-on
# ULTRASONIC FLOWMETER
## Analog + Pulsed out + RS485 Modbus

The BSUF-TTCL wall mount clamp-on ultrasonic flow meter family 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 self adapting technologies allow system to optimally adapt to different pipe materials automatically. These flow meters are carefully designed so that their user interface is 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.
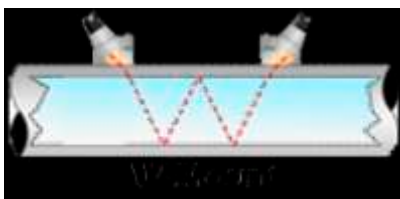
## Applications

These flow meters are ideal for process control or flow measurement at fixed 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.
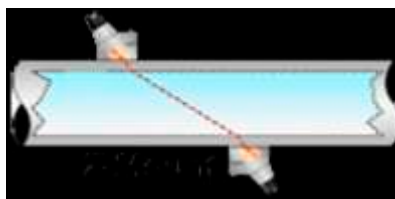Examples of applicable liquids are:

♦ *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.*
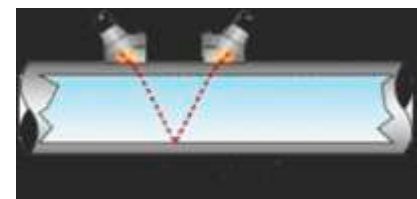♦ *HVAC, energy measurement systems, etc.*

## 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, -30 to 30 m/s (-100 to 100 ft/s)
♦ Wide pipe size range, 10 to 6000 mm dia. (3/8 to 240 in.)
♦ Suitable for all commonly used pipe materials
♦ Signal quality tracking and self adjusting capabilities
♦ Automatically match transducer to pipe materials
♦ Velocity, volumetric and total flow display
♦ Menu driven setup
♦ Rich input and output functions
♦ Ideal for both clean and opaque liquid flow measurements, for most any liquid containing less than 5% total suspended solids (TSS) or aeration or 10,000 mg/l
♦ Bi-directional totalizer for net, positive and negative flow display

## Mounting



W mount



Z mount



V mount

## Ordering Information

| Type | | | Description |
|---|---|---|---|
| BSUFTTCL | | | Ultrasonic Flowmeter |
| | BS1 | | Small diameter sensor 10 to 100 mm |
| | BM1 | | Mid diameter sensor 50 to 1000 mm |
| | BL1 | | Large diameter sensor 200 to 6000 mm |
| | BHTS1 | | Small sensor, High Temp. up to 175°C |
| | BHTM1 | | Mid sensor, High Temp. up to 175°C |
| | BHTL1 | | Large High Temp.Sensors |
| | | XX | Cable Length (replace with length in M.) |

*Example:*

BSUFTTCL-BM1-20

Ultrasonic flowmeter with mid diameter sensors & 20 metre cable.

## Specifications

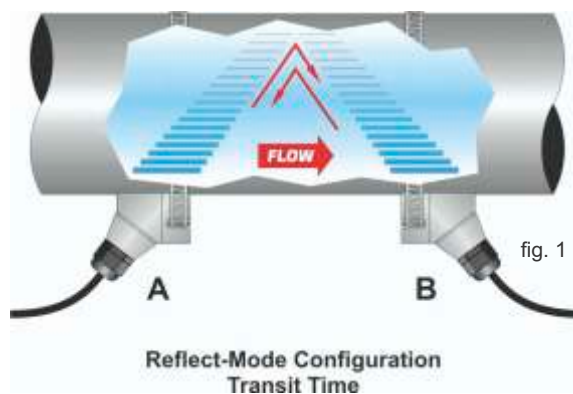| DESCRIPTION | SPECIFICATION |
| --- | --- |
| Liquid Types | Virtually most any liquid containing less than 5% total suspended solids (TSS) or aeration. |
| Power | 10-28 VDC /115/230 VAC 50/60Hz 15%  DC=3VA max. AC=6VA max. |
| Velocity | -30 to 30 m/s ( -100 to 100ft/s)  bi-directional |
| Signal Outputs | 4 - 20 mAdc (impedance 0 - 1k ohms, accuracy 0.1%)<br>Pulsed signal for, flow rate, total flow (positive , negative and net flow) |
| Display | LCD with backlight 2 x 20 letters: flow rate, total flow (positive, negative and net flow), velocity, time, etc. |
| Units | English (U.S.) or metric |
| Enclosure | IP65 (NEMA 4X) |
| Temperature | -40 to 121°C (optional  -40°C to 160°C with HT sensors) |
| Communication | RS485 Modbus |
| Transducer | Automatically records the following data:<br>1. The totalizer data of the last 512 days/128 months/10 years<br>2. The time and corresponding flow meter of the last 64 times of power on & off events<br>3. The working status of the last 64 days |
| Pipe I.D. Sizes | Mid diameter (most common) 2 to 40 in. (50 to 1000mm)<br>Small 3/8 to 4 in. (10 to 100 in. / Large 12 to 240 in. (300 to 6000mm) |
| Transducer to Transmitter Distance | Shielded transducer cable. Standard length 10m. Can be extended to 300 m. |
| Weight | BSUFTTCLBS1 @ 3 kg     BSUFTTCLBM1 @ 3.5 kg     BSUFTTCLBL1 @ 4 kg |
| Repeatability | Better than 0.2% of reading |
| Accuracy | Better than 1.0% of reading |
| Response Time | 0.5s |
| Pipe Material | All metals, most plastics, fiber glass, etc., including lined pipes. |
| Straight Pipe Section | Section longer than 8D, where D is the pipe diameter. If a pump is nearby, the straight pipe section following the pump should be >15D. |

## Measuring Principle

BSUFTTCL 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 onto 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 traverses 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 the 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's 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 is the difference in time of flight (dt) as expressed in the following equation: $V = K*D*dt$, where K is a constant and D is the distance between the transducers.



Reflect-Mode Configuration
Transit Time

fig. 1



Level Sensors

Magnetic

&

Capacitive