STUF-280T

ULTRASONIC HEAT METER

Features:

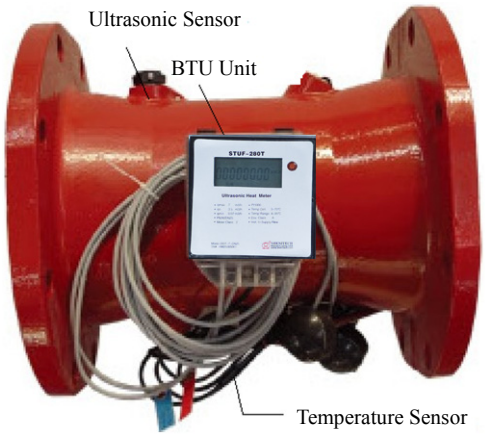
- Wear-free ultrasonic measurement. No maintenance needed
- Proprietary robust sensor design. No reflector, thus, works reliably for both clear water and dirty water
- Excellent long-term stability. Accuracy does not degrade over time
- Not affected by magnetic interference
- Low pressure drop
- For both hot and cold water
- Free positioning for mounting
- Battery supply for 6 or more years
- Nominal pressure up to 1.6MPa
- Pulse / M-Bus / RS485 for remote readout
- Optional BACnet module
- Optional AMR and data management software
- Easy to install. Electronic box can be detached from the sensor body and installed separately
- Low cost over the long run

DN15~DN40
Ultrasonic BTU

The STUF-280T heat meter offers the most advanced BTU measurement by using state-of-the-art ultrasonic flow measurement technology. It does not have any moving parts that can wear out, thus, literally requires no maintenance. It is also very cost-effective. Both commercial and residential installations can profit from the advantages of the wear-free heat measurement, namely, precision, operation security and long service life.

Shenitech's ultrasonic heat meter stands out among the competition due to its unique reflector-free sensor design. It is able to work reliably even when the water is dirty, which could be the case in the HVAC loop after many years' operation.

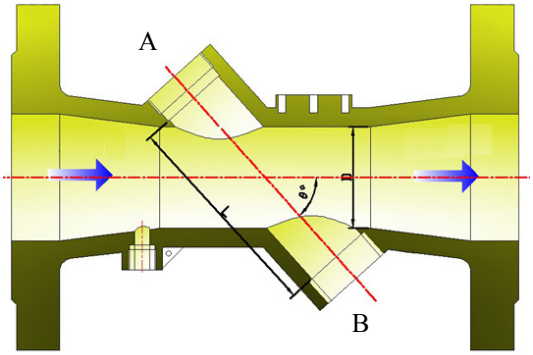
DN50~DN400
Ultrasonic BTU



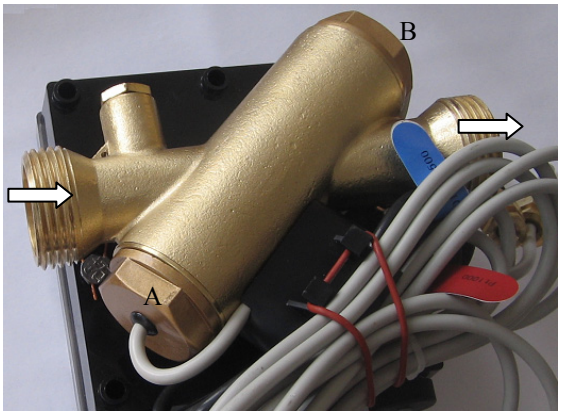
1. Operating Principle

STUF-280T heat meter is consisted of an ultrasonic flow sensor, a pair of PT1000 temperature sensors and a BTU unit. The microprocessor-based BTU unit controls the ultrasonic sensor to transmit and receive ultrasound in an orderly fashion so as to conduct precise flow measurement. It also has electronics dedicated to the PT1000 sensor to measure the temperature in the supply pipe as well as the return pipe. The BTU unit calculates the heat energy based on the flowrate and the temperature difference between the supply and the return.

The figure on the right illustrates how the ultrasonic flow sensor works. Two ultrasonic transducers (A and B) are mounted on a spool-piece face-to-face, one is on the upstream and the other on the downstream. The electronic console (e.g., the BTU unit) operates by alternately transmitting and receiving a burst of sound energy between the two transducers and measuring the transit time it takes for sound to travel between the two transducers. The difference in the transit time measured corresponds directly to the velocity of the liquid in the pipe.



Depending on the pipe size, there are two kinds of transducer arrangement. For large pipes, a straight-through design, as shown in the figure above, is recommended. However, for small pipes, the straight-through does not provide enough sound path to obtain good accuracy. To increase the sound path, our competitors put a sound reflector in the pipe to get a V-shape path or even put two sound reflectors to get a U-shape path. The problem with the reflector is when the liquid in pipe gets dirty, which is quite common in real heating/cooling loop after many years operation, the reflector surface is not smooth anymore and its reflecting efficiency becomes very poor. This could cause the heat meter accuracy largely degraded, or even cause the meter fail to register.



With expertise on flow dynamics, Shenitech has designed a unique flow guide which allows the sound path to be more than 5 times longer than the straight-through design (see figure on the left). This design significantly increases the measurement accuracy. Since there is no reflector, the sensor is very robust and reliable.

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2. Applications

Suitable for Both Commercial and Residential Applications

With its maximum 95°C operating temperature (the 130°C version is available upon request) and nominal pressure of 1.6MPa, the technical specifications of STUF-280T meet the standards for residential as well as commercial meters. The wide dynamic range allows for a load of up to double the rating, thereby ensuring high operation security.

This compact meter fits into even the smallest installation locations and can be mounted separately from the electronics console. The large display can be set to display the heat consumption, temperature, flow total, working time or flow velocity. The meter

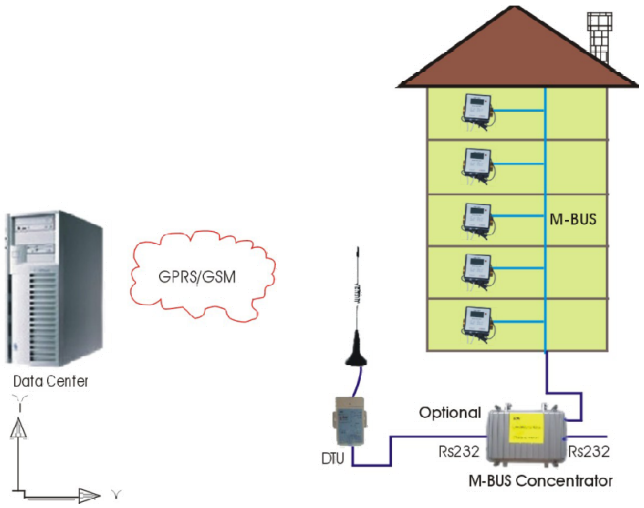
also has a remote readout which could be configured as pulse, M-Bus or RS485. An optional BACnet module is available upon request.

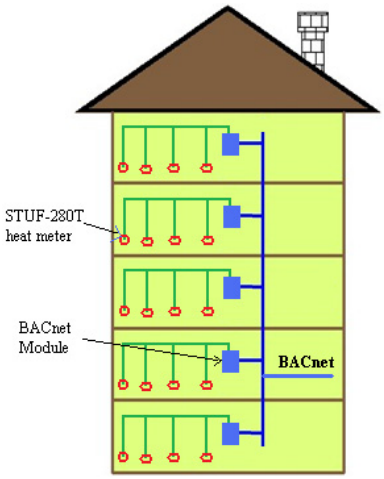
Remote Readout System for Building Energy Management

When equipped with the M-Bus module, as many as 500 heat meters can be networked through a two-wire bus to a central location for integrated resource management.

An optional concentrator and data acquisition software program make the system installation and integration very easy. Shenitech provides the whole system of automatic meter reading (AMR) solution as well (below right).

An alternative for AMR is to use Shenitech's BACnet module. This module is able to connect multiple heat meters to a BACnet bus for building automation (below left).





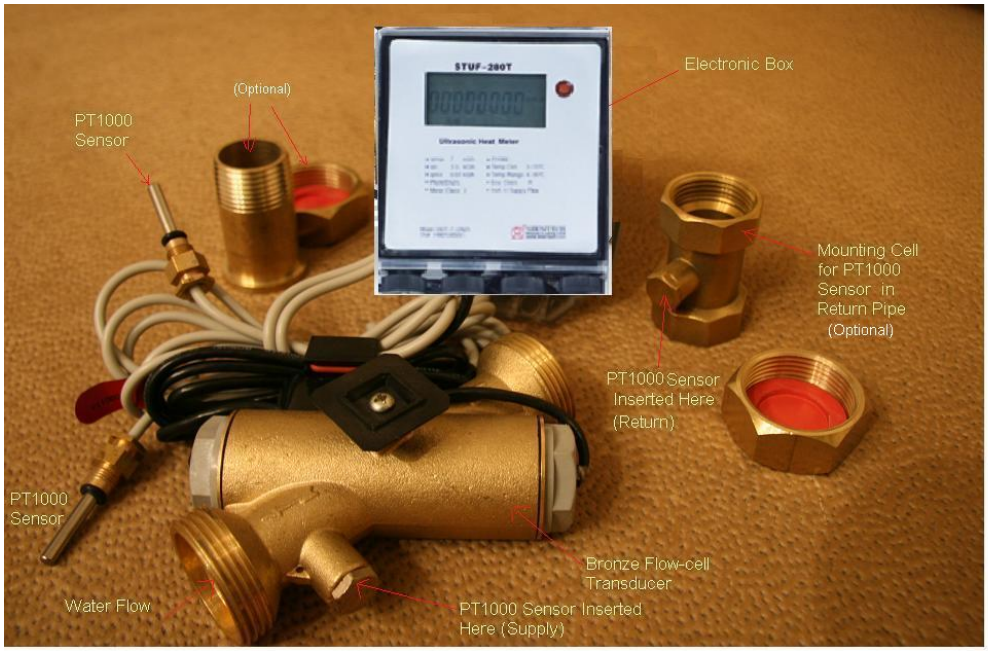
3. Specifications

Pipe Size (mm)	DN	mm	15	20	25	32	40	50	65	80	100
Accuracy Class			Class 2 or Class 3								
Pressure Drop			≤0.025MPa (Normal Flowrate)								
Working Pressure			≤1.6MPa								
Hot/Cold Water			Hot/Cold Water								
Protection			IP68 (transducer) / IP 65 (Electronics)								
Temp Range		°C	-20 ～95								
Max Flowrate	Q_{max}	m^3/h	3.0	5.0	7.0	12．0	20．0	30	50	80	120
Nominal Flowrate	Qn	m^3/h	1.5	2.5	3.5	6．0	10．0	15	25	40	60
Min Flowrate	Q_{min}	m^3/h	0.03	0.05	0.07	0．12	0．2	0.6	1.0	1.6	2.4
Outline Dimension											
Length	L	mm	110	130	130	180	200	200	200	225	250
Connector Length	L1	mm	45	50	58	60	62				
Width	W	mm	80	80	80	90	90	160	160	200	215
Height	H	mm	58	98	105	105	115	160	160	200	215
Joint: Thread or Flange	M		G3/4"	G 1'	G 1'1/4	G 1'1/2	G 2'	Flange 4-M16	Flange 4-M16	Flange 8-M16	Flange 8-M16
Weight		kg	0．7	0．8	0．9	1．0	1．5	6.4	6.4	9	12.5

Note: for sizes bigger than DN100mm, please contact Shenitech for more information.

Static current:	<10uA
Battery type:	Li, 3.6V/2.4Ah
Battery Life:	> 6 years
Environmental Class:	A
Enclosure Protection:	IP65
Pt1000 cable length:	1.5m (longer cable available upon request)
Flow sensor cable length:	1.2m (longer cable available upon request)

4. Model Selection



Parts for a complete BTU meter of size <DN50

STUF-280T-DNxx-yy-zz,

where xx is the pipe size in mm, yy is the output option (0: pulse, 1: M-Bus, 2: BACnet, 3: RS485), zz is the pipe joint option (0: BSP, 1: NPT, 2: Metric Flange, 3: ANSI Flange).

Example 1: STUF-280T-DN25-1-BSP stands for the STUF-280T heat meter for pipe size DN25mm with M-Bus and BSP joint.

Example 2: STUF-280T-NPS1-1-NPT stands for the STUF-280T heat meter for pipe size 1" with M-Bus and NPT joint.

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