

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 or M-Bus concentrator
- Optional AMR system solution, including meter reading software and utility billing software
- Easy to install. Electronic box can be detached from the sensor body and installed separately
- Low cost over the long run



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.

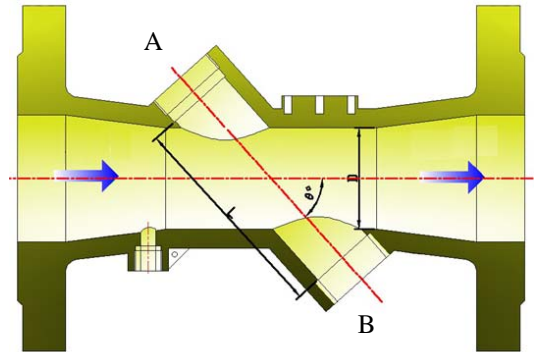
DN50~DN600



Operating Principle

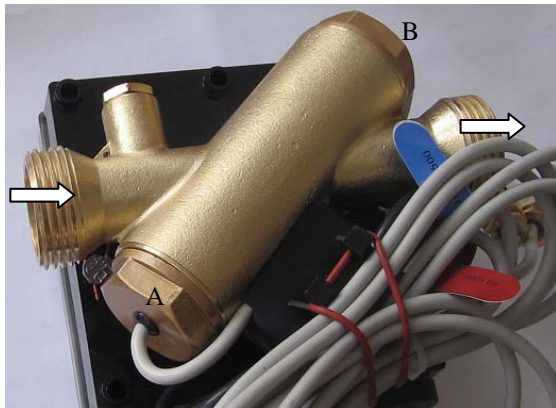
STUF-280T heat meter is consisted of an ultrasonic flow sensor, a pair of PT1000 temperature sensors and a BTU unit. The microprocessor-based BTU unit controls the ultrasonic sensor to transmit and receive ultrasound in an orderly fashion so as to conduct precise flow measurement. It also has electronics 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.

1. 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

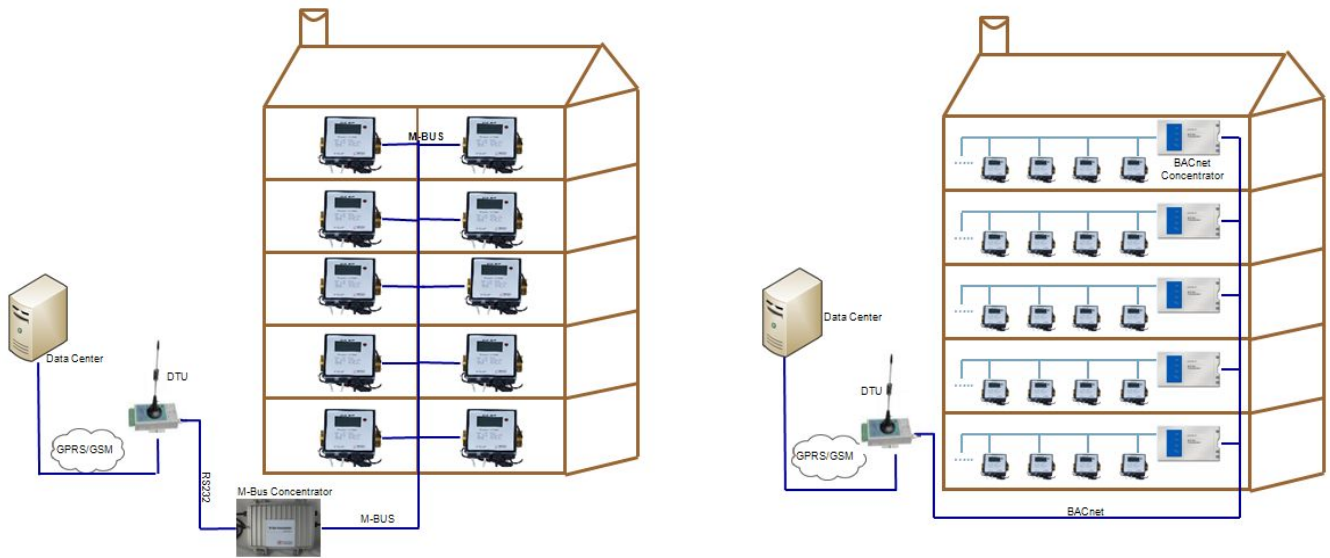
also has a remote readout which could be configured as pulse, M-Bus or RS485. An optional BACnet module is available upon request.

Automatic Meter Reading (AMR) System for Building Energy Management

When equipped with the M-Bus module, as many as 280T 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).

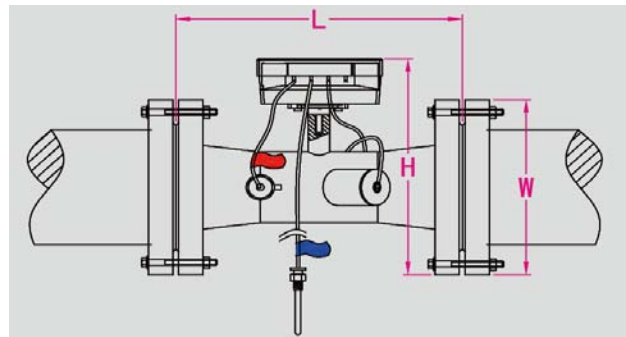
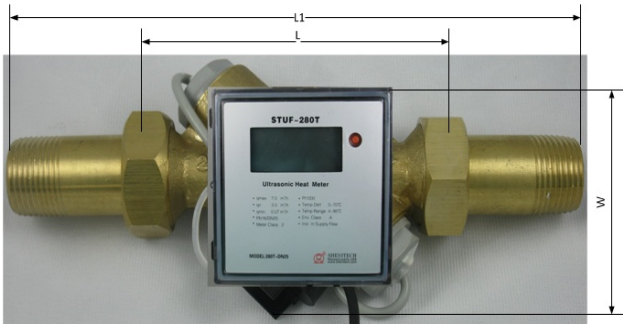
An alternative for AMR is to use Shenitech's BACnet module. This module is able to connect hundreds of heat meters to a BACnet bus for building automation (below left).



2. Specifications

Size* mm	Flowrate m ³ /h			Dimension			Weight** (kg)	Pipe Join***
	q _n	q _{min}	q _{max}	L (mm)	W (mm)	H (mm)		
15	1.5	0.03	3.0	130	120	86	1.32	G3/4"
20	2.5	0.05	5.0	130	120	86	1.32	G1'
25	3.5	0.07	7.0	130	121	89	1.68	G1'1/4
32	6.0	0.12	12.0	160	125	98	2.2	G1'1/2
40	10	0.2	20	180	130	109	2.9	G2'
50	15	0.6	30	200	150	170	7.0	Flange – Nut 4-M16
65	25	1.0	50	200	160	160	7.0	Flange – Nut 4-M16
80	40	1.6	80	225	200	200	11	Flange – Nut 8-M16

100	60	2.4	120	250	215	215	13	Flange – Nut 8-M16
125	100	4.0	200	250	215	215	16	Flange – Nut 8-M16
150	150	6.0	300	300	280	280	28	Flange – Nut 8-M20
200	250	10.0	500	350	330	330	39	Flange – Nut 12-M20
250	400	16.0	800	450	395	395	77	Flange – Nut 12-M24
300	600	25.0	1200	450	460	460	93	Flange – Nut 12-M24



Note: * Larger size BTU meters are available upon request. ** Weight may differ depending on accessories. *** Pipe joint could be NPT / ANSI flange upon request

Pressure:	≤1.6MPa
Press loss:	<0.025MPa
Static current:	<10uA
Battery type:	Lithium, 3.6V
Battery life:	> 6 years, optional 10 years
Accuracy Class:	Class 2
Environmental class:	B, optional C (outdoor)
Environmental temp:	-25°C ~ 55°C
Enclosure protection:	IP65, optional IP68
Pt1000 cable length:	0.3m (longer cable available upon request)
Flow sensor cable length:	1.2m (longer cable available upon request)

3. Model Selection

For BTU meter:

STUF-280T-DNx-y-z-w or **STUF-280T-INx-y-z-w**

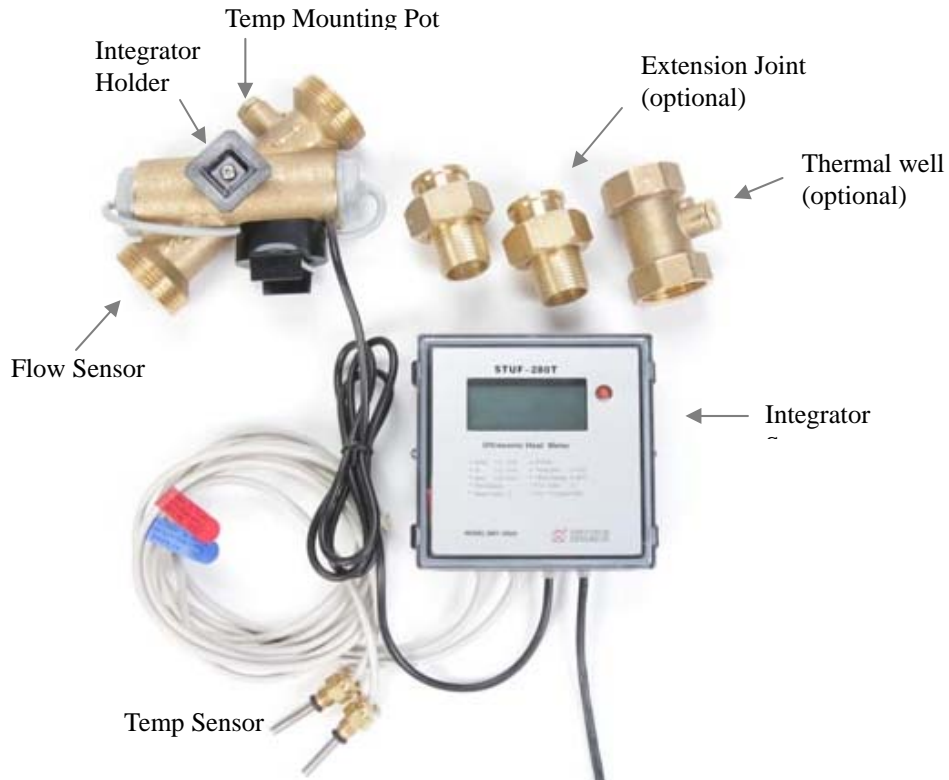
where x is the pipe size in mm, y is the output option (0: pulse, 1: M-Bus, 2: RS485), z is the pipe joint option (0: BSP, 1: NPT, 2: Metric Flange, 3: ANSI Flange), w is the option for accessory (0: without, 1: with). Note that the accessory is for DN40 or smaller size only. It includes a pair of extension connectors and a T-connector.

Example 1: STUF-280T-DN25-1-0-1 stands for the STUF-280T heat meter for pipe DN25mm with M-Bus, BSP joint and accessory.

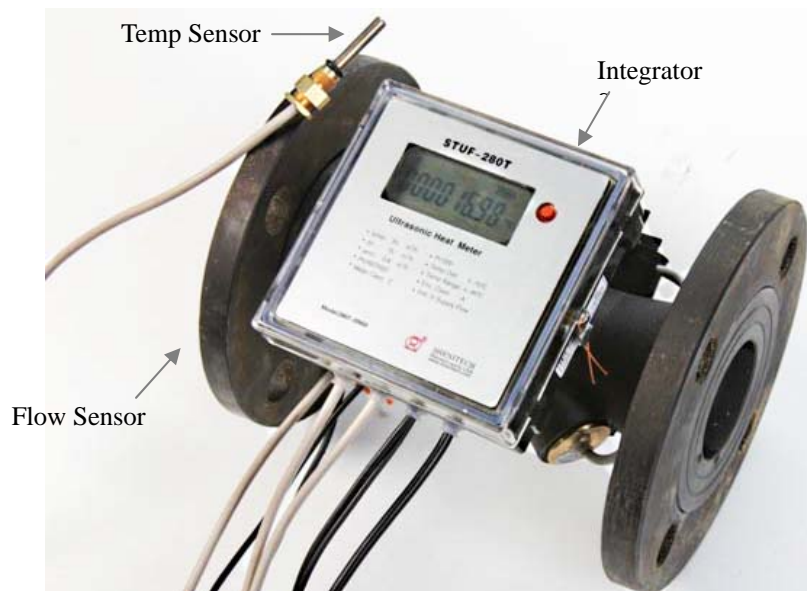
Example 2: STUF-280T-IN1-1-1-1 stands for the STUF-280T heat meter for pipe 1" with M-Bus, NPT joint and accessory.

Example 3: STUF-280T-DN100-1-2-0 stands for the STUF-280T heat meter for pipe DN100 with M-Bus and metric flange joint. No accessory.

**Parts for 280T
DN15-DN40**



**Parts for 280T
DN50 and larger**



For Concentrator:

280C-x-y

where x is type of the concentrator (0: M-Bus concentrator without storage, 1: M-Bus concentrator with storage, 2: BACnet concentrator without storage), y is the interface option on upper later side (0: M-Bus, 1: RS232).

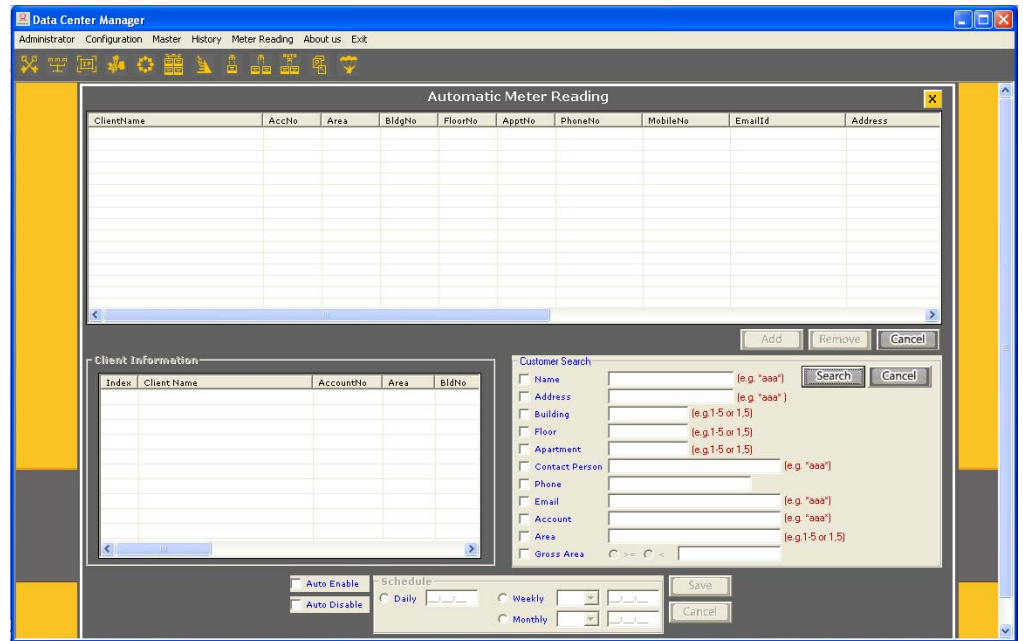
Example 1: 280C-0-0: M-bus concentrator without storage, M-Bus interface to upper layer device.

Example 2: 280C-2: BACnet concentrator, no storage, BACnet interface to upper layer, M-Bus to lower layer.



For AMR Software and Billing Software:

Please contact support@shenitech.com for details.



SHENITECH LLC, 10-214 Tower Office Park, Woburn, MA 01801, USA

Tel. 781 932-0900 / 888 738-0188(toll-free) Fax 978 418-9170 sales@shenitech.com www.shenitech.com

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