Product Specification

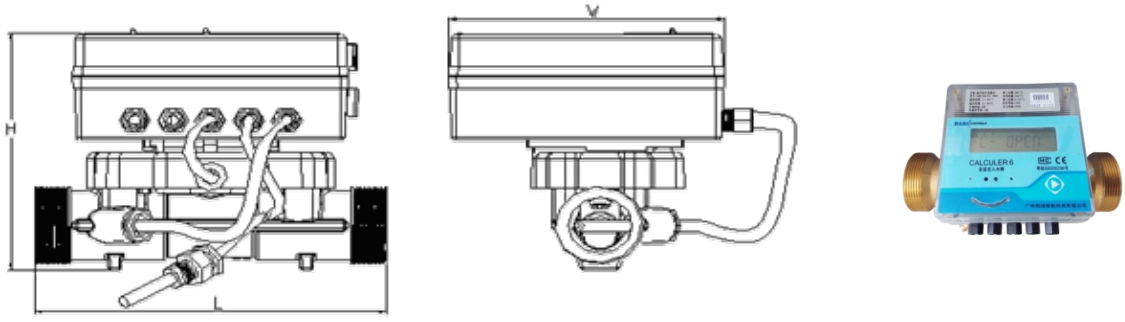
230 Series Ultrasonic BTU Meter

Contents

OVERVIEW

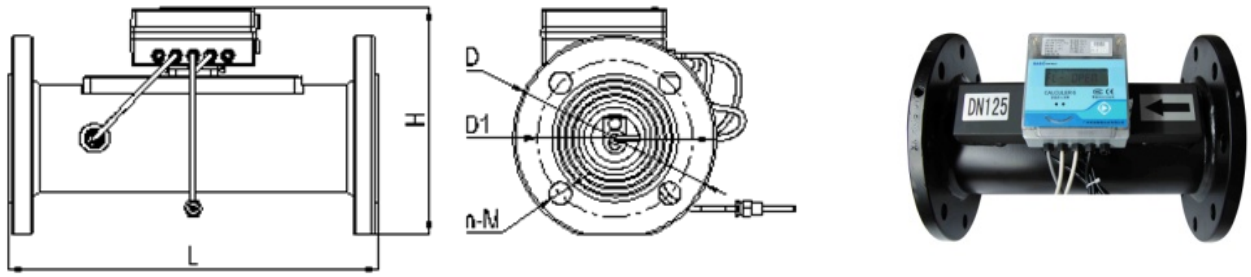
The 230 Series UHM is a highly accurate and stable BTU meter. It utilizes ultrasonic technology to measure household heating and cooling energy consumption. The series UHM is a compact meter that has been designed to incorporate the flow sensor and calculator all in one unit for simplification of the unit's installation. The 8-digit LED display makes reading the measured value simple and easy. The compact size and lack of moving parts makes the series UHM a low maintenance unit. These features make it great for installation on chillers, and boilers.

TYPE SELECTION DN15-DN40



Dimensions					Flow-rate			Weight
in (mm)					GPM (m^3/h)			LB (kg)
DN	L	D	H	W	Q_{max}	Q_p	Q_{min}	
0.6 (15)	4.3 (110)	G3/4B	3.8 (96)	4 (108)	13 (3)	6.6 (1.5)	0.066(0.015)/ 0.13(0.03)	3.1(1.4)
0.8 (20)	5.1 (130)	G1B	4 (101)	4 (108)	22 (5)	11 (2.5)	0.11(0.025)/ 0.22(0.05)	3.1(1.4)
1 (25)	6.3 (160)	G11/4B	4.2 (106)	4 (108)	31 (7)	15 (3.5)	0.15(0.035)/ 0.31(0.07)	4.1(1.8)
1.3 (32)	7.1 (180)	G11/2B	4.4 (113)	4 (108)	53 (12)	26 (6)	0.26(0.06)/ 0.53(0.12)	5.2(2.3)
1.6 (40)	7.9 (200)	G2B	4.8 (121)	4 (108)	88 (20)	44 (10)	0.44(0.01)/ 0.88(0.2)	6.6(3.0)

TYPE SELECTION DN50-DN200



Dimensions								Flow-rate		Weight
in (mm)								GPM (m^3/h)		(kg)
DN	L	D	H	D1	n	M	Q_{max}	Q_p	Q_{min}	
2 (50)	11.8 (300)	6.5 (165)	6.9 (175)	4.9 (125)	4	0.7 (18)	132 (30)	66 (15)	0.66 (0.15)/ 1.32(0.3)	15
2.6 (65)	11.8 (300)	7.3 (185)	7.7 (196)	5.7 (145)	4	0.7 (18)	220 (50)	110 (25)	0.11 (0.25)/ 2.2(0.5)	15
3.1 (80)	13.8 (350)	7.9 (200)	8.5 (216)	6.3 (160)	8	0.7 (18)	352 (80)	176 (40)	1.76 (0.40)/ 3.52(0.8)	19
3.9 (100)	13.8 (350)	8.7 (220)	9.2 (233)	7.1 (180)	8	0.7 (18)	528 (120)	264 (60)	2.64 (0.60)/ 5.28(1.2)	21
4.9 (125)	13.8 (350)	9.8 (250)	10 (264)	8.3 (210)	8	0.7 (18)	881 (200)	440 (100)	4.40 (1.00)/ 8.81(2)	36
5.9 (150)	11.8 (300)	11.2(285)	11 (291)	9.4 (240)	8	0.9 (22)	1321 (300)	660 (150)	6.60 (1.50)/ 13.21(3)	40
7.9 (200)	13.8 (350)	13.4(340)	14 (347)	12 (295)	12	0.9 (22)	2202 (500)	1101 (250)	11.01 (2.50)/ 22.02(5)	78

SPECIFICATIONS

Service: Clean water
Wetted Materials: Brass and Stainless steel
Range: See chart; Q_{min}:Q_p = 1:100 or 1:50 (DN15~DN200)
Q_{min}:Q_p = 1:50(DN50~DN200)
Accuracy: Flow Sensor: ±(2+0.02 Qp / Q)%
Temperature: ±(0.3 + 0.05 * T)K; ΔT = T ± 0.1K
Serial Communications: M-BUS, MODBUS, or BACNET
Temperature Limits: Ambient: 41 to 131°F (5 to 55°C)
Storage: 41 to 131°F (5 to 55°C)
Process: 36 to 203°F (2 to 95°C)
Ambient Humidity: <93%
Pressure Max: 232 psi (16 bar) / 362psi(25 bar) , default 16 bar
Pressure Loss: <1.5 psi (10 kPa)
Power Requirements: Battery: 3.6V
Display: 8 digit LED
Flow Direction: Unidirectional
Enclosure Rating: IP65
Process Connection: See chart
Mounting Orientation: Horizontal or Vertical
Weight: See chart
Agency Approvals: CE

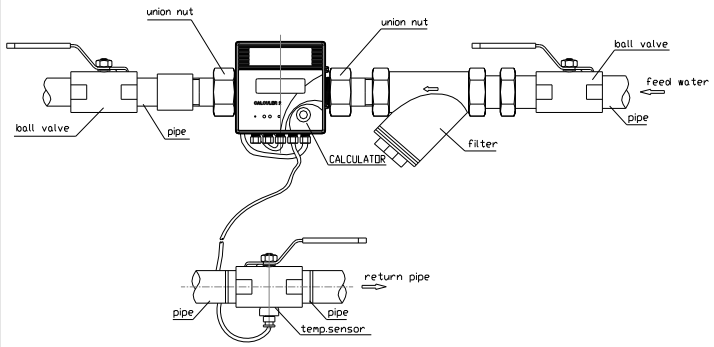


Figure 1: Installation Diagram for DN15 to DN40

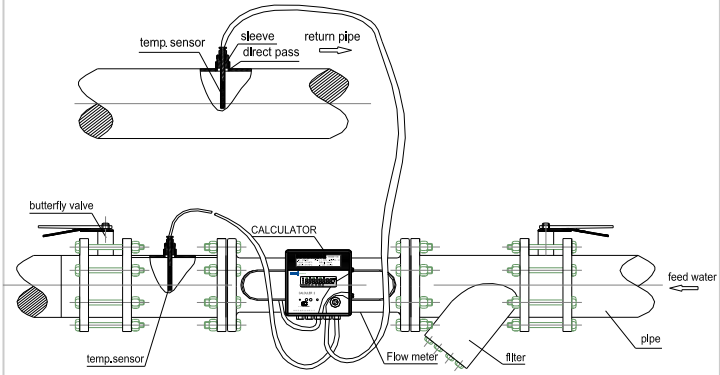


Figure 2: Installation Diagram for DN50 to DN 200

INSTALLATION INSTRUCTIONS

1. Install the meter as shown in either Figure 1 or Figure 2.
2. Mount the temperature sensor with the blue tag on the corresponding return pipe on application. The sensor with the red tag has already been installed in the meter.
3. Flush the system in the proper direction until:
   - No impurities remain in the filter and pipe.
   - No water leaks when pressure is added to the system.
   - The humidity inside the enclosure containing the meter does not exceed 85%.
4. After flushing for a period of time; close the ball valves on either side of the meter and flush the impurities out of all filters.

INSTALLATION REQUIREMENTS

Note：
If the following requirements are not followed, then large air particles and impurities in the pipe could influence the meter's measuring accuracy.

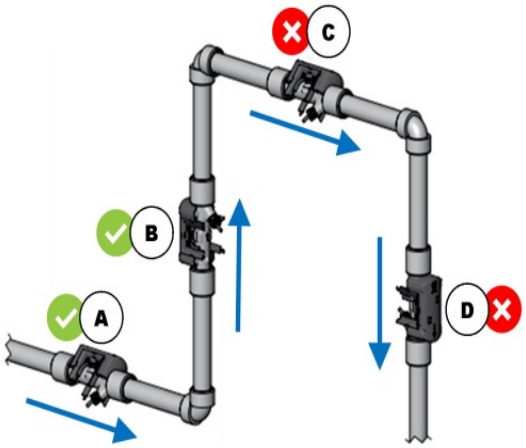


Figure 3: Installation Positions

1. Ensure that there is a 10D straight run of pipe upstream and a 5D straight run of pipe downstream from the meter.
2. See the installation positions in Figure 3, in which A and B are the proper installation positions, while C and D are the improper positions.
3. If the meter is installed on the horizontal pipe, it must be oriented at least 45° from horizontal (see Figure 4). If the meter's face is horizontal (see Figure 5), then debris accumulation can increase inaccuracies. There is no special requirement when installing on the vertical pipe work.

Note：
The meter can be installed on the return pipe or the supply pipe according to users' needs, but it should be selected in advance. Default Installation on supply pipe.

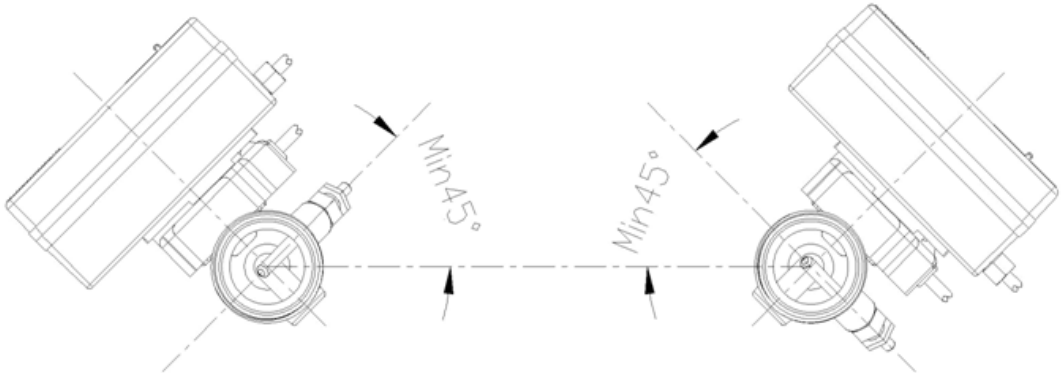


Figure 4: Mounting Rotation 1

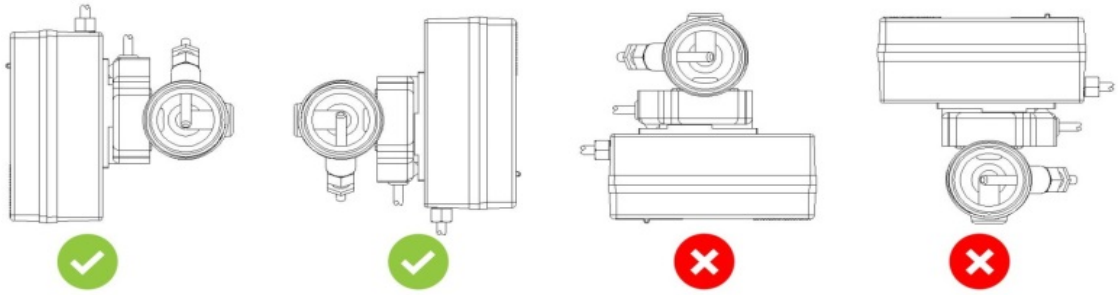


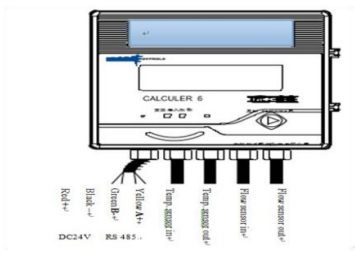
Figure 5: Mounting Rotation 2

INSTALLATION NOTES

1. Don't pull the temperature probe's cables to tight
2. Don't directly weld the meter to the pipe; the extreme heat will damage the BTU meter's internal elements.
3. Make sure the arrow on the meter's body is the pointing in the direction of flow.
4. If several meters are installed on the same vertical pipe work, each meter should be separated from the others to avoid pipe leakage or fallen debris that could affect the other meters' operation.

⚠ **WARNING** ►Don't install the meter near a high temperature heat source such as during electro gas welding. Doing so after installing an optional battery could cause the battery to explode and cause injury to people and damage the meter.

WIRING DIAGRAM



FEATURES

- Works with both heating and cooling systems
- High accuracy

  The high quality ultrasonic transducer and advanced electronic measurement technology work together to ensure the meter's high accuracy and stability
- No moving parts

  This decreases the maintenance cost and ensures that the meter is resistant to dirty water
- PT1000 platinum resistance
- Low starting flow-rate

  The U-shaped acoustic path widens the dynamic flow-rate measurement range and increases the accuracy of low and high end measurements where other, more narrow ranged, devices are inaccurate
- Horizontal or vertical installation
- RS485 and M-bus output ports can be used for automated meter reading
- Automatic diagnostic function.

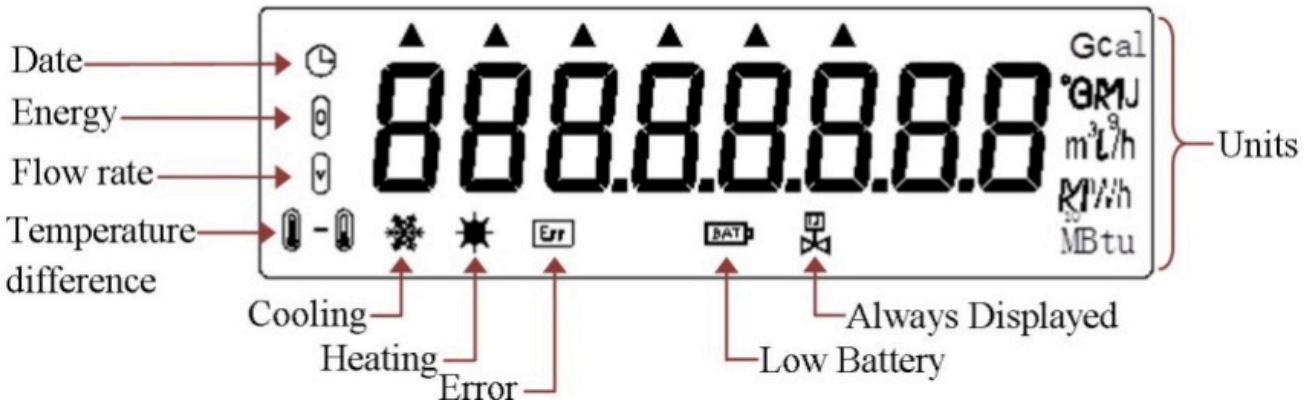
  An error code will be displayed on the screen to indicate the problem
- Ability to install an optional 3.6 V battery that can last up to 6 years

Note：

1. If the meter will not be used in freezing conditions, drain all water from the connecting pipe. Low temperatures will cause the water to freeze in the pipe and damage the meter.
2. This device is intended to be used with clean water. While dirty water will not damage the meter, it will cause errors in the reading.
3. A filter should be mounted near the meter and cleaned regularly.
4. If the heat exchanging system is operating normally, but the instantaneous flow-rate of the heat meter reduces significantly, then there is too much dirt in the filer. This will narrow the pipe and reduce the flow. Cleaning the filter will fix the problem.
5. To protect the meter and avoid damage from harsh conditions, it is recommended that the meter be encased in an enclosure.
6. Primary Address: first 2 digits of Manufacturer ID
7. Secondary Address: later 8 digits of Manufacturer ID
8. Company Code: BAS (0833)

   Version:54
9. M-bus Data: (Data variables order from UHM)
   - Cooling Energy
   - Heat Energy
   - Flow-rate
   - Operating Time
   - Flow Temperature
   - Return Temperature
   - Temperature Difference
   - Instantaneous Energy
   - Instantaneous Volume
   - Monthly energy
   - Recorded Volume
   - Recorded Date

DISPLAY



1. **Switching Between Information**
   Holding down the button for > 1s will switch the sections from current information ▲, to monthly information▲▲, and then to other information ▲▲▲. Once in the desired section, pressing the key will switch the information shown for the given section.
2. **Display Units**
   Energy is displayed in kW•h, power is displayed in kW, flow volume is displayed as m^3, and flow-rate is displayed in m^3/h.
3. **Display Details**
   a. "Monthly Reading Date" is displayed as "Pd=XX", in which XX is the end date of the current month's energy summation. The factory default value is 31, meaning that the monthly recording period ends at midnight on the 31st day of the month. At this time the current month's cumulated energy will be stored and the system will begin to record the next month's energy.
   b. The meter can store and display the recordings from the past 18 months.
   c. The units for "Sum of Working Time" (hours) is displayed as h.
   d. "Software and Protocol Editions" are displayed as "UEr.X.X X.X". The first X.X is the software edition code and the second X.X is the communication protocol edition code.
   e. "Leaving-factory serial number" is the meter's identification number, which is the same as the one in the external label. This serial number is a unique number set by the factory; it is also the secondary address in M-BUS system.
   f. Battery Voltage displays "UCC=X.XX" (the default unit is Volts). When the battery's voltage capacity is lower than 2.9±0.1V, " BAT " will appear on the display. This symbol will not appear if no battery is installed.
   g. If there are any unresolved errors, the start date will display as normal but the end date will display "00-00-00", and then the error message will be displayed.

ERROR MESSAGE TABLE

Error messages	Explanation
IN—CLOSE	Temperature sensor of water supply is in closed state
IN—OPEN	Temperature sensor of water supply is in open state
OU—CLOSE	Temperature sensor of return water is in closed state
OU—OPEN	Temperature sensor of return water is in open state
FL-OPEN	Flow sensor failure. (Could be caused by air in the meter, the absence of water, or water flowing in the wrong direction)
COD=XXXX BAT	There is an error in malfunction record. "XXXX" is the error code Low battery

4. Display Menus