



Datasheet

BTU Meter

LDGR-SUP

**Supmea<sup>®</sup>**

Committed to process automation solutions

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## Datasheet

### BTU Meter

#### LDGR-SUP

Supmea's BTU meter is only suitable for measuring the instantaneous flow of conductive liquid or liquid-solid two-phase fluid, and has a flow accumulation function. The hot water (cold water) supplied by the heat source flows into the heat exchange system at a higher (low) temperature and flows out at a lower (high) temperature. During this process, heat is released or absorbed to the user through heat exchange. When the water flows through the heat exchange system, according to the flow rate given by the flow sensor and the temperature of the supply and return water given by the paired temperature sensor, as well as the elapsed time of the water flow, the calculator calculates and displays the heat released or absorbed by the system.

### Applications

- Sewage treatment
- Printing and dyeing
- Chemical industry
- Environmental protection
- Food
- Paper making
- Tap water supply



### Features

- Excellent measurement repeatability and linearity
- Excellent stability and anti-interference function
- Excellent pressure-resistant design
- Self-diagnosis of empty pipe detection
- Prevent pressure loss measuring tube
- Simple menu operation
- High accuracy



### BTU meter

## Principle

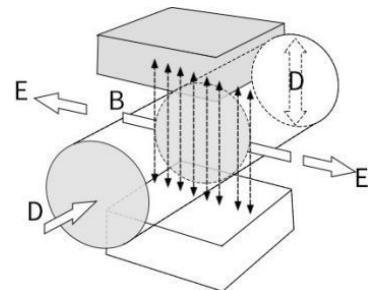
### Principle of electromagnetic flow meter

The measurement principle of magnetic flowmeters can be described as follows: when the liquid goes through the pipe at the flow rate of  $v$  with a diameter  $D$ , within which a magnetic flux density of  $B$  is created by an exciting coil, the following electromotive  $E$  is generated in proportion to flow speed  $v$ :

$$E = K \times B \times V \times D$$

Where:

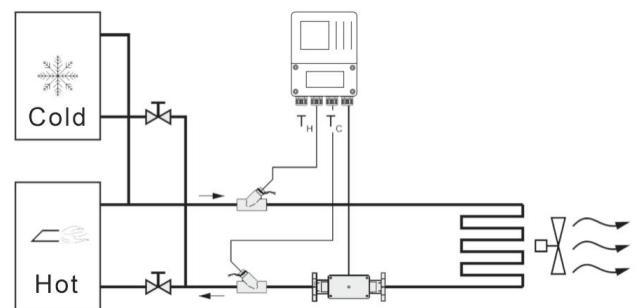
- E—Induced electromotive force
- K—Meter constant
- B—Magnetic induction density
- V—Average flow speed in cross-section of measuring tube
- D—Inner diameter of measuring tube



The induced voltage signal is detected by two electrodes and transmitted to the converter through a cable. After a series of analog and digital signal processing, the cumulative flow and instantaneous flow are displayed on the display of the converter. Then, according to the return temperature difference at the inlet and outlet of the liquid flowing through the electromagnetic heat meter, it is processed by the secondary instrument to calculate the total heat value.

### Principle of BTU meter

The working principle of the electromagnetic heat meter: the hot water (cold water) supplied by the heat source flows into the heat exchange system at a higher (low) temperature and flows out at a lower (higher) temperature. release or absorb heat. When the water flows through the heat exchange system, according to the flow rate given by the flow sensor and the temperature of the supply and return water given by the paired temperature sensor, as well as the elapsed time of the water flow, the calculator calculates and displays the heat released or absorbed by the system.



## Parameters

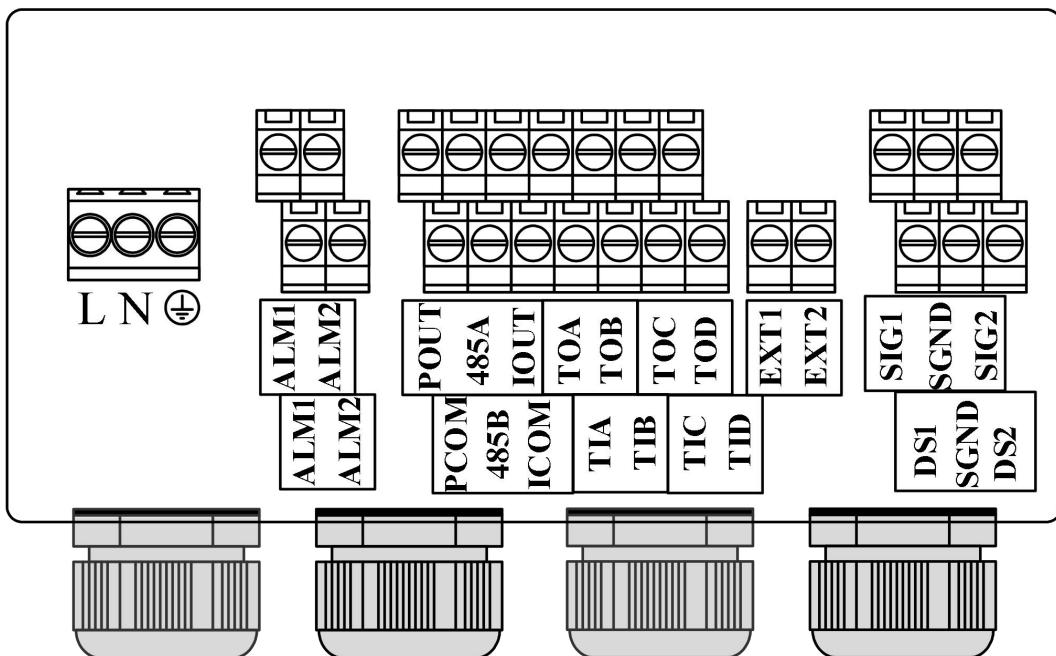
Execution Standard	JB/T9248-2015	
Measuring principle	Faraday's law of electromagnetic induction	
Function	Real-time flow rate, flow velocity, mass flow (when the density is constant), real-time measurement and flow accumulation	
Module configuration	Measurement system is made up of signal converter and measurement sensor	
	Converter	
Compact Type	IP65	
Remote Type	IP65 for transmitter (IP65/IP68 for sensor)	
	Measurement sensor	
Nominal Diameter	DN10-DN2000	
Flange	In line with GB/T9119-2000 standard carbon steel (Optional stainless steel flanges), other standard flange can be customized	
Pressure rating (High pressure can be customized)	DN15 - DN250, PN≤1.6MPa DN300~DN1000, PN≤1.0MPa DN1200~DN2000, PN≤0.6MPa	
Lining Material	Neoprene (CR), Polyurethane (PU) PTFE (F4), PFEP (F46), PFA	
Electrode Material	316L Stainless Steel, Hastelloy C, Hastelloy B, Ti, Ta, Pt	
IP Rate	IP65 for converter IP68 for sensor	IP65
Medium temperature	Neoprene: -10...+60°C Polyurethane: -10...+60°C PTFE/FEP: -10...+120°C PFA: -10...+180°C	Neoprene: -10...+60°C Polyurethane: -10...+60°C PTFE/FEP: -10...+120°C PFA: -10...+120°C
Buried depth	Not deeper than 5 meters (only for remote type sensors with IP68 protection)	
Immersion depth	Not deeper than 3 meters (only for remote type sensors with IP68 protection)	
Sensor cable	Suitable only for remote type instruments. The standard cable length is 10 m; flowmeters can be equipped with a cable of optional length up to 100 m.	
Temperature sensor	PT1000	
Serial communications	RS-485, HART,RS-232	
Output	Current (4-20 mA) , pulse , frequency , state switch	
Function	Empty pipe recognition, electrode contamination	
Graphic display	Monochrome LCD, white backlight; Size: 128*64 pixels	
Display function	2 measurement value pictures (measurements, condition, etc)	
Language	Chinese/ English/Spanish (Spanish version can be customizable)	
Unit	You can configure the menu to select the unit Refer to "6.5 Configuration details" --- "flow units 1-1"	
Operating unit	4 Mechanical keys (Compact Type) or 4 touch key (Remote Type)	
Temperature sensor measuring range	-20°C~120°C	
Medium temperature	Remote type	Compact type

Neoprene: -10...+60°C Polyurethane: -10...+60°C PTFE/FEP: -10...+120°C PFA: -10...+180°C	Neoprene: -10...+60°C Polyurethane: -10...+60°C PTFE/FEP: -10...+120°C PFA: -10...+120°C
Maximum measurement error	±0.1°C (Within the measuring range of temperature sensor)
Temperature	-10°C - 55°C for Compact-Type Flowmeter -10°C - 60°C for Converter of Remote-Type Flowmeter -10°C – 55°C for Converter of Remote-Type Flowmeter
Storage	-40°C - 65°C
Water	Min. 20µS/cm (Actual electric conductivity should be greater than 50µS/cm)
Other	Min. 5µS/cm (Actual electric conductivity should be greater than 50µS/cm)
	Material
Sensor housing	Carbon steel, stainless steel 304, stainless steel 316L
Converter	Standard painted die cast aluminum
Cable gland	(M20*1.5) Polyamide
Cable material	Polyurethane
	Electrical Connections
Power supply	85-245 VAC, 50/60 Hz, 22-26 VDC
Power consumption	Max 15W
Insulation resistance	≥20MΩ
Signal cable	Apply only to remote type
Shielded cable	Signal section, wire: 0.5mm <sup>2</sup> Cu /AWG20
	Output
	Current output
Function	Measurement of volume and quality (in the case of constant density)
Setting	Scope 4-20mA Max 20mA Min 4mA
Internal voltage	24VDC
Loading	≤750Ω
	Pulse and frequency output
Function	Set up Pulse and frequency output
Pulse output	Basis Output pulse width: 0.25ms ~100ms Duty cycle: 50% (Pulse frequency ≥5Hz) Fmax ≤ 5000 cp/s Setting 0.001L – 1m <sup>3</sup>
Frequency	Max Fmax ≤ 5000Hz

	Setting	0-5000Hz
Passive	$U_{Outer} \leq 36VDC$	
Active	$U_{internal} \leq 24VDC$ $I \leq 4.52 \text{ mA}$	
	Status output	
Function	Output as alarm	
Passive	$U_{Outer} \leq 36VDC$	
Active	$U_{External} \leq 24VDC$ $I \leq 4.52mA$	

**Wiring**

Remote type



L, N:

100-240VAC power supply

GND :

Ground

ALM1, ALM2:

Relay out

POUT, PCOM:

Pulse/Frequency output

485A, 485B:

RS485 communication

IOUT, ICOM:

4-20mA output

TIA, TIB, TIC, TID:

Water supply temperature (Pt1000)

TOA, TOB, TOC, TOD:

Return water temperature (Pt1000)

EXT1, EXT2:

Excitation signal

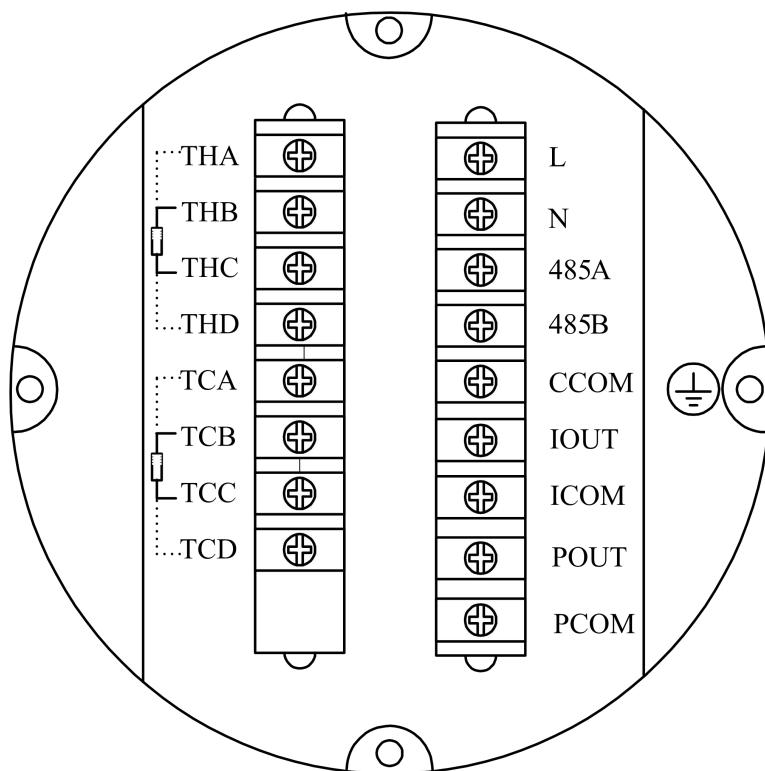
SIG1, SIG2, SGND:

Electrode signal

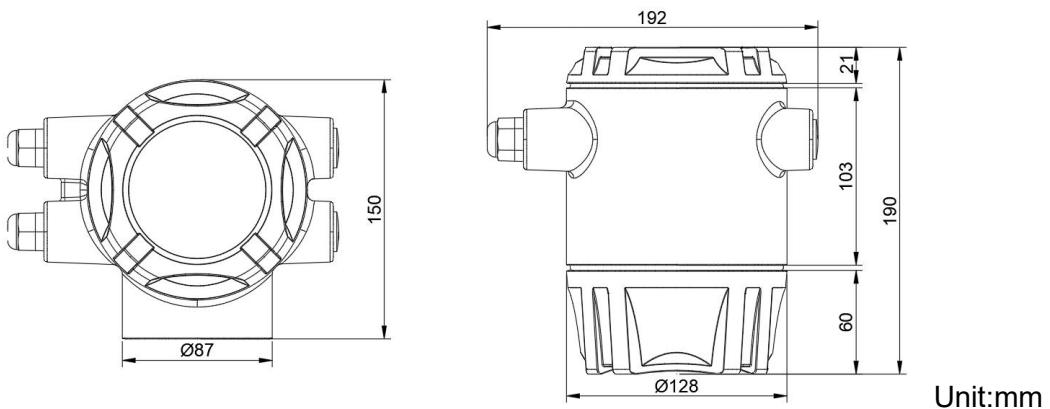
DS1, DS2:

Electrode shield

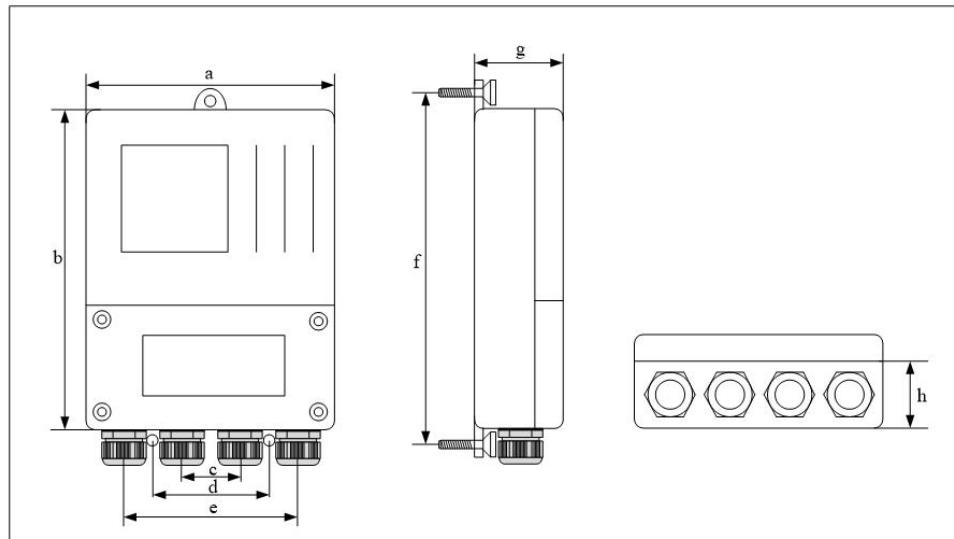
Compact type



L, N: 100-240VAC power supply  
485A, 485B: RS485 communication  
IOUT, ICOM: 4-20mA output connection  
POUT, PCOM: Pulse/Frequency/Relay out  
THA, THB, THC, THD: Water supply temperature (Pt1000)  
TCA, TCB, TCC, TCD: Return water temperature (Pt1000)  
CCOM: RS485 communication ground  
⊕ : Converter instrument grounding protection  
(Note: the left terminal is the BTU meter terminal)

**Dimension**

Compact type



Remote type

Dimension[mm]								Weight[Kg]
a	b	c	d	e	f	g	h	
164	214.5	34	70	102	233.5	69.7	45.7	0.6

Dimensions for electromagnetic flowmeter

Table 1

DN	a	bf	D	Do	n*A	Pressure resistance
15	200	326	95	65	4*14	1.6 MPa
20	200	326	105	75	4*14	
25	200	316	115	85	4*14	
32	200	331	135	100	4*18	
40	200	339	145	110	4*18	
50	200	358	160	125	4*18	
65	200	370	180	145	4*18	
80	200	389	195	160	8*18	
100	250	410	215	180	8*18	
125	250	440	245	210	8*18	
150	300	469	280	240	8*23	
200	350	522	335	295	12*23	
250	450	824	405	355	12*25	
300	500	624	440	400	12*23	
350	550	1029	500	460	16*23	
400	600	737	565	515	16*25	1 MPa
450	600	786	615	565	20*25	
500	600	839	670	620	20*25	
600	600	944	780	725	20*30	
700	700	1052	895	840	24*30	
800	800	1164	1015	950	24*33	
900	900	1264	1115	1050	28*33	0.6 MPa
1000	1000	1374	1230	1160	28*36	
1200	1200	1589	1405	1340	32*33	0.6 MPa

## Installation

### (1) Installation direction

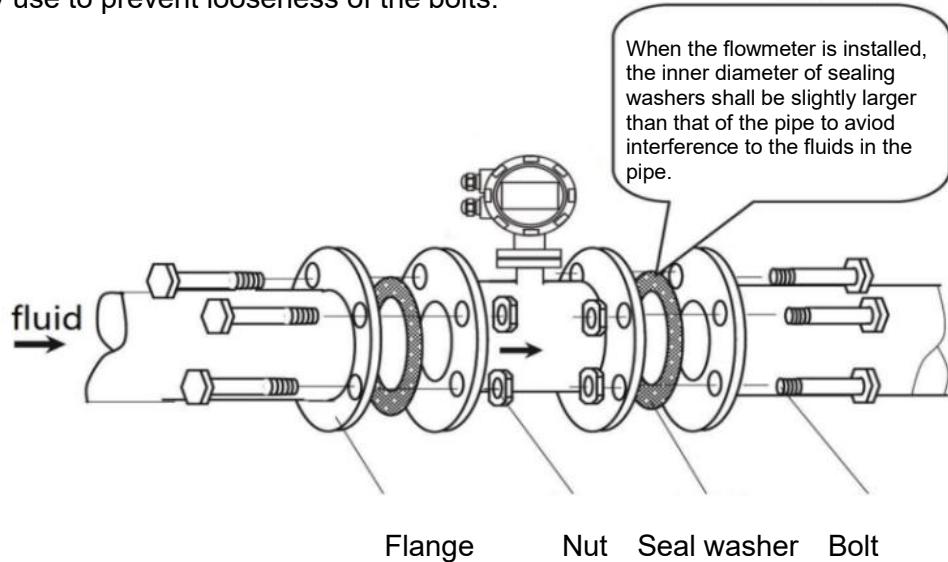
The flow direction of the measured fluid shall be consistent with flow direction mark indicated on the flowmeter.

(2) Seal gaskets installed between flanges shall have good corrosion resistance and shall not protrude into the interior of the pipe.

(3) When welding or flame cutting is performed adjacent to sensor pipe, isolation measures shall be taken to prevent the lining from being deformed due to heat.

(4) If it is installed in a well or immersed in water, apply sealant on the terminal box of the sensor after the system is installed and debugged. (If the protection level of the electromagnetic flowmeter is IP68 at type selection, it has been subject to water-proof sealing.)

(5) When the flowmeter is installed on the field, use bolts to connect the flange on the sensor to that on the pipe. Bolts, nuts and their threads for securing meters shall be complete and free of damage and well lubricated. Use them with suitable flat washers and spring washer. A torque wrench shall be used to tighten the bolts according to the flange size and torque. Regularly tighten the bolts during daily use to prevent looseness of the bolts.



## Ordering code

SUP-XXX -M1-DN50-J1-D2-I2-V1-P3-T1-E1-L2-G2-B1-IP1										Description
LDGR-SUP	-	-	-	-	-	-	-	-	-	
Nominal Diameter	15									DN15(1/2")
	20									DN20(3/4")
	25									DN25(1")
	32									DN32(1.25")
	40									DN40(1.5")
	50									DN50(2")
	65									DN65(2.5")
	80									DN80(3")
	1C									DN100(4")
	1E									DN125(5")
	1G									DN150(6")
	2C									DN200(8")
	2G									DN250(10")
	3C									DN300(12")
	3G									DN350(14")
	4C									DN400(16")
	4G									DN450(18")
	5C									DN500(20")
	6C									DN600(24")
	7C									DN700(28")
	8C									DN800(32")
	9C									DN900(36")
	A0									DN1000(40")
Process Connection standard	J									JB/T 81 Flange
Nominal pressure	I									ISO2852 Clamps
	X									other
Process connection and body materials	A									PN6
	B									PN10
	C									PN16
	D									PN25
	E									PN40
	F									PN63
	X									other
accuracy	MC									Carbon Steel CS
	M1									304SS
	XX									other
Output and power supply	N									2.0class
	AA									4-20mA + Pulse + RS485, 220VAC
	AB									-20mA+HART+Pulse, 220VAC
	AM									4-20mA+Pulse+RS485,

	AK			24VDC 4-20mA+HART+Pulse, 24VDC
electrode material		M3 MF MG T1 T2 MH MJ	N6	316LSS Hastelloy B Hastelloy B Hastelloy C Titanium (Ti) Tantalum (Ta) Platinum-Iridium Alloy (Pt)
lining material			N1	Polytetrafluoroethylene (PTFE) -10 to 120°C
			N2	Chloroprene Rubber (CR) -10 to 70°C, not selectable for DN15-DN40
			N7	Polyurethane (PU) -10 to 60°C, selectable only for DN15-DN600
Electrical interface, housing material and protection class			WA	Teflon F46/FEP -10 to 120°C, selectable only for DN15-DN500
			WC	‣ Integrated, M20×1.5 Cable Gland, Aluminum Alloy, IP65 ‣ Remote, M20×1.5 Cable Gland, Aluminum Alloy, IP68
Split Cable Length		00 10 15 20 25 30 40 50 XX		0m 10m 15m 20m 25m 30m 40m 50m other
Accessories	PA			Matching PT1000 Temperature Sensor
	PB			Matching Flange - Carbon Steel (CS), including bolts and gaskets
	PC			Matching Flange - 304SS
	PE	‣		‣ Matching Grounding Ring - 316LSS
	PF	‣		‣ Matching Grounding Ring - Titanium (Ti)