

ULTRASONIC HEAT METER

LXC Series -Installation & Operation Instruction



Heat Meter Work Principle and Structure

1. Heat meter definition

Heat meter is one kind of meter which measure and display heat energy when water flows through the heat exchange system.

2. Working principle

When the water flows through the heat meter which installed in the heat exchange system, then meter's calculator calculates and display the release or absorption of heat according to flow quantity from the flow sensor and the temp. signal of Inlet and Return flow from matching temp. sensors, and the water flow through time.

3. The advantages of ultrasonic heat meter

- a. Adopt imported precision electronics components, high measurement accuracy, low power consumption, good stability
- b. No dirt deposited dead angle, no impurities by the medium, chemical material and the interference of magnetic materials, suitable for our country water quality
- c. Measurement mechanism has no moving parts, then never wear, long service life
- d. Minimal loss of pressure, to improve heating quality
- e. M-bus and rs-485 double remote transmission modes
- f. Using in wide range, both for cold and hot water

4. The key components of ultrasonic heat meter

a. Ultrasonic Flow sensor

Installed in the heat exchange system, this part collect water flow quantity and send the signal.

b. Temperature sensor(PT1000)

One pair of metrological characteristics consistent or similar temperature sensor respectively measure the inflow and ouflow temperature in the heat exchanging system on the same heat meter.

c. Calculator

Receiving the signals from the flow sensor and matching temperature sensors, then calculating, storage and display the heat (cold) value in the heat exchanging system.

d. LCD display

Mainly display the heat, flow rate, temperature, time and other information

e. Battery

Power supply for the calculator

LXC Series Heat Meters - upto 500 mm

Compliance of Technical Data As Per Standards Mentioned	
General	
Measuring Accuracy	Class 2 (EN1434) MID Complied
Environment Class	Class-A (EN1434 for indoor installation)
Mechanical Class	MI*
Electromagnetic Class	E1*
Ambient Humidity	<93% RH without condensation
Max installation Altitude	2000m above sea level
Storage Temperature	-20°C - 60°C
BTU Calculator	
Ambient operating temperature	5°C - 55°C
Housing Protection Rating	IP54 according to EN60529
Operation Threshold	0.5K
Temperature Difference	3 K - 70 K
Temperature Measurement Range	0°C - 99°C
LCD	9 Digits
Optical Interface	Standard
Communication	M-Bus or Modbus RTU
Temperature Sensor	
Type	PT1000 (Optional PT500/PT100)
Temperature Range	0°C - 105°C (up to 1.5 m overall length)
Flow Sensor	
Protection Class	IP67
Mounting Place	Return Line
Installation Position	Any
Flow Straightening	The sensor installation point is best to meet Upstream 10D, Downstream 5D;30D from the pump outlet (D is the pipe Diameter).
Dynamic Measuring Range	(1:100)
Temperature Range	4°C - 95°C
Cooling Application	5°C - 50°C
Nominal Pressure	PN16 (Optional PN25)
Maximum Overload	2 X qp-30 Seconds



Technical Specification LXC Series

Virtec

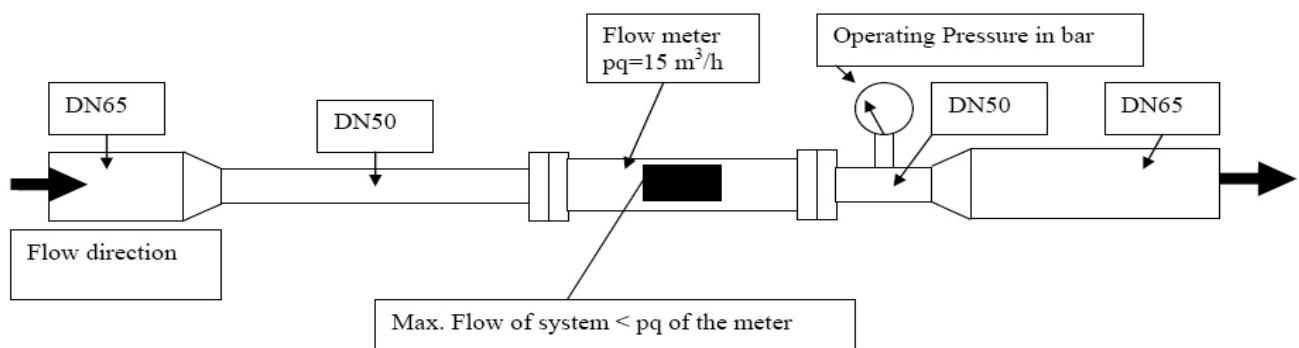


MODEL	DN(MM)	Nominal Flow qp (m³/h)	Min. Flow qd(cut off) (m³/h)	Min. Flow qi (m³/h)	Max.Flow qs (m³/h)	Connection	Material	ΔP	PN
LXC-15	15	1.5	0.015	0.03	3	Threaded	Brass	0.100	PN-16
LXC-20	20	2.5	0.025	0.05	5	Threaded	Brass	0.095	PN-16
LXC-25	25	3.5	0.035	0.07	7	Threaded	Brass	0.093	PN-16
LXC-32	32	6	0.06	0.12	12	Threaded	Brass	0.091	PN-16
LXC-40	40	10	0.10	0.2	20	Threaded	Brass	0.092	PN-16
LXC-50	50	15	0.15	0.60	30	Flanged	Carbon Steel	0.073	PN-16
LXC-65	65	25	0.25	1.00	50	Flanged	Carbon Steel	0.062	PN-16
LXC-80	80	40	0.40	2	80	Flanged	Carbon Steel	0.060	PN-16
LXC-100	100	60	0.60	2	120	Flanged	Carbon Steel	0.075	PN-16
LXC-125	125	100	1.00	4	200	Flanged	Carbon Steel	0.080	PN-16
LXC-150	150	150	1.50	6	300	Flanged	Carbon Steel	0.075	PN-16
LXC-200	200	250	2.50	10	500	Flanged	Carbon Steel	0.070	PN-16
LXC-250	250	400	4.00	16	800	Flanged	Carbon Steel	0.010	PN-16
LXC-300	300	600	6.00	24	1200	Flanged	Carbon Steel	0.015	PN-16
LXC-350	350	750	7.50	30	1500	Flanged	Carbon Steel	0.012	PN-16
LXC-400	400	1000	10.00	40	2000	Flanged	Carbon Steel	0.012	PN-16
LXC-450	450	1200	12.00	48	2400	Flanged	Carbon Steel	0.012	PN-16
LXC-500	500	1500	15.00	60	3000	Flanged	Carbon Steel	0.012	PN-16

*Pressure Rating PN-25 is optional. Battery: Lithium-Ion, upto 16 Years on Mbus ,Dynamic Flow range is 1:100(qd/qp)

Only Qp, Qi and Qs values shall be printed on calculator

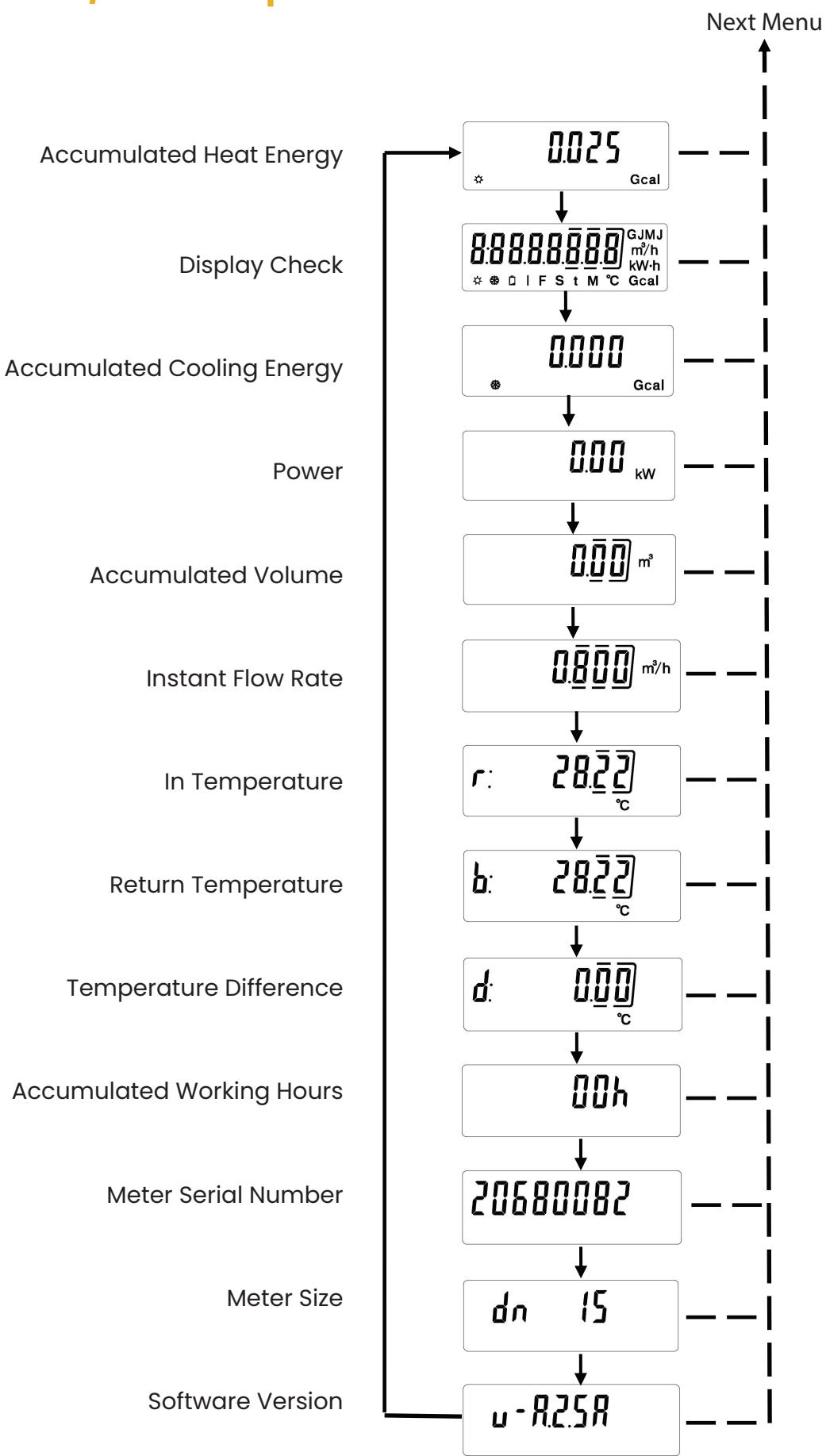
* The importance of accurate meter dimensioning



How to dimension your Virtec flow sensor accurately:

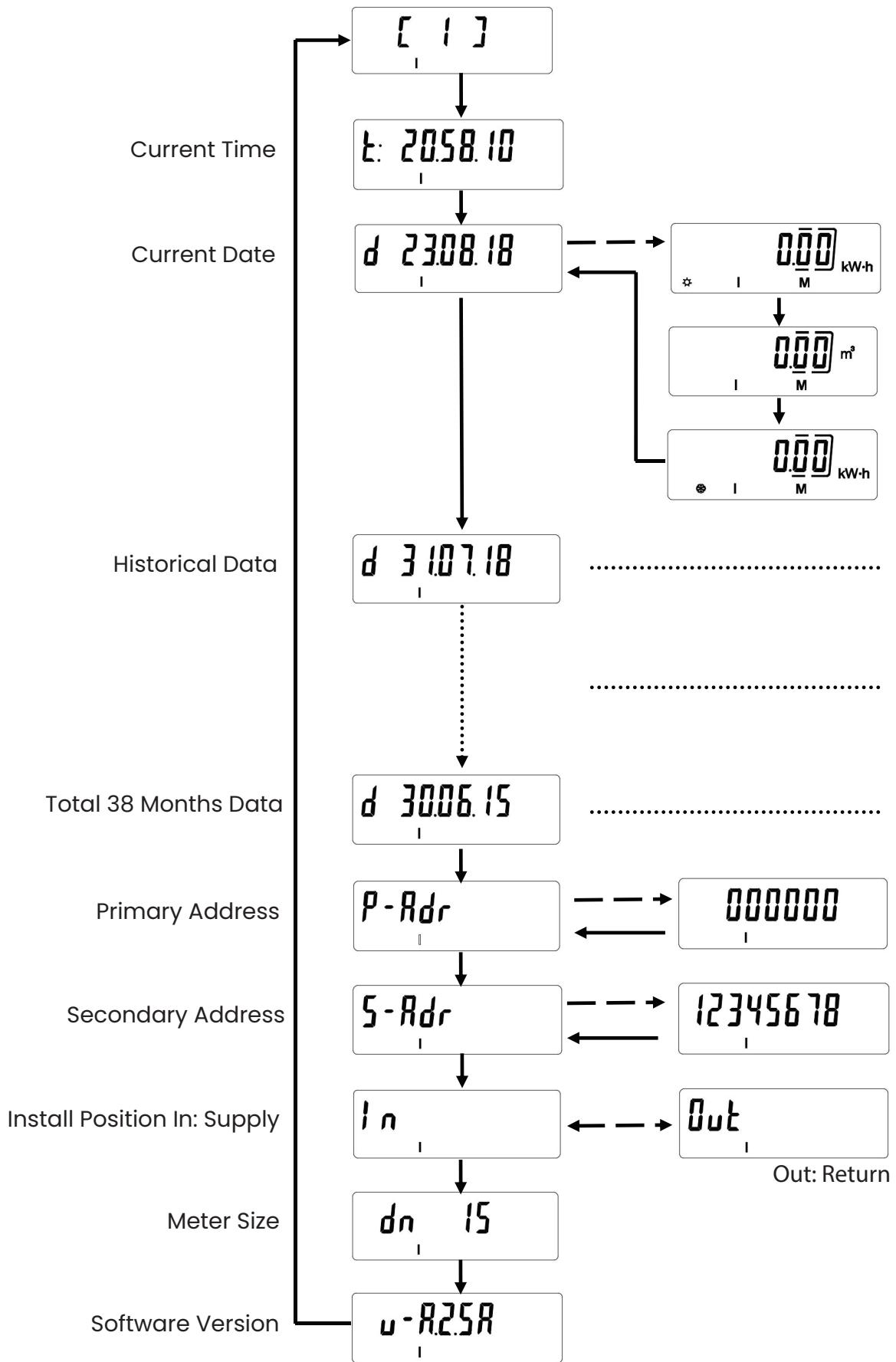
When dimensioning your meter, two major conditions must be considered: Pipe dimension and maximum flow of the system. Regarding pipe dimension, going one dimension up or down in meter size will in general cause no problems, as long as the second parameter, the maximum flow does not exceed the nominal flow of the flow meter. Maximum flow of the system must be obtained without exceeding the nominal flow.

Level 1 / Main Loop

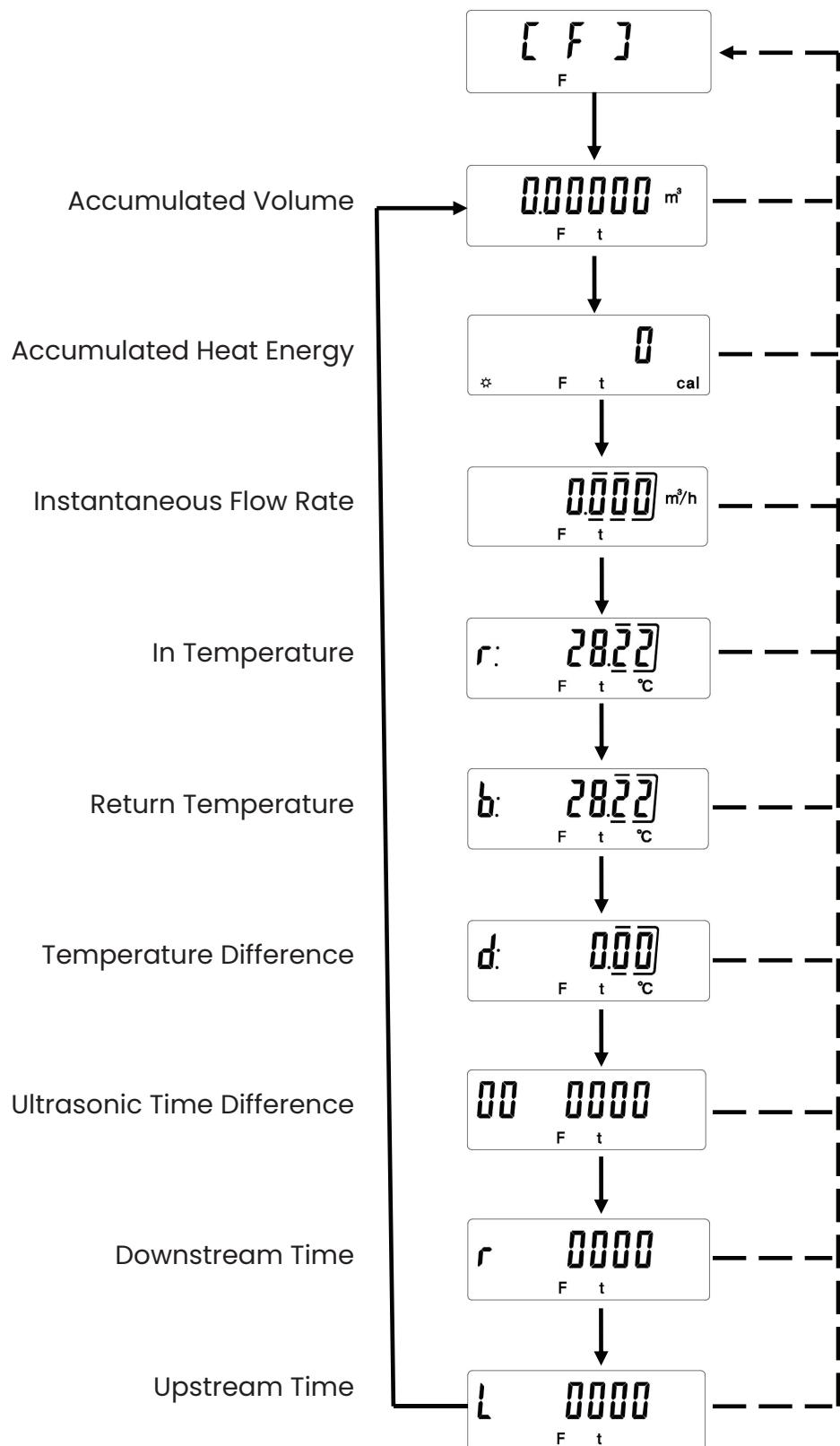


— — — Long Press > 3sec. Short — — — Short Press < 3sec.

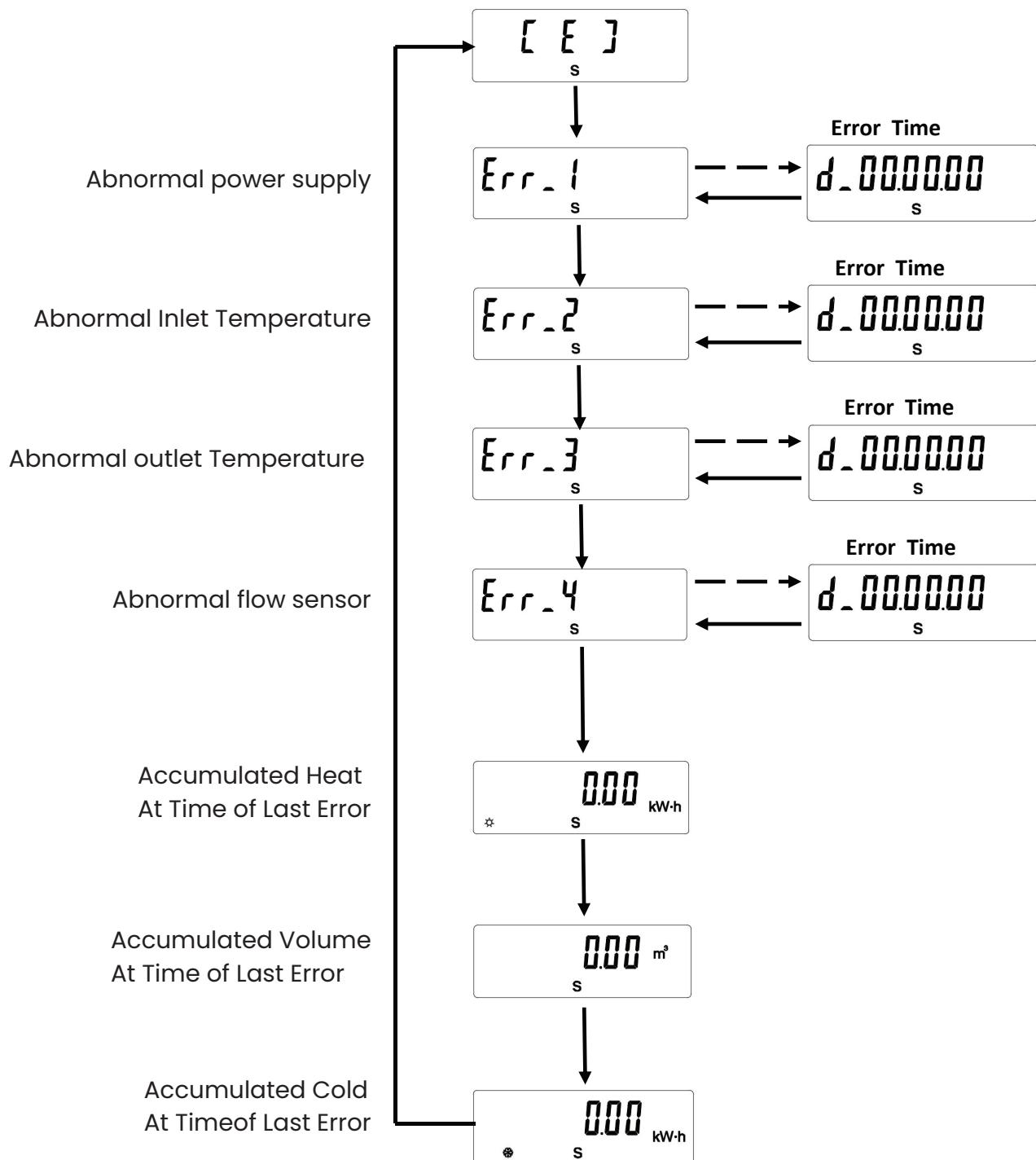
Level 2 /Information



Level 3 / Test Loop

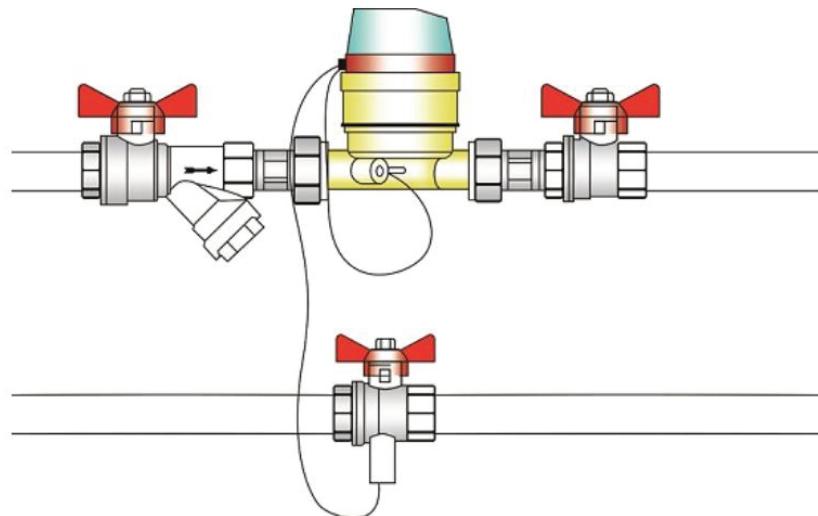


Level 4 / ErrorMen



General Requirements for Installation and Operation

1. Attention: The installation instructions for trained personnel, therefore there isn't introduce the basic operation steps, thermal cycle system must be mechanical forced circulation system, the natural heat circulation system can't satisfy the requirement of the heat meter pressure loss.
2. Heat meter must be installed in dry accessible place.
3. Using professional installation tools to install the heat meter.
4. The heat meter both can be installed in Inflow pipe or Return flow pipe (factory default installed in the inflow pipe, if need to install on the return pipe, must be clearly indication before the factory during the production). When installation, should pay attention to the flow direction of medium is as the same as the arrow on the heat meter pipe body. Special note: no matter the heat meter installed on inflow pipe or return flow pipe, the temperature sensor should be properly connected (red label for inflow pipe, blue label for return pipe).



Household heat meter installation picture

5.The installation position of heat meter ◇ In the pic, the M-1,M-2 show the right installation (M-1 is horizontal installation M-2 is vertical installation), The heat meter installed in the bottom of the pipeline, there is back pressure behind the meter, won't produce bubbles affect measurement accuracy. ◇ In the picture, M-3,M-4 show the wrong installation, M-3 easy to accumulate bubbles, affects the accuracy of measurement, M-4 although vertical installation, but there is not back pressure in the behind of meter, may cause the fluid cannot be completely full of pipes, affect measurement accuracy.

6.When install the heat meter, front straight pipe length should not be less than 5 times of the pipe diameter, back straight pipe length should not be less than 2 times of the pipe diameter (see:《JGJ 173-2009 heating metering technology rules》Article 6.3.4).

7.Pipe should be keep horizontal as much as possible, and pipeline's sectional area should be not big changes

8. In order to ensure the meter accuracy, the cable of temperature sensor shall not be cut short or make longer.
9. When the meter is vertical installation in the same position in each floor, between each meter should have partition wall, prevent pipeline leaking or other things falling to damage the meter.
10. Heat meter horizontal installation as the best location, which is beneficial to the meter is normal working.
11. Suggest the meter installed in special box, and with lock, in order to avoid Damage.
12. Replace the battery must by professional staff.

Attenions

1. Should be installed filters and valves in front and behind the
2. Before heat meter installation, should be clean pipe, and the system.
3. In the installation process of pipe, fittings and meters, must not use "linen silk" sealing the fitting, because when turning screws, the "linen silk" will cut off by thread, the broken part is easy to cause congestion with flow through the meter .
4. The meter has temperature sensor cable, when leave factory, no tighten. When installation, the cable should tighten, in order to avoid leaking (note: the meter installed in inflow temperature senor when the meter in the factory, according to the actual situation to properly installed the inflow or return flow temperature sensor).
5. After installation, all parts should test, check
6. The lead seal on the ultrasonic heat meter cannot be damaged. If the seal is damaged, the manufacturer will not ensure the
7. Abnormal using condition (artificial and bad using environment, etc) caused by damage of ultrasonic heat does not belong to free warranty, when installation, should peruse the discipline, careful operation;

The meter cannot work normally

1. Heating system is working or not ;
2. Globe valve is opened entirely or not ;
3. The pipe is blocked or not;
4. The pipe is blocked or not;
5. The lead seal is complete or not;
6. Battery is good or not ;

Heat meter isn't counting

1. Heat meter reversed installation
2. Transducer cables are broken
3. The filter is be blocked on heat supply pipe of in the resident room

How to determine the filter whether block?

Inflow temp. is normal, return flow temp. is too low, the temp. difference of inflow and return flow is more than 10°, flow rate is too low (m³/h), or now flow rate, usually the filter is blockage, or user does not use

Solution: Close the valve (inflow and return flow valve), remove the filter, to observe whether filter is black, clean filter and inside of it, then install the filter, open pipe valves, wait 3 mins to check whether the flow rate and temp. is normal.

Heat meter data abnormal or jumping

1. Installation position is not correct, down water level
2. Front and back straight pipes are too short, bend is too big, front pipe diameter is changing bigger.

Heat meter has flow quantity, no heat, or heat is very big

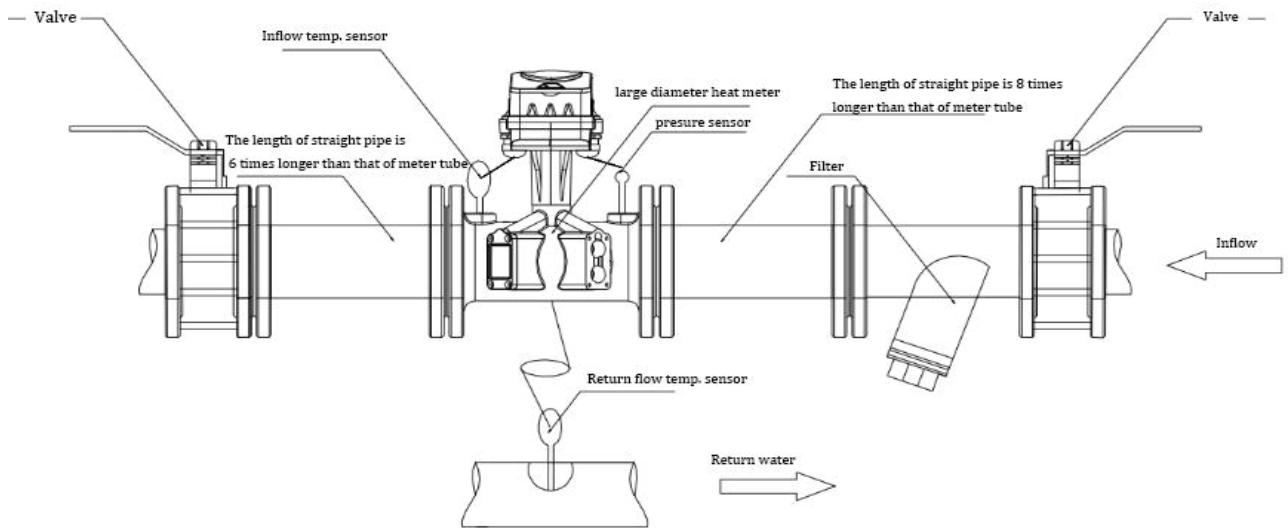
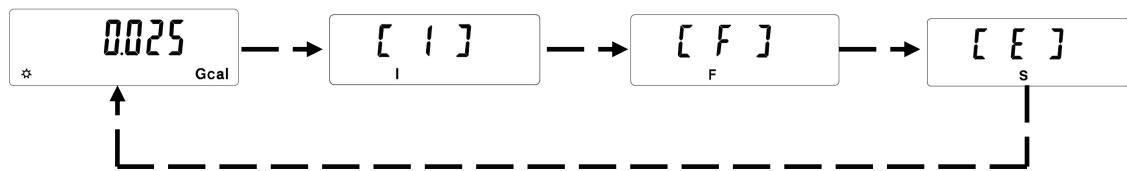
1. Without heat is usually reversed installation of inflow and return flow temp. sensors
2. Heat is very big, because the temp. sensor measure temp. incorrectly, temp. difference is very big

Heat meter abnormal temp., or the temp. is 0

1. The temp. sensor cable is broken
2. Temp. sensor stainless steel casing is broke

Functions and Directions

According to actual use environment, the meter intelligent measures quantity of heat or cool. Heat meter main menu display, accumulated heat (kWh), accumulated cool (kWh), accumulated flow quantity (m³), flow rate (m³/h), inflow temp. (°C), return flow temp. (°C), Temp. difference of inflow and return (°C), Meter no., accumulated working time and display current date, system reading meter date, storage of 38 months operation data (heat and cool quantity, and flow quantity), low battery and automatic diagnosis error function, with IR and MBUS remote interface, can realize remote reading meter function, convenient save operation cost management

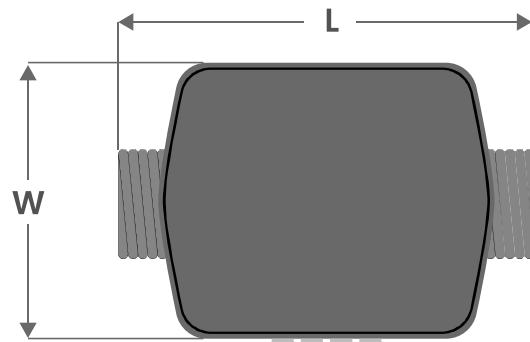
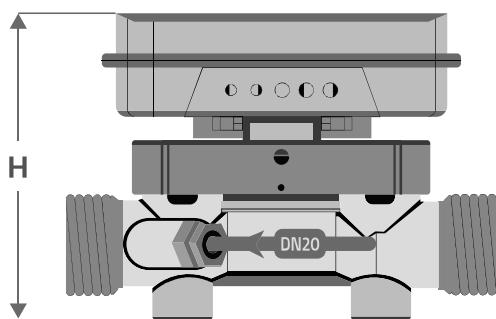


Household heat meter installation picture

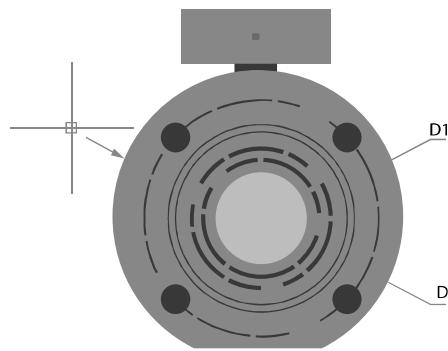
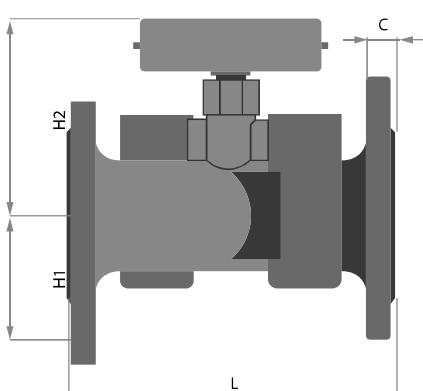
Mounting Details- LXC Series



Dimension - A



Dimension - B



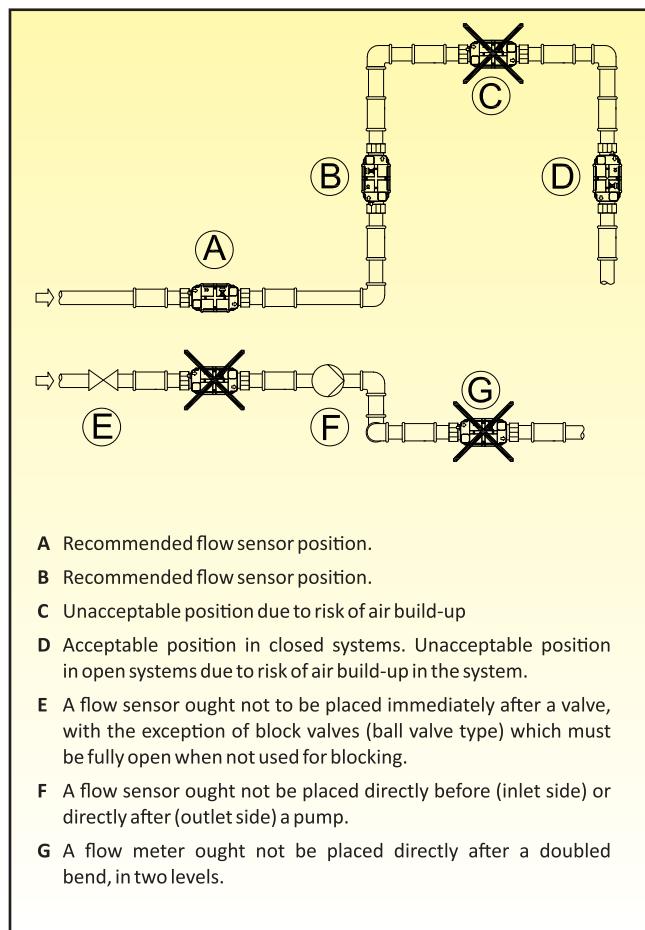
Threaded Series-Dimension A

MODEL	L (mm)	W (mm)	H (mm)	Weight-Kgs
LXC-15	110	85	85	1
LXC-20	130	85	95	1.1
LXC-25	160	85	105	1.2
LXC-32	180	85	105	2.1
LXC-40	200	85	115	3

Flange Series- Dimension B

MODEL	L (mm)	H1 (mm)	H2 (mm)	C (mm)	D (mm)	D1 (mm)	Bolt Hole	Weight (Kg)	Pressure
LXC-50	200	72	115	18	165	125	4 - ø 18	7.2	PN-16
LXC-65	200	78	125	18	182	145	4 - ø 18	7.8	PN-16
LXC-80	225	88	132	20	197	160	8 - ø 18	9.2	PN-16
LXC-100	250	98	142	22	218	180	8 - ø 18	12.2	PN-16
LXC-125	250	116	155	22	245	210	8 - ø 18	16.5	PN-16
LXC-150	300	135	165	24	283	240	8 - ø 22	22.5	PN-16
LXC-200	350	162	193	24	335	295	12 - ø 22	30	PN-16
LXC-250	450	195	225	26	405	355	12 - ø 26	56	PN-16
LXC-300	500	223	250	28	460	410	12 - ø 26	85	PN-16
LXC-350	500	250	280	30	520	470	16 - ø 26	110	PN-16
LXC-400	500	280	310	32	580	525	16 - ø 30	145	PN-16
LXC-450	500	310	340	40	640	585	20 - ø 30	178	PN-16
LXC-500	500	348	378	44	715	650	20 - ø 33	202	PN-16

Installation Recommended





Setting Trends



Virtec is one of the global leaders providing Heat & Flow management solutions in HVAC & Water applications. The solutions are based on two measuring technologies, Ultrasonic & Electromagnetic principle. Our high-end services and cutting-edge product solutions in this field have made us the leading providers of technologically advanced Heat and Flow measuring instruments.



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