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SENSONICAL ULTRA heat meter

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CAL19185M series

Technical specifications

Connection	3/4" M
Probe connection	M10x1
Nominal pressure	PN 16
Measurable working temperature range	3–90°C
Type of probes	Pt 1000 with platinum precision resistance element
Probe cable length	1,5 m
Type of volume meter	ultrasonic
Nominal flow rate	2,5 m^3/h
Sensitivity	12 l/h
Protection class	IP 54
Power supply	3V lithium battery, life > 10 years
Data reading	via button-activated LCD
Data transmission interface	M-Bus
Data memory	E^2PROM
Working ambient temperature	5–55°C
Storage temperature and conditions	5–45°C without humidity
Accuracy class	Dir.2004/22/EC - class 2
Marks	CE for measuring instruments and electromagnetic compatibility
Manufacturer certificate	ISO 9001

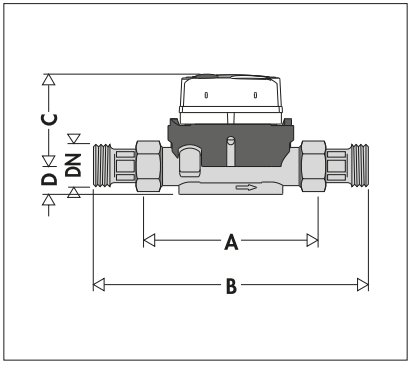
Product range

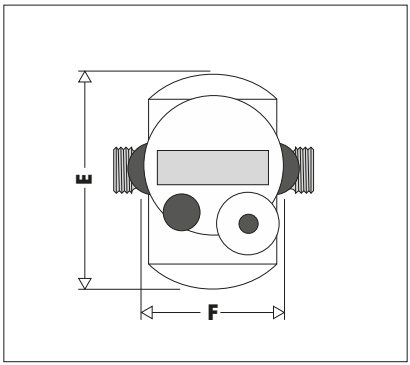
CAL19185M M-bus heating/cooling energy meter.

CAL19185MI M-bus heating/cooling energy meter with 2 pulse inputs.

CAL19185MU heating/cooling energy meter with 1 pulse output.

Dimensions





DN	A	B	C	D
3/4"	130	226	68	19

E	F
110	75

Contents of the pack

No.1 heat meter consisting of: detachable electronic unit, volume meter, two temperature probes. All these parts are permanently connected to each other.
No.1 instruction sheet for installation.
No.1 sealing kit for flow probe and hydraulic section.
No.2 3/4" M tailpiece-nut fittings

Installation

Preliminary recommendations

Comply with the **following instructions** for installation and examine the **installation diagram**. Failure to observe these instructions may invalidate warranty and correct measurement of the thermal energy.

1 Installing the SENSONICAL ULTRA series heat meter requires fitting the probe holder valve code CAL19180 or the TEE code CAL19181 in the system on the flow pipe, observing all the instructions on the relevant instruction sheet.
2 The flow temperature probe must be inserted in the probe holder valve or in the TEE so that it reaches the centre of the pipe. Make sure that the probe **does not touch** the bottom. The immersion depth can be adjusted by means of the nipple.
3 The SENSONICAL ULTRA meter must be installed by technically qualified personnel.
4 The meter must be positioned on the pipe at a distance of more than 200 mm from motors, switches and regulators and more than 50 mm from electrical cables in compliance with the requirements of the EC directive on electromagnetic compatibility and to ensure interference-free operation.
5 Flush the system before inserting the hydraulic section.
6 The **correct positioning** of the hydraulic section of SENSONICAL ULTRA is on the return pipe; attention must be paid to **observe the correct direction of the flow**. The temperature probe not sealed to the template of the volume meter must **necessarily** be inserted in the pocket of the valve CAL19180 or TEE CAL19181 on the system flow line. Consider also that the length of the flow probe cable is equal to 1.5 m and that it **can be neither extended nor shortened**; if it is too long, it is advisable to wind it and secure it with a plastic cable tie. Before and after the meter there must be **shut-off ball valves** in case it needs to be replaced or inspected. A strainer upstream of the system is necessary in order to prevent any blockages.
7 We recommend installing a venting device: air bubbles can cause measurement errors.
8 Clean the instrument only if required using a cloth moistened with water.
9 When positioning, consider the risk of water dripping onto the electronic component of the heat meter.

Installation – Volume meter

a Close the upstream and downstream shut-off valves nearest to the point where the SENSONICAL ULTRA heat meter is to be installed.
b Open the nearest drain valve to decrease the pressure.
c Remove and empty the tube portion where the hydraulic section of the SENSONICAL ULTRA is to be installed.
d Take out the old seals and remove any residues.
e Position the new seals.
f Install the volume meter on which the tailpiece-nut fittings have previously been secured observing the direction of the flow (check the direction of the arrow on the instrument).
g Tighten the fitting to a suitable torque for the seal supplied.
h Turn the electronic unit into the correct position for reading.

Installation – flow temperature probe

a If installing in a dedicated probe holder valve, close it, if in a probe holder TEE, close the nearest shut-off valves.
b Remove the cap on the probe connection and clean the surfaces to remove any residues.
c Remove the O-ring from the probe and place it on the probe connection of the ball valve/TEE.
d Insert the probe and adjust its depth of immersion by means of the nipple.
e Tighten until it stops.

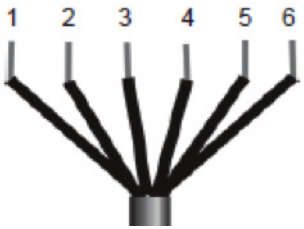
Commissioning the meter

a Slowly open the shut-off device, check the hydraulic tightness and functionality of SENSONICAL ULTRA, and clean the electronic unit if needed.
b Verify the operation of the display by pressing the front button.
c After verifying the instrument works properly, apply the seals on the temperature probes and on the volume section of the flow meter.
d In case the heat meter has to be replaced, note the last displayed consumption data and the serial number of the instrument being replaced and of the new one as well as all the previous readings stored in the instrument deemed necessary.

Connecting the two additional pulse inputs (CAL19185MI)

The pulse inputs enable acquiring the consumption of hot and cold water from two volume meters, according to the following wiring diagram:

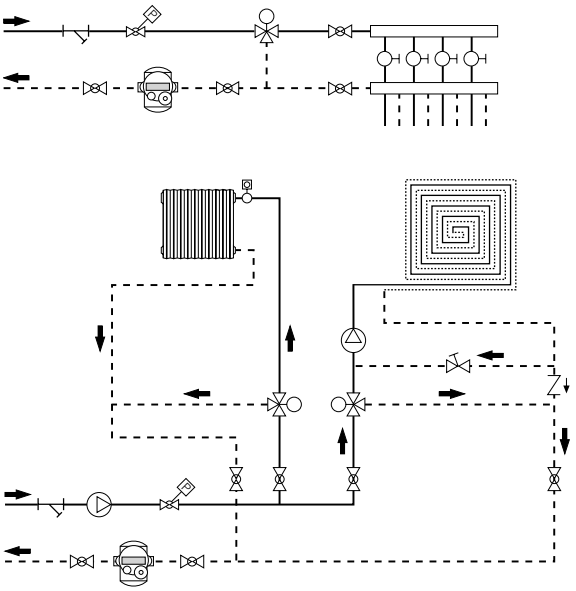
Conductor	Colour	
1	white	IE1 +
2	brown	IE1 -
3	yellow	IE2 +
4	green	IE2 -
5	grey	M-Bus
6	pink	M-Bus



IE: pulse input

In pulse emitters with an open collector output it is mandatory to respect the polarity. During installation, the **conductors must not touch one another to avoid that the instrument logs the pulses.**

Installation diagrams



CAL1918 series ultrasonic heat meter

Probe holder ball valve for SENSONICAL ULTRA

Circulation pump

Three-way valve

Ball valve

Balancing valve

Check valve

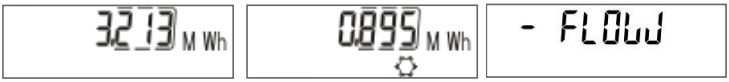
Strainer

NB: Failure to observe these instructions for proper installation can impair operation and invalidate warranty.

Display readings and information

The electronic unit is equipped with a liquid crystal display with 8 digits and special characters. The data that can be displayed are split into three levels and can be viewed using the selection button. The standard mode (without pressing the button) shows the total heating and cooling energy consumption since the startup of the instrument (alternating views).
The main level is automatically displayed first. Pressing the button for more than 4 seconds takes you from one level to another.
Pressing briefly the button allows you to scroll through the data for each level.
If the button is not pressed for one minute the main level is automatically displayed.

1 - Main Level



1 Total heating and cooling energy consumption and any error message (alternating view)

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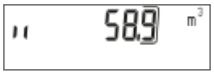
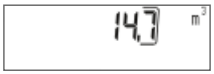
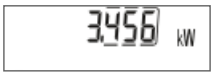
2 Segment test



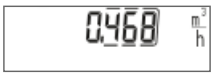
3 Date of last readout alternating with relative heating/cooling energy consumption and pulse input meters[1]



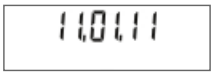
4 Total volume in m^3



5 Instantaneous power in kW



6 Instantaneous flow rate in m^3/h

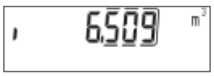


7 Current date in format DD.MM.YY

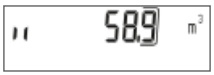
8 Error Message (alternating binary and hexadecimal displaying)

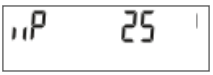
... 9 Not used

... 10 Not used



11 Reading of the 1st pulse meter[1] alternating with the weight of the pulse (in litres)





12 Reading of the 2nd pulse meter[1] alternating with the weight of the pulse (in litres)

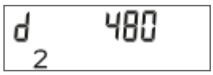
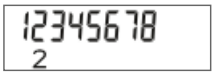
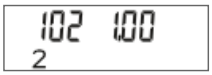
2 - Technical level

1 Maximum power in kW

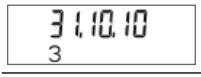
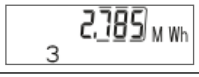
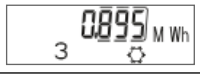
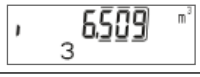
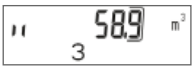
2 Maximum flow rate in m^3/h

3 Flow temperature in °C

4 Return temperature in °C

	5 Temperature difference
	6 Days of operation since setting
	7 Probe model and installation position (R=return, U=inlet)
	8 M-bus address
	9 Serial number of the heat meter
	10 Firmware/software release

3 - Statistical level

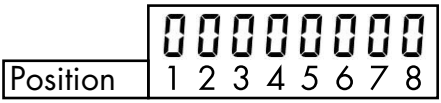
   	
	1 Date of last readout alternating with relative heating/cooling energy consumption and pulse input meters [1]
...	2-16 Monthly values: date of last reading alternating with relative heating/cooling energy consumption and pulse input meters[1]

[1] available on CAL19185MI

Error codes

When the instrument detects an error it displays the error symbol and the relevant code.

The error can also be displayed by selecting item 8 “error message” on the main level.
The instrument detects eight causes of error, indicated by the number 1 in the eight-digit code of the error message. These causes of error can also occur together. The position of the number “1” in the error message corresponds to a cause, as specified below.



Error indicator	Description	Hexadecimal code
“1” in position 1	Low battery	80
“1” in position 2	Check-sum error	40
“1” in position 3	E²PROM error	20
“1” in position 4	Reset	10
“1” in position 5	Coil error	08
“1” in position 6	Reference probe failure	04
“1” in position 7	Return probe error	02
“1” in position 8	Flow probe error	01

Example:

In the binary view there is a “1” in the fifth position: Coil error.

If an error, except for Reset, appears in the **standard view** (total thermal energy), the instrument must be replaced and sent to the supplier to be checked.

Error description

Error	Result	Possible cause
Check sum	No calculations are performed. The flow rate and energy logs are not updated.	Defective component
E²PROM	After resetting the instrument, it doesn’t work.	Defective component
Reset	The measurements since the last data saving into the E²PROM memory have been lost (maximum one day).	EMC – electromagnetic interference
Coil error	No calculations are performed. The flow rate and energy logs are not updated (the new data are not saved).	1. No water in the meter 2. Air in the medium 3. Transducer failure / damaged cables
Internal setting	No calculations are performed. The flow rate and energy logs are not updated (the new data are not saved).	Fault in the PCB of the electronic unit
Return probe failure	No calculations are performed. The flow rate and energy logs are not updated (the new data are not saved).	Probe cable cut or short-circuited
Flow probe failure	No calculations are performed. The flow rate and energy logs are not updated (the new data are not saved).	Probe cable cut or short-circuited

Data transmission interface

The instrument is not powered by the M-Bus interface and is equipped with galvanic isolation. In a M-bus network with a maximum of 250 instruments, it is possible to perform 24 readouts a day for each instrument. If fewer readouts are carried out and/or if the number of instruments installed in the network (connected to the M-Bus system) is lower, any unused requests will be stored in the instrument to be used when needed.

Note:

- During communication via M-Bus, the selection button cannot be used.
- The M-Bus protocol complies with EN 13757-2, EN 13757-3, EN 1434-3 and M-Bus recommendation (Version 4.8, November 1997) – protocol IEC 870 parts 1, 2 and 4.
- None of the meters can withstand a voltage greater than that permitted by the bus voltage (± 50 V). Use a level converter/master as an additional protective measure.
- The instruments can be installed in an M-Bus network by authorized and qualified personnel only.
- Make sure that the structure of the M-Bus network (length and diameter of the cables) is compatible with the baud rate (2400 Baud) of the connected instruments.
- Recommended cable: telephone cable J-Y (ST) Y2 x 2 x 0,8 mm^2.

Safety information

CAUTION:
Failure to follow these instructions may result in personal injury or damage to property.

The device must be installed, commissioned and serviced by qualified technical personnel.
Make sure that all connecting fittings are watertight.
Water temperatures higher than 50°C may cause severe burns. When installing, commissioning and servicing the heat meter, take the necessary precautions so that these temperatures will not be hazardous for people.

NB: Failure to observe these instructions for proper installation can impair operation and invalidate warranty.

LEAVE THIS MANUAL AS A REFERENCE GUIDE FOR THE USER