

SENSONICAL ULTRA

compact direct heat meter

CAL1918 series



Complies with directive
2004/22/EC (MI004)



Products range

CAL19185M	SENSONICAL ULTRA heat meter 3/4" M 2,5 m³/h with M-Bus interface
CAL19185MI	SENSONICAL ULTRA heat meter 3/4" M 2,5 m³/h, M-bus and 2 pulse inputs
CAL19185MU	SENSONICAL ULTRA heat meter 3/4" M 2,5 m³/h, M-bus and pulse output
CAL19180	3/4" F probe holder ball valve fitted for lead sealing
CAL19181	3/4" F probe holder TEE fitted for lead sealing

Function

SENSONICAL ULTRA is a direct heat meter, designed for metering **heating/cooling energy** in systems with zone distribution of the thermal medium. The meter is specially designed to meter consumption in residential buildings.

The compact device consists of an electronic calculation unit, an ultrasonic flow meter and two temperature probes fitted for lead-sealing. The electronic control unit with display can be separated from the flow meter for easier reading. SENSONICAL ULTRA is extremely easy to install and needs no special maintenance (battery life is guaranteed for more than 6 years).

Unlike more conventional turbine flow meters, the flow rate meter on the SENSONICAL ULTRA heat meter is an ultrasonic unit with no moving parts. Combined with the electronics and materials used, this technology allows precise and reliable readings and makes the device far less susceptible to errors or faults caused by possible presence of debris in the medium. Meters are available for **nominal flow rates of 2.5 m³/h with 3/4" M connection**, equipped with a pair of pulse inputs (CAL19185MI) or with a pulse output (CAL19185MU).

The high-precision platinum resistance temperature probes (Pt 1000) are approved and can be easily secured with lead-seals for the maximum protection against tampering. The cable connecting the flow temperature probe to the calculation unit is 1,5m long. The SENSONICAL ULTRA heat meter is equipped with an eight digit LCD display with special characters. Pressing a button provides access to a series of technical and statistical data distributed on three levels to allow the device operating status and associated logged data to be checked. The possibility to check the progress of the cumulative consumption data is particularly important. The display of the device shows monthly consumption values for the past 15 months, complete with the recording date. Alternatively, with pulse inputs (CAL19185MI) the device can display the consumption logs of the water meters connected. The consumption data are accessible also by means of the M-Bus interface.

Technical specifications

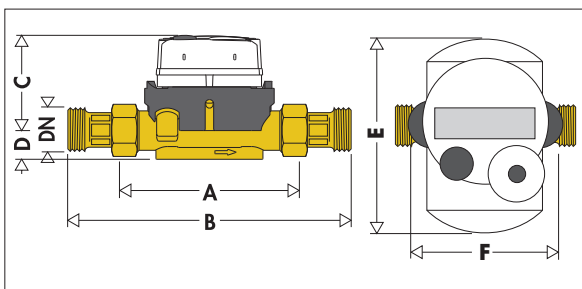
- Long-life battery (6 years + 1).
- No moving parts.
- Low pressure losses.
- Electromagnetic compatibility according to EN 1434.
- Conforms to directive 2004/22/EC (MI004)
- Certified by the manufacturer in accordance with ISO 9001.
- High protection class (IP 54).
- Fitted for lead sealing for tamper-proof protection.
- Extreme reliability and resistance to wear, thanks to modern manufacturing technology and the use of high quality materials.

Technical specifications

			SENSONICAL ULTRA CAL19185M/MI/MU
Temperature probes			
Length of flow probe	m		1
Length of return probe	m		1,4
Flow meter-electronic unit cable length	cm		70
Platinum resistance temperature probe			according to DIN IEC751: PT1000
Temperature probes connection			M10x1
Temperature probes maximum diameter			Ø 5,2 mm, with probe holder valve CAL19180
Flow meter			
Connection			3/4" M
Diameter	DN	mm	20
Length		mm	130 (226 with fittings)
Nominal flow rate	q_p	m³/h	2,5
Pressure loss at q_p	Δp	bar	0,115
Starting flow rate		l/h	12
Lower measurement range	q_i	l/h	25
Upper measurement range	q_s	m³/h	5
Nominal pressure	PN	bar	16
Water temperature range limit values		°C	15–90
Installation point			return
Installation position			horizontal/vertical
Straight pipes upstream and downstream the flow meter			> 60 mm
Microprocessor calculation unit			
Temperature difference limit values	ΔT	K	3–100
Minimum temperature difference		K	> 0,5
Temperature resolution		°C	0,01
Ambient temperature		°C	5–55
Accuracy level - Dir. 2004/22/EC			class 2
Display			LCD with 8-digits + special characters
Unit of measurement			kWh, MWh, GJ, l, m³, m³/h, l/h, kW, MW
Electric supply			lithium battery 3 V, life > 6 years + 1
Protection class			IP 54

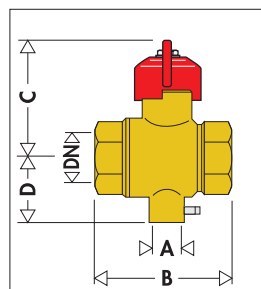
Dimensions

Heat meter CAL19185 series



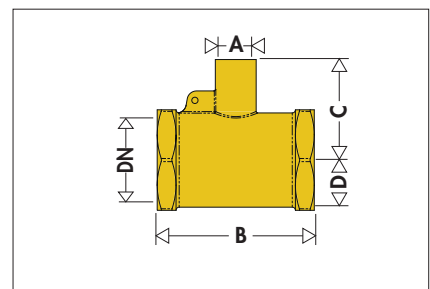
DN	A	B	C	D	E	F
3/4"	130	226	68	19	110	75

Probe holder ball valve Code CAL19180



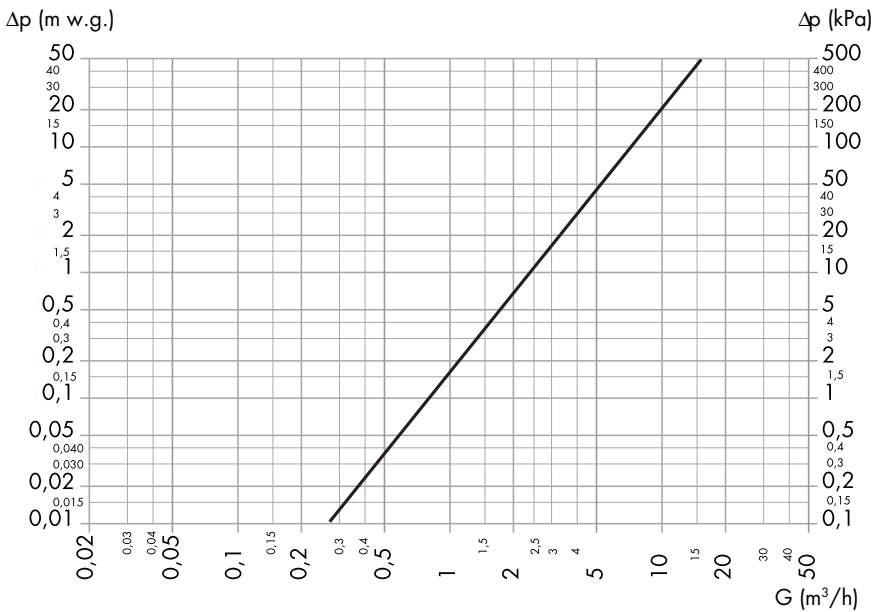
DN	A	B	C	D
3/4"	M.10x1	61	41	34,5

Probe holder TEE Code CAL19181



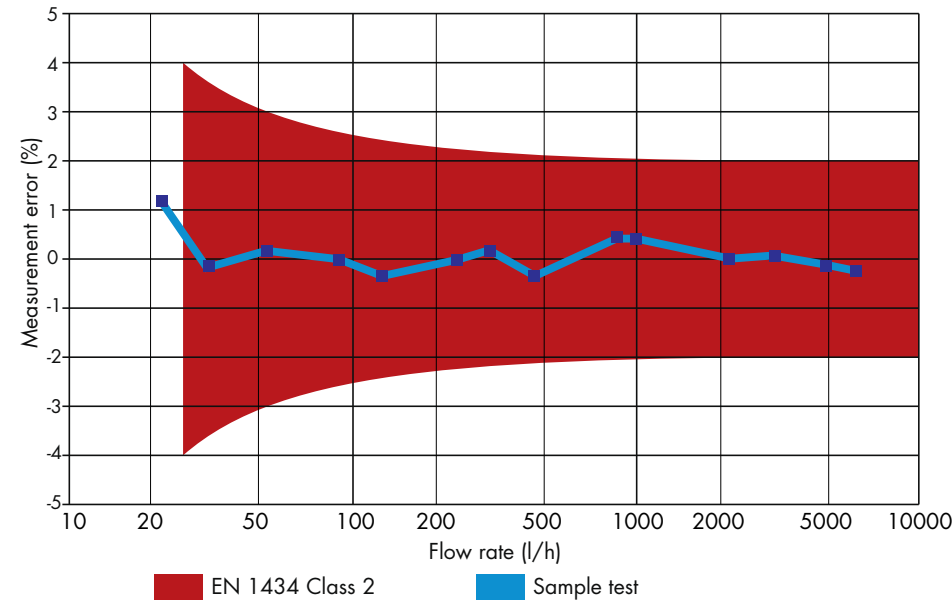
DN	A	B	C	D
3/4"	M.10x1	50	32	16

Hydraulic characteristics



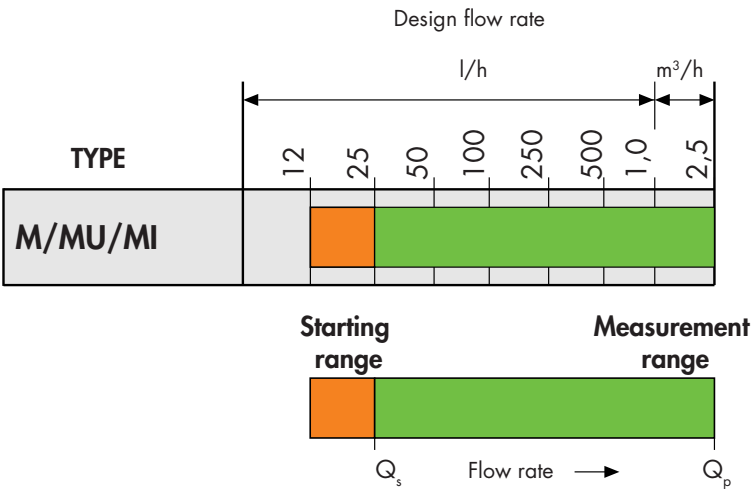
The use of the ultrasonic technology makes it possible to meter flow rate without any moving parts or narrow flow passages. Pressure losses are therefore significantly lower than those of a heat meter with turbine.

Measurement error



SENSONICAL ULTRA is a MID certified heat meter with accuracy level 2 in accordance with EN 1434. The graph alongside plots the error curve of a specimen meter (blue curve) and the limits imposed by class 2 (red area).

Choosing the meter



The decisive factors to select a heat meter are the design flow rate, i.e. the theoretical minimum and maximum quantity of water circulated. The maximum possible flow rate must be equal to or less than the nominal flow rate (q_p). The minimum flow rate must be greater than the lower limit of the measurement range (q_i).

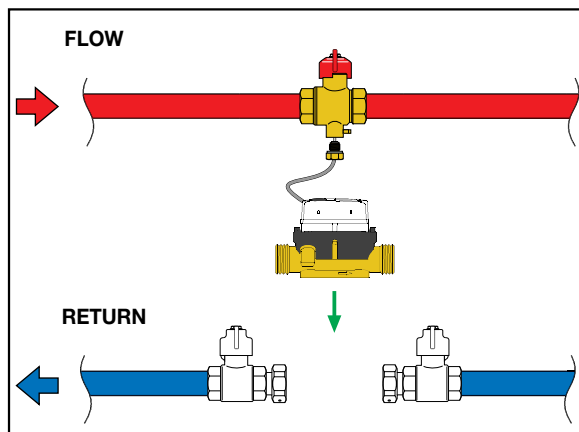
The SENSONICAL heat meter can also measure thermal energy in **cooling mode**.

Switching from the winter to summer **cooling mode is performed automatically** on the basis of the instantaneous ΔT measured between flow and return.

Installation

Flow meter – installation operations

- 1 Close the upstream and downstream shut-off valves nearest to the point where the SENSONICAL ULTRA heat meter is to be installed.
- 2 Open the nearest drain cock to decrease the pressure.
- 3 Remove and empty the tube portion where the hydraulic section of the SENSONICAL ULTRA is to be installed.
- 4 Take out the old seals and remove any residues.
- 5 Position the new seals.
- 6 Install the volume meter observing the direction of the flow (check the direction of the arrow on the device).
- 7 Re-tighten the nuts to a torque value that is commensurate with the supplied seal.
- 8 Turn the electronic unit into the correct position for reading.

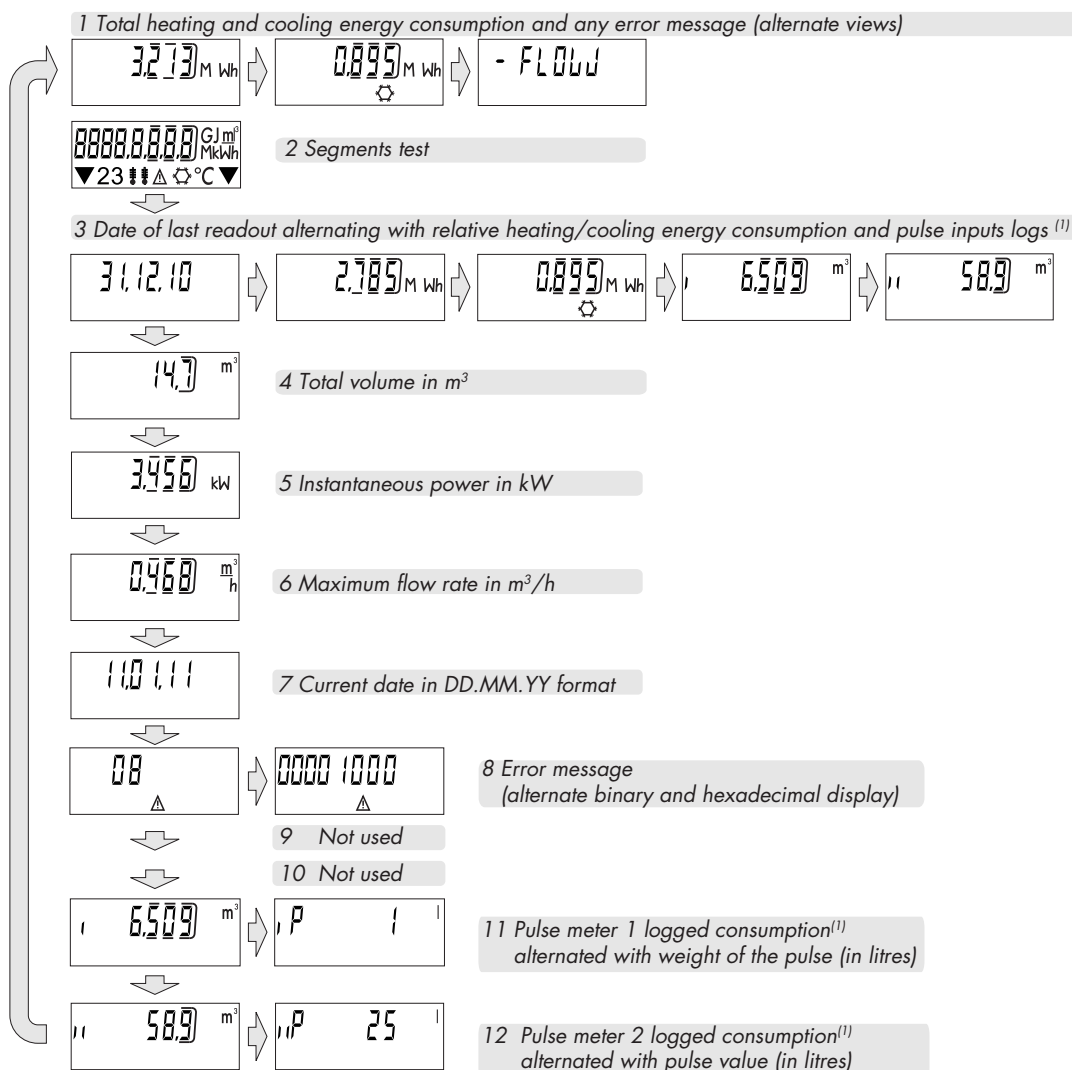


Installation – flow temperature probe

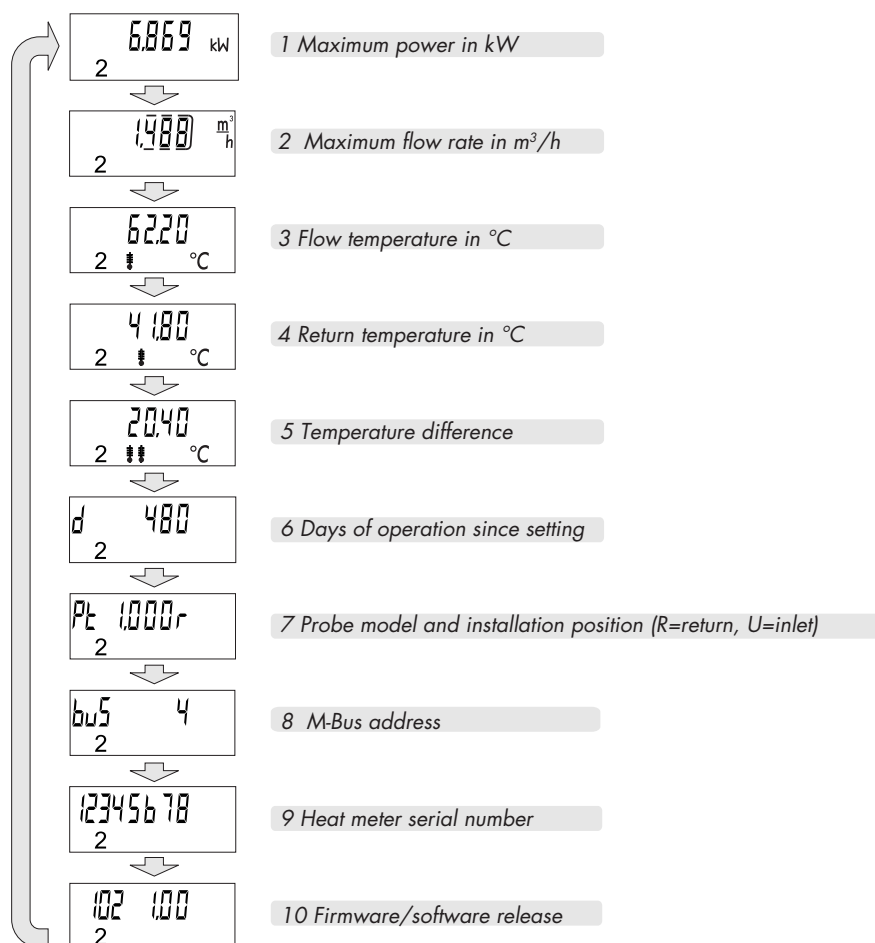
- 1 If installing in a dedicated probe holder valve, close the valve, if in a probe holder TEE, close the nearest shut-off valves.
- 2 Remove the cap on the probe connection and clean the surfaces to remove any residues.
- 3 Remove the O-ring from the probe and place it on the probe connection of the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

Heat consumption reading cycles and meter parameters

Cycle 1 - Main Level



Cycle 2 - Technical level



Cycle 3 - Statistical level

1 Date of last readout alternating with relative heating/cooling energy consumption and pulse input logs ⁽¹⁾



2-16 Monthly values: date of last reading alternating with associated heating/cooling energy consumption and pulse inputs logs ⁽¹⁾

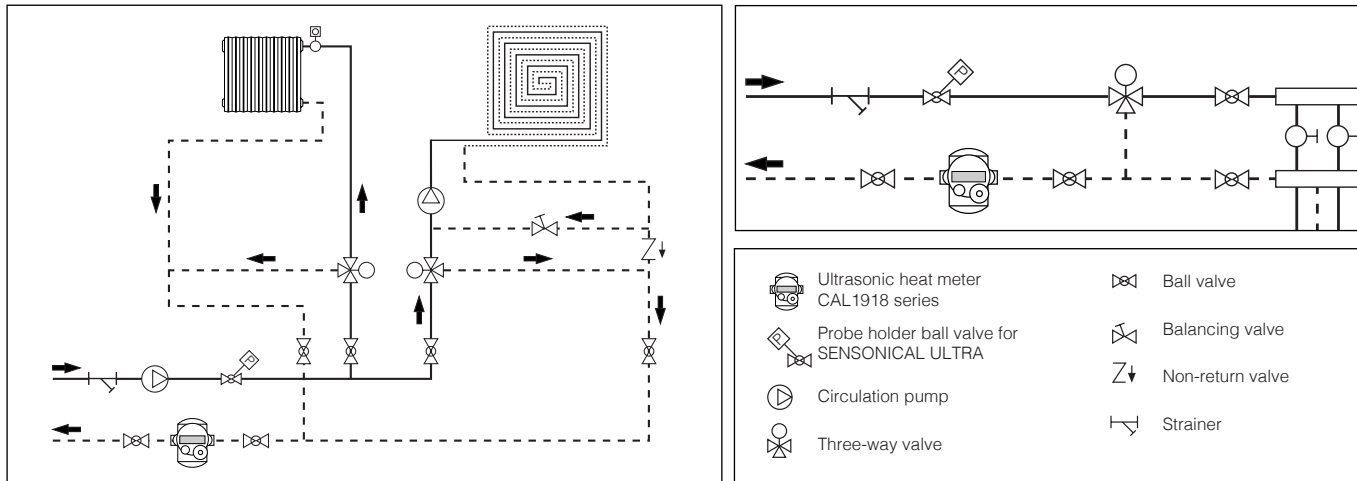
⁽¹⁾ available on CAL1985MI

Interfaces and options

The heat meter is supplied with a M-Bus interface for installation in a network of no more than 250 devices. 24 readings/day are possible for each device.

On request, the heat meter (CAL19185MI) is supplied with 2 supplementary pulse inputs (e.g. for domestic hot/cold water, gas meter, electricity meter) or with a pulse output (CAL19185MU).

Installation diagrams



SPECIFICATION SUMMARY

Code CAL19185M. SENSONICAL ULTRA

Compact direct heat meter for metering thermal energy in zone heating and/or cooling systems. 3/4" M connection. Pair of Pt1000 temperature probes with 1,4 m cable length. Return temperature probe sealed on the hydraulic section of the meter. Flow rate measurement using ultrasonic technology, nominal flow rate 2,5 m³/h. Data reading on 8-digit display with special characters which can be activated by means of a button on the front of the device; data split on 3 information levels: main, technical, statistical (where logged monthly consumption values for past 15 months can be accessed). Facility to centralise readings using M-Bus interface. Connection with other types of meters (e.g. water, gas, electricity) by means of 2 pulse inputs (CAL19185MI) or with generic acquisition system by means of a pulse output (CAL19185MU). Battery powered, with battery life > 6 years. Approved in accordance with European standard EN 1434. Conforms to directive 2004/22/EC (MI004)

Code CAL19180

3/4" F ball valve with connection for temperature probe M10x1. Brass body. Butterfly handle. PTFE control stem seals. Fitted for application of temperature probe lead seal.

Code CAL19181

3/4" F probe holder TEE with connection for M10x1 temperature probe. Brass body. Fitted for application of temperature probe lead seal.

We reserve the right to make changes and improvements to the products and related data in this publication, at any time and without prior notice.