

Compact direct heat meter SENSONICAL ULTRA

CAL1918 series



Conforms to directive
2014/32/EU (MI004)



Product range

CAL19185M	SENSONICAL ULTRA meter 3/4" F 2,5 m ³ /h with M-bus connection
CAL19185MI	SENSONICAL ULTRA meter 3/4" F 2,5 m ³ /h, M-bus and 3 pulse inputs
CAL19185MU	SENSONICAL ULTRA meter 3/4" F 2,5 m ³ /h, with two pulse outputs (heating/cooling)
CAL19180	Probe holder ball valve fitted for lead sealing, 3/4" F
CAL19181	Probe holder TEE fitted for lead sealing, 3/4" F

Function

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

The compact device consists of an electronic calculator unit, an ultrasonic flow rate meter and two temperature probes fitted for lead-sealing. The electronic control unit with display can be separate from the volume meter for easier reading. SENSONICAL ULTRA is extremely easy to install and needs no special maintenance (battery life 10 years, >6 for CAL19185MU).

Unlike more conventional turbine flow rate 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 system. Meters are available **for nominal flow rates of 2.5 m³/h with 3/4" F connection**, equipped with three inputs or with two pulse outputs (CAL19185MI and CAL19185MU).

The high-precision platinum resistance **temperature probes (PT 1000) are approved and easy to seal**, for greater protection against tampering. The cable connecting the flow probe to the calculator unit is 1,5 m long.

The SENSONICAL ULTRA heat meter is equipped with an 8-digit liquid crystal 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's operating status and associated logged data to be checked. The option of checking the progress of the cumulative consumption data is particularly important. The device display shows monthly consumption values for the past 15 months (with a fortnightly frequency), complete with the date of recording. Alternatively, with pulse inputs (CAL19185MI) the device can display the logs of the pulse meters connected. The consumption data can also be accessed by means of the M-Bus interface (not available for CAL19185MU).

Technical specifications

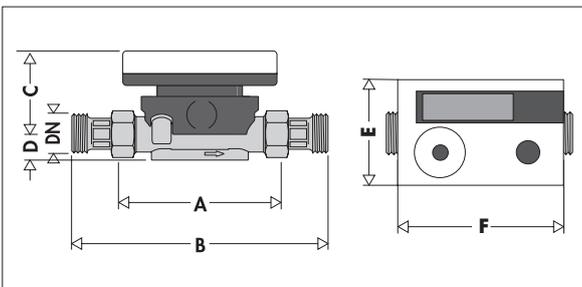
- Long-life battery (10 years, >6 years for CAL19185MU).
- No moving parts.
- Low pressure drop.
- Electromagnetic compatibility according to EN 1434.
- Conforms to directive 2014/32/EU (MI004).
- Certified by the manufacturer in accordance with ISO 9001.
- High protection class IP 65
- Fitted with tamper-proof protection thanks to the special lead sealing.
- Extreme reliability and resistance to wear thanks to modern production technologies and the use of quality materials.

Technical specifications

			SENSONICAL ULTRA CAL19185M/MI/MU	
Temperature probes				
Flow probe length		m	1,4	
Return probe length		m	1,4	
Electronic unit-volume meter cable length		cm	70	
Platinum resistance temperature gauge, fixed connection			In accordance with DIN IEC751: PT1000	
Temperature probe connection			M10x1	
Flow meter				
Connection			3/4" F	
Diameter	DN	mm	20	
Length		mm	226 with fittings	
Nominal flow rate	q_b	m ³ /h	2.5	
Pressure drop at q_b	Δp	bar	0.115	
Start-up flow rate		l/h	12	
Lower measurement range	q_l	l/h	25	
Upper measurement range	q_s	m ³ /h	5	
Nominal pressure	PN	bar	16	
Water temperature range limit values		°C	15 - 90 (calories), 5 - 50 (refrigeration units)	
Point of installation			return	
Installation position			horizontal/vertical	
Straight channels before and after the meter			> 60 mm	
Microprocessor calculator unit				
Temperature difference limits	ΔT	K	3 - 100	
Minimum temperature difference		K	> 0.5	
Temperature resolution		°C	0.01	
Ambient temperature		°C	5-55	
Accuracy class - Dir. 2014/32/EU			class 2	
Display			LCD with 8 digits + special characters	
Unit of measurement			kWh, MWh, GJ, l, m ³ , m ³ /h, l/h, kW, MW	
Electric supply			3 V lithium battery, life 10 years (>6 years for CAL19185MU)	
Protection class			IP 65	

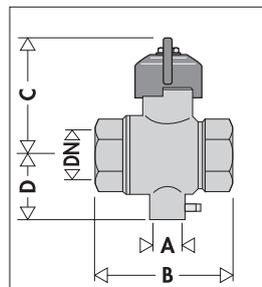
Dimensions

**Flow meter
CAL19185 series**



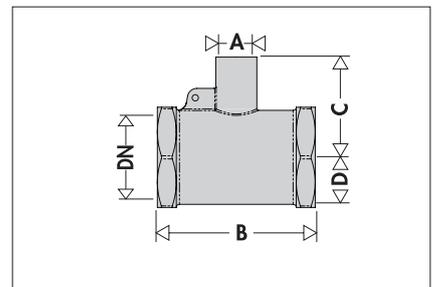
DN	A	B	C	D	E	F
3/4"	130	226	66	19	75	110

**Probe holder ball valve
Code CAL19180**



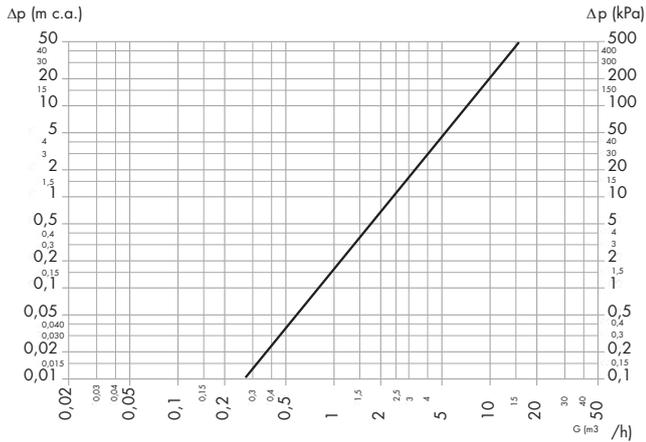
DN	A	B	C	D
3/4"	M.10x1	61	41	34,5

**Probe holder TEE
Code CAL19181**



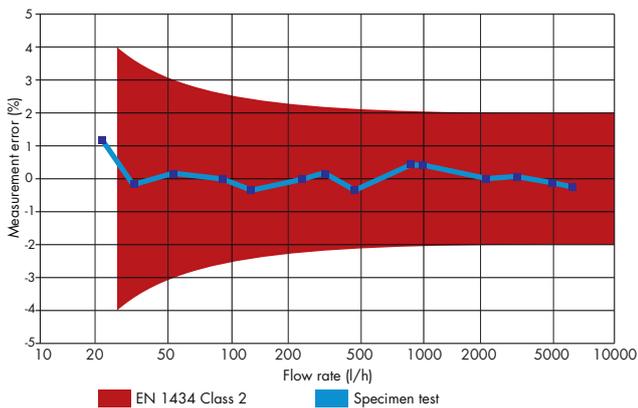
DN	A	B	C	D
3/4"	M.10x1	50	32	16

Hydraulic characteristics



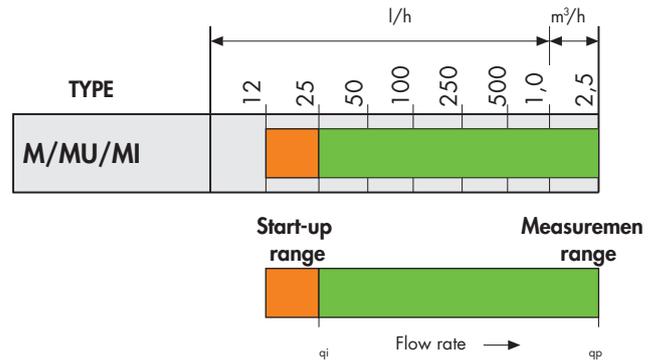
The use of the ultrasonic technology makes it possible to meter flow rate without any moving parts or narrow flow passages. Pressure losses are therefore significantly lower than those of a heat meter with turbine.

Measurement error



SENSONICAL ULTRA is a MID certified heat meter with accuracy level 2 in accordance with EN1434. The image 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_n). The minimum flow rate must be greater than the lower limit of the measurement range (q_l).

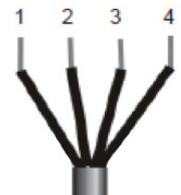
The SENSONICAL heat meter can also measure thermal energy in **cooling mode**.

Changeover from winter to summer mode takes place automatically on the basis of the instantaneous DT measured between flow and return.

Pulse inputs and outputs

The version with dual pulse output (CAL19185MU) transmits the heating and refrigeration unit consumption values via potential-free output, according to the connection diagram below:

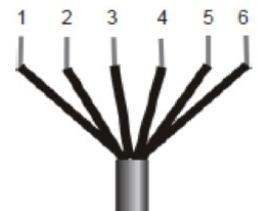
Conductor	Colour	
1	yellow	IA1 +
2	green	IA1
3	brown	IA2 +
4	white	IA2



the pulse weighs 1 kWh/imp.

The version with pulse inputs acquires up to 3 pulse inputs, according to the connection diagram below:

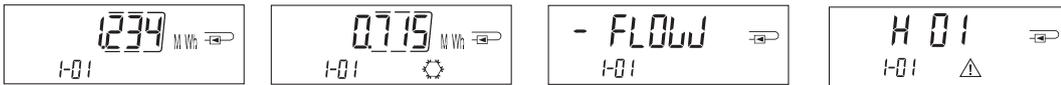
Conductor	Colour	
1	white	IE3 GND
2	brown	IE3 +
3	green	IE2 GND
4	yellow	IE2 +
5	grey	IE1 GND
6	pink	IE1 +



The inputs are pre-configured with the weight of the pulse at 10 l/imp.

Heat consumption reading cycles and meter parameters

Menu 1/ Main Menu



- 1 - Total calories from commissioning (standard view) Alternating view with total refrigeration units (thermal energy meters for heating/cooling applications). Inverse flow. Error message (if an error is detected).



- 2 - On/off segment test (all segments are shown at once).



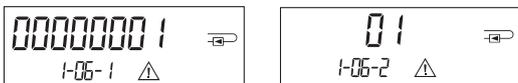
- 3 - Last alternate reading date for calories (refrigeration units).
 Volume
 Tariff register 1 value
 Tariff register 2 value
 at the last date of reading 1 (if the instrument has 3 pulse inputs there is an indication of respective values²)



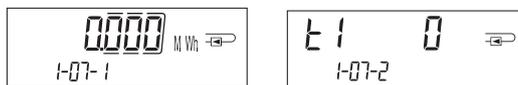
- 4 - Total volume in m³



- 5 - Current date alternating with time



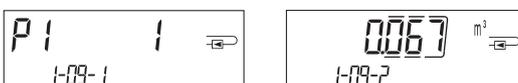
- 6 - Error message (alternating binary and hexadecimal format)



- 7 - Tariff register 1: value alternating with tariff register and parameters



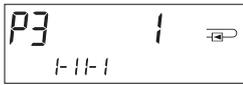
- 8 - Tariff register 2: value alternating with tariff register and parameters



- 9 - Pulse meter 1: pulse value alternating with the meter reading²



10 - Pulse meter 2: pulse value alternating with the meter reading²



11 - Pulse meter 3: pulse value alternating with the meter reading²

- 1 Until the end of the month or up to the fifteenth of the month (for fortnightly values) the consumption and reading date are shown at 0.
- 2 The three pulse inputs are available on CAL19185MI.

Menu 2 / Technical Menu



1 - Instantaneous power in kW



2 - Instantaneous flow rate in m³/h (in the event of inverse flow a negative value is shown)



3 - Inlet temperature in °C



4 - Outlet temperature in °C



5 - Temperature difference in K (for refrigeration units a negative value is shown)



6 - Before commissioning: days from the date of manufacture



After commissioning: days of operation from the date of manufacture alternating with days of operation from the date on which the energy value exceeded 10 kWh



7 - M-Bus address



8 - Serial number



9 - Firmware version

Menu 3 / Statistics Menu



Fortnightly values: date alternating with calories, refrigeration units, volume, tariff register 1 value, tariff register 2 value¹.
(if the instrument has 3 pulse inputs there is an indication of respective values²)

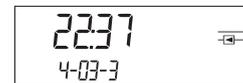
Menu 4 / Maximum Values Menu



1 - Maximum power alternating with date and time



2 - Maximum flow rate alternating with date and time



3 - Maximum inlet temperature alternating with date and time

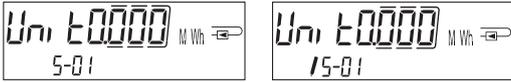


4 - Maximum return temperature alternating with date and time

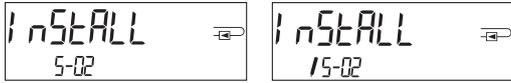


5 - Maximum temperature difference alternating with date and time

Menu 5 / Configuration Menu



1 - Energy unit of measurement configuration



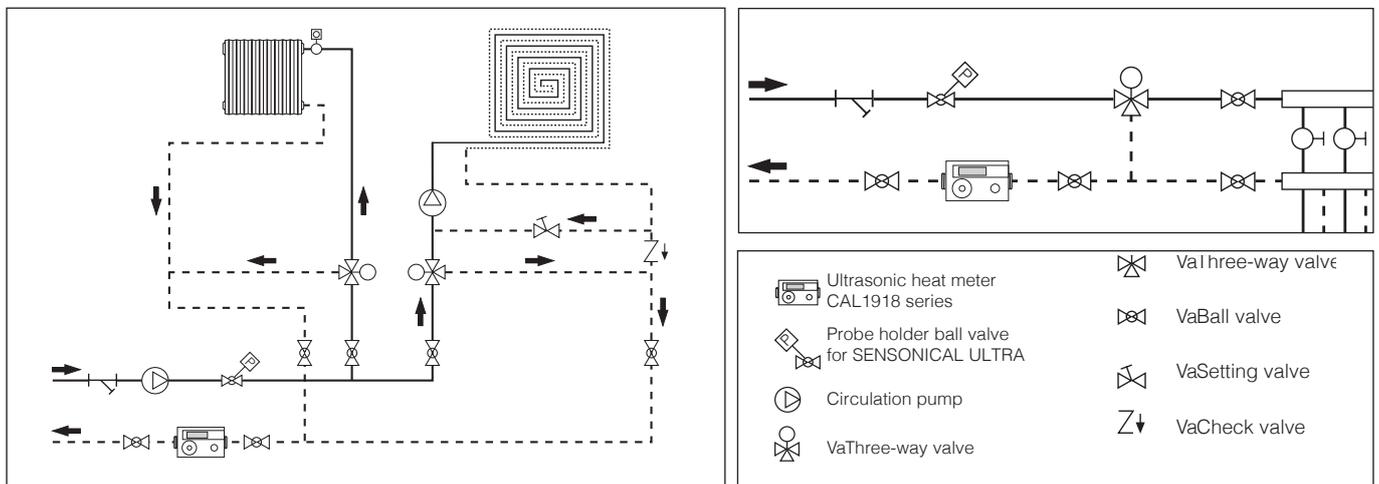
2 - Point of installation configuration

Interfaces and options

The heat meter is supplied with an 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 3 supplementary pulse inputs (e.g. for domestic hot/cold water, gas meter, electricity meter) or with a dual pulse output (CAL19185MU).

Installation diagrams



SPECIFICATION SUMMARY

Code CAL19185M. SENSONICAL ULTRA

Compact direct heat meter for measuring thermal energy in zone heating/cooling systems. 3/4" F 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 of 2,5 m³/h. Data reading on 8-digit display with special characters that can be activated by means of a button on the front of the device; data split across 5 information levels: main, technical, statistical (where logged fortnightly consumption values for the past 15 months can be accessed), maximum values, configuration menu. Option of centralising readings using the M-Bus interface (not available for CAL19185MU). Connection with other meter types (e.g. water, gas, electricity) by means of 3 pulse inputs (CAL19185MI) and with generic acquisition devices by means of a dual pulse output (CAL19185MU). Battery electric supply, life 10 years (>6 years for CAL19185MU). Approved in accordance with European standard EN1434. Conforms to directive 2014/32/EU (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 sealing.

Code CAL19181

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

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