

SENSONICAL compact heat meter

CAL1915 series



Conforms to directive
2004/22/EC (MI004)



Product range

CAL19155	SENSONICAL meter 3/4" F 1,5 m³/h
CAL19157	SENSONICAL meter 3/4" F 2,5 m³/h
CAL19155E	SENSONICAL meter 3/4" F 1,5 m³/h for heating/cooling applications
CAL19157E	SENSONICAL meter 3/4" F 2,5 m³/h for heating/cooling applications
CAL19150	Template for CAL1915 series SENSONICAL.
CAL19159	Adapter for wall installation of the electronic section.

Function

SENSONICAL is a thermal energy direct heat meter, designed for heat metering in systems with horizontal distribution of the thermal medium. The meter is particularly suitable for measuring consumptions in residential buildings. SENSONICAL, thanks to its double memory register, is able to keep a record of thermal energy used in both heating and cooling modes. No operations have to be carried out in order to meter both modes.

The compact device consists of a calculator unit, a positive displacement flow rate gauge and two temperature probes. SENSONICAL is extremely easy to install and needs no special maintenance (battery life is guaranteed for 10 years). Replacing the meter (if necessary) is also very easy, thanks to a specially designed template support.

The SENSONICAL meter flow rate gauge is the multi-nozzle turbine type. Turbine speed is measured without the use of magnets. The electronic technology and materials used enable precise and reliable measurement. Meters are available for the following nominal flow rates: **1,5 m³/h and 2,5 m³/h with 3/4" F connection.**

The high-precision platinum resistance temperature probes (Pt500) 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 meter is equipped with an eight-digit liquid crystal display that can be switched on using a sensor button, as it is normally off in order to save battery charge. This display enables easy reading of heat consumption values as well as a range of technical data, to allow appliance operating status evaluation and data logging. It has five selection cycles, which can be used to gather all the typical and operational data relating to the metering equipment.

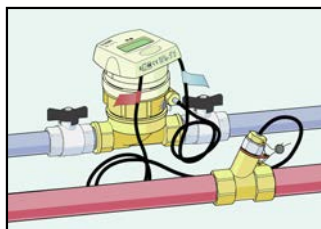
The option of checking the progress of the cumulative consumption data is particularly important. The device provides consumption values corresponding to the last 12 months, as well as the maximum instantaneous flow rate and power values measured within the same period.

In the consumption data cycle the values for the most recent two seasons, at a previously identified date, are provided.

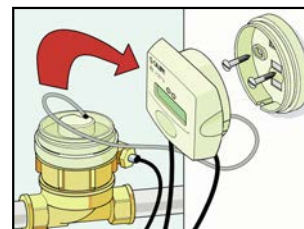
Technical specifications

- Long-life battery (10 years).
- Approval in accordance with EN 1434.
- Conforms to directive 2004/22/EC (MI004).
- Certified by the manufacturer in accordance with ISO 9001.
- CE marked for electromagnetic compatibility in domestic and industrial environments.
- Innovative microprocessor (ASIC) with low energy consumption.
- Button with built-in sensor
- High protection class IP 54
- Special tamper-proof protective seal.
- Extremely compact dimensions and innovative design.
- Extreme reliability and resistance to wear thanks to modern production technologies and the use of quality materials.

Typical installation



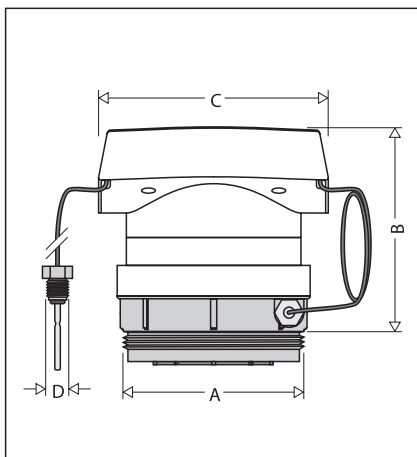
Wall installation using adapter



Technical specifications

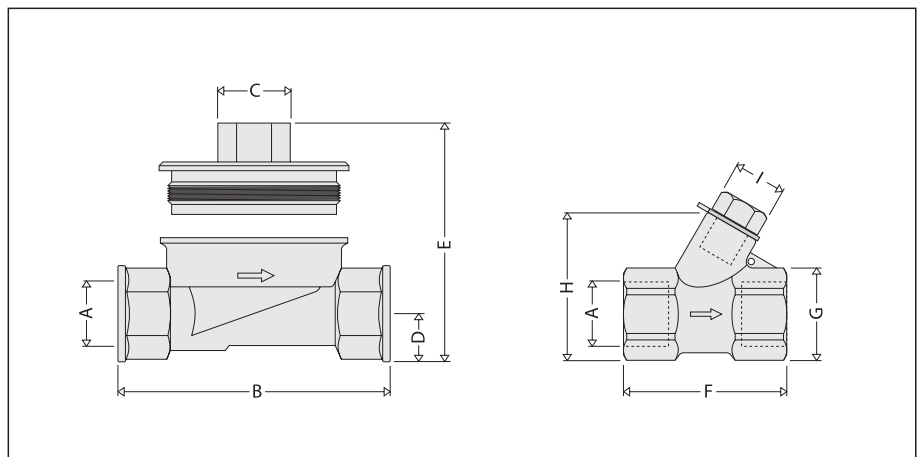
			SENSONICAL CAL19155 / CAL19155E	SENSONICAL CAL19157 / CAL19157E
Temperature probes				
Flow probe length	m	1,5		
Return probe length	m	1		
Platinum resistance temperature gauge, fixed connection		In accordance with DIN IEC 751: Pt 500		
Temperature range limits	°C	5–150		
Temperature probe mounting		Ø 5 mm, with pocket CAL19150		
Flow meter				
Connection			3/4" F	
Nominal flow rate	Q _{nom}	m³/h	1,5	2,5
Head loss at Q _{nom}	Δp	kPa	23	22
Lower measurement range	Q _{min}	l/h	60	50
Separation limit	Q _t	l/h	120	200
Startup value, horizontal mounting		l/h	5	7
Startup value, vertical mounting		l/h	7	10
Nominal pressure	PN	bar	16	
Temperature range limits		°C	5–90	
Straight channels before and after the meter			Not necessary	
Microprocessor calculator unit				
Temperature range limits	TB	°C	5–150	
Temperature difference limits	Δt	K	2–100	
Override - temperature difference		K	<0,2	
Measurement sensitivity		°C	<0,01	
Ambient temperature		°C	0–55	
Ambient conditions			To DIN EN 1434-1 class C	
Heat consumption indicator		kWh	7 digits, 1 decimal place	
Electric supply			Built-in battery, duration 10 years	
Protection class			In accordance with DIN 40050: IP 54	

Dimensions CAL1915 series meter



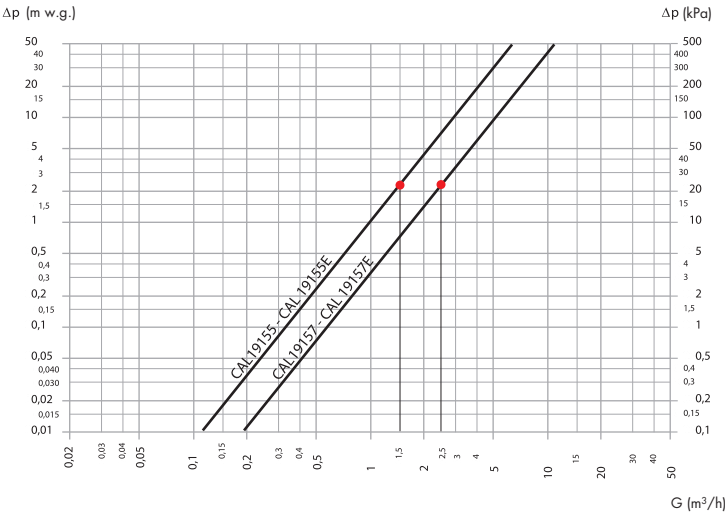
A	B	C	D
2"	80	∅ 76	10 p.1

Dimensions Template support and pocket – Code CAL19150



A	B	C	D	E	F	G	H	I
3/4"	100	Ex.22	19	68	60	Ex.32	56	Ex.17

Hydraulic characteristics

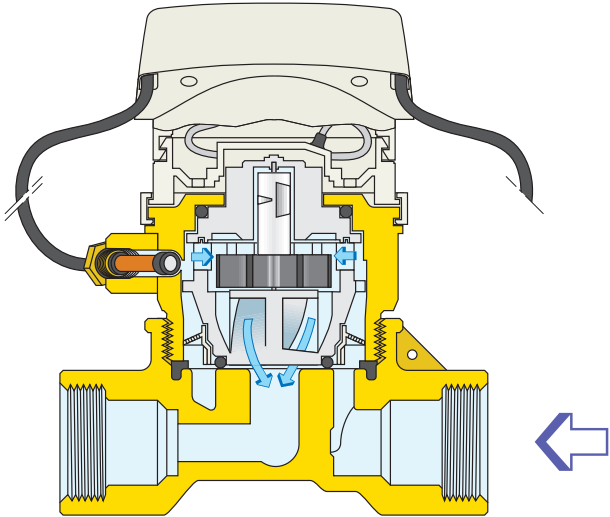


Head loss curve for SENSONICAL, including template support and pocket.

• = Head loss at Q_{nom}

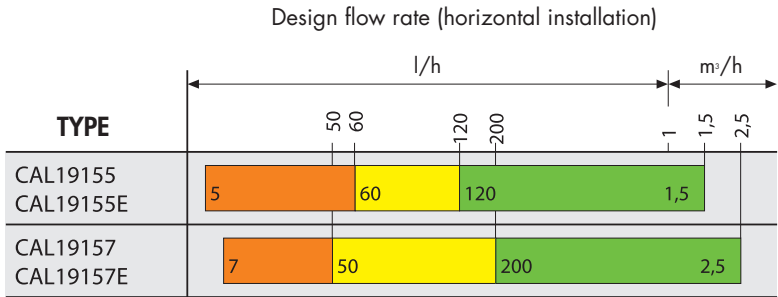
CAL19155 - CAL19155E - 3/4" F Q_{nom} 1,5 m^3/h
CAL19157 - CAL19157E - 3/4" F Q_{nom} 2,5 m^3/h

Functional details

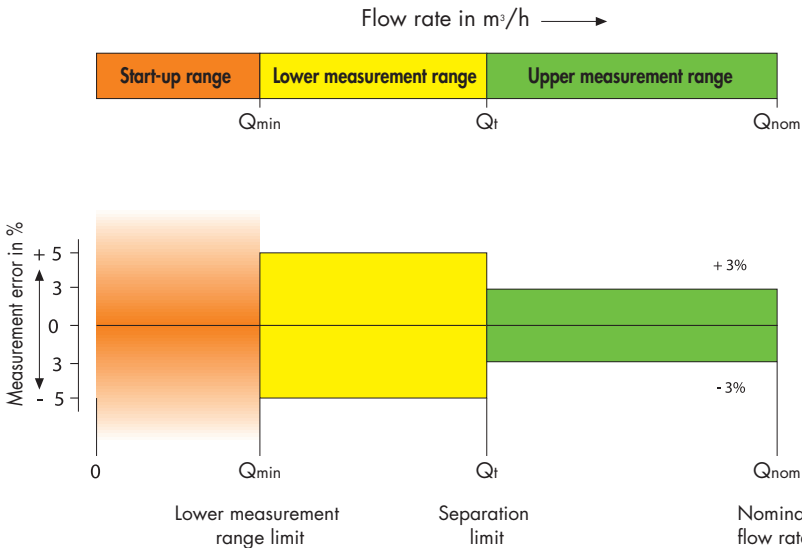


The flow rate meter turbine is a multi-nozzle model, with speed measurement performed without the use of magnets. This means the medium thrust towards the impeller resumes in an even manner, guaranteeing increased measuring stability for the entire life of the device. Ferrous deposits (due to the presence of magnets) are prevented from forming, thereby ensuring optimal measurement conditions are maintained.

Choosing the meter



A decisive factor in choosing the heat meter is 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 permitted nominal flow rate (Q_{nom}). The minimum flow rate must be greater than the lower limit of the measurement range (Q_{min}).



The SENSONICAL meter can also measure thermal energy in air-conditioning mode. In this case, when choosing the meter, it is vital that the model designed for this purpose is selected. It is identified by the letter E after the product code. In this case, metering clearly takes place with heating and cooling thermal medium distribution using the same pipes. **Switchover between** the two conditioning modes is automatic by means of algebraic discretization of the instant thermal gradient. Head losses are identical in the following models:
CAL19155 and CAL19155E,
CAL19157 and CAL19157E.

Installation

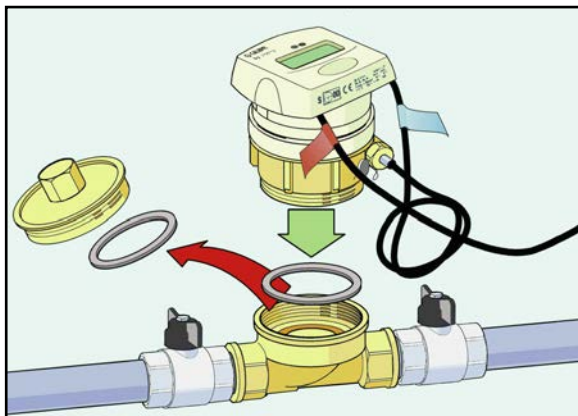
For installation of the SENSONICAL heat meter, the template in the series CAL19150 is essential, to be fitted **on the return pipe**. The **pocket** for the temperature sensor **must be positioned on the flow pipe**, in the immediate vicinity, as the maximum length of the probe is 1,5 m.

The template is easy to install on all types of pipe, **either horizontally or vertically**.

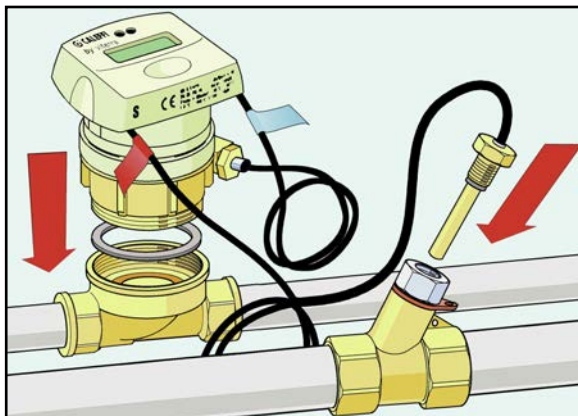
The following instructions **MUST** be observed during the installation process:

- 1) **Fit the CAL19150 series template**, and therefore the meter, in accordance with the illustrative technical diagrams provided below.
- 2) Take account of the overall geometric dimensions of the meter and **the additional space required for any necessary assembly or disassembly procedures**.
- 3) **Observe the flow direction** and the positioning of the hydraulic part on the hydraulic system return.
- 4) Bear in mind that **the maximum length of the probe is 1,5 m** when establishing the position of the pocket to be installed on the flow pipe.
- 5) Make sure that the system **is fitted with a suitable strainer which captures the impurities circulating within the system**; if not **arrange for installation (compulsory)**. The impurities could be captured by the strainer mesh at the inlet before the meter impeller, creating problematic metering conditions.
- 6) Provide, **upstream and downstream** of the meter, **suitable shut-off devices** to facilitate installation, or replacement if necessary.
- 7) After fitting the template, the pipelines must be tested under pressure and washed; these operations must be performed before installing the heat meter.
- 8) To minimise energy losses or noise in the hot water pipes, suitable insulating material should be used for both the template and the probe pocket.
- 9) Observe all the guidelines provided above and in the instruction sheet supplied with the relevant items.
- 10) Sealing of the probes and the positive displacement portion is strongly recommended, in order to prevent tampering.

Positive displacement portion installation diagrams



After closing off the shut-off devices, remove the overflow nut and corresponding gasket, and fit the new gasket and the flow meter.

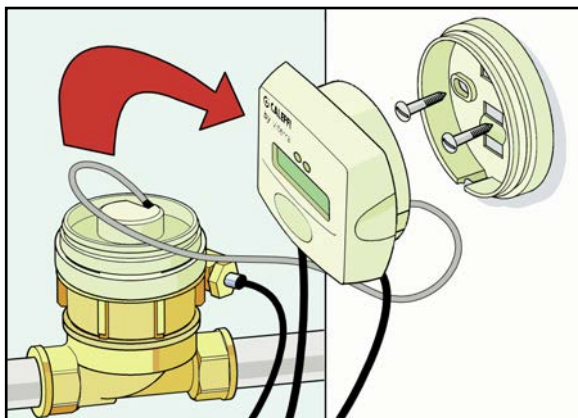


Gradually tighten the meter, until a perfect hydraulic seal is created.

Insert the probe in the pocket, already positioned on the delivery pipeline, screwing it fully down.

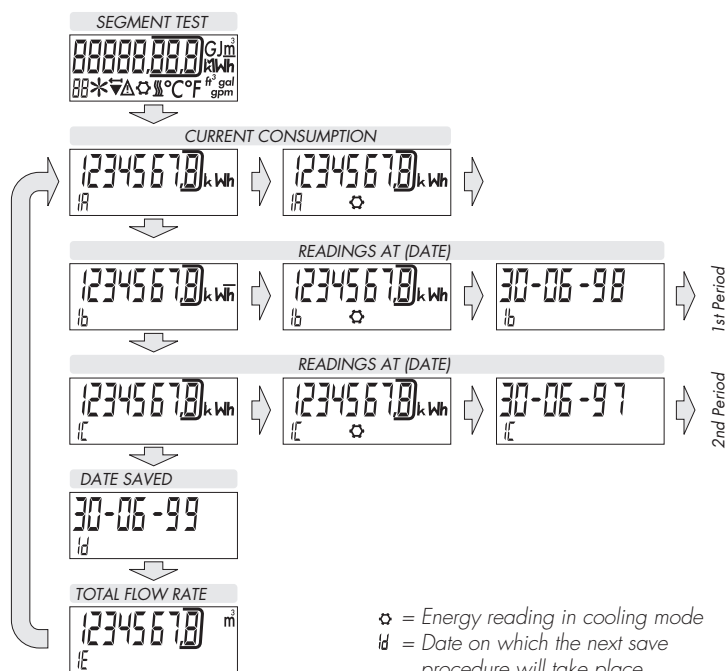
CAL19159 wall adapter

The adaptor is used when the electronic section of the SENSONICAL meter is to be positioned at a distance from the hydraulic section: use is recommended above all in cooling applications or to facilitate reading of heat consumption in problematic hydraulic installations. The maximum distance between the hydraulic and electronic sections is 25 cm, and is dictated by the connection cable available.

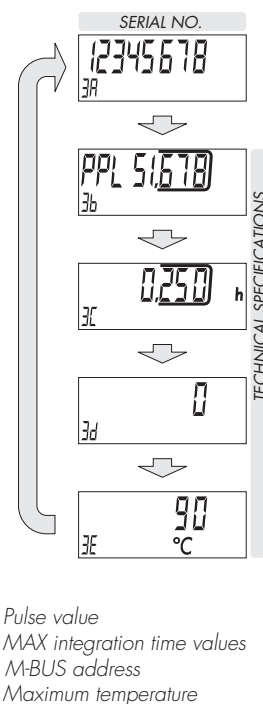


Heat consumption reading cycles and meter parameters

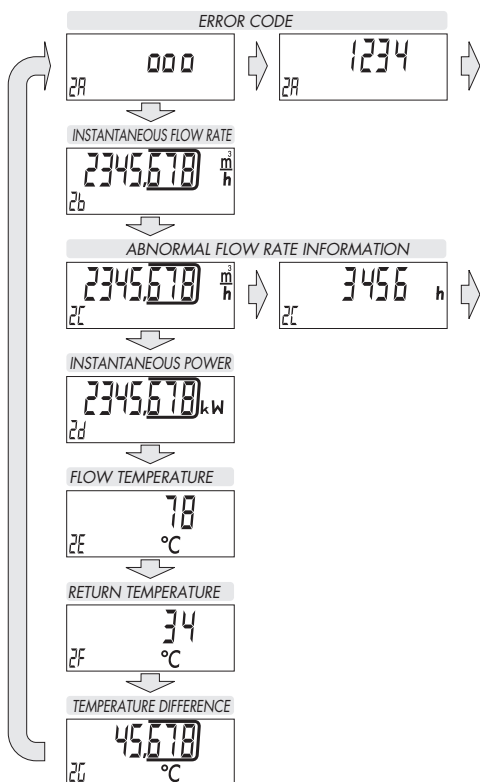
**Cycle 1: Current and logged consumption data
(2 periods within the year)**



Cycle 3: Technical and identification characteristics

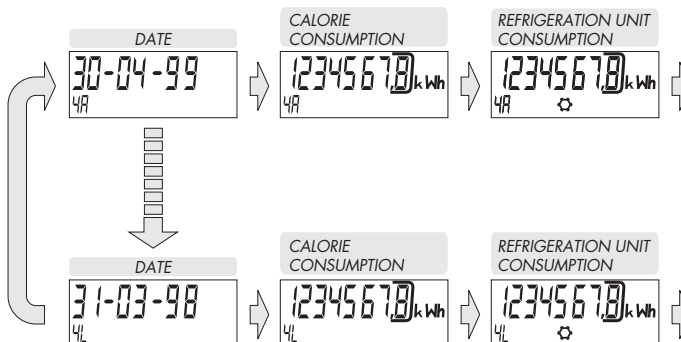


Cycle 2: Meter diagnostics

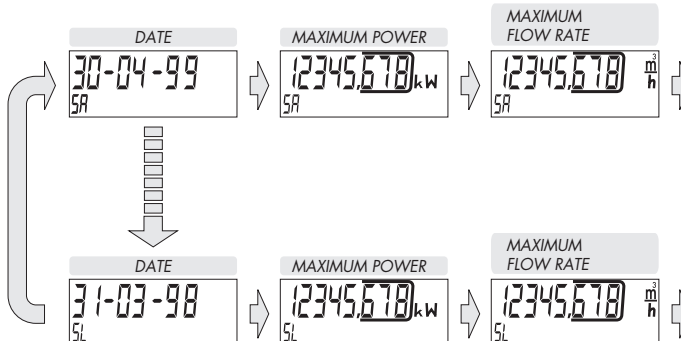


$2R$ = Error code and correct operation days
 $2C$ = Indication of abnormal flow rate value and hours of operation in this condition

Cycle 4: Monthly consumption statistics (12 periods)

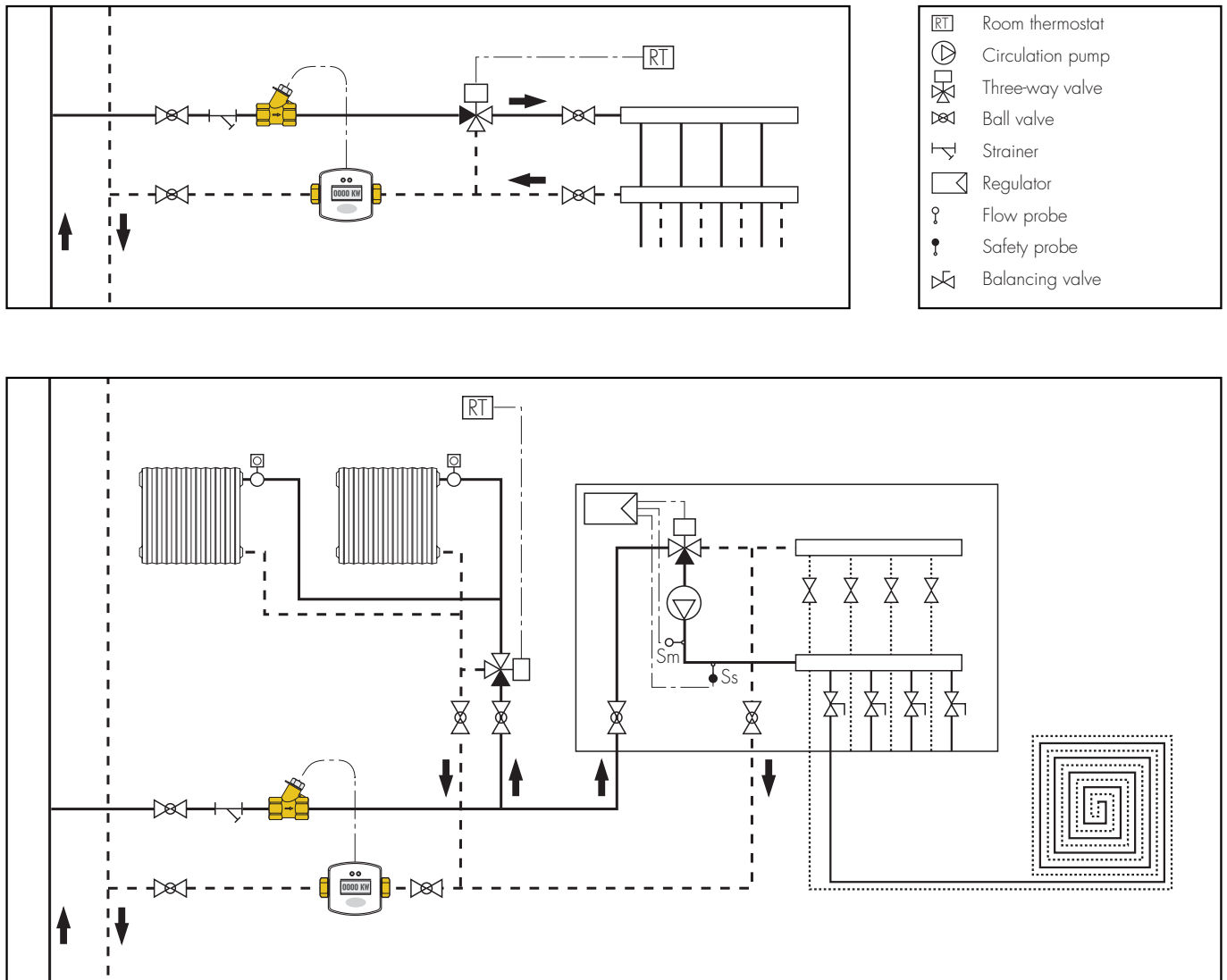


Cycle 5: Monthly maximum power and flow rate statistics (12 periods)



Further details are provided on the instruction sheet supplied with the product.

Application diagrams



SPECIFICATION SUMMARY

CAL1915 series. SENSONICAL

Compact direct heat meter for measuring thermal energy in zone heating and/or cooling systems. 3/4" F connection via brass template (CAL19150 series) complete with overflow nut, to be installed on the return pipe, and 3/4" F brass pocket for immersion probe, to be installed on the flow pipe. Pair of Pt500 temperature probes with a length of 1,5 m on the flow pipe and 1 m on the return pipe; the latter is built in.

Flow rate metering by means of multi-nozzle turbine positive displacement system, nominal flow rate of 1,5 m³/h (2,5 m³/h).

Data reading via 8-digit display, using sensor button located on the front of the device, with data dividable into 5 display cycles: reading of overall consumption data, instant readings of significant technical parameters, meter ID data, statistical monthly consumption values of last 12 months, power and flow rate peak values in last 12 months.

Battery powered, with a duration of 10 years.

Approved in accordance with European standard EN 1434. Conforms to directive 2004/22/EC (MI004).

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.