Thermal Energy Meter
Supercal 539 Plus / heating cooling

Application

Electronic, battery-powered compact thermal energy meter for recording heat consumption in autonomous heating systems or heating/cooling consumption in heating/cooling systems.
The Supercal 539 compact thermal energy meter is used to measure heat energy or combined heating/cooling energy. The main area of application is a central heating or heating/cooling system that distributes heat or heat/cool to individuals, who are then invoiced for the heat or heat/cool used. Owing to its additional and optional pulse inputs (for the connection of water meters for example) the integration of a low cost system becomes a reality.
Areas of application:

- Multi-family buildings
- Offices and administration buildings

Functions

- Recording heat or heat/cool consumption by means of measuring the flow and temperature difference
- Connecting two additional pulse inputs to the optical interface, M-Bus or radio system
- Displaying consumption data
- Displaying 15 monthly energy and volume values
- Displaying 15 monthly cooling energy
- Displaying 15 monthly values of additional pulse input 1
- Displaying 15 monthly values of additional pulse input 2
- Displaying operating data
- Self-monitoring with error display

Variants and options

Supercal 539 Plus

- Optical interface and two pulse inputs
- Optical interface, one pulse output for energy and two additional pulse inputs
- Optical interface. M-Bus and two additional pulse inputs
- Optical interface, bi-directional radio with two additional pulse inputs

Supercal 539 heating cooling / combined heating cooling meters

- Optical interface
- Optical interface, two pulse outputs for heating and cooling energy
- Optical interface. M-Bus
- Optical interface, bi-directional radio

Supercal 539 heating und cooling Plus

- Optical interface and one pulse input
- Optical interface, two pulse outputs for heat and for cool energy and one additional pulse input
- Optical interface. M-Bus and one additional pulse input
- Optical interface, bi-directional radio with one additional pulse input

Special version

- Energy unit: MWh, GJ
- Mounting in supply flow

Main feature

- Easy to operate and read
- Combined heat/cool meter
- Non-volatile EEPROM memory
- 15 monthly energy values for heat energy, volume, cool energy and for the additional pulse inputs 1 and 2
- The Supercal 539 is suitable for all communication environments: optical interface, M-bus (as per EN 1434) and Radio
- Optional additional pulse inputs for low cost system integration
- Many years of reliable operation thanks to new contact flow sensor
- New energy-saving technology of the permanently connected Pt10‘000Ω measuring unit
- The sensor mounting point is integrated into the flow sensor
- The Supercal 539 includes the functions necessary for self-monitoring, as well as for monitoring operating station
- Can be installed in supply or return flow

Design

The compact thermal energy meter consists of a single jet flow sensor with magnetic sensor, an integrator and two temperature sensors. The inlet fitting includes a filter which traps any larger impurities.

Flow sensor

The flow sensor complies with state-of-the-art technology. Thanks to the high quality standard, many years of operating reliability are guaranteed. The flow sensor operates in the dry, and the impeller wheel is equipped with a special hard metal bearing. As only the impeller wheel works in the wet area, problems that might be caused by impurities in the water are largely excluded. The sensor mounting point is integrated into the flow sensor.

Integrator

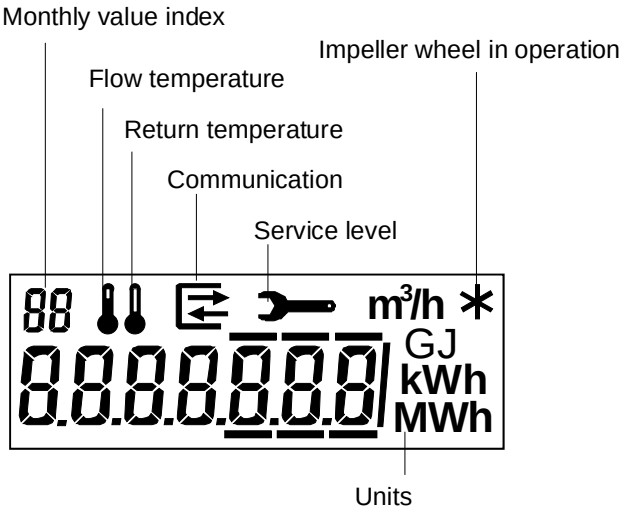
The integrator is equipped with a 7-digit LCD display and can be rotated through 350°. In standard metering operations the battery life of up to 6 years can be guaranteed.

Temperature sensor

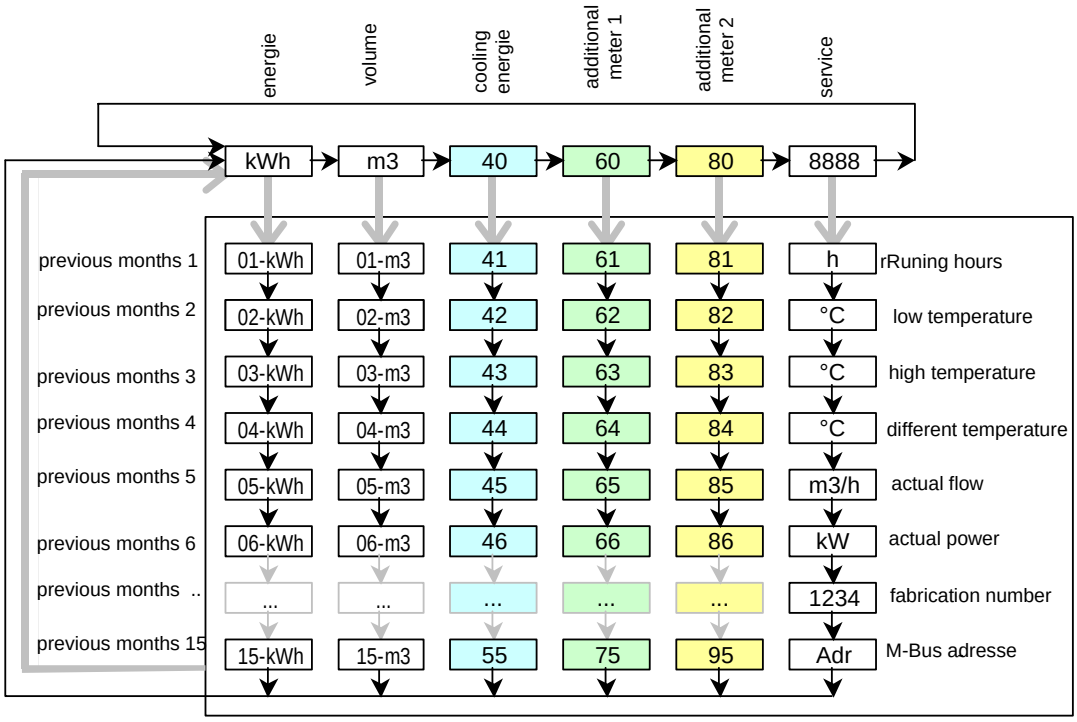
The temperature sensors Pt10‘000Ω are permanently connected to the measuring unit. The return flow sensor is built into the sensor mounting position in the flow sensor as standard. The supply flow sensor can be mounted directly or with by means of sensor pockets.

Display

The LCD display on the Supercal 539 has a large, clear design making it easier to read.



LCD display



Error messages

Error code	Description	Remedial action
Err 1	Water meter faulty	Return to manufacturer
Err 2	Temperature sensor faulty	Return to manufacturer
Err 3	Electronics faulty	Return to manufacturer

Technique

Measuring principle

The medium flowing through the system drives the impeller wheel and the rotational speed is scanned electronically using a magnet. The temperature difference in the supply and return flows is measured with a pair of platinum temperature sensors (Pt 10'000).

Energy calculation

The flow sensor records the flow and the pair of temperature sensors records every two minutes the supply and return flow temperatures. Using a microprocessor, the integrator calculates the temperature difference and then calculates the thermal energy, respectively the heating/cooling energy, consumed using the average flow and the heat coefficient.

Cooling energy consumption

The cooling energy is memorized in a separate register. The cooling energy is cumulated when the two following conditions are met :
(Δt) Temperature difference = > -0.5K, and the supply temperature = < 18°C

The temperature threshold value is parameterized at the factory at 18°C. The threshold value can be changed 1°C-levels.

The cooling energy is updated every minute and has the same unit. When the supply temperature is lower than the return temperature the signal will indicate the – negative symbol.

Non-volatile memory

The device parameters, as well as the cumulative values for energy and volume, operating hours and error type are stored in a non-volatile memory (EEPROM), and this information is not lost in the event of a power failure (e.g. changing batteries). Once a day and in the event of battery failure, the cumulative values are updated in the EEPROM.

Monthly values

On the first of the month the 15 monthly energy values for heat energy, volume, cool energy and for the additional pulse inputs 1 and 2 are stored in the integrator depending on the variant.

Pulse inputs

The Supercal 539 Plus offers in option the possibility of up to two additional pulse inputs for low cost system integration.

Communication options

The additional pulse inputs and outputs are equipped with a 1.5 m long cable. A splash proof distribution box (minimum IP54) is foreseen for the connection of the pulse inputs, outputs and of the M-Bus. The parameterization of the communication inputs and outputs takes place with the help of the service software 931.

Technical Data

Flow metering

Nominal flow qp	0.6 m^3/h	1.0 m^3/h	1.5 m^3/h	1.5 m^3/h	2.5 m^3/h
Maximum flow qs	1.2 m^3/h	2.0 m^3/h	3.0 m^3/h	3.0 m^3/h	5.0 m^3/h
Minimum flow qi					
Horizontal mounting	12 l/h	10 l/h	15 l/h	15 l/h	25 l/h
Vertical mounting	24 l/h	20 l/h	30 l/h	30 l/h	50 l/h
Starting point	< 3 l/h	< 3 l/h	< 5 l/h	< 5 l/h	< 8 l/h
Nominal pressure	16 bar	16 bar	16 bar	16 bar	16 bar
Pressure loss at qp Δp	0.10 bar	0.23 bar	0.23 bar	0.23 bar	0.23 bar
Metrological class	EN 1434 Class 3				

Mounting

Nominal width DN	15 mm	15 mm	15 mm	20 mm	20 mm
Connecting thread	G ¾ B	G ¾ B	G ¾ B	G 1 B	G 1 B
Mounting length	110 mm	110 mm	110 mm	130 mm	130 mm
Long-term operating temp.			90°C		
Short-term operating temp.			110°C		

Temperature measurement

Temperature sensors	Pt10'000Ω
Integrator sensor	0 - 110°C
Temp. difference range Δt	3 - 75K
Minimum starting value	0.5K

Power supply

Lithium battery, 3.6 V

Pulse outputs

Open collector 1 Hz 500 ms

Pulse inputs

power supply	$3.6V_{DC}$
$R_{pull\ UP}$	1 MΩ
Pulse values	1, 2.5, 5, 10, 25, 50, 100, 250

Thermal energy meter

Environmental class	A
Battery protection class	III
Housing protection class	IP54 as per DIN VDE 0470, Part 1
Permissible temperatures	
Transport and storage	-10 - 60°C (dry)
Operation	5 - 55°C [1)]
Data memory	non-volatile
Display	LCD, 7-digit
Weight	0.8 kg

[1)] The average annual permissible temperature with the radio option is 40°C

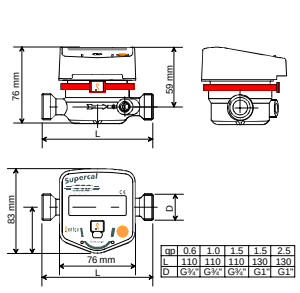
Installation instructions

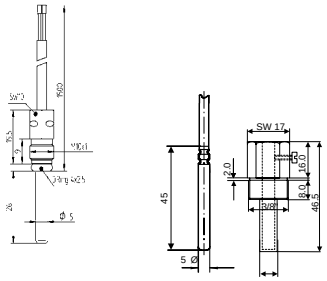
- Local regulations regarding the use of thermal energy meters must be observed
- The pipework must be flushed through before installing the meter
- Both temperature sensors and all screw pipe joints must be fitted with seals
- It is recommended to fit the thermal energy meter between two shut-off valves
- The information given on the identification plate must be observed
- It is essential to pay attention to the isolation instructions in order to avoid the accumulation of condensation in the integrator or a any capillary effect on the temperature sensor cable!

Operating instructions

- Basically, the battery must be replaced in the event of re-certification or repair

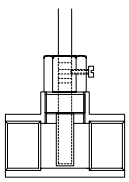
Masszeichnung, dimesion in mm





Einbau in T-Stück mit Tauchhülse

Installation with t-fitting and protection pockets



T-Stück 3/4" x 3/8" x 3/4"

Isolationsvorschrift, Isolation instruction