

Superstatic 440

Static Heat Meter
Fluid Oscillator Principle
Qp 1 m³/h - 1500 m³/h,
DN 15 - DN 1500



The approved and tested oscillating jet principle of Superstatic flow sensors in combination with 531 Supercal integrators guarantees reliable, long-term metering of thermal energy and flow.

Design

The Superstatic 440 thermal energy meter consists of a Supercal 531 (battery-powered) or (mains-powered) integrator and a pair of temperature sensors. Consumption values can easily be read off the display or via an optical interface.

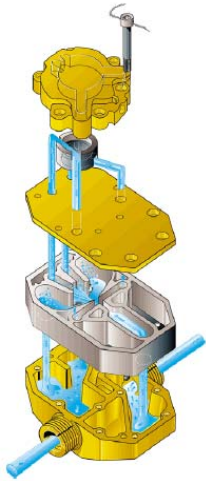
Temperature sensor pair

Supercal 531 integrators in combination with the Superstatic flow sensor are supplied as standard in the Pt 500 version. The temperature sensors are matched to one another. They are always supplied in pairs and must not be separated, extended or shortened. In the case of temperature sensor pairs with a cable longer than 3 m, we recommend the exclusive use of screened temperature sensor pairs. In this case, the screening must be fitted correctly.

Measurement technique

The Supercal 531 with mains power supply records every 3 seconds the supply and the return temperature, with battery power every 20 seconds (D-type battery) or 30 seconds (C-type battery). The recording flow rate is dependant on the pulse value of the flow sensor unit and is constantly updated. From the mean flow rate, the temperature difference and the heat coefficient will be calculated the energy of the captured medium and displayed on the 8-digit LCD display.

Functional description



The top level of Superstatic flow sensors is always the sensor level with feedback loops. The sensor frequency pulses are directly proportional to the flow volume.

The oscillating jet level with the oscillator has an acceleration section with interactive reciprocal action. The oscillator frequency of the oscillating jet and the electrical signals generated does not need any external energy source.

The water inlet and outlet have a fluid input optimized for flow and an integrated calming section, which makes an external calming section up to DN40 redundantly.

Main features

Superstatic flow sensors are optimized for the measurement and calculation of energy consumption in district heating systems. They are also extremely well suited to use purely as volumetric flow meters for various media.

- Interchangeable measuring head
- Comprehensive range 1 – 400 m³/h
- Purchase and maintenance costs are reasonable compared with other static flow sensors
- Corrosion resistant materials
- Threaded and flange fittings
- No calming sections necessary up to DN40
- No moving parts, therefore no wear
- not sensitive to dirt
- durable
- Can be installed virtually anywhere
- Common spare parts 1 – 400 m³/h
- Dynamic range 1 : 50 at 40– 400 m³/h
- Direct pick-up of voltage pulses without reflectors
- Measurement irrespective of medium
- Long-term, stable, accurate and reliable measurement, even if water quality is poor

Ordering

When placing an order of Superstatic flow sensors the appropriate integrator unit Supercal 531 and battery or main power supply operation must be always ordered along. In the order you must indicate to us, the nominal flow, mounting length and connection of the desired Superstatic flow sensor.

With all orders the special requirements such as display unit, pulse value, glycol content, K-value, correction curves, temperature sensor resistance and mounting place (supply or return) are to be provided!

Design

The Supercal 531 integrator is suitable for connecting Pt 500 or Pt 100 temperature sensor pairs with 2 or 4-conducting wire techniques. Volume inputs can be combined with mechanical, magnetic-inductive, ultrasonic or fluidic oscillators flow sensors with a maximum nominal flow rate of 10'000 m³/h. The factor of the pulse value is defined in the flow meter unit. The volume input value is defined when the unit is produced. The pulse value can be modified one single time by means of the push button. The additional pulse inputs allow the connection of hot water, cold water, gas, oil and electricity meters. Consumption values can easily be read on the LCD display, via the optical interface, RS-232, M-bus or modem.

**Power supply module
Options combinations:**

The flexible power supply concept of the Supercal 531 allows the following

- 6 year battery, D type
- 11 year battery, C type
- 220...240V alternating voltage 50/60 Hz
- 100...120V alternating voltage 50/60 Hz
- 12...24V alternating voltage 50/60 Hz
- 12...24V DC voltage 50/60 Hz

Communication module

:

All versions can be ordered with two optional galvanically separated communication modules or the two communication modules can also be equipped later on when the integrator is in operation and this without compromising verification:

- RS 232 with two additional impulse inputs
- RS 232 with two additional open collector outputs
- RS 232 with two additional relay outputs
- M-Bus-module with two additional impulse inputs
- M-Bus-module two additional open collector outputs
- M-Bus-module two additional relay outputs
- Analogue module 2 outputs 0-20 mA or 4-20 mA or 0-10V
- Analogue module 2 inputs 0-20 mA or 4-20mA or 0-10V
- Radio module
- LON module
- Internet module

Data storage

The Supercal 531 has in case of power failure, two non-volatile EEPROM for extensive data safety storage. In both EEPROM the data are updated every hour. The first non-volatile memory is located inside on the printed circuit board of the relevant calibration and measurement part of the integrator and stores the following data:

- parameters of the integrator and configuration parameter
- cumulated energy
- cumulated volume
- customer's specific tariff
- 15 monthly values
- 32 maximum values
- 32 average values
- two set day
- cumulated energy or volume on the set day
- operating hours
- date and time
- MET serial number (integrator upper part, calibration and measurement part)
- pulse value of the flow meter

The second non-volatile EEPROM is located on the printed circuit board in the integrator base part and stores the following parameters:

- MIO serial number (integrator base part, printed circuit board)
- identification number and customer number
- pulse value of additional meters 1 and 2
- cumulated values of additional meters 1 and 2
- unit of additional meters 1 and 2
- M-Bus or radio address (primary and secondary)
- radio address
- baud rate (M-Bus)
- pulse value of the pulse output
- parameter setting of the analogue outputs
- alarm and threshold value

This EEPROM ensures a smooth exchange of the calibration and measurement relevant part, without a new entering of the configuration of the communication.

Backup	For examination and safety storage of the measurement results the Supercal stores once per hour all data in a non-volatile memory. With power supply failure all values are automatically updated and stored.
Cumulated energy	The energy can be displayed in kWh, MWh, GJ, MJ and BTU. At the factory kWh is set as a standard energy unit parameter. The maximum energy that can be displayed is 99'999'999; the number of decimals can be set at the factory or by an authorized calibration laboratory.
Test segment	All segments will be shown on the LCD-display.
Cumulated volume	Cumulated volume is displayed in m ³ or gallons. For special applications, a display with 0.001 m ³ (liter) is possible. At the factory, m ³ is set as a standard volume unit parameter. The maximum displayable energy, is 9'999'999.9 m ³ , the number of decimals can be set at the factory or by an authorized calibration laboratory.
Operating hours	Operating hours is displayed in hours.
Error time	The cumulated time, while some error was present, is indicated in minutes.
Flow rate	The current flow rate is displayed in m ³ /h or in gallon/h. At the factory, m ³ /h is set as a standard flow rate parameter; the number of decimals can be set at the factory or in an authorized calibration laboratory.
Supply and return temperature	The Temperatures are displayed with one decimal. Temperatures under 0°C are shown with a – (minus) sign. The display range is –20...200°C. The temperature indication, can upon request, also be displayed in °F.
Temperature difference	The temperature difference is displayed with two decimals. If the return temperature is higher than the supply temperature, a - (minus) sign will be placed in front. The temperature difference, can upon request, also be displayed in °F.
Power	The power can be displayed in kW, MW, GJ, MJ, KJ or BTU/h. At the factory kWh is set as a standard power unit parameter.
Set day values	The Supercal 531 has two set days. On set day the cumulated energy, volume and pulse inputs are stored with date.
Monthly value	The storage date for the 15 monthly values can be set. The cumulated energy, volume, auxiliary pulse inputs and tariff values are stored. The storage date of the monthly values can be set, if the parameter setting mode is activated.
Average value	For the period of the 32 average values an integration time from 1 minute to 45 days can be chosen. The average value for the actual power, flow, supply and return temperature, temperature difference, impulse A1 and impulse input A2 are displayed on the LCD display and stored.
Maximum value	The precise monitoring and recording of power drops can be parameterized in 1-hour cycles and cycles up to 1-year. The maximum values for the actual

power, flow, supply and return temperature, temperature difference, impulse A1 and impulse input A2 is displayed on the LCD display are displayed with date and time and also stored. The maximum values are displayed with date and time.

Pulse parameters

The pulse values for the flow meter and for the additional meters A1 and A2 and the pulse values are displayed in the configuration menu. These data can be changed via the push buttons, if the parameter setting mode is activated

Identification number

The identification/customer number is displayed with 8 digits with an index Cn. The identification/customer number can be changed via the push buttons, if the parameter-setting mode is activated.

Date and time

The date and the time are displayed in the different menus. The date with the index DA and the time with Hr are displayed. No differentiation between summers and wintertime. Thanks to the backup function and in case of power supply loss the date and time update's it selves for several months. The date and the time can be changed via the push buttons, if the parameter setting mode is activated.

Pt100 or Pt500

The Pt100 or Pt500 resistance value is displayed. The resistance value can

Resistance values

only set at the factory.

Primary address

The primary address is displayed on the LCD display. The primary address can be changed via the push buttons, if the parameter-setting mode is activated.

Communication

Communication is displayed by mean of an indicator. The indicator enables one to recognize whether the integrator calculates or communicates from the inside or the outside.

Special functions

The special functions can be customized and activated at the factory. All functions and parameters for the special functions can be set with the software.

Threshold values

Two threshold values can be set over the optical interface or over the display and the push buttons. The following internal values can be used for the definition of thresholds: current flow, current power, supply or return temperature, temperature difference as well as a time window consisting of date and time. A threshold can also be activated when an error appears.

Status message transistor

The Supercal 531 allows a locking of status messages on the transistor outputs.

Outputs

The conditions of the status can be defined with the threshold values. Herewith, also an alarm output for fast and exact external monitoring of the operating conditions can be generated.

Solar- and cooling installations

The integrator units, calibrated for water ensure also with glycol mixtures a precise measurement, as the average mixing ratio can customized over the optical interface. The Supercal 531 processes and computes also negative temperatures. The dust proof and splash water-protected housings, IP65, is

especially suitable for cooling installations. For these customized mixing ratios no official approvals are possible.

Cooling energy

The cooling energy is cumulates, if at the same time the two following conditions are fulfilled:

- (Δt) temperature difference $> -0.2K$,
- as well as the supply temperature $< 18^{\circ}C$

The threshold value of the temperature is set at the factory at $18^{\circ}C$. The threshold value can be changed in steps of $1^{\circ}C$ via the optical interface. The cooling energy has the same physical unit as the heat energy. If the integrator unit is used for the combined heating and cooling measurement, then cooling energy, cooling power and the temperature difference with a minus (-) displayed and the appropriate values are assigned to the tariff 1.

Tariffs

Beside cooling/heating tariff the Supercal 531 disposes over the most different customer specific – customized tariffs (e.g. power tariffs), which can be defined with the help of the threshold values. The tariffs can be reloaded without compromising the verification over the optical interface or M-bus. Example of tariff types:

Tariff control by means of the current flow rate

- Tariff control by means of the current power
- Tariff control by means of the temperature difference
- combined cooling / heating meter
- Tariff control by means of the inner tariff time switch
- Tariff control by means of the M-Bus

Open system

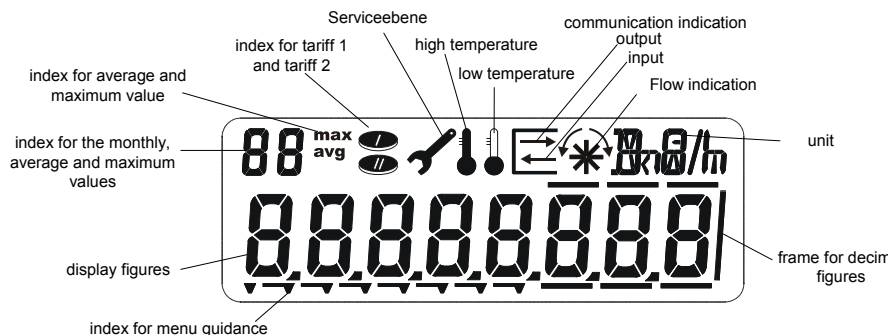
In open system installations a flow sensor is mounted in the supply pipe and another one in the return pipe. By the difference of the temperatures and the two flows the integrator unit calculates the used heat energy.

Volume measurement

The integrator Supercal 531 can also be used for volume measurement only. In order to ensure an accurate measurement the average water temperature is parameterized

Display

In consideration of the person reading the LCD display of the Supercal 531, the display was arranged clear and particularly large.



The display sequences are divided into the following menus:

- Main menu
- Set days
- 15 monthly values
- 32 average values
- 32 maximum values
- Configuration
- Service information
- Test and parameter setting level

The display sequence can be customized. The two push buttons enable simple and customer friendly usage and readout of measurement data.

Control concept



With the command push button the different display levels or the display within the display level can be selected.



By pressing the enter push button a display level or one of the submenus can be selected. Afterwards the individual displays within the display level or within the submenu can be selected with the command push button. If the command push button and the enter push button are pressed at the same time, then the display switches back again to the selection level of the different display levels.

Operating mode

The integrator Supercal 531 works in principle in normal mode. The following additional operating modes are integrated in the integrator's software:

- Test mode (without damaging the seal)
- Parameterization mode (user seal to be removed)
- Verification mode (verification seal to be removed)

The integrator Supercal 531 is fully parameterized at the factory and according to the country specific parameter settings. Authorized laboratories offices may modify the factory parameters.

Test mode

In order to access to the parameter setting and test mode, it is necessary to break the user seal on the backside of the integrator cover. A connection point is located below the user seal. To activate the parameter setting and test mode a jumper must be set. On the display the test menu appears. The test results can be readout on the high-resolution display.

Parameter set mode

In the parameter mode the setting of the following parameters can be set:

- delete stored error display
- delete average values
- delete maximum values
- set integration time of the average values
- setting of set day
- Set date and time
- enter customer number
- enter primary address
- set baud rate (M-Bus)
- set pulse value of the pulse- and analog module
- set pulse value of the volume pulse
- set pulse value of the pulse inputs
- set unit of the pulse inputs

The parameters can be changed via the push buttons or by the optical interface with the service software. By pulling out the jumper the integrator unit switches automatically into normal operation.

Verification mode

The verification mode is switched on by putting the Jumpers. In addition the verification seal must be destroyed. This is only permitted by authorized laboratory. The Jumper must remain in place during the calibration. These calibration relevant functions can be activated and worked on, exclusively, via the optical interface, in connection with the service software.

In the verification mode, verification relevant data can be changed. Therefore a verification seal protects the connection junction. If the

calibration seal is damaged, automatically the validity of the official verification is expired. Through pull out the Jumper the integrator unit automatically switches back into the normal operation mode.

Test and calibration interfaces

NOWA (standardized integrator-test adaptor according to AGFW)- High resolution test pulses- Integrated integrator test programme- Internal test simulation

Error messages

The Supercal 531 displays on the LCD the Err- sign together with a number code of the occurring errors. When several errors occur at the same time the numbers the error code are summed up.

Err1	The supply sensor is short circuited or disconnected
Err2	The return sensor is short circuited or disconnected
*T-Indicator	Temperature sensor exchanged and/or temperature sensors in the colder line is higher than in the warmer line
Err8	storage error EEPROM in measuring and calibration relevant part (only after the second time active)
Err16	storage error EEPROM in the integrator unit - lower part (only after the second time active)
Err32	configuration error EEPROM in measuring and calibration relevant part
Err64	configuration error EEPROM in the integrator unit - lower part
Err128	error of internal electronic, back to the manufacturer
Err256	voltage failure (by main or bus supply)
Err512	defect of communication module, module location 1
Err1024	defect of communication module, module location 2
Err2048	error impulse input auxiliary meter A1
Err4096	error impulse input auxiliary meter A2
Err8192	error of internal electronic, back to the manufacturer

If an error stays more than one hour, then it is stored in the error memory with date and time (error beginning) and duration (in minutes). If an error stays less than 60 minutes, then it is deleted automatically and without storage.

The two temperature sensor indicators are displayed as a message with the cumulated energy display on the main menu, indicating if:

- the temperature sensors are interchanged ⇒ this condition arise with most installations during the summer time
- the temperature in the colder line is higher than in the warmer line.

All error messages are deleted automatically on the LCD display, 30 seconds after the error correction.

Optical interfaces

The integrator Supercal 531 has an optical interface according to EN 61107. The M-Bus protocol according to EN1434. The optical interface corresponds electrically and mechanically to the ZVEI IEC 1107 standard. It allows following start-up and service work:

- Readout of all values
- Parameterization
- tests

Communication Options

The Supercal 531 differentiates between standard option possibilities equipped at the factory and optional plug-in communication modules. In the Supercal 531 are two plug-in spaces for all kinds of optional communication

modules foreseen. The integrator unit recognizes the optional modules approximately 10 second after plug-in - the functions are freely available.

Open collector outputs

The Supercal 531 has as a standard two Open Collector outputs for energy, volume, tariff 1, tariff 2, alarm and threshold values. These outputs are not galvanically separated.

Optionally, also two galvanically separated Open Collector output modules for standard or high-speed impulse outputs are available. The high-speed impulse can be used, for example, for the control of a valve. The impulse type and pulse duration can be set over the optical interface or with the help of the control push button.

Relay outputs

The optional relay module with two outputs serves mainly for the connection of status messages as for example operating errors in the following range:

- Temperature and flow measurement
- Operation and mains supply voltage
- Tariff status

Resolution of the Impulse in and output

The set resolution as well as the unit of the impulse in- and output are seen on the display menu - configuration

Analog outputs

The analogue module includes two galvanically separated power outputs, which are freely programmable. Due to the galvanic separation the analogue output needs a separate power supply of 25mA.

M-Bus

If the M-Bus is equipped at the factory, then it exists the possibility to add two additional communication modules. If the M-Bus is realized with an optional module then another additional communication module can still be added. There is also the possibility of using at the same time two M-Bus outputs for different applications. The two additional impulse inputs are automatically integrated into the M-Bus telegram transmitted. The M-Bus communication is realized with a variable data structure.

RS-232 interface

The optional serial interface module makes data exchange possible with the heat meter, reading of the data contained in the memory. The reading is affected in accordance with the M-Bus protocol EN 1434-3 and the Baud rate can be selected from 300 to 9600 Baud.

Radio

The optional radio module is based on the established bi-directional technology. The two additional impulse inputs are integrated automatically into the radio telegram and transmitted.

LON

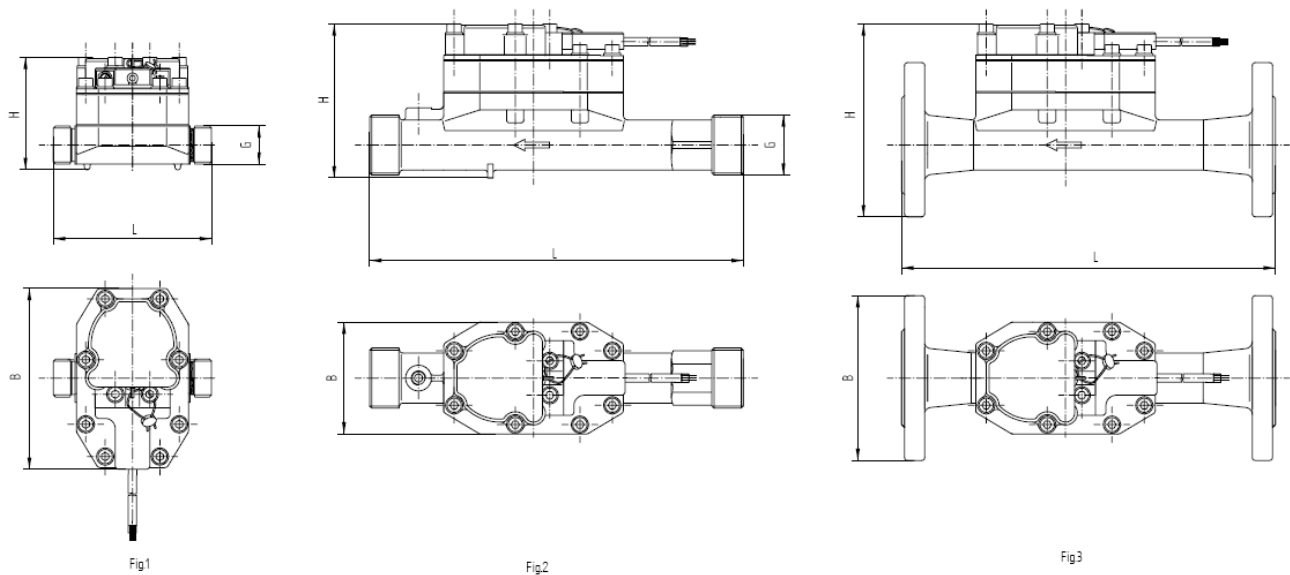
The optional LON-module is based on the LONWORKS network. The two additional pulse inputs are automatically integrated in the radio telegram and transmitted.

Technical data

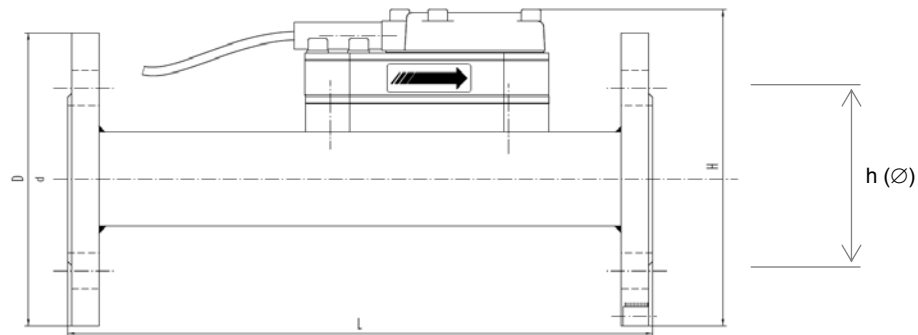
Flow sensor

Nominal Flow qp	Threaded connection	Flanged connection	Length	Material	Nominal Pressure	Maximal Durchfluss qs	Minimal Durchfluss qi	Low flow threshold value (50°C)	Pulse rate at qp	Threaded hole for sensor	Weight	Pressure loss at qp
m³/h	G"	DN	mm		PN	m³/h	l/h	l/h	imp/l		kg	bar
1	(EN ISO 228-1) 3/4"	(ISO 7005-3) (15)	110	Brass	16/25	2	10	4	51	Yes	1.8	0.2
1	1"	(20)	190	Brass	16/25	2	10	4	51	Yes	2.3	0.20
1.5	3/4"	(15)	110	Brass	16/25	3	15	10	27.5	Yes	1.8	0.09
1.5	1"	(20)	190	Brass	16/25	3	15	10	27.5	Yes	2.3	0.09
2.5	1"	(20)	190	Brass	16/25	5	25	10	27.5	Yes	2.3	0.25
3.5	1 1/4"	(25)	260	Brass	16/25	7	35	15	18.5	Yes	1.96	0.16
3.5		25	260	Brass	16/25	7	35	15	18.5		1.96	0.16
6	1 1/4"	(25)	260	Brass	16/25	12	60	30	8.2	Yes	1.96	0.16
6		25	260	Brass	16/25	12	60	30	8.2		2.9	0.16
10	2"	(40)	300	Brass	16/25	20	100	50	5.25	Yes	6.1	0.25
10		40	300	Brass	16/25	20	100	50	5.15		7	0.25
		(ISO 7005-1)										
15		50	270	Stainless	16/25	30	150	75	3.15		12.2	0.25
25		65	300	Stainless	16/25	50	250	125	1.93		12.8	0.25
40		80	225*	Stainless	16/25	80	800	400	0.82		115	0.09
40		80	300	Stainless	16/25	80	800	400	0.82		12.2	0.09
60		100	250*	Stainless	16/25	120	1200	600	0.55		14	0.1
60		100	360	Stainless	16/25	120	1200	600	0.55		14.6	0.1
100		125	250*	Stainless	16/25	200	2000	1000	0.33		16	0.1
150		150	300	Stainless	16/25	300	3000	1500	0.22		26	0.1
150		150	500*	Stainless	16/25	300	3000	1500	0.22		23	0.1
250		200	350	Stainless	16/25	500	5000	2500	0.14		30	0.1
400		250	450	Stainless	16/25	800	8000	4000	0.09		57	0.1
						m³/h	m³/h	m³/h				
1500		500	500	Steel	10	3000	150	50	0.028		130	0.1

Dimensions Static Flow Sensor



qp	DN	G	PN	Fig.No	B (mm)	H (mm)	L(mm)	h (Ø mm)
1 m³/h	---	¾"	16 / 25	1	125	79	110	
1 m³/h	---	1"	16 / 25		125	79	190	
1.5 m³/h	---	¾"	16 / 25		125	79	110	
1.5 m³/h	---	1"	16 / 25		125	79	190	
2.5 m³/h	---	1"	16 / 25		125	79	190	
3.5 m³/h	---	1 ¼"	16 / 25	2	78	105	260	
3.5 m³/h	25	---	16 / 25	3	115	134	260	Ø 85
6 m³/h	---	1 ¼"	16 / 25	2	78	105	260	
6 m³/h	25	---	16 / 25	3	115	134	260	Ø 85
10 m³/h	---	2"	16 / 25	2	78	122	300	
10 m³/h	40	---	16 / 25	3	150	157	300	Ø 110



qp	DN	PN	L (mm)	D (mm)	H (mm)	h (Ø mm)
15 m³/h	50	16, 25	270	165	176	Ø 125
25 m³/h	65	16, 25	300	185	194	Ø 145
40 m³/h	80	16, 25	300	200	208	Ø 160
60 m³/h	100	16, 25	360	220	231	Ø 180
100 m³/h	125	16, 25	250	250	258	Ø 210
150 m³/h	150	16, 25	300	285	290	Ø 240
250 m³/h	200	10, 16, 25	350	340	343	Ø 295
400 m³/h	250	10, 16, 25	450	405	402	Ø 355
1500 m³/h	500	10	500	670	670	Ø 620

Calculator / Integrator Supercal 531

STANDARD VERSION

Temperature measurement

Pt100 or Pt500	
2- and 4-wire	
Absolute temperature range	-20...180°C
or	0...200°C
Approved range	2...200°C
Absolute temperature difference	1...150K
Homologation range	2...150K
Response limit	0.2 K
Temperature resolution t	0.1 K
Temperature resolution Δt	0.01 K
Measuring precision better than EN1434-1 request	

Measuring cycle

Temperature measurement:	
- 30 seconds when battery operated (Standard Type C)	
- 20 seconds when battery operated (Type D)	
- 3 seconds when mains operated	
Volume measurement:	
- Pulse volume are constantly updated	

Medium temperature

Operation	5...55°C
Storing and transport	-25...70°C

Display	8 digit LCD-Display
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Display units

Energy	kWh, MWh, GJ, MJ, BTU
Volume	m ³ , Gallon
Additional pulse inputs	volume or energy
Temperature	°C, °F or K

Voltage supply modular optional

Battery	6 + 1 year
Battery	11 + 1 year
Mains	115 or 230VAC – 45/65 Hz
Mains	24VAC 45/65 Hz or 12-24VDC

Data security

Verification- and measurement relevant part	EEPROM
Integrator base	EEPROM

Housing protection

Standard	IP54
Optional (for example for cooling measurement)	IP6

Test and calibration interface

- NOWA
- High resolution test pulses
- Integrated integrator test program
- Internal simulation test

Pulse input

Input frequency	
Normal mode	max. 5 Hz
Fast mode	
Battery operation	max 5 kHz
Mains operation	max. 12 kHz
Input voltage	0 -30V
Volume pulse inputs	1-10-100-1000 l/pulse or 2.5-25-250-2500 l/pulse
Volume pulse fast	0.0001 –9999.9 pulse

2 additional pulse inputs

Input frequency	
Normal mode	max. 5 Hz
Schnell mode	max. 12 kHz
Input voltage	0 -30V
Pulse values	0.0001 –9999.9 pulse/l

2 pulse outputs

Output frequency	
Normal mode	max. 5 Hz (+/-20%)
Fast mode	max 10 kHz (+/-20%)
Short circuit	max 100 µA
Pulse values	0.0001 –9999.9 pulse/l

Optical interface

Hardware according to DIN IEC1107	
Protocol according to M-BUS EN1434	

OPTIONS

M-Bus (mounted fix at work)

Fix or variable Data structure	
Potential free, reverse battery proof	
Baud rate 300...9600 baud	

Radio module (mounted fix at work)

Mode	FM, bi-directional
Frequency	433,82 MHz
Transmitting power	< 10mW
Range	ca. 300 m (open filed)

OPTIONAL COMMUNICATION MODULES

The communication module can be adapted afterwards and when in operation without damaging the verification validity.

Standard Open Collector

Module with two outputs

Voltage	maximal 30V
Power	maximal 40 mA
Voltage drop	approx.. 1.3 V at 20 mA
Voltage strength	500 V eff against mass
Pulse width repetition rate	1 : 1
Pulse duration	100 ms transmitting
Max. pulse frequency	5 Hz

Fast Open Collector

Module with two outputs

Voltage	maximal 30V
Power	maximal 40 mA
Voltage drop	ca. 1.3 V at 20 mA
Voltage strength	500 V eff against mass
Pulse duration	0.1 – 100 ms in 1 ms step
Max. pulse frequency	100 Hz

Relay output

module with two outputs

Contact potential maximal	100V AC/DC,
	50/100mA

Cutt-off voltage	500 mA
Voltage to ground	maximal 100V AC/DC,
50/100mA	

Cable length	max. 25 m
Maximal pulse frequency	1 Hz

Passive analogue module with two outputs

Power supply	5..15VDC
	(external power supply)
Power range	4...20mA or 0...20mA
Resistance RL	(Ohm) max. at 24V = 950 Ω
Resolution	12 bit
Max. converter error	0.15% from meas. value
	+ 0.15% from end value

LON module

Network	LONWORKS
Transmitting mean	2-twisted wire, FTT-10A
Power supply bus interface	24VDAC, max. 50 mA
Connection	4-Pol-terminal screw

RS-232 module

Fix or variable data structure	
Potential free, reverse battery proof	
Baud rate 300...38'400 baud	

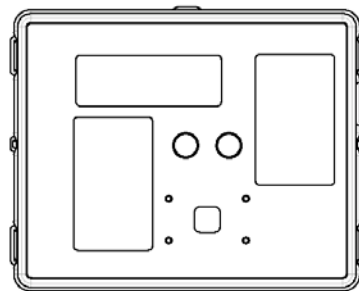
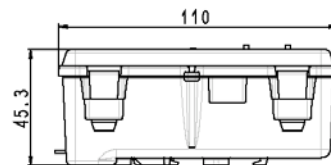
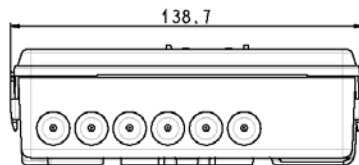
M-Bus module

Fix or variable data structure	
Potential free, reverse battery proof	
Baud rate 300...38'400 baud	

Radio module

Mode	FM, bi-directional
Frequency	433,82 MHz
Transmitting power	< 10mW
Transmitting range	approx. 300 m (open field)

Dimensions calculator / integrator Supercal 531



Projects

Safety

The integrator Supercal 531 is produced reliable by using state-of-the-art techniques and according to heat meter standards. If the integrator unit is operated outside of the specifications described herein or is not handled in accordance with regulation, then all service and warranty claims towards the company Sontex are void.

Local regulations

Following must be observed:

- Local regulations for electrical installations
- Local regulations for the use of energy meters
- Mounting information for the installation of energy meters and temperature sensors according to EN1434-2 and EN1434-6.

Power supply

In the case of mains operated integrators an uninterruptible power supply must be provided.

- Local regulations for electrical installations must be guaranteed.
- Over voltage or under voltage are unacceptable

Lightening protection

Preventive measures against lightening must be taken within the mains supply or bus system.

Bus installations

With all bus installation a galvanic separation must be ensured on the part of the flow sensors. Otherwise the integrator unit can be destroyed!

Cooling installations

Isolation regulations must be observed. Generally the integrator is to be mounted away from the cooling pipe.

Mounting

As standard, the mounting instructions are delivered with the integrator and must be observed for the installation and the start up. With temperature sensor cable with a length over 3 m, generally shielded cables are to be used. The shielding must be connected appropriately with the enclosed fixing clips to the mass.

Security seals

All integrator units are to be provided with the necessary seals, so that the equipment is protected against an unauthorized access. Calibration relevant seals may not be damaged or removed! Otherwise, all guarantees and service warranties will no longer apply, as well as the validity of the calibration. Authorized personnel for service purposes and to be afterwards renewed may only remove user security seals.

Service and repairs

Laboratories authorized by Sontex may only carry out the service and repair work.

