

Engelmann Heat Meter

# SensoStar I / T / M

Mechanical flow sensors for installation points IST, TE1, M60



Most accurate measurement results using the multi-jet principle  
Various installation options due to a large selection of interfaces  
Flexible communication based on modular system  
Fast response due to dynamic temperature measurement cycle

# Precise heat/cooling measurement

The **SensoStar I / T / M** is a high-precision measuring device that uses inductive sensing to record heat or cooling energy. The comprehensive range covers all common installation interfaces as well as a variety of temperature sensor and communication variants.

## We speak your language

The continuously growing portfolio of communication modules offers you a wide range of remote readout options.

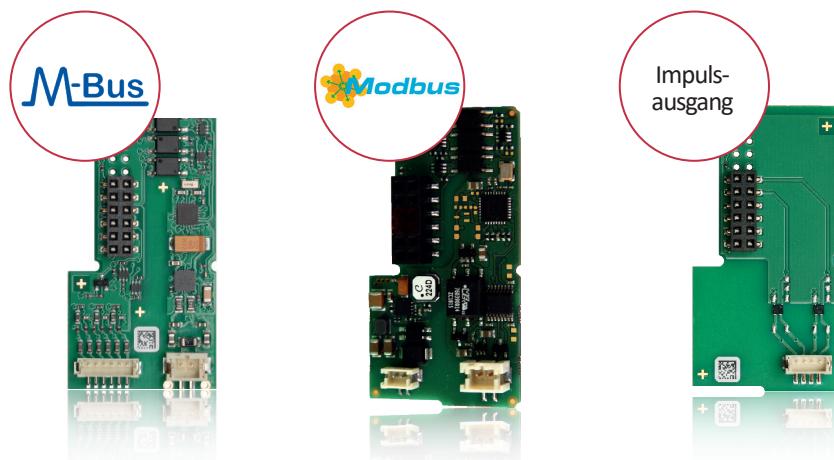
### RADIO MODULES



### Features

- Meters from Qp 0.6 to Qp 2.5
- Installation points: IST, TE1, M60
- Horizontal / vertical / overhead installation
- Installation point and display unit adjustable on site
- Return flow detection
- Detachable calculator with 0.50 m connection cable
- Battery life of up to 20 years

### WIRED MODULES



wM-Bus, LoRaWAN and M-Bus can also be equipped with 3 pulse inputs to connect other devices.

# SensoStar I / T / M

## TECHNICAL DATA



### Flow sensor

Sizes	<b>Nominal flow rate Qp m³/h</b>	m³/h	0.6	1.5	2.5
	<b>Low flow threshold value</b>	l/h	4	4	5.5
	<b>Minimum flow Qi</b>	l/h	30	30	50
	<b>Maximum flow Qs</b>	m³/h	1.2	3	5
<b>Pressure drop Δp at Qp</b>		bar	0.1	0.2	0.24
<b>Pressure drop Δp at Qs</b>		bar	0.4	0.74	0.92
<b>Dynamic range Qi/Qp</b>		-	1:20	1:50	1:50
<b>Measuring method</b>			bidirectional inductive scanning system		
<b>Accuracy class (MID)</b>			Class 3		
<b>Protection class</b>			IP65		
<b>Nominal pressure PN</b>		bar	16		
<b>Medium</b>			water; optional, without approval: water with a propylene glycol or ethylene glycol percentage rate of 20 %, 30 %, 40 % or 50 % (type and concentration of glycol can be set at any time)		
<b>Mounting position</b>			any position (horizontal, vertical, overhead)		
<b>Point of installation</b>			outlet flow and inlet flow; can be set when the amount of energy is still ≤ 10 kWh		
<b>Temperature range medium heat</b>		°C	15 – 90		
<b>Temperature range medium cooling (from Qp 1.5 to Qp 2.5)</b>		°C	5 – 50		

### Calculator

<b>Temperature range medium</b>	°C	0 – 150 heat / 0 – 50 cooling (Qp 1.5 and Qp 2.5)
<b>Ambient temperature in the field</b>	°C	5 – 55 at 95 % relative humidity
<b>Transport temperature</b>	°C	-25 – 70 (for max. 168 h)
<b>Storage temperature</b>	°C	-25 – 55
<b>Temperature difference range ΔΘ heat</b>	K	3 – 100
<b>Temperature difference range ΔΘ cooling</b>	K	-3 --50
<b>Minimum temperature difference ΔΘ heat</b>	K	> 0.05
<b>Minimum temperature difference ΔΘ cooling</b>	K	<-0.05
<b>Minimum temperature difference ΔΘ heat / cooling</b>	K	> 0.5 / <-0.5
<b>Resolution temperature</b>	°C	0.01
<b>Measuring cycle temperature; dynamic</b>	s	2 / 60; using a power pack: 2 s permanent
<b>Display</b>	LCD – 8 digits + special characters	
<b>Displayed thermal energy</b>	up to 3 decimal places	

# SensoStar I / T / M

## TECHNICAL DATA

<b>Units</b>	MWh, kW, m <sup>3</sup> , m <sup>3</sup> /h (kWh, GJ, MMBTU, Gcal); unit of energy can be set when the amount of energy is still ≤ 10 kWh
<b>Interfaces</b>	optical interface (M-Bus protocol); <i>optional communication:</i> radio: wireless M-Bus*, LoRaWAN*; wired: M-Bus*, Modbus, 2 pulse outputs
<b>Power supply</b>	easily replaceable 3 V lithium battery; preparation for 3 V power pack available (input voltage 230 V / 24 V)
<b>Estimated lifetime</b>	years 20 without communication module; 16 with M-bus hourly readout; 15 with M-Bus 10 minute readout; 10 with others e.g. wM-bus, Modbus, LoraWAN
<b>Data storage</b>	24 monthly and semi-monthly values
<b>Billing dates</b>	freely selectable annual billing date; 15 monthly and semi-monthly values via display or radio (compact mode); 24 monthly and semi-monthly values via optical interface or M-Bus
<b>2 tariff registers</b>	individually adjustable; store energy or time
<b>Storage of the maximum values</b>	flow, power and temperatures (inlet, outlet, ΔΘ) as well as the respective maximum values of the last 15 months
<b>Protection class</b>	IP65
<b>Approvals</b>	DE-16-MI004-PTB025; DE-16-M-PTB-0097; CH-T2-18768-00; CE
<b>EMV (MID)</b>	EN 1434

\* Optional with 3 pulse inputs.

### Temperature sensors (2-wire technology)

<b>Platinum precision resistor</b>	Pt 1000
<b>Sensor diameter</b>	mm UTS: 5; 5.2; 6; AGFW: 27.5; 38; needle sensor: 3.5 x 75
<b>Connection cable length</b>	m 1.5; 3; 6
<b>Installation type</b>	asymmetrical; symmetrical

### Weights

<b>Weight (standard version in kg)</b>	Variant I	Variant T	Variant M
<b>Calculator not detachable</b>	0.655	–	–
<b>Calculator detachable</b>	0.700	0.780	0.700

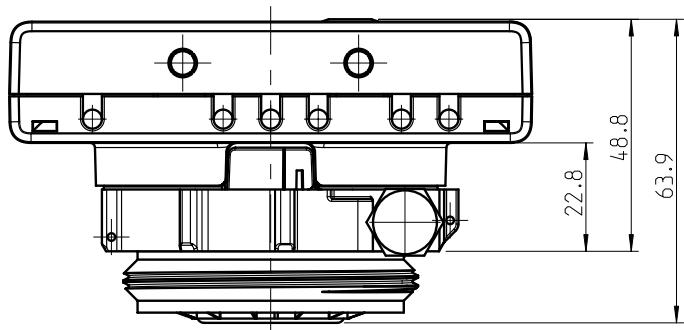
### Dimensions

<b>Pulse cable length (only separable version)</b>	m	0.50
<b>Calculator housing (H x W x D)</b>	mm	75 x 110 x 34.5
<b>Connection thread</b>	Variant I: 2"	Variant T: M62 x 2
		Variant M: M60 x 1.5

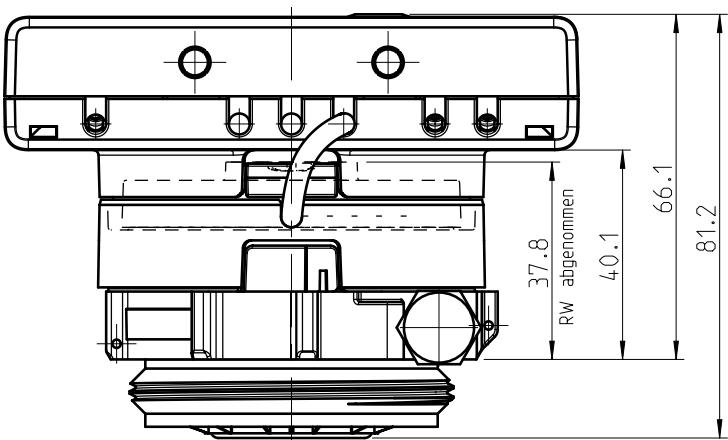
# SensoStar I / T / M

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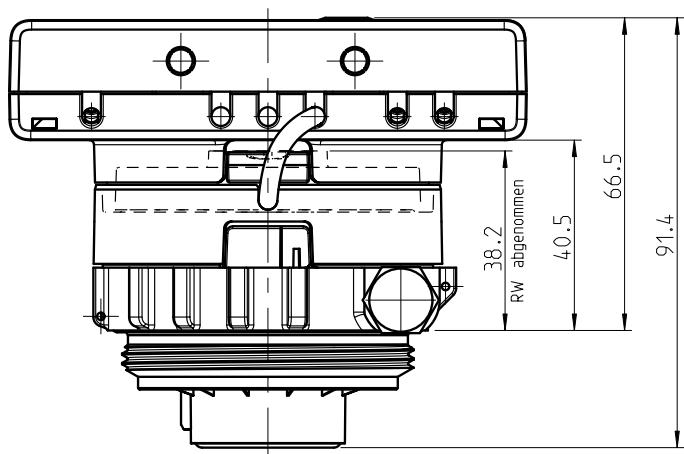
SensoStar I



SensoStar M

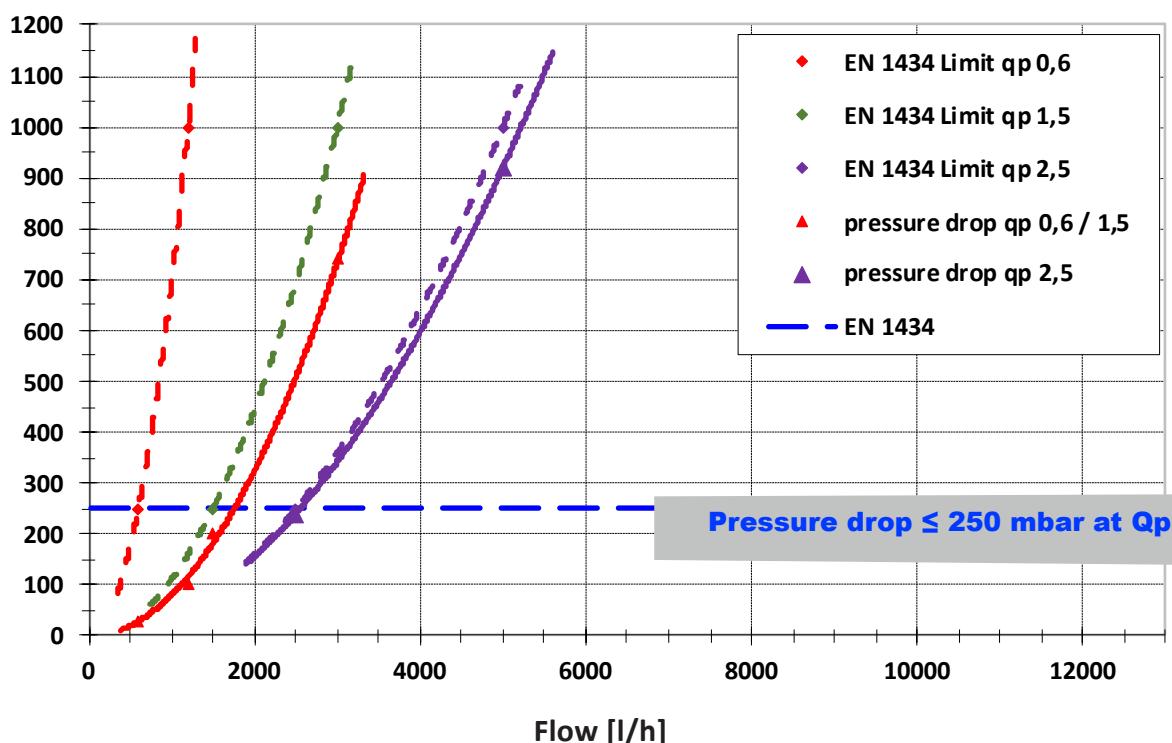


SensoStar T



### PRESSURE DROP SENOSTAR I / T / M

Pressure drop [mbar]



**Contact us here:**



+49 6222 98 00 188 (Orders)

+49 6222 98 00 2727 (Technical Service)

+49 6222 98 00 0 (Head Office)



[info@engelmann.de](mailto:info@engelmann.de)



Engelmann Sensor GmbH

Rudolf-Diesel-Straße 24-28

69168 Wiesloch-Baiertal

Germany



[www.engelmann.de](http://www.engelmann.de)