

Engelmann **Ultrasonic Thermal Energy Meter**

SensoStar U

Ultrasonic flow sensor for inline installation points



Most accurate measurement results in any installation position

Various installation options due to a large selection of installation lengths

Flexible communication based on modular system

Fast response due to dynamic temperature measurement cycle

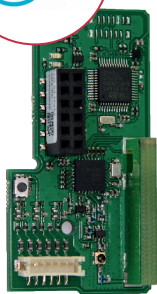
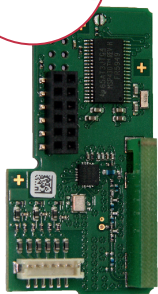
Precise heat/cooling measurement via ultrasound

The **SensoStar U** is a high-precision measuring device that uses ultrasonic measurement technology to record heat or cooling energy. This meter offers the right solution for every installation situation or requirement. The comprehensive range covers all installation lengths, 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.

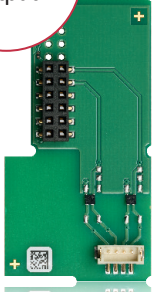
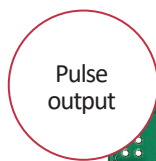
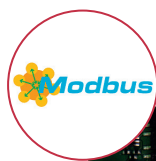
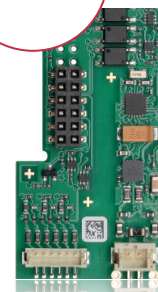
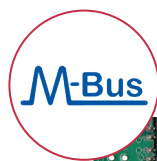
RADIO MODULES



Features

- Sizes: DN 15 to DN 40
- Meters from Qp 0.6 to Qp 10
- Lengths: 105 mm to 300 mm
- Horizontal / vertical / overhead installation
- Installation point and display unit adjustable on site
- Return flow and air detection
- Detachable calculator with 0.85 m or 2.85 m connection cable
- Battery capacity 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.

Flow sensor

Sizes	Nominal flow rate Qp	m³/h	0.6	0.6	1.5	1.5	2.5	2.5	3.5	3.5	6	6	10
	Low flow threshold value	l/h	6	6	6	6	12	12	14	14	30	30	50
	Minimum flow Qi	l/h	12	12	12	12	25	25	28	28	60	60	100
	Maximum flow Qs	m³/h	1.2	1.2	3	3	5	5	7	7	12	12	20
Pressure drop Δp at Qp		bar	0.03	0.03	0.21	0.04	0.12	0.12	0.21	0.21	0.20	0.20	0.11
Pressure drop Δp at Qs		bar	0.13	0.13	0.85	0.17	0.46	0.46	0.89	0.89	0.80	0.80	0.43
Nominal diameter		mm	DN 15	DN 20	DN 15	DN 20	DN 20	DN 25	DN 20	DN 25	DN 25	DN 32	DN 40
Dynamic range Qi/Qp		-	1:50	1:50	1:125	1:125	1:100	1:100	1:125	1:125	1:100	1:100	1:100

Measuring method	ultrasound; Time-of-Flight	
Accuracy class (MID)	class 2	
Protection class	IP68	
Nominal pressure PN	bar	16
Medium	water	
Mounting position	any position (horizontal, vertical, overhead)	
Point of installation	outlet flow and inlet flow; can be set when the amount of energy is still ≤ 10 kWh	
Temperature range medium heat	°C	15 – 90 15 – 130 high temperature (150; for max. 2000 h) (optional)
Temperature range medium cooling (from Qp 1.5 to Qp 10)	°C	5 – 50
Temperature range medium heat/cooling	°C	15 – 90 heat 15 – 120 high temperature (optional) 5 – 50 cooling

Calculator

Temperature range medium	°C	0 – 150 heat / 0 – 50 cooling (from Qp 1.5 to Qp 10)
Ambient temperature in the field	°C	5 – 55 at 95 % relative humidity
Transport temperature	°C	-25 – 70 (for max. 168 h)
Storage temperature	°C	-25 – 55
Temperature difference range ΔΘ heat	K	3 – 100
Temperature difference range ΔΘ cooling	K	-3 – -50
Minimum temperature difference ΔΘ heat	K	> 0.05
Minimum temperature difference ΔΘ cooling	K	< -0.05
Minimum temperature difference ΔΘ heat/cooling	K	> 0.5 / < -0.5
Resolution temperature	°C	0.01
Measuring cycle temperature; dynamic	s	2 / 60; by using external power supply: 2 s permanent
Measuring cycle flow	s	2
Calculator housing dimensions (H x W x D)	mm	75 x 110 x 34.5
Length of connecting cable calculator–flow sensor	m	0.85 (optional: 2.85)
Display	LCD – 8 digits + special characters	
Displayed thermal energy	up to 3 decimal places	

SensoStar U

TECHNICAL DATA

Units	MWh, kW, m³, m³/h (kWh, GJ, MMBTU, Gcal); unit of energy can be set when the amount of energy is still ≤ 10 kWh	
Interfaces	optical interface (M-Bus protocol); <i>optional communication:</i> radio: wireless M-Bus*, LoRaWAN*; wired: M-Bus*, Modbus, 2 pulse outputs	
Power supply	easily replaceable 3 V lithium battery; preparation for 3 V power pack available (input voltage 230 V / 24 V)	
Battery capacity, designed	years	20 (without communication module); 16 (M-bus, readout interval 1 hour); 15 (M-Bus, readout interval 10 minutes); 10 (with others e.g. wM-bus, Modbus, LoraWAN)
Data storage	24 monthly and semi-monthly values	
Billing dates	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	
2 tariff registers	individually adjustable; store energy or time	
Storage of the maximum values	flow, power and temperatures (inlet, outlet, ΔΘ) as well as the respective maximum values of the last 15 months	
Protection class	IP65	
Approvals	DE-16-MI004-PTB025; DE-16-M-PTB-0097; CH-T2-18768-00; CE	
EMC (MID)	EN 1434	

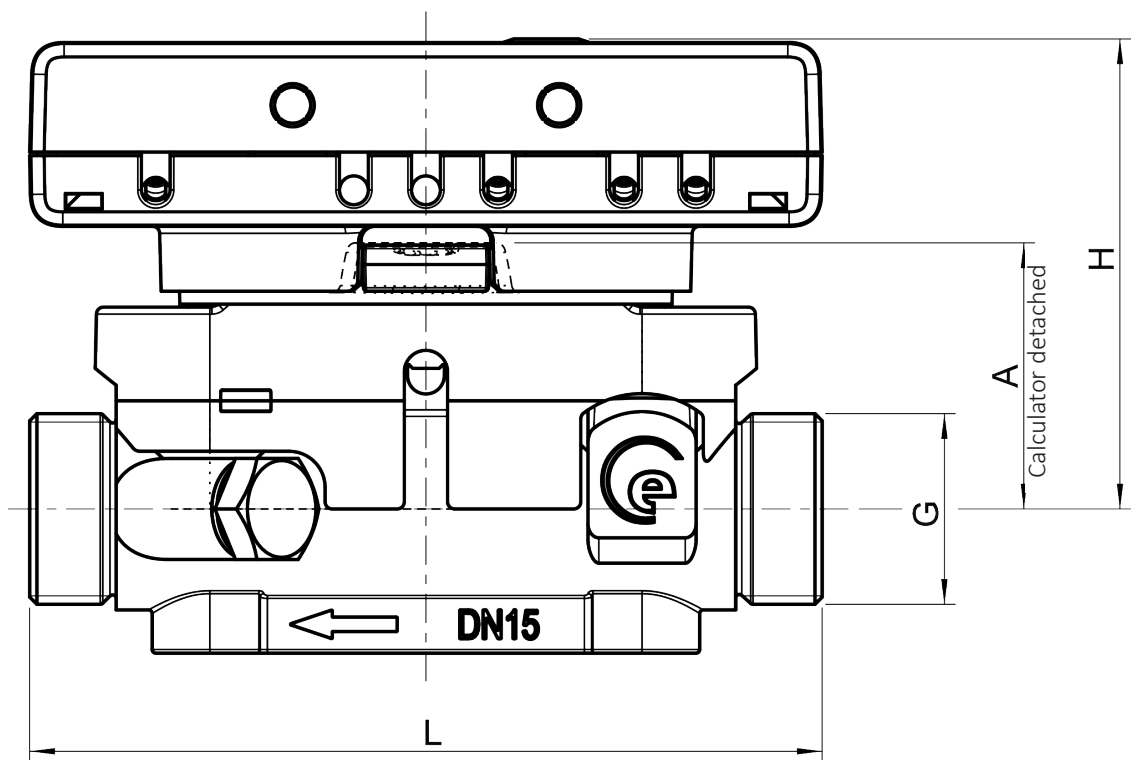
* Optional with 3 pulse inputs.

Temperature sensors (2-wire technology)		
Platinum precision resistor	Pt 1000	
Sensor diameter	mm	UTS: 5; 5.2; 6; AGFW: 27.5; 38
Connection cable length	m	1.5; 3; 6
Installation type	asymmetrical; symmetrical	

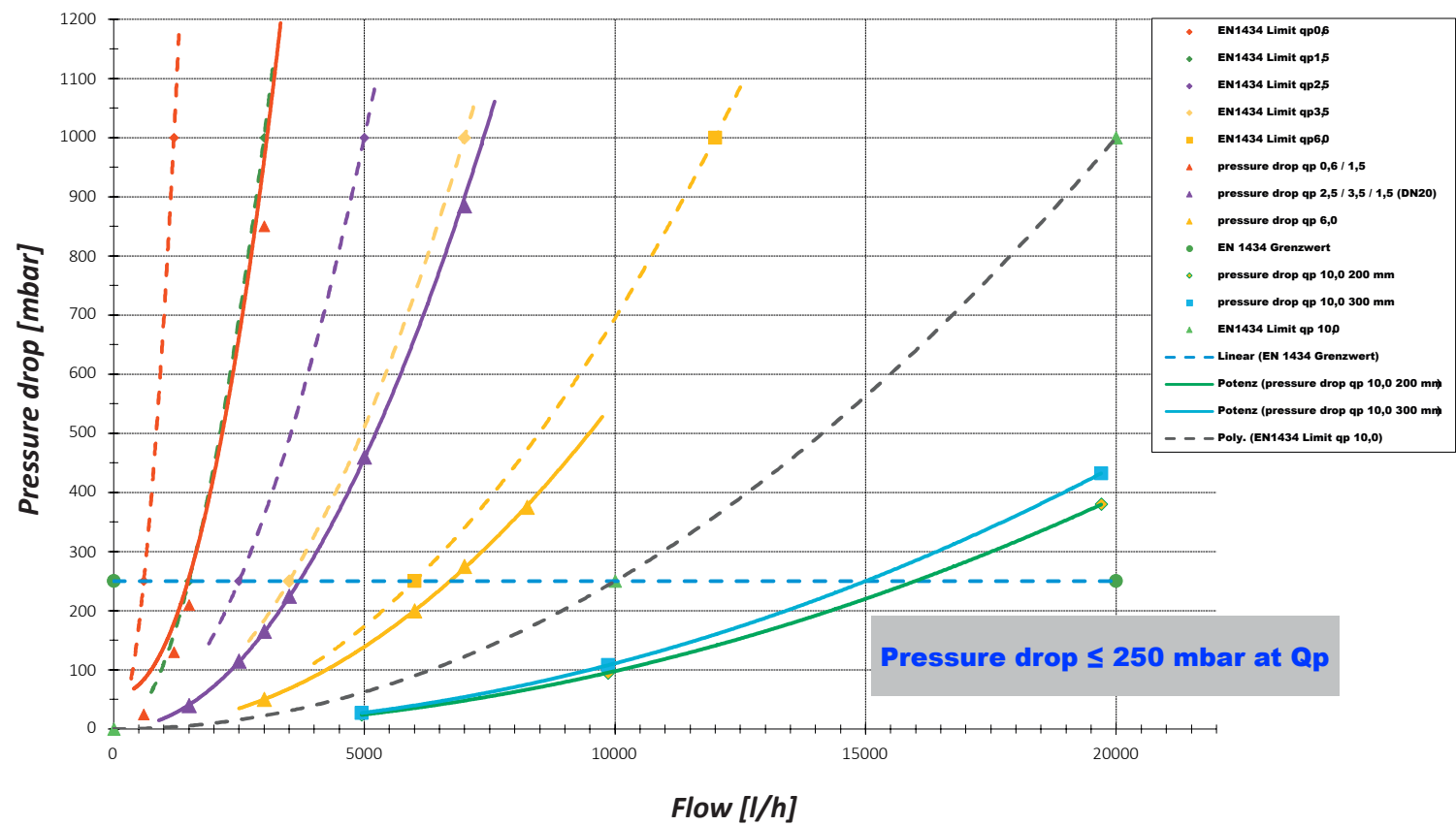
Meter dimensions						
Qp (m³/h)	Nominal diameter	G (")	L (mm)	H (mm)	A (mm)	Weight standard version (kg)
0.6	DN 15	G3/4B	110	65	38.5	0.600
0.6	DN 20	G1B	190	65	38.5	0.770
1.5	DN 15	G3/4B	110	65	38.5	0.600
1.5	DN 20	G1B	105	66	39.5	0.650
1.5	DN 20	G1B	130	66	39.5	0.680
1.5	DN 20	G1B	190	65	38.5	0.770
2.5	DN 20	G1B	105	66	39.5	0.650
2.5	DN 20	G1B	130	66	39.5	0.680
2.5	DN 20	G1B	190	66	39.5	0.790
2.5	DN 25	G1 1/4B	260	66	39.5	1.080
3.5	DN 20	G1B	130	66	39.5	0.680
3.5	DN 20	G1B	190	66	39.5	0.790
3.5	DN 25	G1 1/4B	150	66	39.5	0.820
3.5	DN 25	G1 1/4B	260	66	39.5	1.080
6.0	DN 25	G1 1/4B	150	68.5	42	0.820
6.0	DN 25	G1 1/4B	260	68.5	42	1.080
6.0	DN 32	G1 1/2B	150	68.5	42	1.020
6.0	DN 32	G1 1/2B	260	68.5	42	1.330
10.0	DN 40	G2B	200	73	46.5	1.530
10.0	DN 40	G2B	300	73	46.5	1.970

SensoStar U

TECHNICAL DATA



PRESSURE DROP SENSOSTAR U



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