

Engelmann **Ultrasonic Thermal Energy Meter**

SensoStar U / UC

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

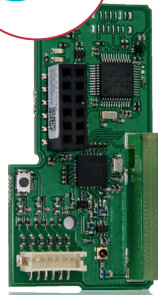
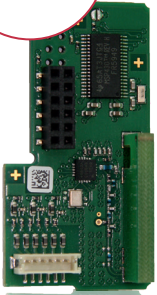
Precise heat/cooling measurement via ultrasound

The **SensoStar U** and **SensoStar UC** are high-precision measuring devices that use ultrasonic measurement technology to record heat or cooling energy. Whether in brass or composite version – this meter offers the right solution for every installation situation and every 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.

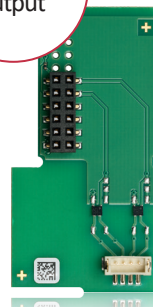
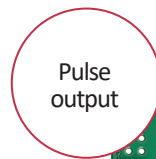
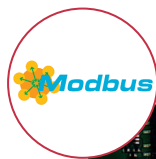
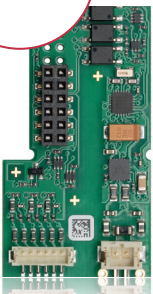
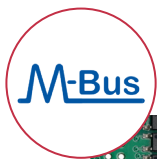
RADIO MODULES



Features & Range of Functions

- Sizes: DN 15 to DN 50
- Meters from Qp 0.6 to Qp 15
- 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.

General	
Environmental class (MID)	C (EN 1434)
Mechanical class (MID)	M2
Electromagnetic class (MID)	E2
Calculator	
Temperature range medium	°C 0 – 150 heat / 0 – 50 cooling
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 $\Delta\Theta$ heat	K 3 – 100
Temperature difference range $\Delta\Theta$ cooling	K -3 – -50
Minimum temperature difference $\Delta\Theta$ heat	K > 0.05
Minimum temperature difference $\Delta\Theta$ cooling	K < -0.05
Minimum temperature difference $\Delta\Theta$ 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
Units	MWh, kW, m ³ , m ³ /h (kWh, GJ, MMBTU, Gcal) unit of energy can be set when the amount of energy is still \leq 10 kWh
Interfaces	optical interface (M-Bus protocol, ZVEI according to EN 62056-21) <i>optional communication:</i> radio: wireless M-Bus*, LoRaWAN* wired: M-Bus*, Modbus, 2 pulse outputs * Optional with 3 pulse inputs.
Power supply	easily replaceable 3 V lithium battery (A-cell, 0.86 g lithium) 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 24 semi-monthly values
Billing dates	freely selectable annual billing date 15 monthly and 15 semi-monthly values via display or radio (compact mode) 24 monthly and 24 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, $\Delta\Theta$) as well as the respective maximum values of the last 15 months
Protection class	IP65
Calming section	U0D0
Approvals	DE-16-MI004-PTB025; DE-16-M-PTB-0097 CH-T2-18768-00; CE
Type designation	S3
EMC (MID)	EN 1434

Flow sensors (general)		
Measuring method		ultrasound; time-of-flight
Accuracy class (MID)		class 2 (EN 1434)
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 0.6 to Qp 15)	°C	5 – 50
Temperature range medium heat/cooling	°C	15 – 90 heat 15 – 120 high temperature (optional) 5 – 50 cooling

Temperature sensors (2-wire technology)		
Platinum precision resistor Pt 1000 (soldered in place)		
Sensor diameter	mm	UTS: 5; 5.2; 6; AGFW: 27.5; 38
Connection cable length	m	1.5; 3; 6
Installation type		asymmetrical; symmetrical
Platinum precision resistor Pt 500 (interchangeable in pairs)		
Sensor diameter	mm	UTS: 5; 5.2
Connection cable length	m	1.5; 3
Installation type		asymmetrical; symmetrical

Flow sensor brass

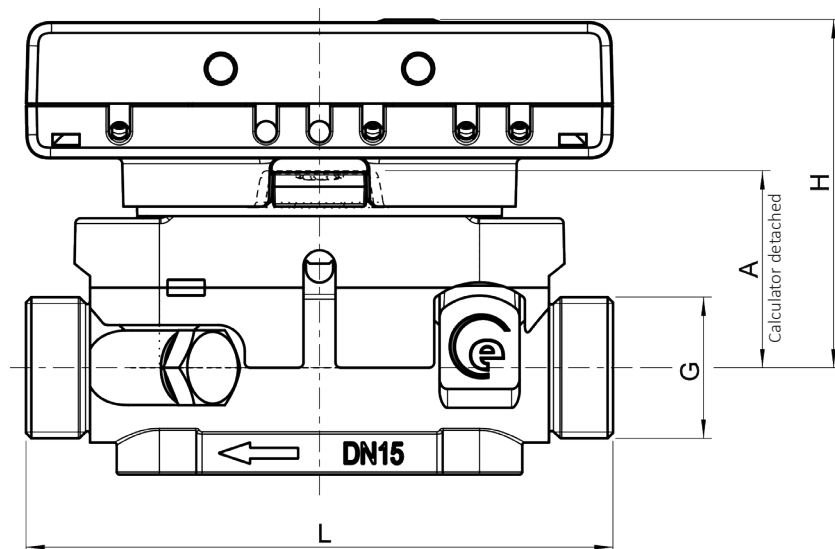
Sizes	Nominal flow rate Q_p	m ³ /h	0.6	0.6	1.5	1.5	2.5	2.5	3.5	3.5	6	6	10	15
	Low flow threshold value	l/h	6	6	6	6	12	12	14	14	30	30	50	50
	Minimum flow Q_i	l/h	12	12	12	12	25	25	28	28	60	60	100	150
	Maximum flow Q_s	m ³ /h	1.2	1.2	3	3	5	5	7	7	12	12	20	30
Pressure drop Δp at Q_p *		bar	0.03	0.03	0.21	0.04	0.12	0.12	0.21	0.21	0.20	0.20	0.11	0.14
Pressure drop Δp at Q_s		bar	0.13	0.13	0.85	0.17	0.46	0.46	0.89	0.89	0.80	0.80	0.43	0.71
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	DN 50
Dynamic range Q_i/Q_p		-	1:50	1:50	1:125	1:125	1:100	1:100	1:125	1:125	1:100	1:100	1:100	1:100

* Pressure drop ≤ 0.25 bar according to standard EN 1434.

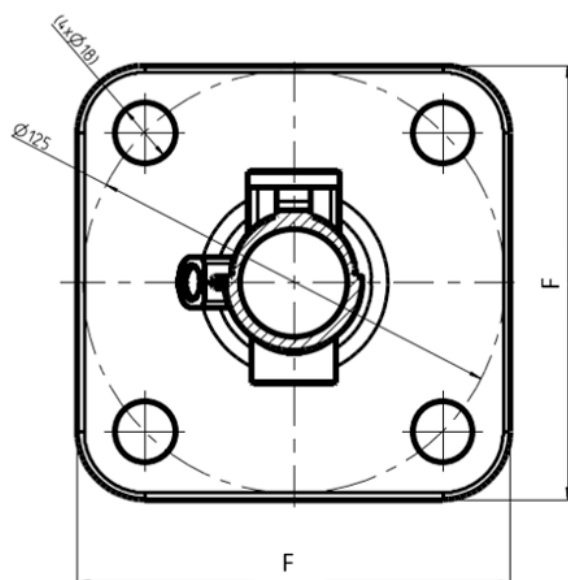
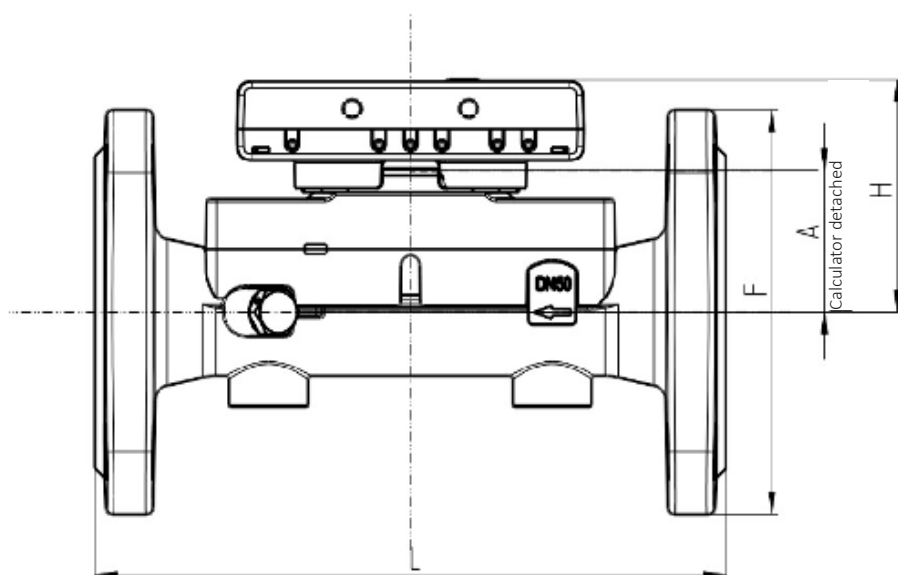
Meter dimensions brass

Q_p (m ³ /h)	Nominal diameter	G (") F (mm)	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
15.0	DN 50	F 128.4	200	73.7	44.9	4.600
15.0	DN 50	F 128.4	270	73.7	44.9	4.950

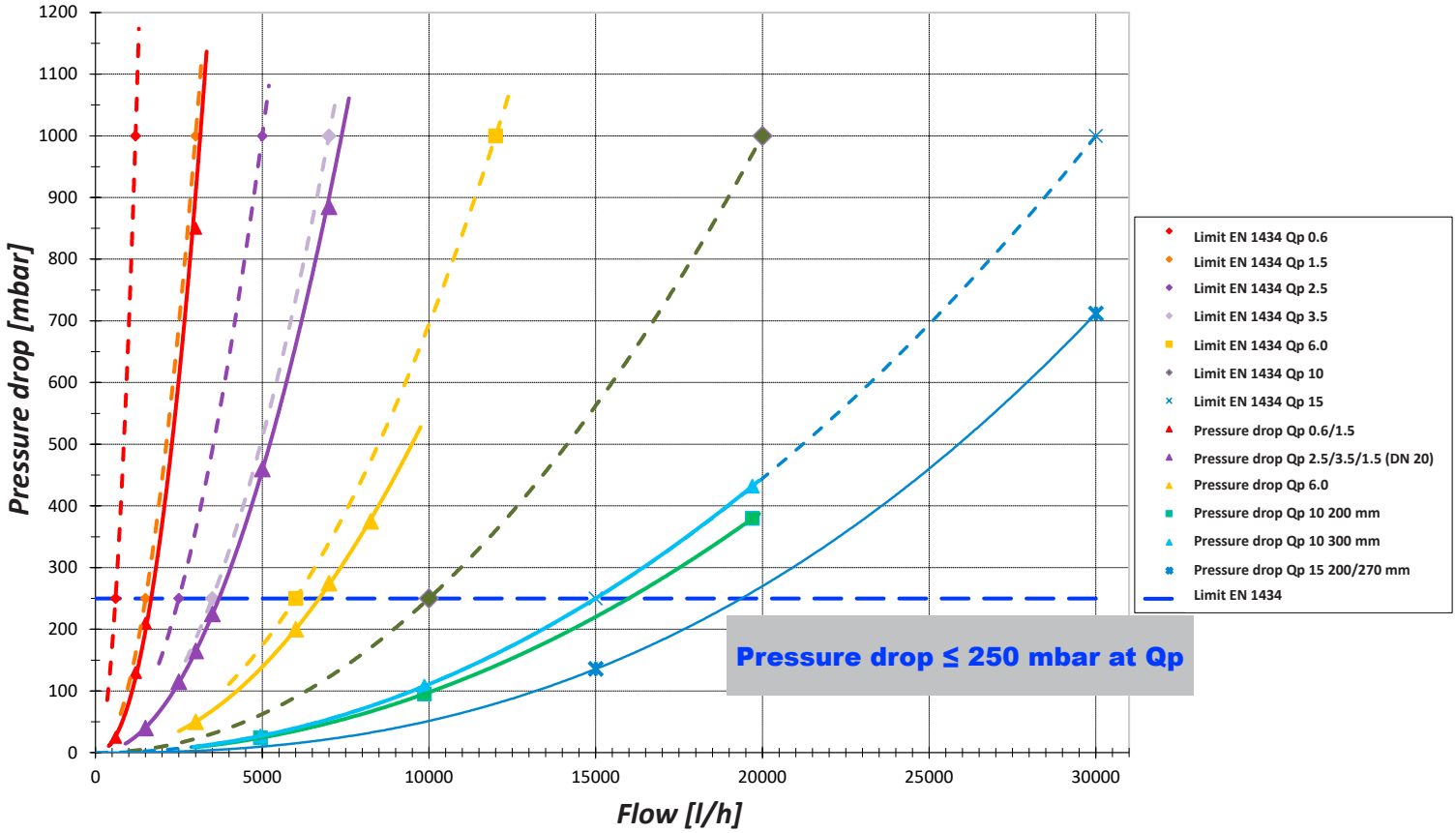
SENSOSTAR U (QP 0.6 – QP 10)



SENSOSTAR U FLANGE (QP 15)



PRESSURE DROP SENSOSTAR U



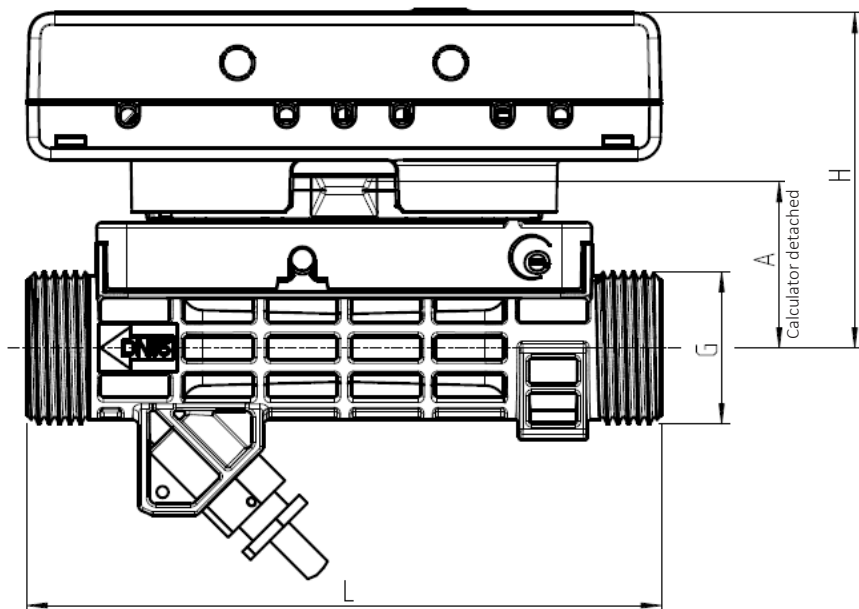
Flow sensor composite

Sizes	Nominal flow rate Q_p	m ³ /h	0.6	1.5
	Low flow threshold value	l/h	6	6
	Minimum flow Q_i	l/h	12	12
	Maximum flow Q_s	m ³ /h	1.2	3
Pressure drop Δp at Q_p		bar	0.05	0.16
Pressure drop Δp at Q_s		bar	0.11	0.68
Nominal diameter		mm	DN 15	DN 15
Dynamic range Q_i/Q_p		-	1:50	1:125

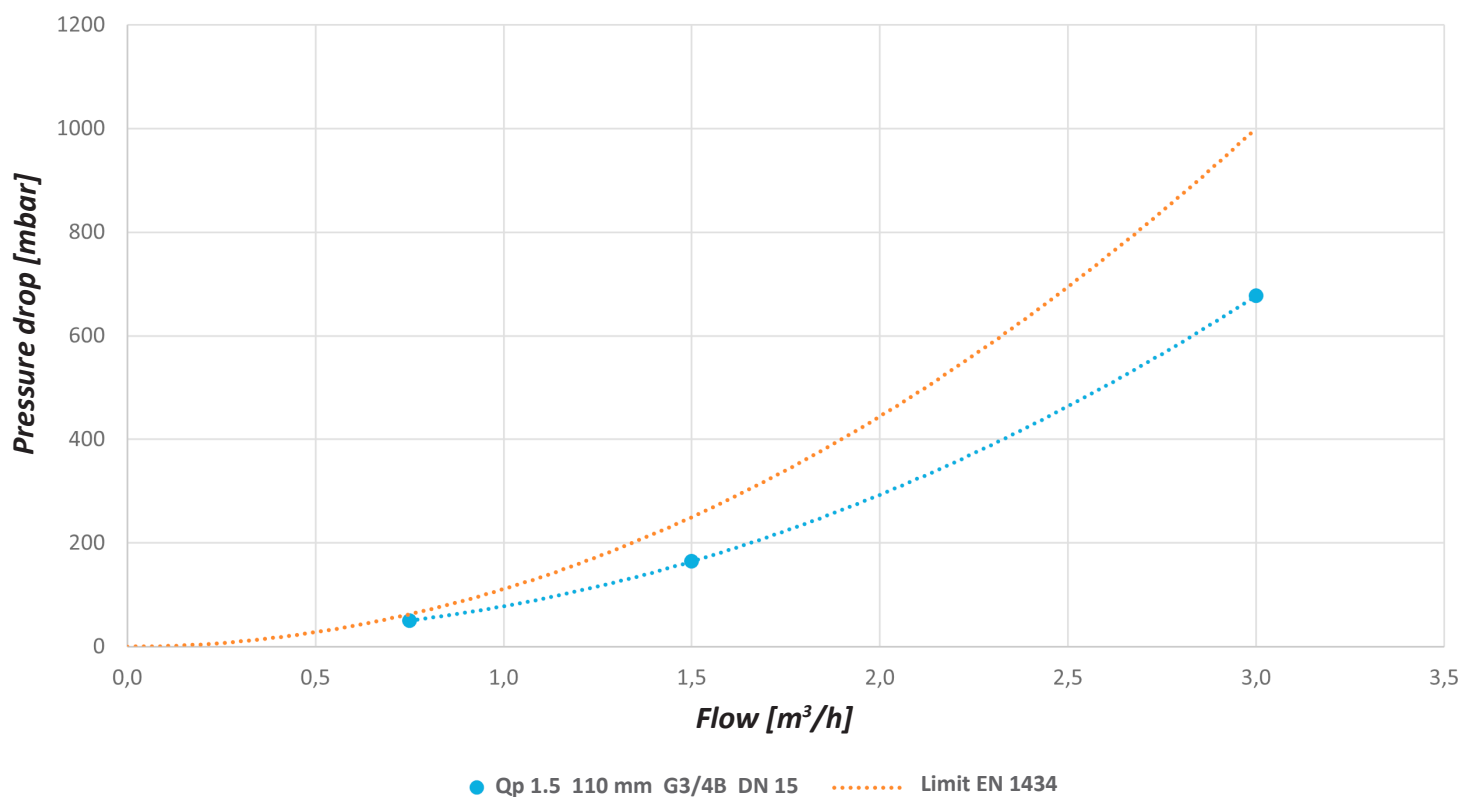
Meter dimensions composite

Q_p (m ³ /h)	Nominal diameter	G (")	L (mm)	H (mm)	A (mm)	Weight standard version (kg)
0.6	DN 15	G3/4B	110	58	38.5	0.260
1.5	DN 15	G3/4B	110	58	38.5	0.260

SENSOSTAR UC



PRESSURE DROP SENSOSTAR UC





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