

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.

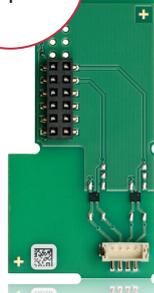
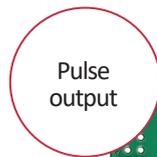
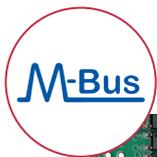
#### RADIO MODULES



### 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.

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 <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 $\leq 10$ 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 230V / 24V)
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, $\Delta\theta$ ) 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
Type designation		S3
EMC (MID)		EN 1434

\* Optional with 3 pulse inputs.

# SensoStar U / SensoStar UC

## TECHNICAL DATA

Flow sensors (general)		
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 $\leq 10$ 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)		
<b>Platinum precision resistor Pt 1000 (soldered in place)</b>		
Sensor diameter	mm	UTS: 5; 5.2; 6; AGFW: 27.5; 38
Connection cable length	m	1.5; 3; 6
Installation type		asymmetrical; symmetrical
<b>Platinum precision resistor Pt 500 (interchangeable in pairs)</b>		
Sensor diameter	mm	UTS: 5; 5.2
Connection cable length	m	1.5; 3
Installation type		asymmetrical; symmetrical

# TECHNICAL DATA

## Flow sensor brass

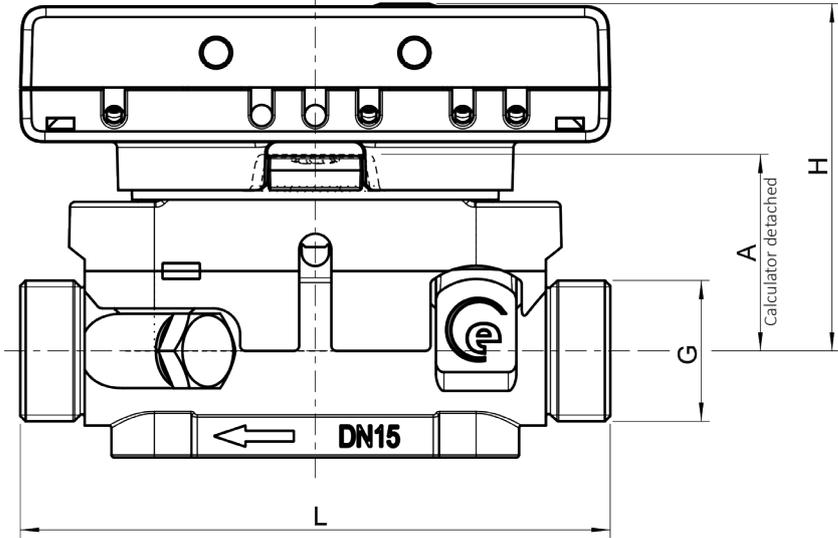
Sizes	Nominal flow rate Qp	m <sup>3</sup> /h	0.6	0.6	1.5	1.5	2.5	2.5	3.5	3.5	6	6	10	15
	Low flow threshold value	l/h	6	6	6	6	12	12	14	14	30	30	50	50
	Minimum flow Qi	l/h	12	12	12	12	25	25	28	28	60	60	100	150
	Maximum flow Qs	m <sup>3</sup> /h	1.2	1.2	3	3	5	5	7	7	12	12	20	30
Pressure drop Δp at Qp	bar	0.03	0.03	0.21	0.04	0.12	0.12	0.21	0.21	0.20	0.20	0.11	0.14	
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	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 Qi/Qp	-	1:50	1:50	1:125	1:125	1:100	1:100	1:125	1:125	1:100	1:100	1:100	1:100	

## Meter dimensions brass

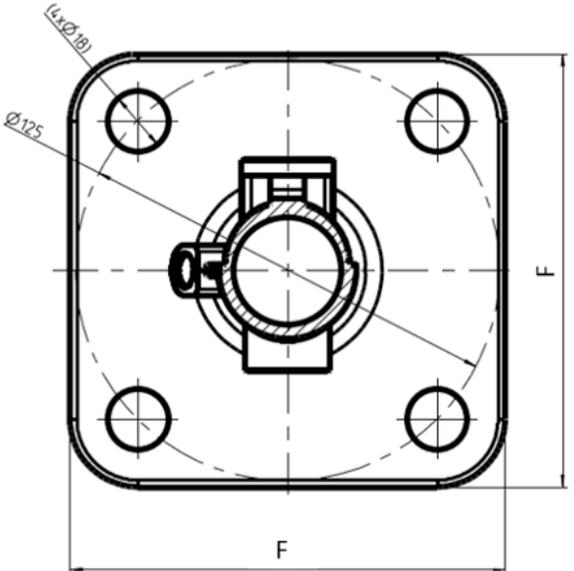
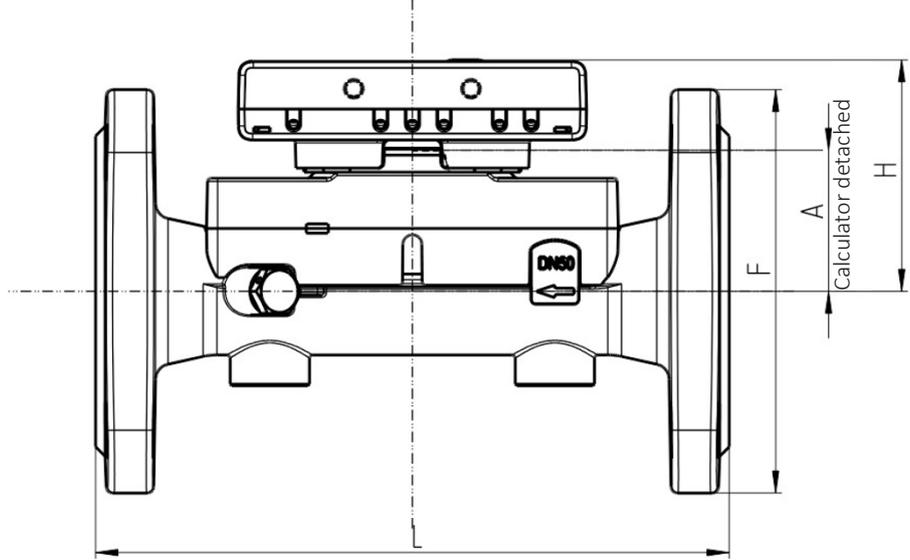
Qp (m <sup>3</sup> /h)	Nominal diameter	G (") F (mm)	L (mm)	H (mm)	A (mm)	Weight standard version (kg)
0.6	DN 15	G3/4B	110	65	38.5	0.600
0.6	DN 20	G1B	190	65	38.5	0.770
1.5	DN 15	G3/4B	110	65	38.5	0.600
1.5	DN 20	G1B	105	66	39.5	0.650
1.5	DN 20	G1B	130	66	39.5	0.680
1.5	DN 20	G1B	190	65	38.5	0.770
2.5	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

# TECHNICAL DATA

## SENSOSTAR U (QP 0.6 – QP 10)



## SENSOSTAR U FLANGE (QP 15)





# SensoStar U / SensoStar UC

## TECHNICAL DATA

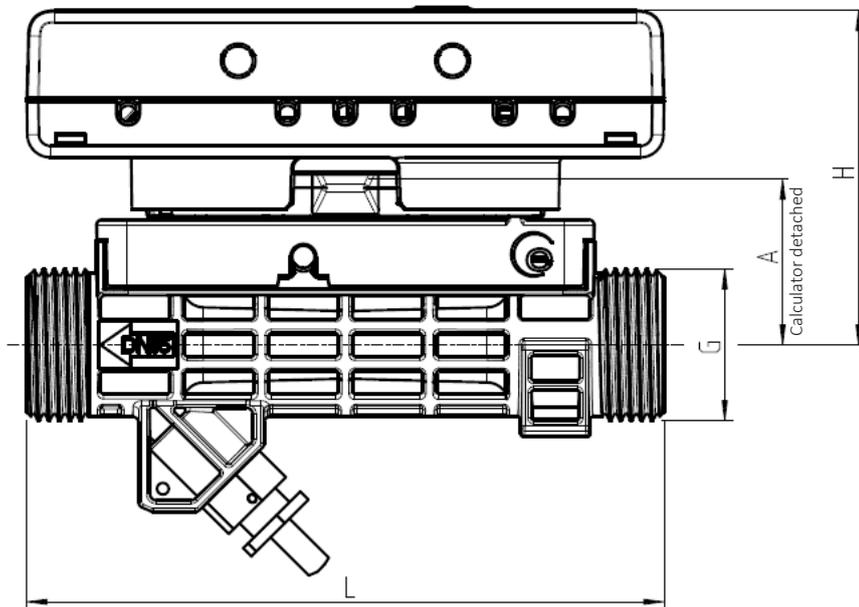
### Flow sensor composite

Sizes	Nominal flow rate $Q_p$	m <sup>3</sup> /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 <sup>3</sup> /h	1.2	3
Pressure drop $\Delta p$ at $Q_p$		bar	0.05	0.16
Pressure drop $\Delta p$ 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 <sup>3</sup> /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

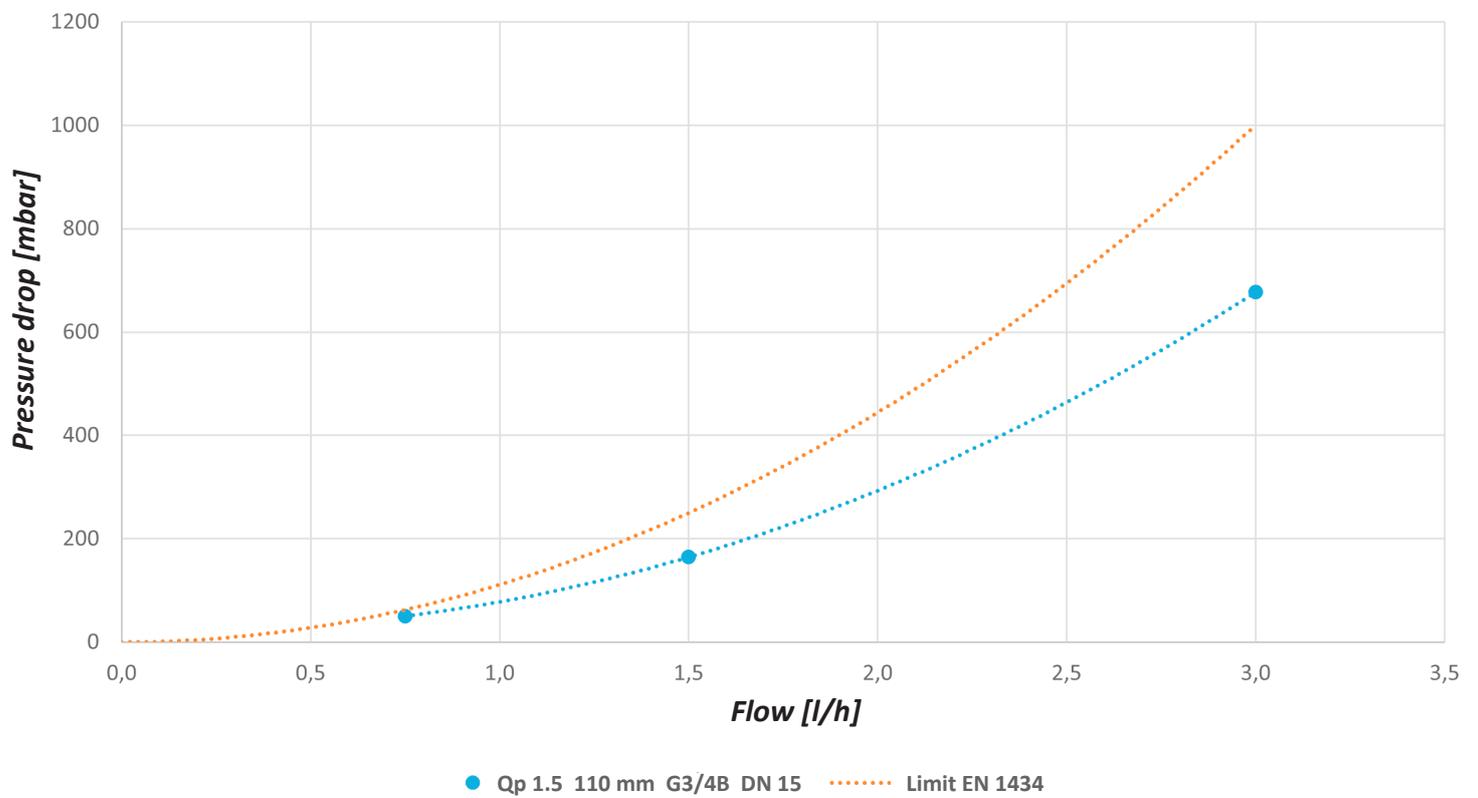
### SENSOSTAR UC



# SensoStar U / SensoStar UC

## TECHNICAL DATA

### PRESSURE DROP SENSOSTAR UC



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