

Engelmann Heat 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 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.

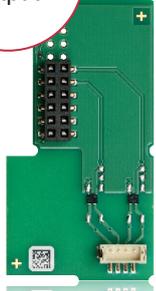
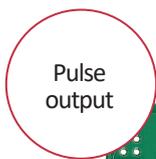
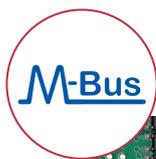
RADIO MODULES



Features

- Sizes: DN 15 to DN 40
- Meters from Qp 0.6 to Qp 10
- Lengths: 105 mm to 300 mm
- Any installation position possible
- 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 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.

| Flow sensor | | | | | | | | | |
|---|--------------------------|-------------------|--|--|-------|---------|---------|---------|-------|
| Sizes | Nominal flow rate Q_p | m ³ /h | 1.5 | 2.5 | 3.5 | 3.5 | 6 | 6 | 10 |
| | Low flow threshold value | l/h | 6 | 12 | 14 | 14 | 30 | 30 | 50 |
| | Minimum flow Q_i | l/h | 12 | 25 | 28 | 28 | 60 | 60 | 100 |
| | Maximum flow Q_s | m ³ /h | 3 | 5 | 7 | 7 | 12 | 12 | 20 |
| Pressure drop Δp at Q_p | | bar | 0.21 | 0.12 | 0.21 | 0.21 | 0.20 | 0.22 | 0.11 |
| Pressure drop Δp at Q_s | | bar | 0.85 | 0.46 | 0.89 | 0.89 | 0.80 | 0.90 | 0.43 |
| Connection (G") | | | G3/4B | G1B | G1B | G1 1/4B | G1 1/4B | G1 1/2B | G2B |
| Nominal diameter (internal) | | mm | DN 15 | DN 20 | DN 20 | DN 25 | DN 25 | DN 32 | DN 40 |
| Dynamic range Q_i/Q_p | | | 1:125 | 1:100 | 1:125 | 1:125 | 1:100 | 1:100 | 1:100 |
| Measuring method | | | | ultrasonic – transit time | | | | | |
| Accuracy class (MID) | | | | class 2 (EN 1434-1) | | | | | |
| Protection class | | | | IP68 (flow sensor) | | | | | |
| Medium | | | | water | | | | | |
| Approvals | | | | DE-16-MI004-PTB025 (MID heat) DE-16-M-PTB-0097 (national German cooling) CH-T2-18768-00 (national Swiss cooling) CE | | | | | |
| Nominal pressure P_N | | bar | 16 | | | | | | |
| Static pressure | | bar | min. 1 | | | | | | |
| Temperature range medium heat | | °C | 15 – 90; 15 – 130 high temperature (150; for max. 2000 h) (optional) | | | | | | |
| Temperature range medium cooling (from Q_p 1.5 to Q_p 10) | | °C | 5 – 50 | | | | | | |
| Temperature range medium heat/cooling | | °C | 15 – 90 heat 15 – 120 high temperature (optional) 5 – 50 cooling | | | | | | |
| Point of installation | | | | outlet flow and inlet flow; can be set when the amount of energy is still ≤ 10 kWh | | | | | |
| Mounting position | | | | any position | | | | | |

Static pressure requirement: To minimize the risk of measuring errors due to cavitation or air in the water it is recommended to keep a sufficient static pressure of min. 1 bar at the flow sensor outlet.

| Calculator | | |
|--|----|--|
| Temperature range medium | °C | 0 – 150 heat / 0 – 50 cooling (from Q_p 1.5 to Q_p 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 $\Delta\theta$ 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; using a power pack: 2 s permanent |

TECHNICAL DATA

| | | |
|---|---|--|
| 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 ≤ 10 kWh | |
| Communication interfaces | optical interface (M-Bus protocol) wired: M-Bus,* Modbus, 2 pulse outputs radio: wireless M-Bus,* LoRaWAN* | |
| Power supply | easily replaceable 3 V lithium battery preparation for 3 V power pack available (input voltage 230 V / 24 V) | |
| Estimated lifetime | years | 20 without communication module 12 with M-bus hourly readout 10 with others e.g. wM-bus, Modbus, LoraWAN |
| Data storage | 24 monthly and semi-monthly values | |
| Billing dates | freely selectable annual billing date | |
| 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 (calculator) | |
| Electromagnetic class (MID) | EN 1434 | |
| Environmental class (MID) | E1, E2, M1 | |
| CE | yes | |

* Optional with 3 pulse inputs.

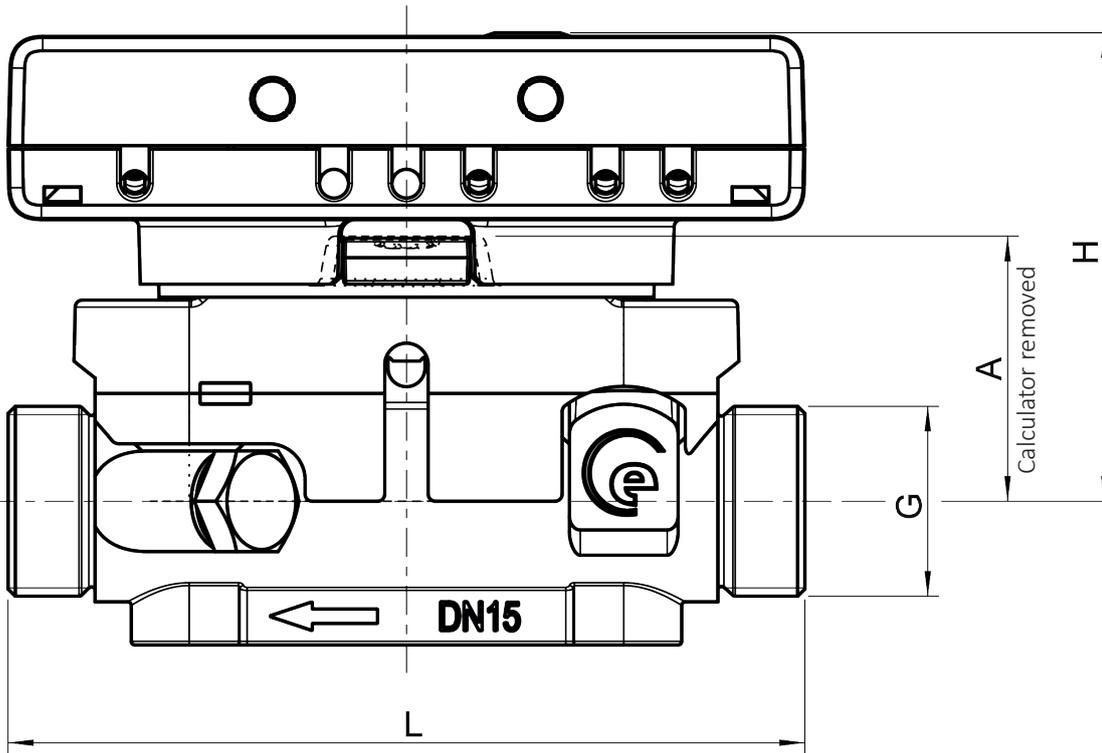
Temperature sensors (2-wire technology)

| | | |
|-----------------------------|---------------------------|--------------------------------|
| 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 | |

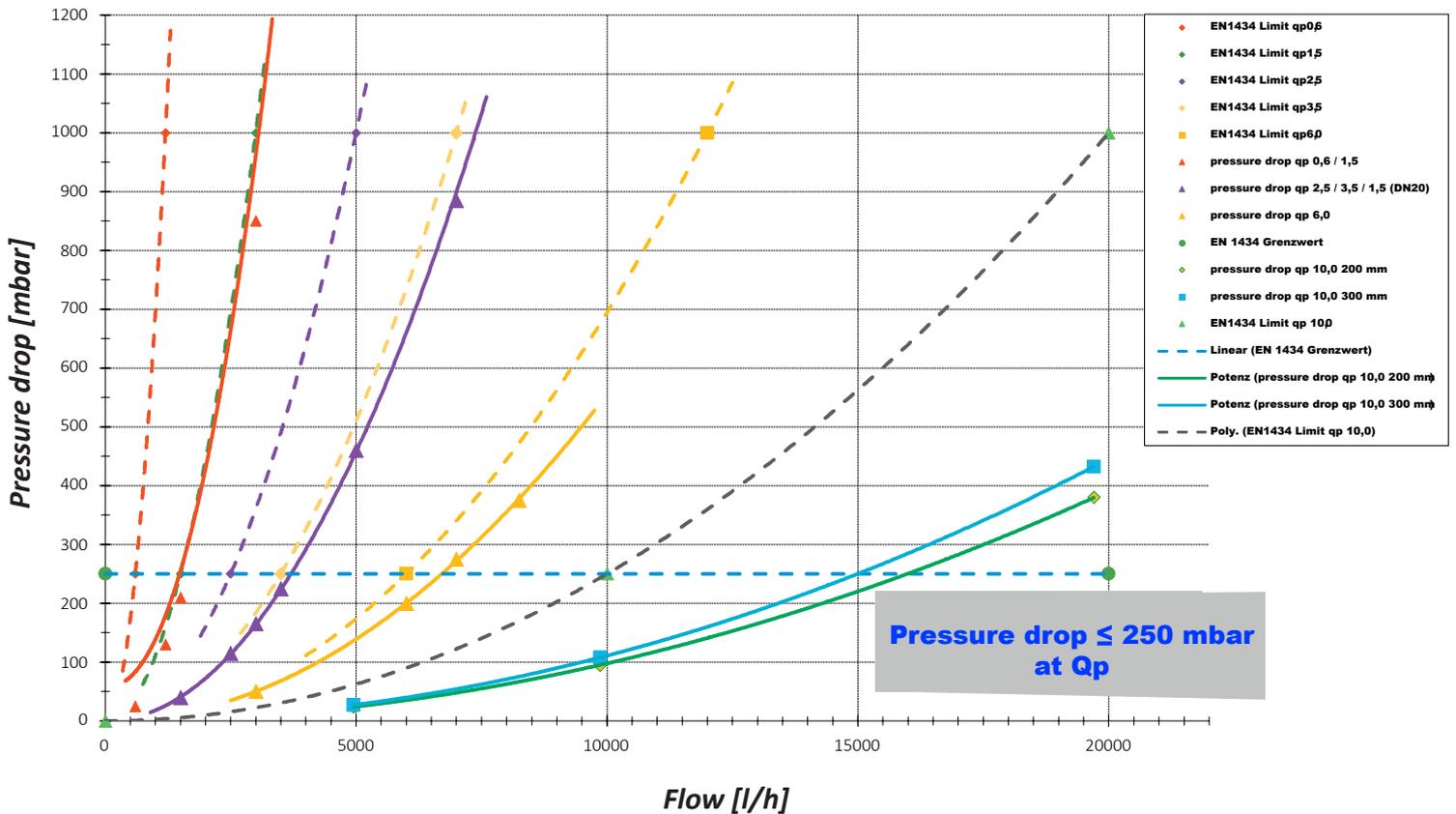
Meter dimensions

| Qp (m ³ /h) | Nominal diameter | G (") | L (mm) | H (mm) | A (mm) | Weight standard version (kg) |
|------------------------|------------------|---------|--------|--------|--------|------------------------------|
| 1.5 | DN 15 | G3/4B | 110 | 65 | 38.5 | 0.600 |
| 2.5 | DN 20 | G1B | 130 | 66 | 39.5 | 0.680 |
| 3.5 | DN 20 | G1B | 130 | 66 | 39.5 | 0.680 |
| 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 | 180 | 70.5 | 44 | 1.375 |
| 10.0 | DN 40 | G2B | 200 | 73 | 46.5 | 1.530 |
| 10.0 | DN 40 | G2B | 300 | 73 | 46.5 | 1.970 |

TECHNICAL DATA



PRESSURE DROP SENSOSTAR U



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