

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

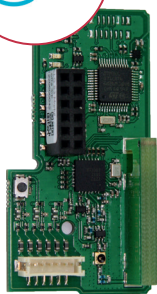
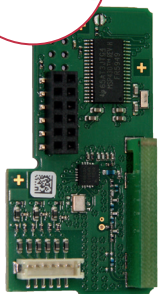
## Precise heat/cooling measurement via ultrasound

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.

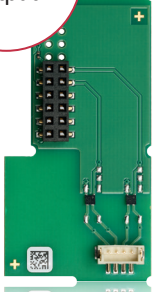
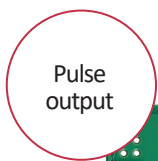
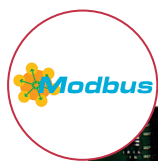
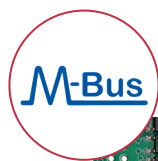
#### RADIO MODULES



#### 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, m³, m³/h (kWh, GJ, MMBTU, Gcal)<br>unit of energy can be set when the amount of energy is still $\leq 10$ kWh                                                                     |
| Interfaces                                                 |       | optical interface (M-Bus protocol)<br><i>optional communication:</i><br>radio: wireless M-Bus*, LoRaWAN*<br>wired: M-Bus*, Modbus, 2 pulse outputs                                         |
| Power supply                                               |       | easily replaceable 3 V lithium battery<br>preparation for 3 V power pack available<br>(input voltage 230V / 24V)                                                                           |
| Battery capacity, designed                                 | years | 20 (without communication module)<br>16 (M-Bus, readout interval 1 hour)<br>15 (M-Bus, readout interval 10 minutes)<br>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<br>15 monthly and 15 semi-monthly values via display or radio (compact mode)<br>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, $\Delta\theta$ )<br>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<br>CH-T2-18768-00<br>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;<br>can be set when the amount of energy is still $\leq 10$ kWh |
| Temperature range medium heat                              | °C  | 15 – 90<br>15 – 130 high temperature (150; for max. 2000 h) (optional)                     |
| Temperature range medium cooling<br>(from Qp 0.6 to Qp 15) | °C  | 5 – 50                                                                                     |
| Temperature range medium heat/cooling                      | °C  | 15 – 90 heat<br>15 – 120 high temperature (optional)<br>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      |

SensoStar U / SensoStar UC

TECHNICAL DATA

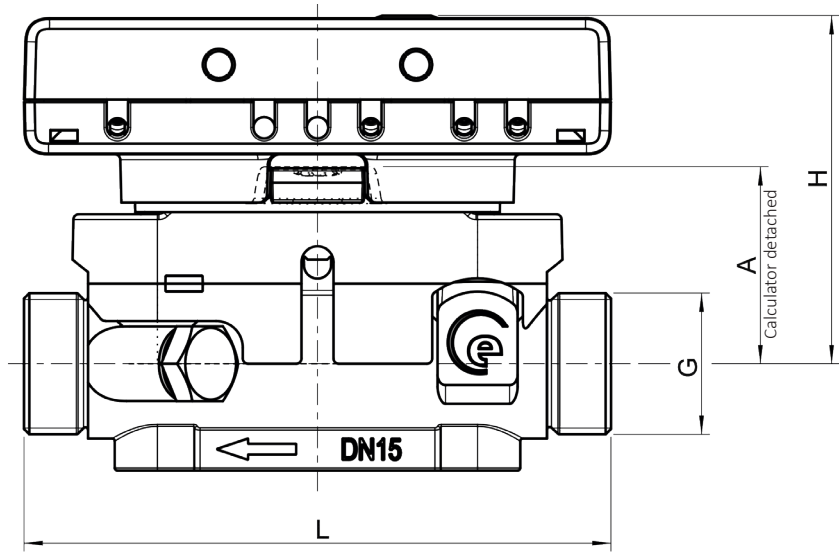
| Flow sensor brass      |                          |      |       |       |       |       |       |       |       |       |       |       |       |       |
|------------------------|--------------------------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 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    | 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          | m³/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 (m³/h)              | Nominal diameter | G (")<br>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                        |

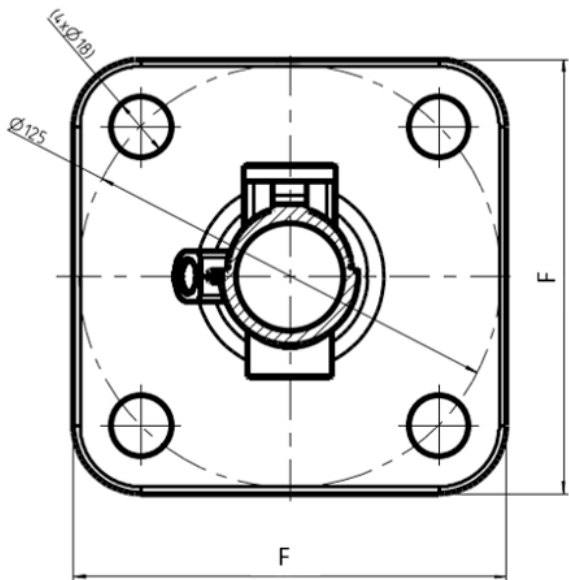
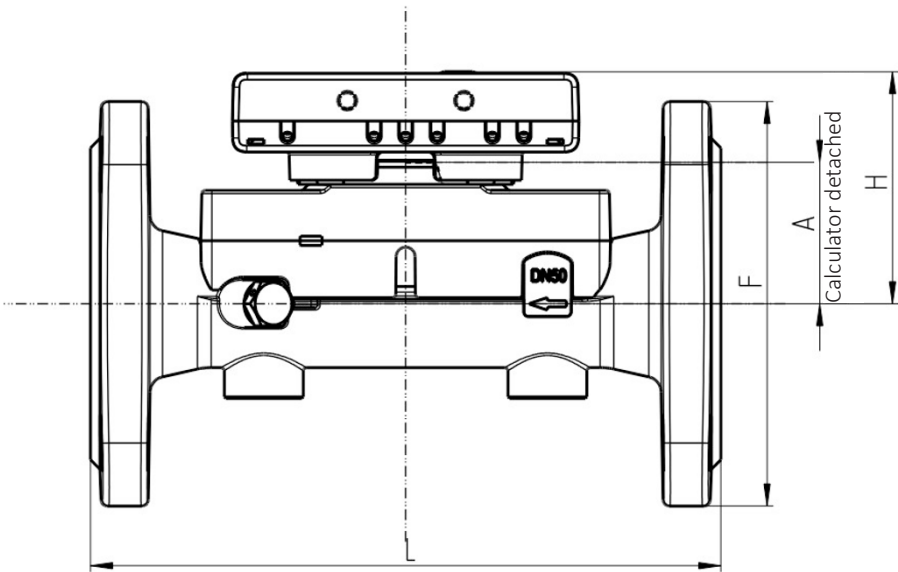
SensoStar U / SensoStar UC

# TECHNICAL DATA

SENSOSTAR U (QP 0.6 – QP 10)



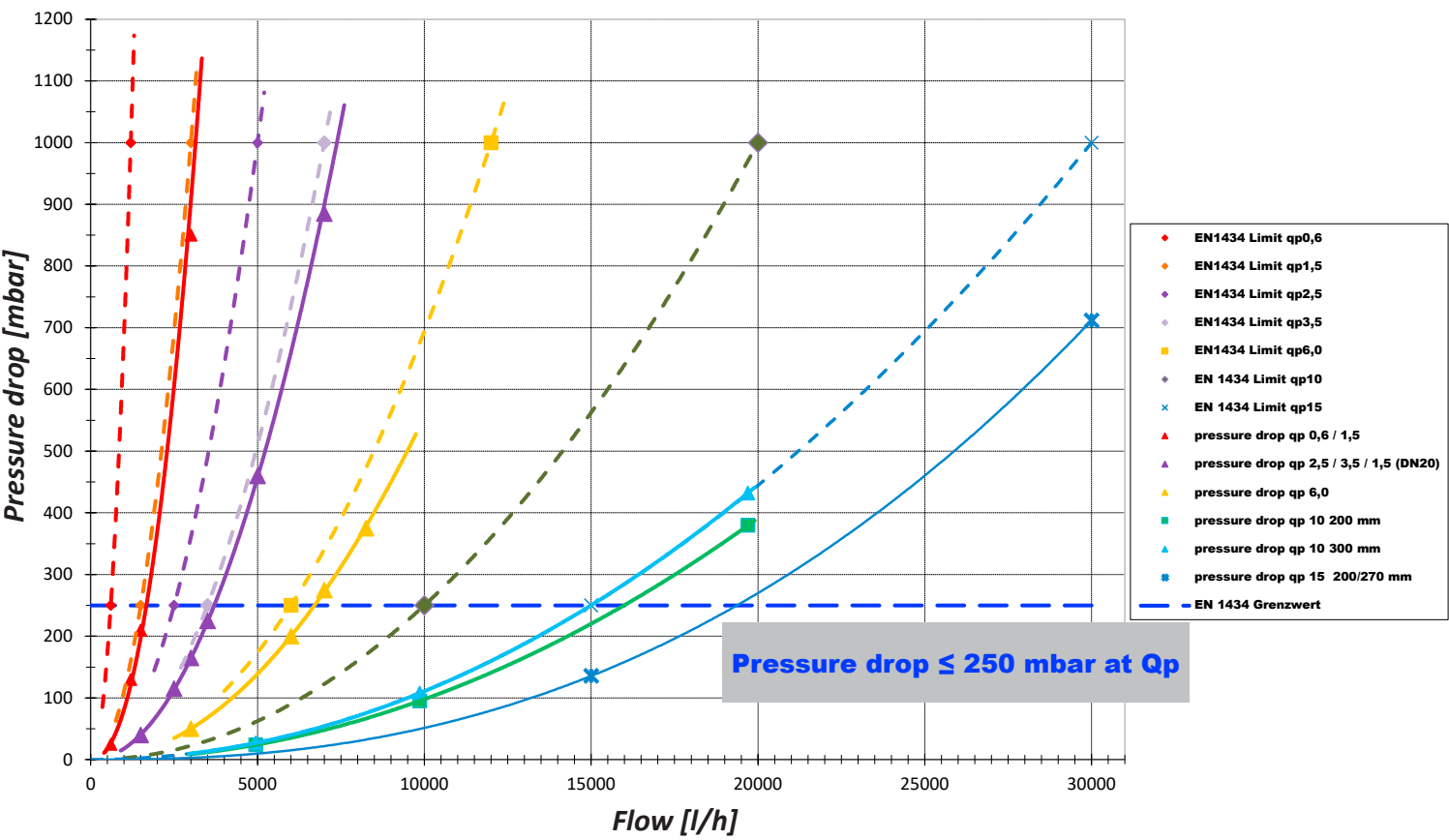
SENSOSTAR U FLANGE (QP 15)



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# TECHNICAL DATA

PRESSURE DROP SENSOSTAR U



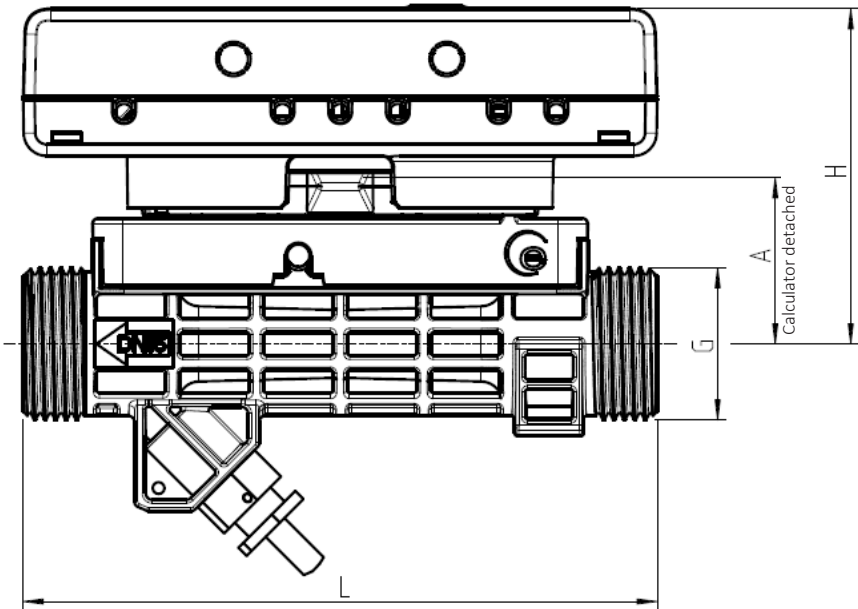
SensoStar U / SensoStar UC

TECHNICAL DATA

| Flow sensor composite  |                          |      |       |       |
|------------------------|--------------------------|------|-------|-------|
| Sizes                  | Nominal flow rate Qp     | m³/h | 0.6   | 1.5   |
|                        | Low flow threshold value | l/h  | 6     | 6     |
|                        | Minimum flow Qi          | l/h  | 12    | 12    |
|                        | Maximum flow Qs          | m³/h | 1.2   | 3     |
| Pressure drop Δp at Qp |                          | bar  | 0.05  | 0.16  |
| Pressure drop Δp at Qs |                          | bar  | 0.11  | 0.68  |
| Nominal diameter       |                          | mm   | DN 15 | DN 15 |
| Dynamic range Qi/Qp    |                          | -    | 1:50  | 1:125 |

| Meter dimensions composite |                  |       |        |        |        |                              |
|----------------------------|------------------|-------|--------|--------|--------|------------------------------|
| Qp (m³/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                        |

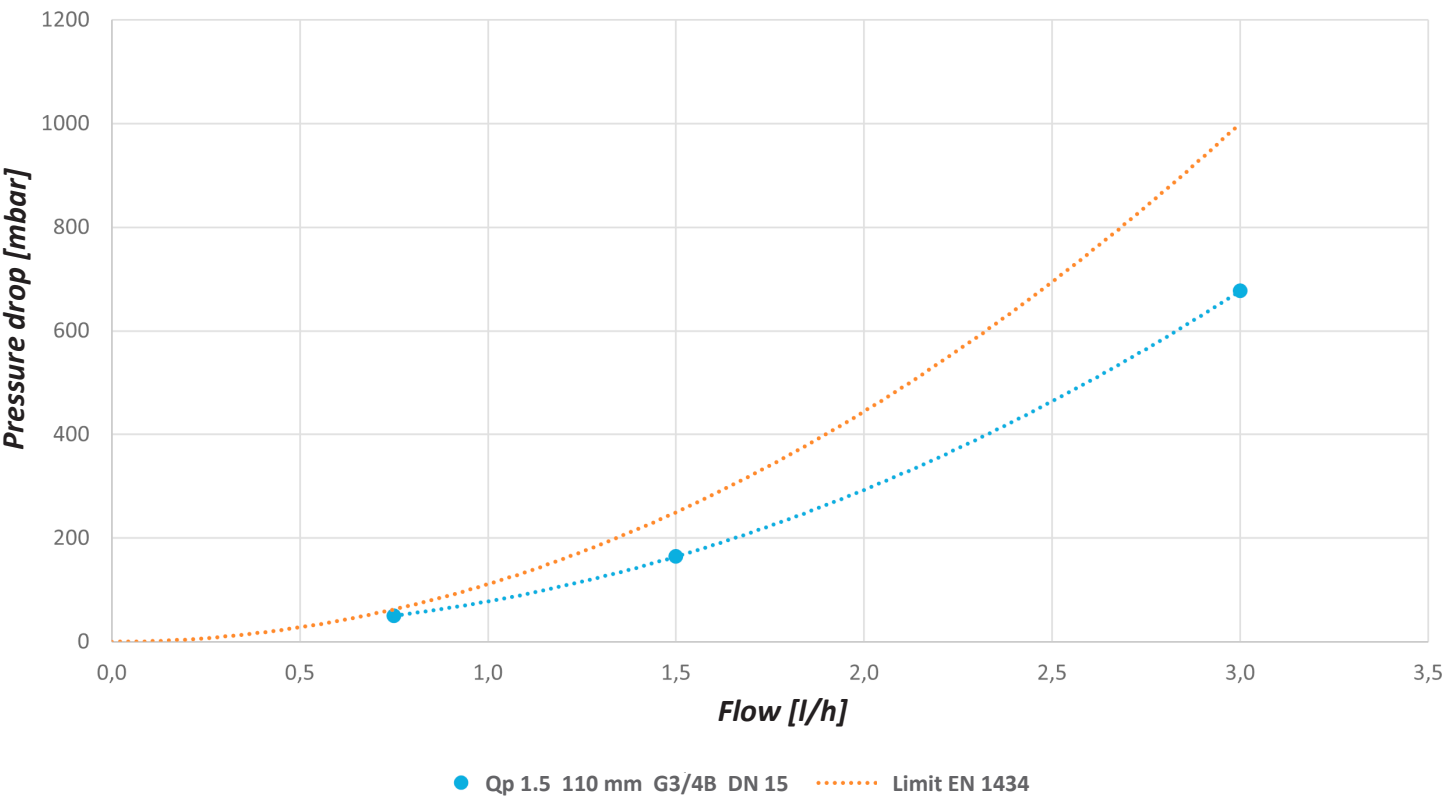
SENSOSTAR UC



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# TECHNICAL DATA

PRESSURE DROP SENSOSTAR UC



### 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)