Electronic volume flow sensor

FTS...DL electronic volume flow sensors have a measurement principle based on Karman vortex streets. The generation of eddies from an obstructing body projecting into the flow is strictly proportional to the flow velocity. The generated eddies are detected by a piezoelectric paddle and evaluated by the integrated electronics. A microprocessor converts the analogue measurement values into a serial digital signal suitable for the DL bus (data link).
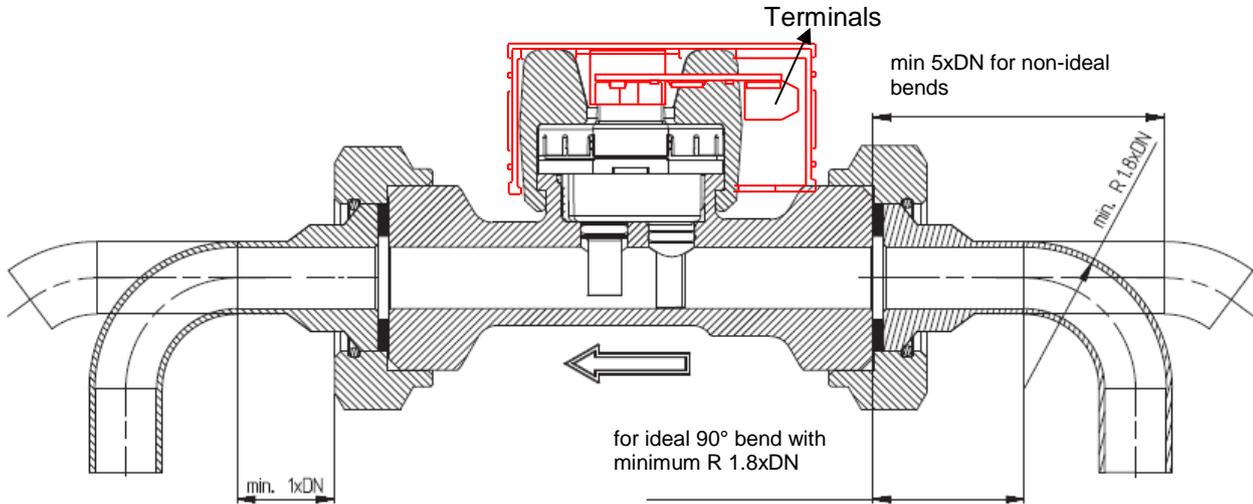
The sensor has the following features:

- Measurement of flow rates between 14 and 240 litres per minute
- Measurement of media temperatures from -40 to 125°C using a PT1000 sensor
- Measurement output via the DL bus
- Measurement of a second temperature (PT1000)
- Connection option for a pressure sensor PRS0-6 (0 - 6 bar)
- The flow channel contains no moving parts
- Adapter PCB for easy connection to commercial cable cross sections
- Freely selectable fitting position
- Measurement principle insensitive to contamination and medium properties
- Drinking water approvals: KTW and DVGW process sheet W270, WRAS
- Not suitable for freshwater stations as the DL bus transmits the signals too slowly to the controller
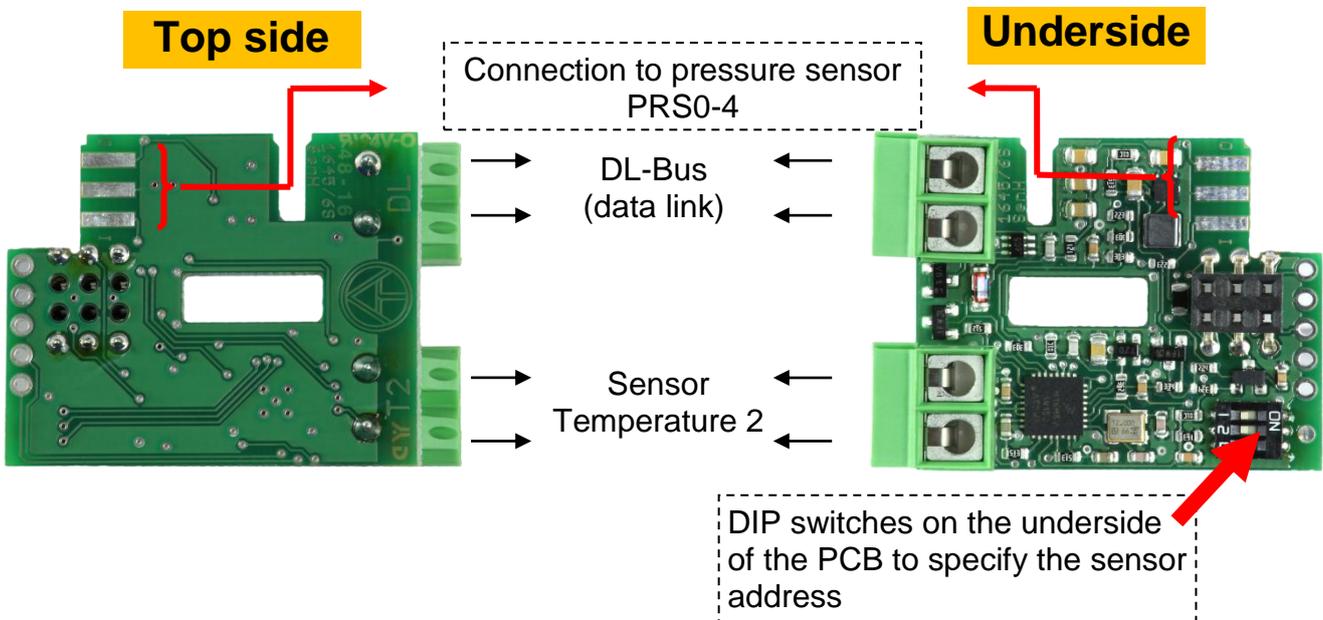- Can only be used in conjunction with controllers that have X2 technology

Installation:

The following instruction must be observed for correct functioning of the sensor:

♦ The pipe internal diameter must never be smaller than the internal diameter of the measurement pipe (DN ....).

♦ Numerous bends or elbows which are not in the same plane must be avoided directly upstream of the inlet (generation of swirl).

Terminals

min 5xDN for non-ideal bends

min. R 1.8xDN

for ideal 90° bend with minimum R 1.8xDN

min. 1xDN

The flow direction must be observed without fail (indicated on the sensor by an arrow). The fitting position can be freely selected.

Electrical connection:

Top side

Underside

Connection to pressure sensor PRS0-4

→ DL-Bus ←
→ (data link) ←

→ Sensor ←
→ Temperature 2 ←

DIP switches on the underside of the PCB to specify the sensor address

The polarity of the connections ("earth") is interchangeable, hence is unimportant.

The adapter shown takes its power supply from the DL bus (data link) and returns the corresponding measurement when requested by the controller (controllers that have X2 technology e.g. **UVR16x2**). The input "Temperature **T2**" on the adapter PCB permits measurement of an additional external temperature. This is only possible for sensors of type PT1000.

The request is made up of the **address** of the sensor (adapter PCB) and **index** of a measurement recorded there.

The **address** is set using the DIP switches. These are located on the underside on the PCB. In the delivered condition, the address is set to 1 (factory setting). Provided no other sensors are connected to the DL-bus, no change of address is required.

The effective address is derived from address 1 (= factory setting) plus the sum of all the values of the selected DIP switch settings.

Example: Required address 6   = 1 (from factory setting) + 1 + 4

                                  = DIP switches 1 and 4 must be set to **ON**.

The **index** of the respective measurements is fixed:

Index:	Measurement:	Sensor type
2	Temperature [0.1°C]	FTS .... DL
3	Temperature **2** [0.1°C]	PT1000
4	Pressure [0.01 bar]	FTS …. DL + pressure sensor **PRS0-6**
5	Pressure [0.01 bar]	FTS …. DL + pressure sensor **PRS0-4**
10	Volume flow [1l/h]	FTS 14-240 DL (DN 32)

Controllers that have X2 technology: The measured values are parameterised in the menu "**DL bus**".

Technical data	Measurement range	Overall length	Connection thread	Pipe diameter
FTS 14-240 DL	14 … 240 l/min	134 mm	G 1 ½"	DN 32

Technical data		
Flow	Accuracy for <50%FS	< 1% FS (FS = full scale)
	Accuracy for >50%FS	< 2% of the measurement value
Temperature	Measurement range	-40 … +125 °C
	Accuracy	Class B, ± 0.3 K ± 0,005*T
Bus load (DL-Bus)	Without pressure sensor	25%
	With pressure sensor	30%
Operating temperature range		-40°C … +125°C briefly +140°C **Note**: With low medium temperatures, condensation must be prevented from forming on the sensor PCB.
Pressure loss [Pa] (100000 Pa = 1 bar)		0,25 * Q²
Burst pressure		>18 bar at +40°C
Housing material		Brass (CuZn40Pb2), PA6T/6I (40% GF)
Drinking water approval		KTW / W270, WRAS

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