

## Flow Sensors for Liquids SONOFLOW



## 1 General Information

### 1.1 Application

SONOFLOW is used for the measurement of the flow rate and detection of the volume flow rate of liquids in thin pipes and tubes.

The measuring section consists of specific material, making the sensors suitable for applications in fields with highly hygienic standards, such as the medical technology and the dosing technique.

The sensors are constructed as a component to be integrated into machines and apparatus. The mechanical installation and electrical integration into the control system can be carried out easily.

Besides standardised applications the SONOFLOW sensors can also be adopted to customized applications.

Please use the available questionnaire for an optimized adaptation to your measuring problem.

### 1.2 Measuring Method

The sound running period is measured with and against the flow direction. The flow rate is derived from the delay time.

#### Advantages

- no need for any fixtures or contractions in the measuring section → little pressure drop
- no loose parts within the metering box → no wear at the sensor
- measuring method is widely independent from color and electromagnetic characteristics of the liquid, such as conductivity
- the method works without any time delay → clear advantage over paddle wheel flow sensors or thermal methods, measurement of intermittent flows is also feasible
- measurement is feasible in both flow directions

## 2 Technical Specifications

### 2.1 Configuration of the SONOFLOW

The measuring system consists of a fixed measuring section with adequate connections for the liquids. Two ultrasonic transducers are integrated into the measuring section. Ultrasonic signals are generated, received and analysed via an adequate trigger and analysis circuit.

The sensor consists of interfaces for an integration into a control system (current output 4...20 mA). Furthermore, the sensor can be connected via a serial interface with a PC, so that measuring data can be collected or settings can be varied (i.e. for calibration purposes).

### 2.2 Liquid Requirements

The method is suitable for all sound transparent, watery and bubble free liquids. However, in some cases density differences, mixed phases and pulsation may have an effect on the flow rate profile and result in erroneous measurement results.



For industrial applications with high-viscosity liquids such as fats or special paints a screening test has to be carried out (on request).

The intensity of the ultrasound transmitted into the liquid is low, so that no biological interactions are to be expected.

### 3 Technical Data

Measuring method	ultrasonic propagation time method
Metering range	0 ... 50 ml/s, depending on the diameter of the measuring section, measuring bidirectional
Measuring section	length: approx. 50 mm diameter: 2 ... 6 mm
Accuracy	± 5 % or ± 50 µl/s, the bigger value applies
Nominal pressure	16 bar
Medium	water and other sound transparent liquids (exchange of the calibration data required)
Materials	contact with medium: stainless steel, PVDF, PEEK gaskets: PTFE, Viton tube connections: stainless steel other materials on request
Tube connections	connections stainless steel: diameter external/internal: 8/4 mm other connections on request
Installation	mountable at any position
Temperature measurement	internal for the determination of the medium temperature, dissolution ±1 °C
Output 1	current output 4 ... 20 mA (against GND) for output flow or temperature, optionally reversible as PNP switch for pulse output flow additional outputs on request
Measuring cycle	20 ms
Working temperature	+0 .. 60 °C, other temperatures on request modification of the working temperature may affect accuracy
Storage temperature	-20 ... +70 °C, other temperatures on request
Protection class	IP65
Operational voltage	+15 ... 30 VDC, ripple max. 10 %, internal inverse-polarity protection
Power requirement	max. 100 mA
Dimensions	L x B x H: 92 x 50 x 46 mm (length without connections)
Service interface	TTL interface for calibration of parameters and for detection of data, only suggestive in connection with the testing equipment
Scope of delivery Accessories/options	SONOFLOW, type FS02.xx technical datasheet <ul style="list-style-type: none"> <li>▪ M12-sensor cable, length 2 m/ 5 m/ 10 m</li> </ul>
	Test Equipment consisting of: <ul style="list-style-type: none"> <li>▪ USB-DataConverter</li> <li>▪ Switching power supply</li> </ul> CD with Software SONOFLOW monitor

## 4 Settings/Test Equipment

For settings or for diagnostics a PC is required in connection with an optional test equipment (USB-DataConverter, software).

The SONOFLOW can be adapted with the help of a parameter table. Here you can find the geometrical data as well as the calibrating data. That way it is possible to upload the calibrating data of different mediums into the SONOFLOW.



Please contact our service team for further information.

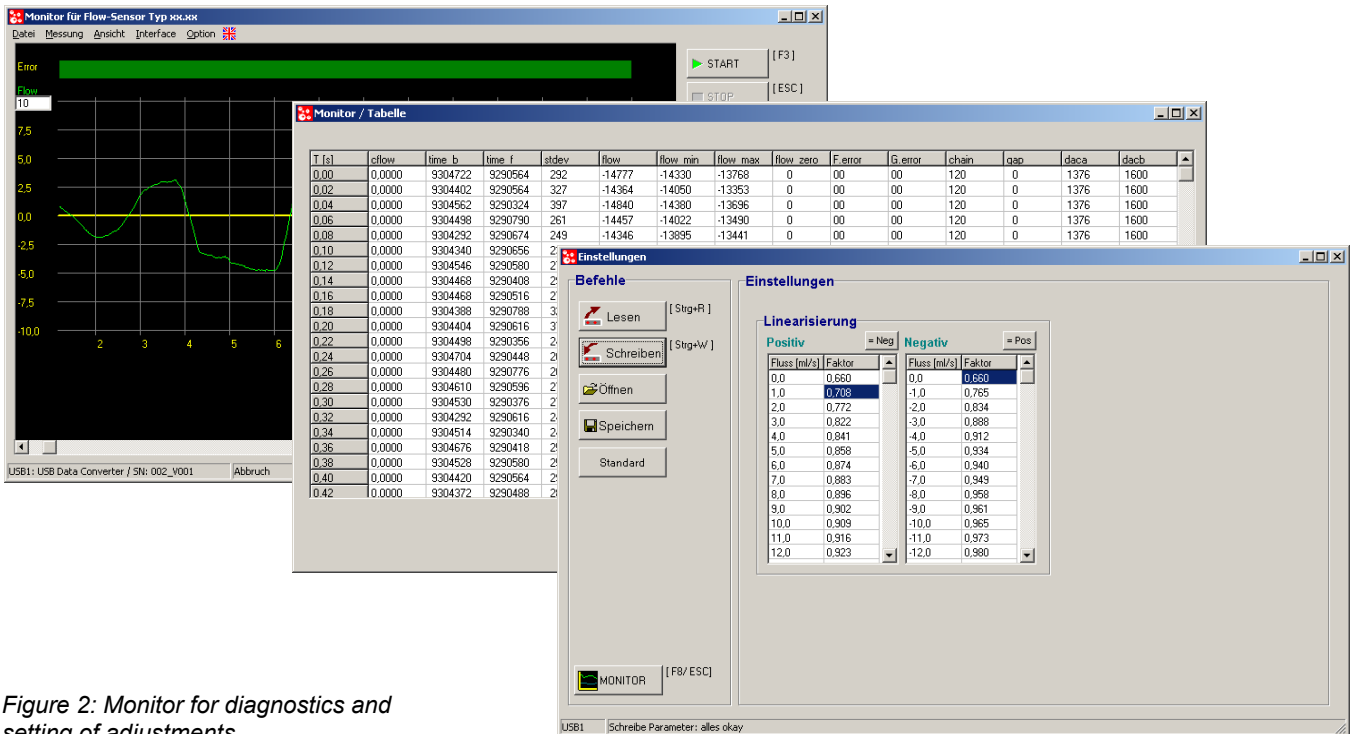


Figure 2: Monitor for diagnostics and setting of adjustments