



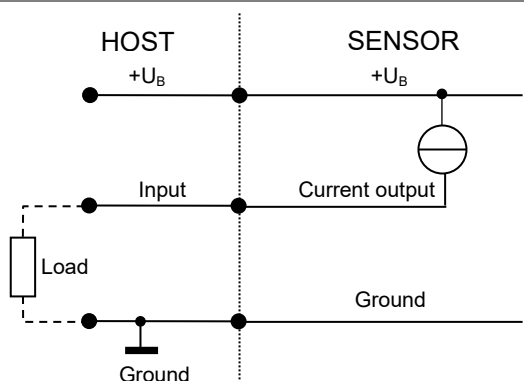
The compact inline sensor **SONOFLOW® IL.52/3 V2.0** serves to quickly detect smallest flow rates of liquids. Constructed as a built-in component for machines and apparatuses, the sensor can easily be mechanically installed and electrically integrated into the control system. Due to the current, frequency and switching outputs industrial dosing applications can be supported. The RS-485 interface (SONOTEC® protocol; Modbus® via software settings) allows bus operation of up to 12 sensors in rough industrial environments. Specifically designed for the use in areas with rigorous hygiene requirements, the sensor is suitable for circulation cleaning, steam sterilization and autoclaving.

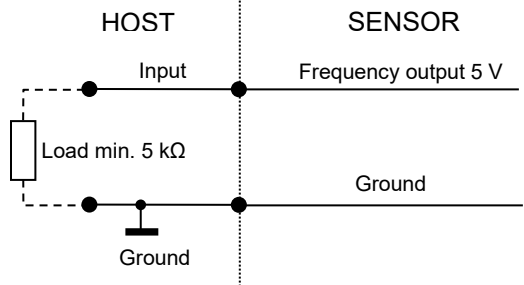
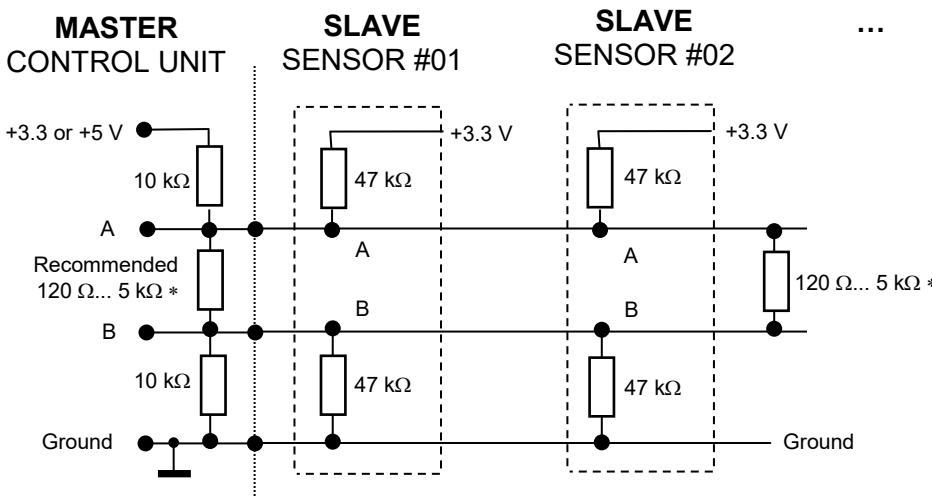
General data

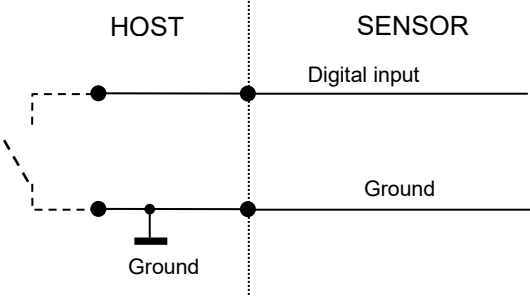
SONOFLOW® IL.52/3 V2.0 Ultrasonic Flow Sensor for Liquids		
Order-No.	IL.52/3 PEEK / Viton®	200 08 0001
	IL.52/3 PEEK / FFKM	200 08 0044
Dimensions (L × W × H)	148 × 59 × 46 mm	
Weight	370 g	
Media	Water or other acoustically transparent, low-viscosity liquids (for applications with high-viscosity liquids, e.g. fats / special paints, screening tests must be made)	
Upper range value	3 000 ml/min	
Accuracy for water (at 23° C ± 2 K and 1 bar)	0 ... 30 ml/min: ± 0.3 ml/min	
	30 ... 3 000 ml/min: ± 1.0 %	
Calibration	Factory calibrated for water at 23 °C ± 2 K, outlet of the tubes depressurized (0 bar), other calibration on request	
Zero stability	0.375 ml/min	
Max. pressure drop	0.95 bar at a flow rate of 3 000 ml/min (value dependent on flow rate, with lower readings accordingly reduced)	

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Viton® is a registered trademark of DuPont de Nemours, Inc.

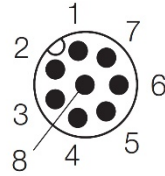
Ultrasonic Flow Sensor

Measuring method	Ultrasound, time of flight measurement
Measuring cycle	Typical 20 ms (minimum 4 ms)
Indirect temperature measurement	Integrated sensor at the inlet (accuracy of temperature sensor ± 1 °C, with T_{ambient} 23 °C and Q 1 l/min)
Mounting	Fixed installation: 4 × recessed threaded holes M5, depth: 10 mm
Measuring channel	Ø 3.0 mm
Adaptor for tube connection	Outer diameter 8 mm, inner diameter 4 mm, material: PEEK
Max. pressure	10 bar
Material	In contact with fluid: Measuring channel and cell: PEEK, Seals: Viton® / FFKM Side plates: stainless steel; Connector: PA black, Pins: brass
Operating voltage	12 ... 30 VDC, ripple max. 10 %, protection against reverse polarity (external fuse, if required: min. 200 mA)
Current consumption	Maximum 50 mA (with open current, frequency and switching output, depending on supply voltage)
Electrical connection	8 pin M12 connector, DIN EN 61076-2-101:2013
Shielding	Required: via cable / housing (mounting screws)
Interfaces	<ul style="list-style-type: none"> • Current output for flow rate: 0/4 ... 20 mA • Frequency output for flow rate: 0 ... 20 kHz, 5 V digital • RS-485 interface: bus-capable (SONOTEC® protocol, optional Modbus®) • Switching output: configurable as PNP / NPN / Push-Pull, 0 ... 30 V • Digital input
Current output for flow rate	<p>⚠ NOTE: Load to GND. The max. load depends on the operating voltage: 12 V → 250 Ω, 15 V → 500 Ω, 24 V → 1 kΩ, 30 V → 1.2 kΩ</p>  <p>The diagram illustrates the electrical connection between a HOST and a SENSOR. A vertical dashed line separates the two. On the HOST side, there are three terminals: +U_B (supply voltage), Input, and Ground. On the SENSOR side, there are three terminals: +U_B (supply voltage), Current output, and Ground. A Load is connected between the Input terminal on the HOST and the Ground terminal on the HOST. The Current output terminal on the SENSOR is connected to the Ground terminal on the SENSOR. The +U_B terminals on both sides are connected to a common supply line.</p>

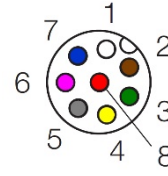
<p>Frequency output for flow rate</p>	
<p>RS-485 interface</p>	<p>SONOTEC® protocol: Half-duplex operation / 115.200 baud / no parity / 1 stop bit / no handshaking (Modbus® via software settings)</p> <p>⚠ NOTE: Please find the description of the serial protocol for details (upon request).</p> <p>Recommended electrical connection of the RS-485 interface</p> <p>⚠ CAUTION! If the interface is not used, it does not necessarily has to be connected; the two pins A and B can remain open.</p>  <p>* According to bus standard: depending on number of sensors and cable length</p>
<p>RS-485 Bus operation</p>	<p>The sensor supports bus operation with max. 12 subscribers. The default address is #01.</p> <p>⚠ NOTE: The address can be changed by software settings (see opt. accessories). Permitted are addresses from #01 ... #12. → Menu: Identification RS-485 address</p>
<p>Switching output</p>	<p>Freely configurable: e.g. adapting batch process or threshold switch of flow, maximum 100 mA</p>

Digital input	<p>Freely configurable: for example for zero point calibration of flow or start dosing processes Voltage resistant up to 30 V</p>
	
Protection class	IP65
Cleaning and sterilization	<ul style="list-style-type: none"> • Maximum liquid temperature: temporarily +145 °C; Resistant to cleaning agents (e.g. caustic soda or 3 percent nitric acid) • Autoclavable: for max. 5 cycles of 30 minutes at 121 °C <p>⚠ NOTE: Before the cleaning, verify that the sensor materials (PEEK, Viton® / FFKM) are resistant against the cleaning agent.</p>
Media temperature	0 ... +100 °C (T > 70 °C without voltage, temporarily +145 °C)
Ambient temperature	0 ... +70 °C
Storage temperature	-20 ... +70 °C
Directives and standards	<ul style="list-style-type: none"> • EMC directive 2014/30/EU • RoHS: 2011/65/EU, exception: III 7cl/ IV 15 • Acoustic emission: IEC 61157
Maintenance	Maintenance-free
Scope of delivery	<ul style="list-style-type: none"> • SONOFLOW® IL.52/3 V2.0 according to specification • User documentation
Optional accessories	<ul style="list-style-type: none"> • 8-pole M12 sensor cable, length 2 m / 5 m • Calibration protocol <p>SONOFLOW® C³ Software – for setting parameters, to adjust sensors for a specific application and for recording measurements; Consisting of:</p> <ul style="list-style-type: none"> • USB Data Converter, type 013 for the connection to a computer • USB cable, type A-B, length 2 m • 8-pole M12 connecting cable, length 2 m • Switching power supply (12 VDC) • USB flash drive with SONOFLOW® C³ Software and driver for Windows

Electrical connection



Male connector
(at the sensor)



Female connector
(at the cable)

M12 connecting cable	Pin	Color	Connection
Assignment	1	White	Ground
	2	Brown	Operating voltage +12 ... 30 VDC
	3	Green	Current output (0/4 ... 20 mA)
	4	Yellow	RS-485 B
	5	Grey	RS-485 A
	6	Pink	Frequency output 0 ... 20 kHz
	7	Blue	Switching output: PNP / NPN / Push-Pull
	8	Red	Digital input

Technical drawings

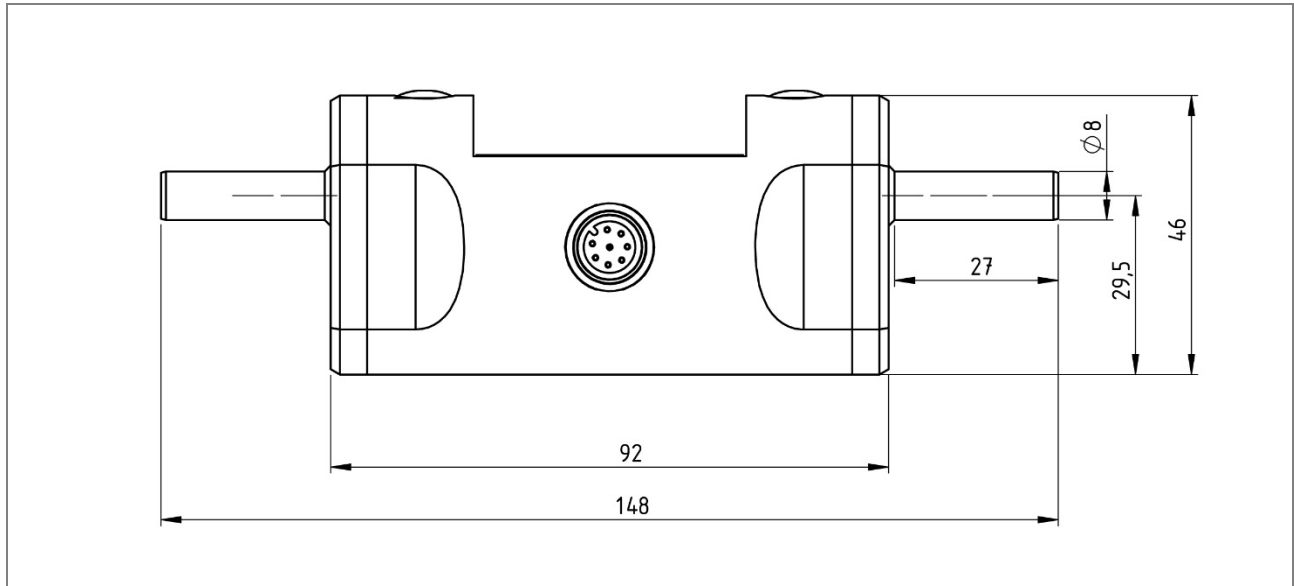


Figure 1: Dimensions SONOFLOW® IL.52/3 V2.0 – Side view

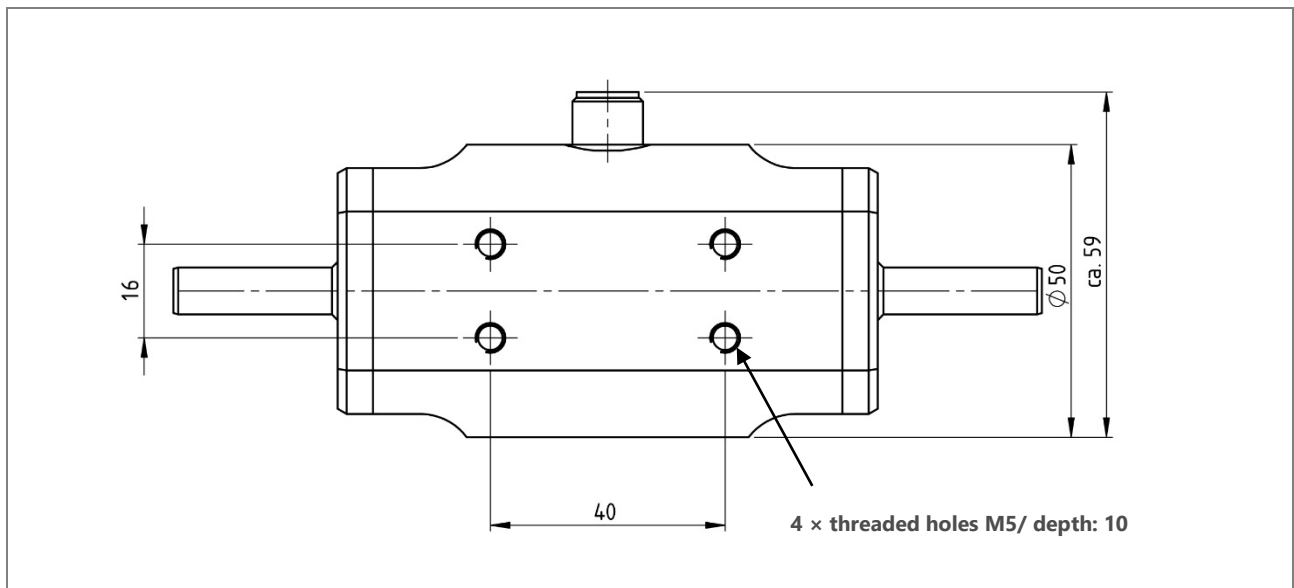


Figure 2: Rear side with drill holes for mounting

All figures and drawings are not to scale. Dimensions in mm, unless otherwise specified. Information is subject to change without notice.

MANUFACTURER
SONOTEC GmbH
Nauendorfer Str. 2
06112 Halle (Saale)
Germany

Tel.: +49 (0)345 / 133 17- 0
sales_eu@sonotec.de
www.sonotec.eu

CONTACT USA
SONOTEC US Inc.
190 Blydenburgh Rd
Suite 8, 2nd Floor
Islandia, New York 11749, USA

Phone: +1 631 / 415 4758
sales@sonotecusa.com
www.sonotecusa.com