



(Picture with standard connector, for customized connectors see 'Technical drawing' page 6).

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 and steam sterilization.

## General data

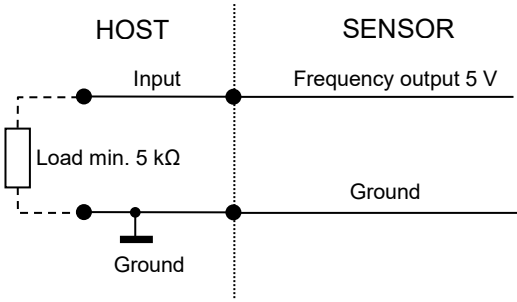
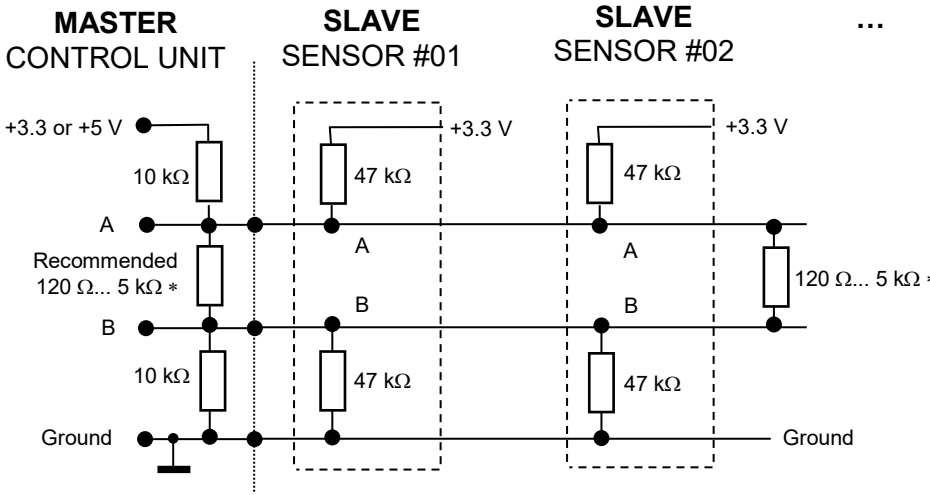
### SONOFLOW® IL.52/3 V2.0

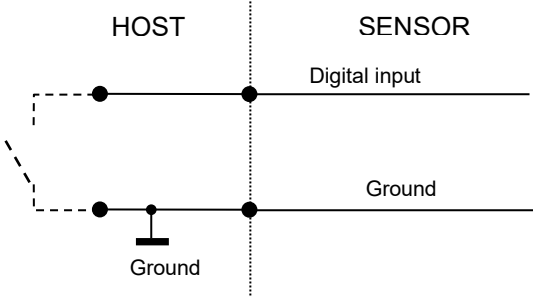
#### Ultrasonic Flow Sensor for Liquids with Customized Tube Adaptor

Sensor version	Size (for details see 'Technical drawing' page 6)	Sensor seals
LQ1 tube adaptor	Outer thread Tr 12 × 1.25, inner Ø 4 mm, PEEK	FFKM
LQ3 tube adaptor	Outer thread R1/8", inner Ø 4 mm, PEEK	FFKM
UNF tube adaptor	1/4"-28, inner Ø 2 mm, PEEK	Viton®*
Measuring channel	Ø 3.0 mm	
Dimensions (L × W × H)	148 × 59 × 46 mm	
Weight	Approx. 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 %	

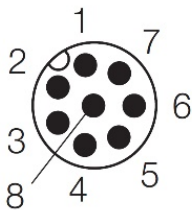
Modbus® is a registered trademark of Schneider Electric and is licensed by the Modbus Organization, Inc.  
Viton® is a registered trademark of DuPont de Nemours, Inc.

<b>Calibration</b>	Factory calibrated for water at 23 °C ± 2 K, outlet of the tubes depressurized (0 bar), other calibration on request
<b>Zero stability</b>	0.375 ml/min
<b>Max. pressure drop</b>	0.95 bar at a flow rate of 3 000 ml/min (value dependent on flow rate, with lower readings accordingly reduced)
<b>Measuring method</b>	Ultrasound, time of flight measurement
<b>Measuring cycle</b>	Typical 20 ms (minimum 4 ms)
<b>Indirect temperature measurement</b>	Integrated sensor at the inlet (accuracy of temperature sensor ±1 °C, with T <sub>ambient</sub> 23 °C and Q 1 l/min)
<b>Mounting</b>	Fixed installation: 4 × recessed threaded holes M5, depth: 10 mm
<b>Max. pressure</b>	10 bar
<b>Material</b>	In contact with fluid: Measuring channel and measuring cell: PEEK (seals and adaptor for tube connection: see 'Sensor versions' page 1)  Side plates: stainless steel; Connector: PA black, Pins: brass
<b>Operating voltage</b>	12 ... 30 VDC, ripple max. 10 %, protection against reverse polarity (external fuse, if required: min. 200 mA)
<b>Current consumption</b>	Maximum 50 mA (with open current, frequency and switching output, depending on supply voltage)
<b>Electrical connection</b>	8 pin M12 connector, DIN EN 61076-2-101:2013
<b>Shielding</b>	Required: via cable / housing (mounting screws)
<b>Interfaces</b>	<ul style="list-style-type: none"> <li>• Current output for flow rate: 0/4 ... 20 mA</li> <li>• Frequency output for flow rate: 0 ... 20 kHz, 5 V digital</li> <li>• RS-485 interface: bus-capable (SONOTEC® protocol, optional Modbus®)</li> <li>• Switching output: configurable as PNP / NPN / Push-Pull, 0 ... 30 V</li> <li>• Digital input</li> </ul>
<b>Current output for flow rate</b>	<p>⚠ <b>NOTE:</b> 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>

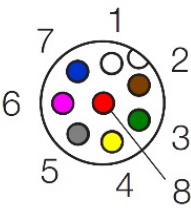
<b>Frequency output for flow rate</b>	
<b>RS-485 interface</b>	<p>SONOTEC® protocol: Half-duplex operation / 115.200 baud / no parity / 1 stop bit / no handshaking (Modbus® via software settings)</p> <p>⚠ <b>NOTE:</b> Please find the description of the serial protocol for details (upon request).</p> <p>Recommended electrical connection of the RS-485 interface</p> <p>⚠ <b>CAUTION!</b> 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>
<b>RS-485 Bus operation</b>	<p>The sensor supports bus operation with max. 12 subscribers. The default address is #01.</p> <p>⚠ <b>NOTE:</b> The address can be changed by software settings (see opt. accessories). Permitted are addresses from #01 ... #12. → Menu: Identification   RS-485 address</p>
<b>Switching output</b>	<p>Freely configurable: e.g. adapting batch process or threshold switch of flow, maximum 100 mA</p>

<b>Digital input</b>	<p>Freely configurable: for example for zero point calibration of flow or start dosing processes Voltage resistant up to 30 V</p> 
<b>Protection class</b>	IP65
<b>Cleaning and sterilization</b>	<p>Maximum liquid temperature: temporarily +145 °C; Resistant to cleaning agents (e.g. caustic soda or 3 percent nitric acid)</p> <p>⚠ <b>NOTE:</b> Before the cleaning, verify that the sensor materials (PEEK, Viton® / FFKM) are resistant against the cleaning agent. Not autoclavable (for suitable sensor version contact our service).</p>
<b>Media temperature</b>	0 ... +100 °C (T > 70 °C without voltage, temporarily +145 °C)
<b>Ambient temperature</b>	0 ... +70 °C
<b>Storage temperature</b>	-20 ... +70 °C
<b>Directives and standards</b>	<ul style="list-style-type: none"> <li>• EMC directive 2014/30/EU</li> <li>• RoHS: 2011/65/EU, exception: III 7cl/ IV 15</li> <li>• Acoustic emission: IEC 61157</li> </ul>
<b>Maintenance</b>	Maintenance-free
<b>Scope of supply</b>	<ul style="list-style-type: none"> <li>• SONOFLOW® IL.52/3 V2.0 according to specification</li> <li>• User documentation</li> </ul>
<b>Optional accessories</b>	<ul style="list-style-type: none"> <li>• 8-pole M12 sensor cable, length 2 m / 5 m</li> <li>• Calibration protocol</li> </ul> <p>SONOFLOW® C<sup>3</sup> Software – for setting parameters, to adjust sensors for a specific application and for recording measurements; Consisting of</p> <ul style="list-style-type: none"> <li>• USB Data Converter, type 013 for the connection to a computer</li> <li>• USB cable, type A-B, length 2 m</li> <li>• 8-pole M12 connecting cable, length 2 m</li> <li>• Switching power supply (12 VDC)</li> <li>• USB flash drive with SONOFLOW® C<sup>3</sup> Software and driver for Windows</li> </ul>

Electrical connection



Male connector  
(at the sensor)



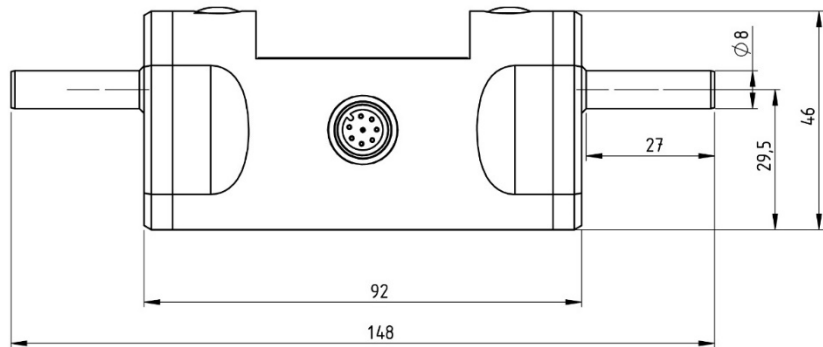
Female connector  
(at the cable)

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

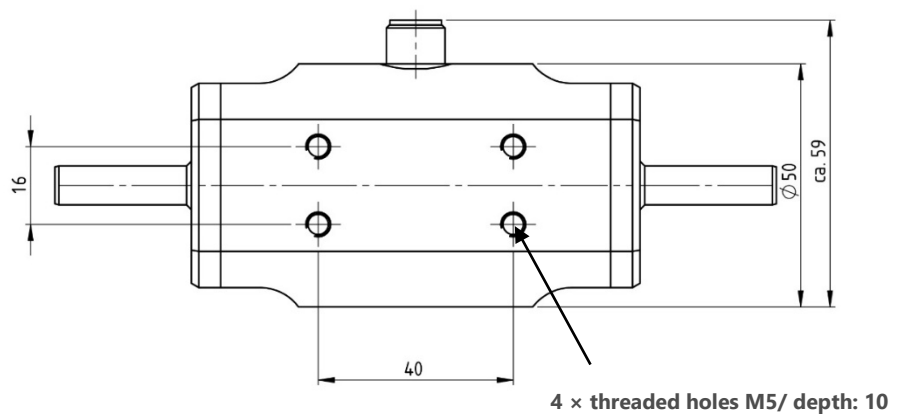
## Technical drawings

### SENSOR

#### Side view



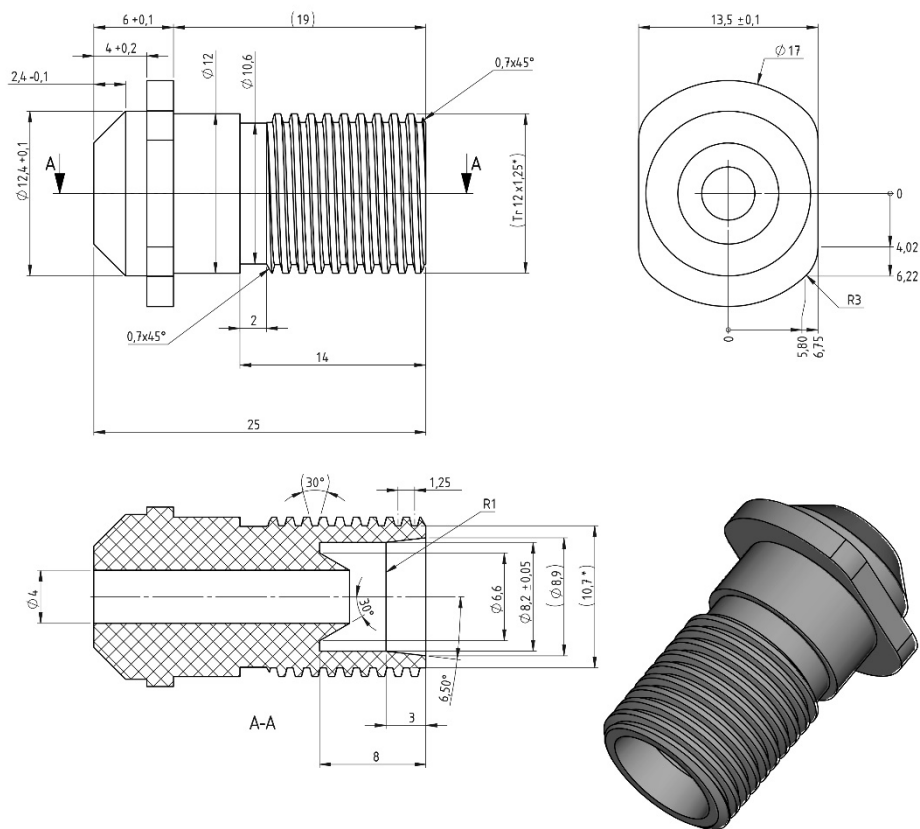
#### Rear side with drill holes for mounting



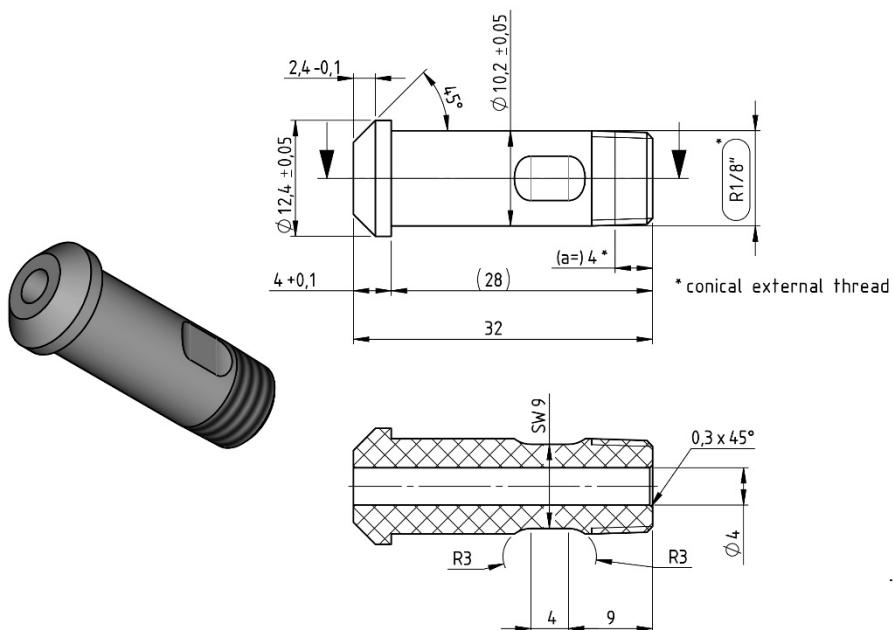
(General drawing with standard connection; for customized connectors see next pages.)

## TUBE CONNECTORS

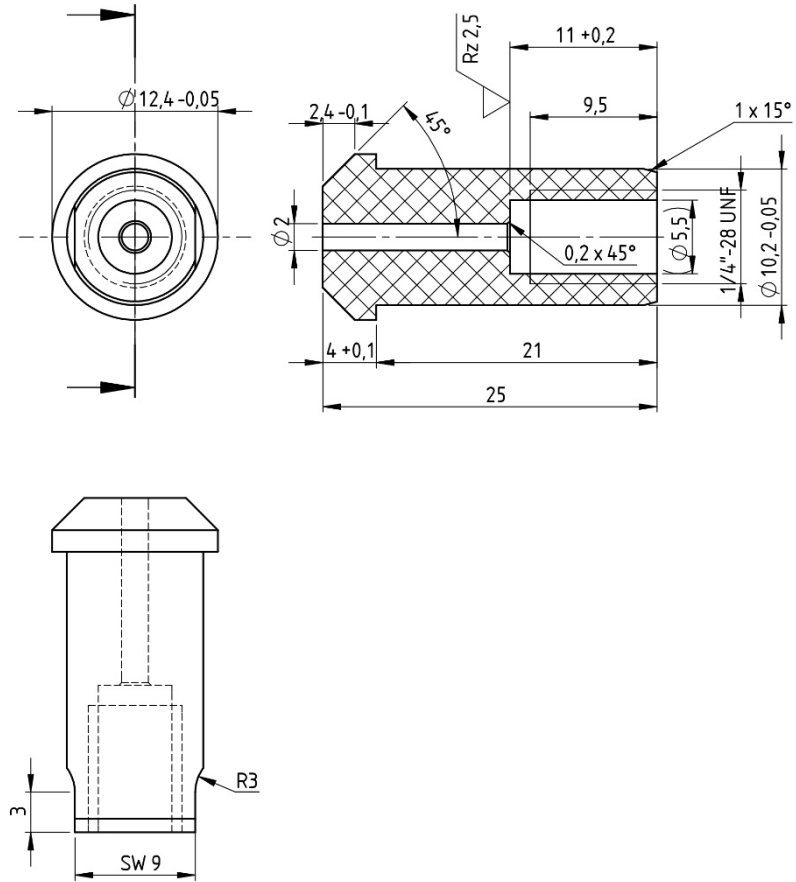
### LQ1 tube adaptor



### LQ3 tube adaptor



## UNF tube adaptor



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