

The sensor series **SONOFLOW CO.55 V2.0** – designed as clamp-on-sensors – detect the flow rate of liquids in plastic tubes of different diameters or materials within a few milliseconds.

The sensors have no contact to the medium or product and are suitable for applications in fields with strict hygienic standards e.g. the medical technology, biotechnology and pharmaceutical industry as well as chemical and semiconductor industry. Due to the current, frequency and switching outputs industrial dosing applications can be supported. The RS485 interface allows bus operation of up to 12 sensors in rough industrial environments. The **SONOFLOW CO.55 V2.0** sensors with complete built-in electronics can be installed in machines or apparatuses.

In addition to our standard sensors, we also manufacture customer-specific solutions regarding housing materials, colors, mechanical dimensions, customized output specifications and parameter settings.

### Overview sensors

Specification SONOFLOW	Order-No.	Measuring channel (□ CH = CW)	Dimensions (L x W x H)	Weight
<b>CO.55/035 V2.0</b>	200 01 0292	3.5 mm	44 x 44 x 28 mm	120 g
<b>CO.55/044 V2.0</b>	200 08 0026	4.4 mm	44 x 44 x 30 mm	125 g
<b>CO.55/060 V2.0</b>	200 01 0293	6.0 mm	44 x 44 x 32 mm	130 g
<b>CO.55/080 V2.0</b>	200 01 0297	8.0 mm	44 x 44 x 34 mm	135 g
<b>CO.55/100 V2.0</b>	200 08 0006	10.0 mm	44 x 44 x 35 mm	138 g
<b>CO.55/120 V2.0</b>	200 08 0027	12.0 mm	44 x 44 x 36 mm	140 g
<b>CO.55/140 V2.0</b>	200 08 0004	14.0 mm	44 x 44 x 38 mm	145 g
<b>CO.55/160 V2.0</b>	200 08 0008	16.0 mm	44 x 44 x 40 mm	150 g
<b>CO.55/190 V2.0</b>	200 08 0007	19.0 mm	66 x 66 x 48 mm	380 g

## Tubing properties

**Material:** PVC, Silicone, PTFE, PFA, FEP, TPE, Tygon, PE, etc.  
**Outer diameter:** 4 mm ... 22 mm

The selection of the right sensor depends on tubing dimensions as well as on tubing properties. If possible, please provide us with a tubing sample. The sensors are also applicable for further tubing diameters, up to 2". Please note that the given OD and ID are guide values.

Sensor	Tubing OD	Tubing ID	Tubing material	Product ID of tube manufacturer
<b>CO.55/035 V2.0</b>	5/32"	1/32"	Silicone	PHI-031x156 *
	4.0 mm	3.0 mm	PVC <sup>1</sup>	3500304 ***
<b>CO.55/044 V2.0</b>	3/16"	1/16"	Silicone, PVC	PHI-062x187 *
	5.0 mm	3.0 mm	PVC <sup>1</sup>	702101031099 **
<b>CO.55/060 V2.0</b>	6.4 mm	3.2 mm	Silicone, PVC	PHI-1.6MMx6.4MM *
	1/4"	1/8"	Silicone, PVC	PHI-125x250 *
	7.0 mm	5.0 mm	PVC <sup>1</sup>	702101051099 **
<b>CO.55/080 V2.0</b>	9.0 mm	6.0 mm	PVC <sup>1</sup>	702101061599 **
	9.6 mm	4.8 mm	Silicone, PVC, TPE	PHI-4.8MMx96.MM *
	3/8"	3/16"	Silicone, PVC, TPE	PHI-187x375 *
<b>CO.55/100 V2.0</b>	7/16"	1/4"	Silicone, PVC, TPE	PHI-250x437 *
	12.0 mm	9.0 mm	PVC <sup>1</sup>	702101091550 **
<b>CO.55/120 V2.0</b>	14:0 mm	10:0 mm	PVC <sup>1</sup>	702101102050 **
<b>CO.55/140 V2.0</b>	16.0 mm	9.6 mm	Silicone, PVC, TPE	PHI-9.6MMx16MM *
	16.0 mm	10.0 mm	PVC <sup>1</sup>	702101103050 **
<b>CO.55/160 V2.0</b>	18.8 mm	12.8 mm	Silicone, PVC, TPE	PHI-12.4MMx18.8MM *
	3/4"	1/2"	Silicone, PVC, TPE	PHI-500x750 *
	19.0 mm	14.0 mm	PVC <sup>1</sup>	702101142550 **
<b>CO.55/190 V2.0</b>	22.0 mm	16.0 mm	PVC <sup>1</sup>	702101163050 **
	22.3 mm	12.7 mm	Silicone	PLTS-12.7MMx22.3MM *

<sup>1</sup> Sensors are factory calibrated with the highlighted tubing.  
 Calibration to all the listed tubing upon request, please inform our sales team.

Special calibration to customer specific tubing is available.

**Manufacturer:**

\* TBL Performance Plastics, New Jersey 07871 (USA); \*\* ESSKA.de GmbH, 20537 Hamburg (Germany);

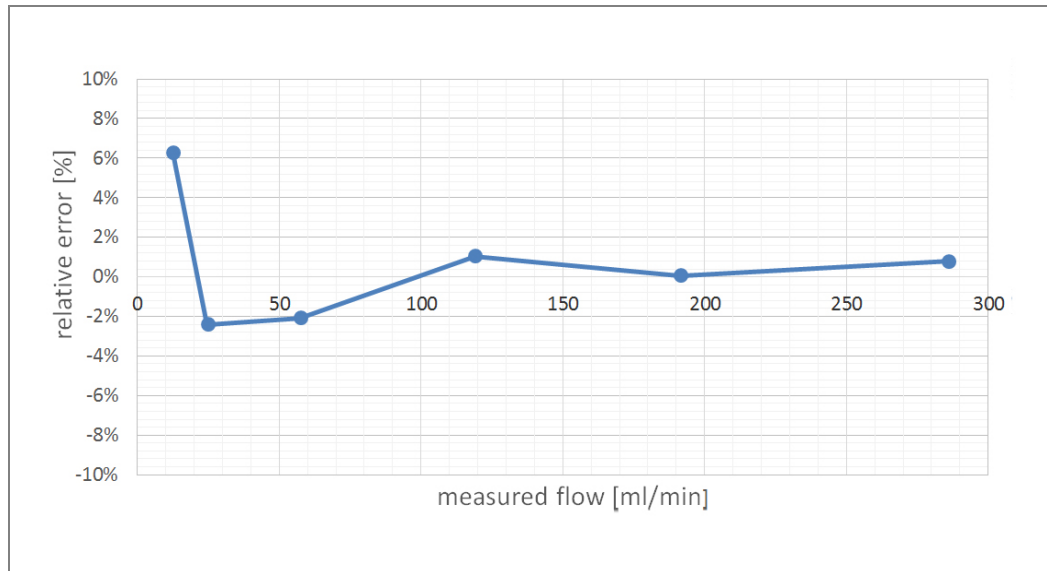
\*\*\* Deutsch & Neumann GmbH, 10585 Berlin (Germany)

**Accuracy**

Specification SONOFLOW	Upper range value	Accuracy for water: adjusted at 23 °C ± 2 K and 1 bar on specified tube	
CO.55/035 V2.0	3 000 ml/min	0 ... 300 ml/min: ± 6 ml/min	300 ... 3 000 ml/min: ± 2 %
CO.55/044 V2.0	5 000 ml/min	0 ... 500 ml/min: ± 10 ml/min	500 ... 5 000 ml/min: ± 2 %
CO.55/060 V2.0	6 000 ml/min	0 ... 600 ml/min: ± 12 ml/min	600 ... 6 000 ml/min: ± 2 %
CO.55/080 V2.0	8 000 ml/min	0 ... 800 ml/min: ± 16 ml/min	800 ... 8 000 ml/min: ± 2 %
CO.55/100 V2.0	10 000 ml/min	0 ... 1 000 ml/min: ± 20 ml/min	1 000 ... 10 000 ml/min: ± 2 %
CO.55/120 V2.0	12 000 ml/min	0 ... 1 200 ml/min: ± 24 ml/min	1 200 ... 12 000 ml/min: ± 2 %
CO.55/140 V2.0	14 000 ml/min	0 ... 1 400 ml/min: ± 28 ml/min	1 400 ... 14 000 ml/min: ± 2 %
CO.55/160 V2.0	16 000 ml/min	0 ... 1 600 ml/min: ± 32 ml/min	1 600 ... 16 000 ml/min: ± 2 %
CO.55/190 V2.0	18 000 ml/min	0 ... 1 800 ml/min: ± 36 ml/min	1 800 ... 18 000 ml/min: ± 2 %

**Accuracy and calibration**

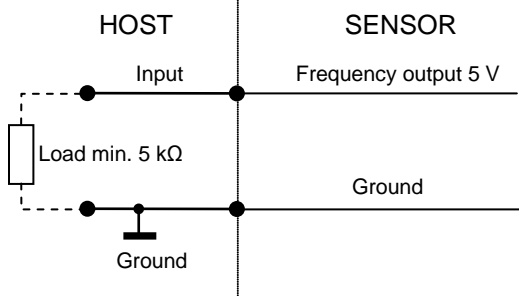
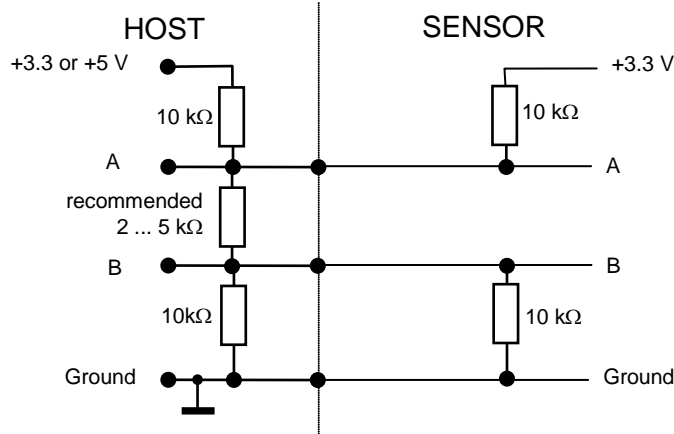
Example for accuracy of **SONOFLOW CO.55/035** in the lower flow range, achieved by calibration to customer specific conditions:

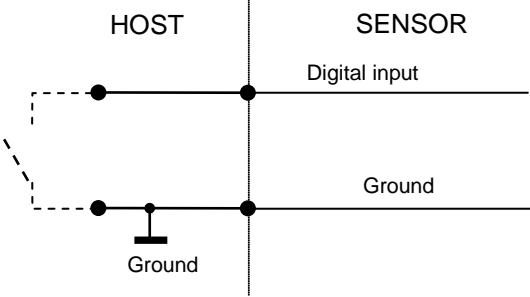


Accuracy depends on tubing, temperature, fluid properties and other conditions. Calibration to customer tubing, fluid, flow range, temperature, etc. on request.

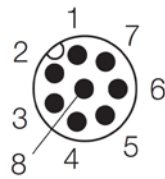
## Technical data

SONOFLOW CO.55 V2.0	
Flow Sensor for liquids	
<b>Measuring method</b>	Ultrasound, two sections of measurements, dry coupling, no couplant required
<b>Calibration</b>	Sensors are factory calibrated for water at $23\text{ °C} \pm 2\text{ K}$ , tube end depressurized (0 bar); other calibration on request
<b>Mounting</b>	Fixed installation: 4 fixing holes M4, 8 mm deep
<b>Media</b>	Water, human blood or other acoustically transparent liquids
<b>Sensor materials</b>	Measuring channel: PMMA black Housing: aluminium, anodized grey/red (optional: stainless steel, plastics)
<b>Operating voltage</b>	12 ... 30 VDC, maximum ripple 10 %, protection against reverse-polarity
<b>Current consumption</b>	Maximum 30 mA (with open current, frequency and switching output)
<b>Electrical connection</b>	8-pin M12 Connector, DIN EN 61076-2-101:2012
<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>• RS485 interface: bus-capable</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>

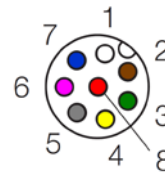
<p><b>Frequency output for flow rate</b></p>	
<p><b>RS485 interface</b></p>	<p>Half-duplex operation / 115.200 baud / no parity / 1 stop bit / no handshaking</p> <p>⚠ <b>NOTE:</b> Please find the description of the serial protocol for details (upon request).</p>  <p>Recommended electrical connection 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><b>RS485 Bus operation</b></p>	<p>The sensor supports bus operation with max. 12 subscribers. The default address is #1.</p> <p>⚠ <b>NOTE:</b> The address can be changed with the help of the ABD Monitor. Permitted are addresses from #1 ... #12.          → Menu: Identification   RS485 address</p>
<p><b>Switching output</b></p>	<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</p> <p>Voltage resistant up to 30 V</p>
	
<b>Ambient- / Media temperature</b>	0 ... 60 °C, other temperatures available on request
<b>Storage temperature</b>	-20 ... +70 °C
<b>Protection class</b>	IP65
<b>Directives and standards</b>	<ul style="list-style-type: none"> <li>• EMC directive 2004/108/EG</li> <li>• RoHS: 011/65/EU, exception: III 7cl/ IV 15</li> <li>• Acoustic emission: IEC 61157</li> </ul>
<b>Maintenance</b>	Maintenance-free
<b>Scope of delivery</b>	<ul style="list-style-type: none"> <li>• SONOFLOW CO.55 V2.0 according to specification</li> <li>• User documentation</li> </ul>
<b>Optional accessories</b>	<ul style="list-style-type: none"> <li>• 8-pin M12 sensor cable, length 2 m / 5 m</li> <li>• Calibration protocol</li> </ul> <p>SONOFLOW Monitor for setting parameters and 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>• Power supply unit (24 VDC)</li> <li>• 8-pin M12 connecting cable, length 2 m</li> <li>• USB cable, type A-B, length 2 m</li> <li>• CD with Software SONOFLOW Monitor and driver for Windows</li> </ul>

**Electrical Connection**



Male connector  
(at the sensor)



Female connector  
(at the cable)

M12 connecting cable	Pin	Colour	Connection
<b>Assignment</b>	1	White	Ground
	2	Brown	Operating voltage +12 ... 30 VDC
	3	Green	Current output (0/4 ... 20 mA)
	4	Yellow	RS485 B
	5	Grey	RS485 A
	6	Pink	Frequency output 0 ... 20 kHz
	7	Blue	Switching output: PNP / NPN / Push-Pull
	8	Red	Digital input

**Sensor Designation**

Identifier	Sensor
<b>S</b>	Material: <u>S</u> tainless steel
<b>P</b>	Material: <u>P</u> lastics
<b>D</b>	With <u>D</u> isplay
<b>SD</b>	Material: <u>S</u> tainless steel, with <u>D</u> isplay
<b>I</b>	With <u>I</u> nlay
<b>H</b>	With <u>H</u> andle

**Technical drawings**

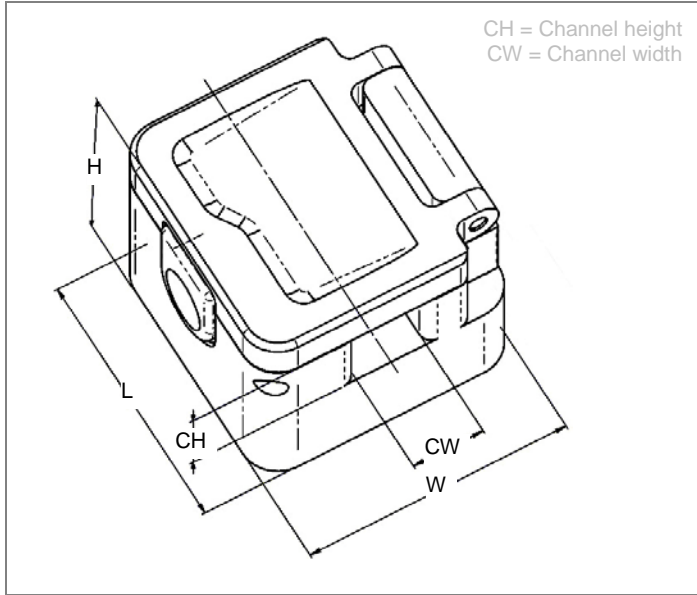


Figure 1: Dimensions SONOFLOW CO.55 V2.0  
(The drawings are not to scale)

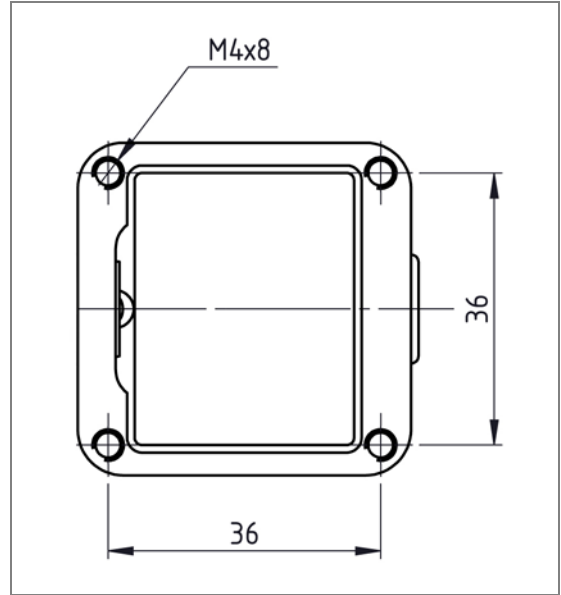


Figure 2: Rear side with drill holes for mounting



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Information is subject to change without notice!

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