

## Technical Data Sheet

# SONOFLOW CO.55 V3.0

Ultrasonic Flow Sensor for Non-Invasive Flow Measurement



SONOFLOW CO.55 V3.0 clamp-on flow meters measure the flow rate of liquids in flexible tubes of different diameters. With high accuracy, reproducibility and repeatability – even in the lowest flow range – the sensors are suited for a variety of applications. Various accessories allow for easy integration into bench top setups and industrial process environments.

## Accuracy

SONOFLOW type	Accuracy (of reading) on specified tubing <sup>1</sup>		Typical flow range <sup>2</sup>
	Low flow range	High flow range	
<b>CO.55/0250 V3.0</b>	0 ... 150 ml/min: ± 1.5 ml/min	> 150 ml/min: ± 1 %	0 ... 1 000 ml/min
<b>CO.55/0375 V3.0</b>	0 ... 300 ml/min: ± 3 ml/min	> 300 ml/min: ± 1 %	0 ... 4 000 ml/min
<b>CO.55/0500 V3.0</b>	0 ... 500 ml/min: ± 5 ml/min	> 500 ml/min: ± 1 %	0 ... 5 000 ml/min
<b>CO.55/0625 V3.0</b>	0 ... 700 ml/min: ± 7 ml/min	> 700 ml/min: ± 1 %	0 ... 10 000 ml/min
<b>CO.55/0750 V3.0</b>	0 ... 1 000 ml/min: ± 10 ml/min	> 1 000 ml/min: ± 1 %	0 ... 15 000 ml/min
<b>CO.55/1375H V3.0</b>	0 ... 6 000 ml/min: ± 60 ml/min	> 6 000 ml/min: ± 1 %	0 ... 80 000 ml/min

1) Accuracy based on standard calibration conditions as listed. Accuracy depends on tubing, tubing variations, temperature, fluid properties, clamping and other conditions (design of inlet and outlet section).

2) Maximum flow: limited by tubing and pump capacity only.

## Calibration conditions

Sensors are factory calibrated under the following standard conditions:

- Tubing as listed in table 'Tubing properties', not sterilized
- Water at 23 °C ± 2 K
- Warm up: at least 30 min
- Zero calibration after clamp-on
- Open tubing outlet (pressure close to zero)

Besides recalibrations of our flow sensors we offer safety inspections and repair service for all our products. Contact us!

## Tubing properties

Typical types of tubes are listed below. The sensors are also suitable for comparable flexible tubes (different tube manufacturers, diameters, materials such as PVC, TPE, etc.). If possible, provide a tubing sample (minimum length 75 cm) along with your order.

Sensor variant with cover clasp

**Tube type:** Masterflex® precision pump tubing, platinum-cured silicone, not sterilized\*

SONOFLOW type	Tubing ID	Tubing OD	Tubing details from the manufacturer	
CO.55/0250 V3.0	1/8" [0.125"]	1/4" [0.250"]	L/S® 16	Item No. 96410-16
CO.55/0375 V3.0	1/4" [0.250"]	3/8" [0.375"]	L/S® 17	Item No. 96410-17
CO.55/0500 V3.0	5/16" [0.313"]	1/2" [0.5"]	L/S® 35	Item No. 96410-35
CO.55/0625 V3.0	3/8" [0.375"]	5/8" [0.625"]	I/P® 73	Item No. 96410-73
CO.55/0750 V3.0	1/2" [0.5"]	3/4" [0.75"]	I/P® 82	Item No. 96410-82

Sensor variant with handle (H)

**Tube type:** Saint-Gobain® C-Flex® tubing, thermoplastic elastomer (TPE), not sterilized\*

SONOFLOW type	Tubing ID	Tubing OD	Tubing details from the manufacturer	
CO.55/1375H V3.0	1"	1 3/8" [1.375"]	374	Item No. 374-1000-6

\* Gamma sterilization, x-ray sterilization, or autoclaving of the tubing may impact its material properties, potentially affecting sensor readings. Recalibration may be required after tubing sterilization.

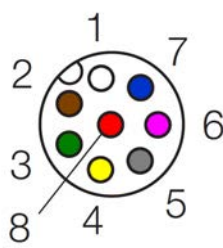
## Sensor interfaces

Interface	Specifications
<b>Current output</b>	0 (4) ... 20 mA   Resolution: < 1 $\mu$ A   Update rate: up to 1 kHz   Configurable for flow range Load to GND. The max. load depends on the operating voltage: 12 V $\rightarrow$ 250 $\Omega$   15 V $\rightarrow$ 500 $\Omega$   24 V $\rightarrow$ 1 k $\Omega$   30 V $\rightarrow$ 1.2 k $\Omega$
<b>RS-485 interface</b>	RS-485 bus operation: max. 12 subscribers   Default address: #01 Available protocols: <ul style="list-style-type: none"><li>• SONOTEC protocol: Half-duplex operation   115 200 baud   No parity   1 stop bit   no handshaking</li><li>• Modbus<sup>®</sup> protocol: configurable settings via software</li></ul>
<b>Switching output</b>	Switching characteristics: PNP / NPN / Push-pull   0 ... 30 V   max. 100 mA   PWM output period: 0.1 ms ... 1 000 ms   Output range 0 ... 100 % or 5 ... 95 %   Smallest pulse length: 5 $\mu$ s Configurable as: <ul style="list-style-type: none"><li>• Volume switch (adapting batch process / dosing)</li><li>• Threshold switch of flow</li><li>• Pulses of volume (flexible pulse length, max. 20 kHz)</li><li>• Flow rate (via frequency or duty cycle)</li><li>• Status information via switch</li></ul>
<b>Digital input</b>	Internal pull-up to operating voltage (100 k $\Omega$ )   Voltage resistant up to 30 V Configurable for: <ul style="list-style-type: none"><li>• Zero point calibration of flow</li><li>• Start dosing processes (reset volume)</li></ul> (Either separate or simultaneous execution possible)

## Electrical specifications and connections

Parameter	Specifications
<b>Operating voltage</b>	12 ... 30 VDC   Maximum ripple: 10 %   Protection against reverse-polarity (external fuse, if required: min. 200 mA)
<b>Current consumption</b>	Maximum 60 mA (with open current, frequency and switching output, depending on supply voltage)   Inrush current (during start-up < 10 ms): < 350 mA at 12 V, < 150 mA at 24 V
<b>Electrical connection</b>	8-pin M12 connector   DIN EN 61076-2-101:2012

8 pin connector to 8 pole cable

Connection	Pin	Assignment	Color
 <p>Male connector (at the sensor)</p>	1	Ground	White
	2	Operating voltage	Brown
	3	Current output	Green
	4	RS-485 B	Yellow
	5	RS-485 A	Grey
	6	(not assigned)	Pink
	7	Switching output / frequency output	Blue
	8	Digital input	Red
<b>Shielding</b>	Cable shield must be connected to housing		

## General data

Parameter	Specifications
Measuring method	Ultrasonic time of flight measurement
Sensor materials	Measuring channel: ABS   Housing: anodized aluminum, polyamide   Connector: Stainless steel
Mounting	4 threaded mounting holes (see 'Technical drawings')
Maintenance	Maintenance-free
Directives and standards	<ul style="list-style-type: none"><li>• EMC Directive 2014/30/EU</li><li>• RoHS Directive 2011/65/EU, exception: III 7cl/ IV 15; RoHS 2015/863</li><li>• Acoustic emission: IEC 61157:2007 + A1:2013</li></ul>

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## Conditions of use

Parameter	Specifications
Customized calibration	Standard calibration according to factory specification. Calibration to deviating, flexible customer tubing, fluid, flow range, temperature, etc. on request.
Operating conditions	Adaptation to different tubes or operating conditions by parameter settings (with the help of optionally available software).
Media	Water or similar liquids
Ambient- / Media temperature	0 ... 60 °C (other temperatures available on request)
Storage temperature	-20 ... +70 °C
Degree of protection	IP65

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## Scope of supply and accessories

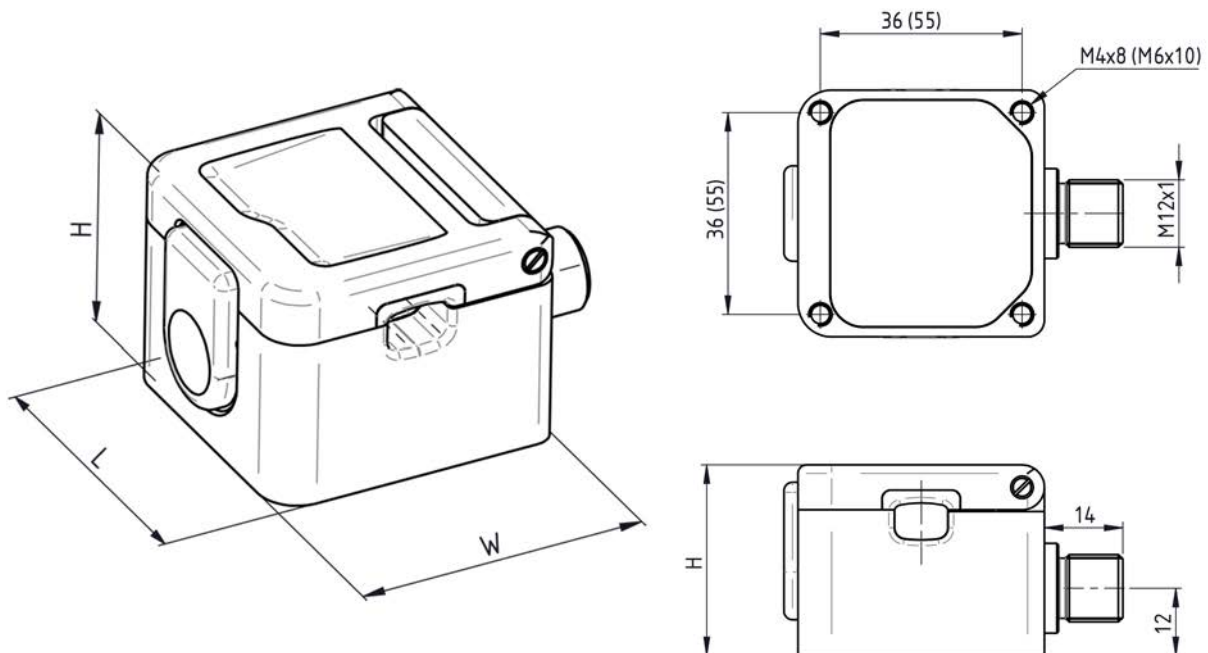
Parameter	Specifications
<b>Scope of supply</b>	<ul style="list-style-type: none"><li>• Sensor SONOFLOW CO.55 V3.0 according to specification</li><li>• User documentation</li><li>• Calibration report</li></ul>
<b>Optional accessories</b>	<p>Sensor cable   Length: 2 m   8-pole M12 connector</p> <hr/> <p>SONOFLOW Monitor software for setting parameters, recording measurements and updating sensor software, 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>• Cable 2 m, 8-pole M12 connector</li><li>• Switching power supply 12 V</li><li>• Flow Monitor Software Package</li><li>• User documentation</li></ul> <hr/> <p>SONOFLOW RD.10 Remote Display including connecting cable for</p> <ul style="list-style-type: none"><li>• Monitoring sensor performance (display e.g. current flow rate, volume or measuring state)</li><li>• Zero calibration</li><li>• Manual volume reset</li></ul> <hr/> <p>EtherNet/IP Gateway programmed for SONOTEC</p> <ul style="list-style-type: none"><li>• Serial communication with an EtherNet/IP-based system (e.g. PLC)</li><li>• Support of up to 12 sensors</li><li>• Pre-configured parameters and commands (library with Modbus registers for time-saving installation)</li></ul> <hr/> <p>Portable USB Data Converter Type 023 for</p> <ul style="list-style-type: none"><li>• Mobile operation of sensors via a standard USB power socket or power bank</li><li>• Triggering of functions stored for the digital sensor input ('push button switch')</li></ul>

## Sensor dimensions and technical drawings

Design data (STEP files) for integration will be provided upon request. Please feel free to contact us.

Sensor variant with cover clasp

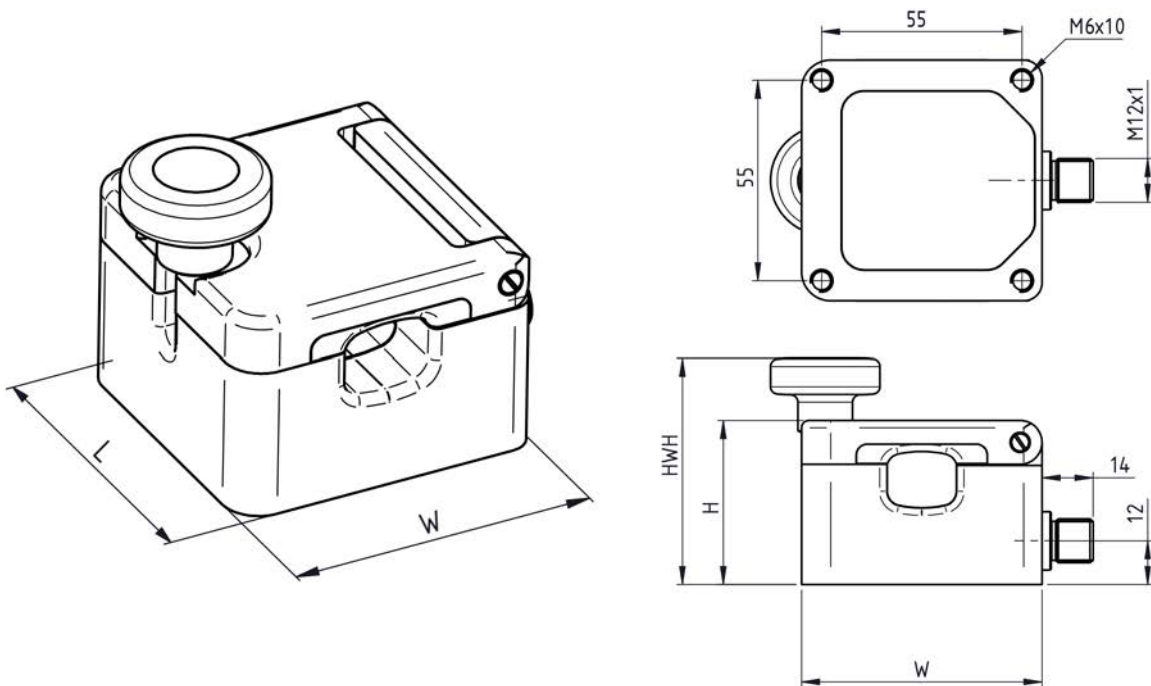
SONOFLOW type	Product No	Dimensions (L x W x H)	Mounting holes	Mounting hole spacing	Weight (approx.)
CO.55/0250 V3.0	200 08 0117	44 x 44 x 34 mm	M4 x 8 mm	36 mm	140 g
CO.55/0375 V3.0	200 08 0118	44 x 44 x 34 mm	M4 x 8 mm	36 mm	140 g
CO.55/0500 V3.0	200 08 0139	44 x 44 x 34 mm	M4 x 8 mm	36 mm	140 g
CO.55/0625 V3.0	200 08 0133	66 x 66 x 45 mm	M6 x 10 mm	55 mm	400 g
CO.55/0750 V3.0	200 08 0120	66 x 66 x 45 mm	M6 x 10 mm	55 mm	400 g



Sensor variant with handle (H)

For applications on tubes with large outer diameters, the corresponding sensors are equipped with a locking screw (handle) to assist handling when inserting the tube.

SONOFLOW type	Product No	Dimensions (L x W x H) [Height with handle]	Mounting holes	Mounting hole spacing	Weight (approx.)
CO.55/1375H V3.0	200 08 0140	66 x 66 x 62 [80] mm	M6 x 10 mm	55 mm	450 g



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

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 Specialist in Ultrasonic Flow Measurement