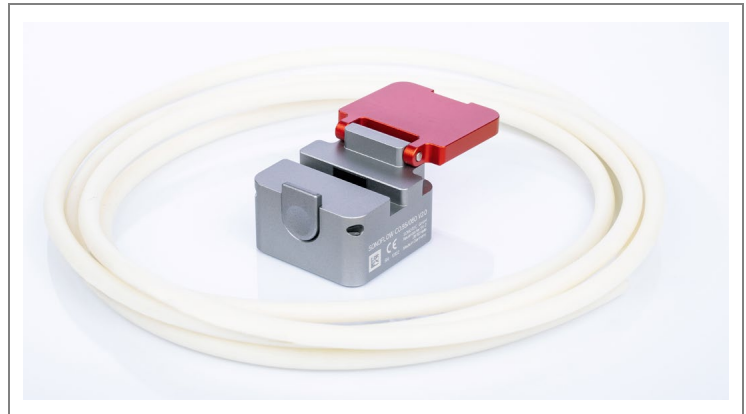




The sensor series **SONOFLOW CO.55/xxx(H) V2.0** – designed as clamp-on-sensors – detect the flow rate of liquids in plastic tubes of different diameters or materials within a few milliseconds.



For applications on tubes with large outer diameters the sensors **SONOFLOW CO.55/xxx(H) V2.0** are equipped with a handle for an optimized handling for tube insertion.

The sensors have no contact to the medium or product and are suitable for applications in fields with strict hygienic standards. 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.

The sensors **SONOFLOW CO.55/xxx(H) V2.0** 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

Type SONOFLOW	Order-No.	Max. flow range	Measuring channel (CH = CW)	Dimensions (L x W x H)	Weight
CO.55/035 V2.0	200 01 0292	3 000 ml/min	□ 3.5 mm	44 × 44 × 28 mm	120 g
CO.55/044 V2.0	200 08 0026	5 000 ml/min	□ 4.4 mm	44 × 44 × 30 mm	125 g
CO.55/060 V2.0	200 01 0293	6 000 ml/min	□ 6.0 mm	44 × 44 × 32 mm	130 g
CO.55/080 V2.0	200 01 0297	8 000 ml/min	□ 8.0 mm	44 × 44 × 34 mm	135 g
CO.55/100 V2.0	200 08 0006	10 000 ml/min	□ 10.0 mm	44 × 44 × 35 mm	138 g
CO.55/120 V2.0	200 08 0027	12 000 ml/min	□ 12.0 mm	44 × 44 × 36 mm	140 g
CO.55/140 V2.0	200 08 0004	14 000 ml/min	□ 14.0 mm	44 × 44 × 38 mm	145 g
CO.55/160 V2.0	200 08 0008	18 000 ml/min	□ 16.0 mm	44 × 44 × 40 mm	150 g
CO.55/190 V2.0	200 08 0007	40 000 ml/min	□ 19.0 mm	66 × 66 × 48 mm	380 g

Type SONOFLOW (with Handle)	Order-No.	Max. flow range	Measuring channel (CH x CW)	Dimensions L x W x H [Height without handle]	Weight
CO.55/230H V2.0	200 08 0047	50 000 ml/min	□ 23.0 mm	66 × 75 × 72 [51] mm	510 g
CO.55/260H V2.0	200 08 0049	70 000 ml/min	□ 26.0 mm	66 × 75 × 75 [54] mm	520 g
CO.55/300H V2.0	200 08 0076	100 000 ml/min	□ 30.0 mm	66 × 75 × 79 [58] mm	510 g
CO.55/340H V2.0	200 08 0050	140 000 ml/min	30.0 x 34.0 mm	66 × 75 × 79 [58] mm	510 g

Tubing properties

Material: PVC, Silicone, PTFE, PFA, FEP, TPE, Tygon, PE, etc. (not sterilized)
Outer diameter: ≈ 4 mm ... 35 mm

	<p>Note</p> <p>The following listed tubes are examples for frequently used tubes and the given OD and ID are guiding values. The sensors are also applicable for further tubing diameters, up to 2". The selection of the right sensor depends on tubing dimensions as well as on tubing properties. If possible, provide us with a tubing sample (minimum length 50 cm).</p>
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Other materials and diameters upon request. Contact our service.

Type SONOFLOW	Tubing OD		Tubing ID		Wall thickness		Tubing
	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	
CO.55/035 V2.0	4.0 mm		3.0 mm		0.5 mm		PVC, Deutsch & Neumann 3500304
	3.96 mm	5/32" 0.1563"	0.79 mm	1/32" 0.031"	1.6 mm	1/16" 0.0625"	Platinum-Cured Silicone, Cole-Parmer® L/S 13, Masterflex®
CO.55/044 V2.0	5.0 mm		3.0 mm		1.0 mm		PVC, ESKA, 702101031099
	4.76 mm	3/16" 0.1875"	1.6 mm	1/16" 0.0625"	1.6 mm	1/16" 0.0625"	Platinum-Cured Silicone, Cole-Parmer® L/S 14, Masterflex®
CO.55/060 V2.0	7.0 mm		5.0 mm		1.0 mm		PVC, ESKA, 702101051099
	6.35 mm	1/4" 0.25"	3.18 mm	1/8" 0.125"	1.6 mm	1/16" 0.0625"	Platinum-Cured Silicone, Cole-Parmer® L/S 16, Masterflex®
CO.55/080 V2.0	9.0 mm		6.0 mm		1.5 mm		PVC, ESKA, 702101061599
	9.53 mm	3/8" 0.375"	6.35 mm	1/4" 0.25"	1.6 mm	1/16" 0.0625"	Platinum-Cured Silicone, Cole-Parmer® L/S 17, Masterflex®
CO.55/100 V2.0	12.0 mm		9.0 mm		1.5 mm		PVC, ESKA, 702101091550
	11.13 mm	7/16" 0.438"	6.35 mm	1/4" 0.25"	2.39 mm	3/32" 0.0938"	Platinum-Cured Silicone, Cole-Parmer® L/S 24, Masterflex®
CO.55/120 V2.0	14.0 mm		10.0 mm		2 mm		PVC, ESKA, 702101102050
	14.29 mm	9/16" 0.563"	9.53 mm	3/8" 0.375"	2.39 mm	3/32" 0.0938"	Platinum-Cured Silicone, Cole-Parmer® L/S 36, Masterflex®
CO.55/140 V2.0	16.0 mm		12.0 mm		2 mm		PVC, ESKA, 702101122050
	15.88 mm	5/8" 0.625"	9.53 mm	3/8" 0.375"	3.18 mm	1/8" 0.125"	Platinum-Cured Silicone, Cole-Parmer® I/P 73, Masterflex®
CO.55/160 V2.0	19.0 mm		14.0 mm		2.5 mm		PVC, ESKA, 702101142550
	19.05 mm	3/4" 0.75"	12.7 mm	1/2" 0.5"	3.18 mm	1/8" 0.125"	Platinum-Cured Silicone, Cole-Parmer® I/P 82, Masterflex®
CO.55/190 V2.0	22.0 mm		16.0 mm		3 mm		PVC, ESKA, 702101163050
	22.23 mm	7/8" 0.875"	15.88 mm	5/8" 0.625"	3.18 mm	1/8" 0.125"	Platinum-Cured Silicone, Saint-Gobain, Sani-Tech® STHT®-C-625-4
CO.55/230H V2.0	25.4 mm	1"	15.88 mm	5/8" 0.625"	4.76 mm	3/16" 0.1875"	Platinum-Cured Silicone, Saint-Gobain, Sani-Tech® STHT®-C-625-5
CO.55/260H V2.0	28.56 mm	1 1/8" 1.125"	19.05 mm	3/4" 0.75"	4.76 mm	3/16" 0.1875"	Platinum-Cured Silicone, Saint-Gobain, Sani-Tech® STHT®-C-750-5
CO.55/300H V2.0	31.75 mm	1 1/4" 1.25"	19.05 mm	3/4" 0.75"	6.35 mm	1/4" 0.25"	Platinum-Cured Silicone, Cole-Parmer® I/P 91, Masterflex®
CO.55/340H V2.0	34.93 mm	1 3/8" 1.375"	25.4 mm	1"	4.76 mm	3/16" 0.1875"	Platinum-Cured Silicone, Saint-Gobain, Sani-Tech® STHT®-C-1000-5

Manufacturers:

PVC Tubing: Deutsch & Neumann GmbH, 10585 Berlin (Germany); ESKA.de GmbH, 20537 Hamburg (Germany)
 Silicone Tubing: Cole-Parmer®, Vernon Hfills, IL 60061 United States; Saint-Gobain Performance Plastics, Solon, OH 44139

Calibration and conditions of use

Calibration	<p>Sensors are factory calibrated under the following conditions:</p> <ul style="list-style-type: none">▪ Tubing as listed and highlighted in table 'Tubing properties', not sterilized*▪ Water at 23 °C ± 2 °C▪ Warm up: at least 30 min (to compensate thermal effects)▪ Zero calibration just before measurement procedure▪ Normal pressure <p>Calibration to customer tubing, fluid, flow range, temperature, etc. on request.</p>
Media	Water or other acoustically transparent liquids
Conditions of use	<p>⚠ CAUTION:</p> <p>The sensors need to be adjusted individually to special operating conditions in case of operation with tubing not listed in the table 'Tubing properties', because the accuracy of flow measurement can be affected.</p> <p>Contact our service for details!</p> <hr/> <p>⚠ NOTE:</p> <p>Generally, the sensors are able to measure liquids in an extended operating temperature range of +1 to +50 °C, but with limited accuracy only.</p>

Accuracy depends on tubing, temperature, fluid properties and other conditions. Absolute accuracy is influenced by zero stability, resolution and zero offset effects. For details see next chapter.

* 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.

Accuracy

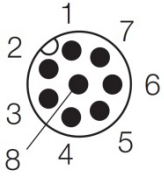
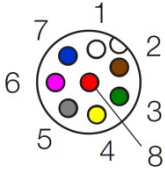
Type SONOFLOW	Upper range value	Accuracy for water: adjusted at 23 °C ± 2 K and 1 bar on specified tube (listed)	
CO.55/035 V2.0	3 000 ml/min	0 ... 300 ml/min: ± 6 ml/min	300 ... 3 000 ml/min: ± 2 %*
CO.55/044 V2.0	5 000 ml/min	0 ... 500 ml/min: ± 10 ml/min	500 ... 5 000 ml/min: ± 2 %*
CO.55/060 V2.0	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	18 000 ml/min	0 ... 1 800 ml/min: ± 36 ml/min	1 800 ... 18 000 ml/min: ± 2 %*
CO.55/190 V2.0	40 000 ml/min	0 ... 4 000 ml/min: ± 80 ml/min	4 000 ... 40 000 ml/min: ± 2 %*
CO.55/230H V2.0	50 000 ml/min	0 ... 5 000 ml/min: ± 100 ml/min	5 000 ... 50 000 ml/min: ± 2 %*
CO.55/260H V2.0	70 000 ml/min	0 ... 7 000 ml/min: ± 140 ml/min	7 000 ... 70 000 ml/min: ± 2 %*
CO.55/300H V2.0	100 000 ml/min	0 ... 10 000 ml/min: ± 200 ml/min	10 000 ... 100 000 ml/min: ± 2 %*
CO.55/340H V2.0	140 000 ml/min	0 ... 14 000 ml/min: ± 280 ml/min	14 000 ... 140 000 ml/min: ± 2 %*

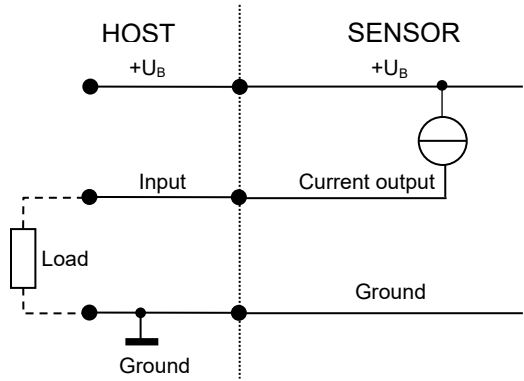
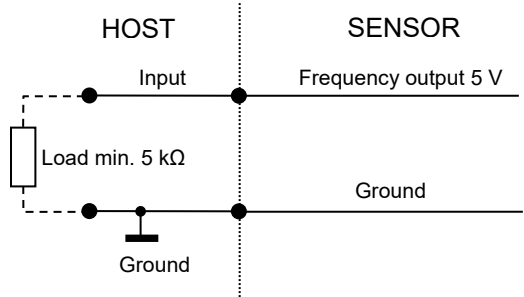
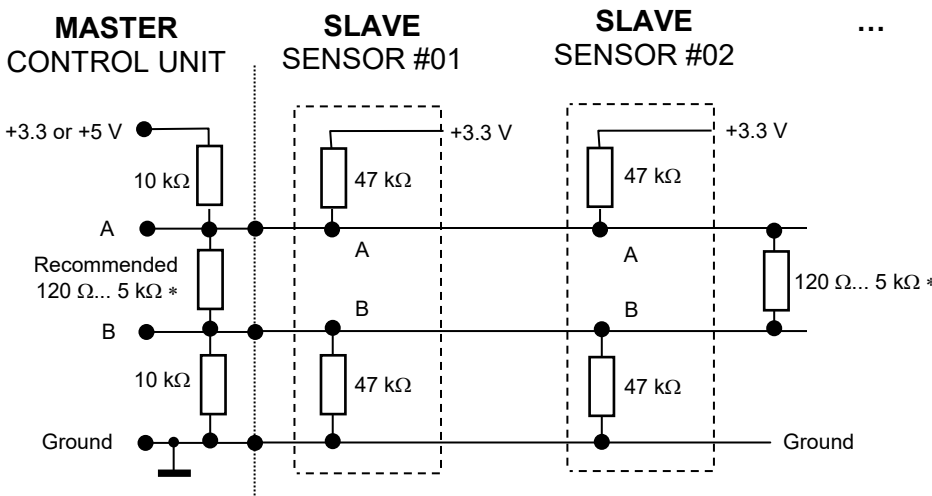
* of reading

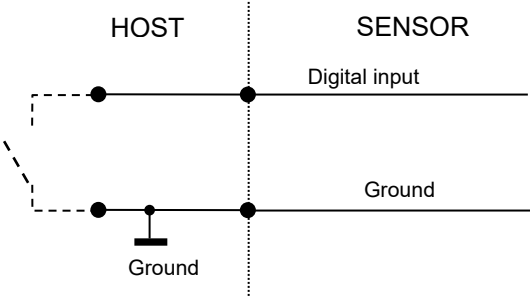
Technical data

SONOFLOW® CO.55/xxx(H) V2.0

Flow Sensor for Non-Invasive Flow Measurement

Measuring method	Ultrasound, two sections of measurements, dry coupling, no couplant required		
Mounting	Fixed installation: 4 fixing holes	CO.55/xxx V2.0 CO.55/xxxH V2.0	M4, 8 mm deep M5, 10 mm deep
Sensor materials	Measuring channel: PMMA black Housing: aluminium, anodized grey/red (optional: stainless steel, plastics)		
Operating voltage	12 ... 30 VDC, maximum ripple 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 61076-2-101:2012		
Shielding	Required: via cable / housing (mounting screws)		
Electrical Connection	M12 connecting cable		
Assignment			
	Pin	Color	Connection
	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	
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 		

<p>Current output for flow rate</p>	<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>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>

RS-485 bus operation	<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>
Switching output	<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</p> <p>Voltage resistant up to 30 V</p> 
Ambient- / Media temperature	<p>0 ... 60 °C, other temperatures available on request</p>
Storage temperature	<p>-20 ... +70 °C</p>
Degree of protection	<p>IP65</p>
Directives and standards	<ul style="list-style-type: none"> • EMC 2014/30/EU • RoHS 2011/65/EU, exception: III 7cl/ IV 15; RoHS 2015/863 • Acoustic emission: IEC 61157
Maintenance	<p>Maintenance-free</p>
Scope of supply	<ul style="list-style-type: none"> • SONOFLOW CO.55/xxx(H) V2.0 according to specification • User documentation

Optional accessories	<ul style="list-style-type: none"> • 8-pin M12 sensor cable, length 2 m • Calibration protocol
	<p>C³ Software for testing parameter settings, 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 C³ Software and driver for Windows
	<p>SONOFLOW RD.10 Remote Display including connecting cable for</p> <ul style="list-style-type: none"> • Monitoring sensor performance (display e.g. current flow rate, volume or measuring state) • Zero calibration • Manual volume reset
	<p>EtherNet/IP Gateway programmed for SONOTEC</p> <ul style="list-style-type: none"> • Serial communication with an EtherNet/IP-based system (e.g. PLC) • Support of up to 12 sensors • Pre-configured parameters and commands (library with Modbus registers for time-saving installation)
	<p>Portable USB Data Converter Type 023 for</p> <ul style="list-style-type: none"> • Mobile operation of sensors via a standard USB power socket or power bank • Triggering of functions stored for the digital sensor input ('push button switch')

Technical drawings

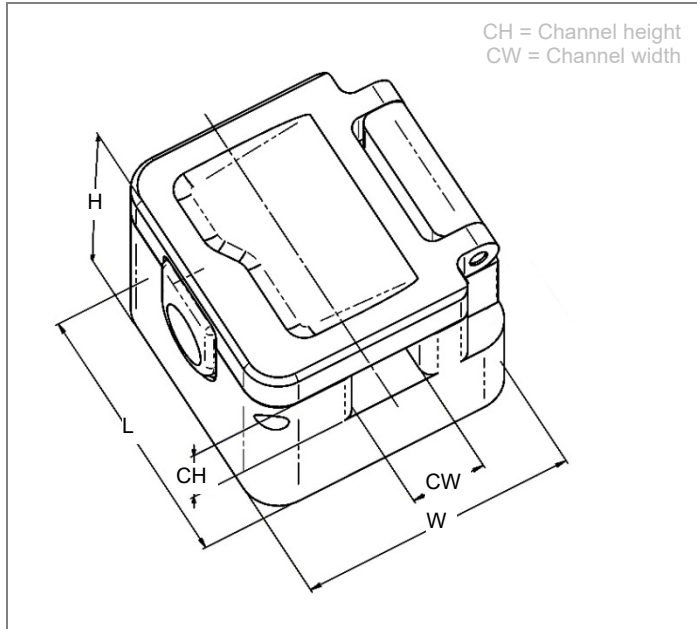


Figure 1: Dimensions SONOFLOW CO.55/xxx V2.0

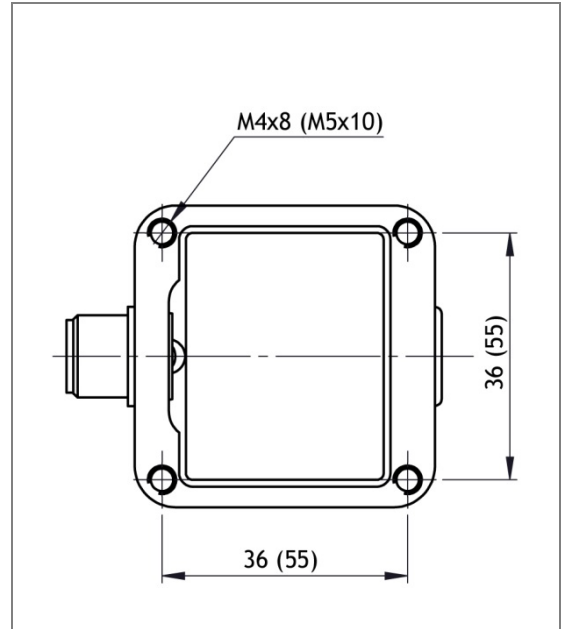
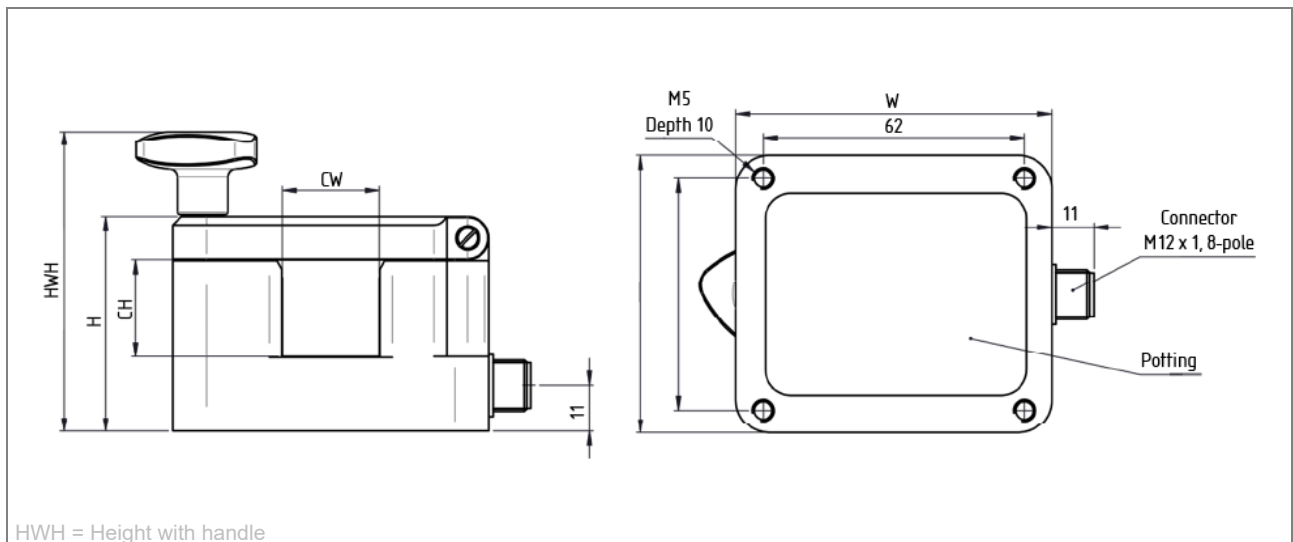


Figure 2: Rear side with drill holes for mounting (dimensional deviation SONOFLOW CO.55/190 V2.0)



HWH = Height with handle

Figure 3: Dimensions SONOFLOW CO.55/xxxH V2.0

Drawings are not to scale. Dimensions in mm, unless otherwise specified. Information is subject to change without notice! Modbus® is a registered trademark of Schneider Electric and is licensed by the Modbus Organization, Inc.

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