

Instruction manual

Vortex Flow-Sensor

VX 570



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I. Foreword



Read these operating instructions carefully and completely before installation, start-up and maintenance work. Follow the instructions to ensure safe operation and proper functioning.

The operating instructions must always be available at the place of use. It is not permitted to make only individual pages available.

Important notes for installation and maintenance personnel

Installation of the flow sensor is only permitted by trained skilled staff with knowledge and experience in compressed air and electrical engineering.

Electrical connection, commissioning and maintenance may only be carried out by qualified electricians in accordance with the electrotechnical regulations (DIN EN 50110-1, DIN EN 60204-1 etc.). Prerequisite: Professional training and knowledge of the technical standards, EU directives and EU regulations.

Observe applicable national accident prevention regulations and ordinances. Observe general occupational health and safety measures,

E.g. wear suitable and prescribed personal protective equipment (PPE). Repairs and adjustments may only be carried out by the manufacturer.

Duties of the installer and plant operator

The flow sensor must be checked and maintained regularly by an instructed and qualified person.

Cleaning and maintenance intervals are to be determined by the plant operator according to DIN-ISO certification - frequency depending on ambient conditions and expected impairments.

Calibration: As part of DIN ISO certification, have the flow sensor calibrated at regular intervals, after 2 years at the latest.

Remove the flow sensor for calibration and send it to CS Instruments GmbH & Co.KG.

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1 Scope of delivery

- Flow-Sensor VX 570
- Calibration certificate
- This instruction manual

2 Name plate

VX 570 Part number: 0697 0570 Serial number: 0421 0012 Supply / Versorgung: 18...36 VDC Gas: Air max. Pressure: 16 bar Thread/Gewinde: R 2" Diameter/Durchmesser: 53.1 mm T _{amb} : -20°C...70°C T _{medium} : -40°C...100°C Order-Code; A1B1C1D1E1F1G1H1	CS Instruments GmbH & Co.KG Gewerbehof 14 D-24955 Harrislee www.cs-instruments.com Signal / Bus: 4..20mA CH1: 12..1000 m³/h RS 485 (Modbus RTU)  
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3 Intended Use

The VX 570 flow sensor is used for continuous flow measurement, based on the measurement of the vortex shedding frequency, derived from the phenomenon of Karman's vortex street.


The VX 570 flow sensor is designed and constructed exclusively for the intended use described here and may only be used accordingly.


A check as to whether the device is suitable for the selected application must be carried out by the user. It must be ensured that the medium is compatible with the wetted parts. The technical data listed in the data sheet are binding.


Improper handling or operation outside the technical specifications is not permitted. Claims of any kind due to improper use are excluded


4 Safety instructions

4.1 In this manual warning and information symbols used

 This symbol is found at all work safety instructions in this operating manual where there is danger to life and limb of persons. Observance of these instructions and cautious behavior are particularly important in these cases. All work safety instructions must also be passed on to other users. In addition to the information in these operating instructions, the general safety and accident prevention regulations must also be observed.









 **Achtung** This symbol is located at the points in the operating instructions that require special attention in order to comply with the guidelines, regulations, instructions and the correct sequence of operations, as well as to prevent damage and destruction.

 This symbol indicates important information or measures for environmental protection.

 This symbol indicates particularly important information for operators.

4.2 Warnings

Warnings are subdivided according to the hazard levels **DANGER**, **WARNING** and **CAUTION**. Meaning of the warnings:

	<p>Danger Immediate danger!</p> <p> Failure to observe this warning may result in serious injury or death.</p>
	<p>WARNING Possibly dangerous situation!</p> <p> Failure to observe this warning may result in serious injury or death.</p>
	<p>Caution Possibly dangerous situation!</p> <p> Failure to observe this warning may result in moderate to minor injuries.</p>
	<p>Note Possibly dangerous situation!</p> <p> Failure to observe this warning may result in property damage.</p>

4.3 General safety instructions



Note

▶ Work on power-operated equipment may only be carried out by trained, instructed or by authorized personnel.



Note

▶ Without consultation and approval of CS Instruments GmbH & Co. KG the warranty claim is void in case of modification works which are not listed in this operating manual. This symbol is used at points in the operating instructions where special attention must be paid to ensure that the guidelines, regulations, instructions and the correct sequence of operations are observed and damage and destruction are prevented.

Risk of injury and accidents during operation outside the permissible ambient/operating conditions or operating temperatures due to excess pressure or faulty installation. Depending on the application, the pipeline pressure can be up to 40 bar / 580 psiG depending on the application.

Ensure that the flow sensor is only operated within the permissible limit values (→ type plate, specified max. PS pressure) and that the measuring range end values are taken into account.

Risk of injury due to unauthorized device modifications, incorrect installation or damaged components. The operating permit becomes invalid in these cases. **Operation is only permitted with original components.**

Only operate the flow sensor when it is completely assembled. Do not operate a damaged sensor and prevent further use until it has been repaired. The sensor must be checked and maintained regularly by instructed and qualified persons. Device modifications are not permitted and release the manufacturer from any warranty and liability.

Explosion risk in Ex-protected areas due to ignition of explosive substances when sparks are generated. The flow sensor does not have Ex approval! Do not use the flow sensor in Ex-protected areas.

4.4 Environmental protection

The flow sensor and also the packaging contain recyclable materials which must not be disposed of in the residual waste. Dispose of the packaging materials and the flow sensor in an environmentally friendly manner at the end of its service life in accordance with the regulations applicable in your country.

The used operating and auxiliary materials as well as replacement parts produced during operation of the flow sensor must be disposed of in accordance with the environmental protection regulations.

DE: Disposal code according to Waste Catalogue Ordinance (AVV) **16 02 14**, electrical and electronic devices and their components.

5 Product information

The VX 570 is a flow sensor with integrated pressure and temperature compensation for measurements of gas (air, mixed gases), steam (saturated or superheated steam) and liquids.

5.1 Product features

- Measurement of standard volume flow, operating volume flow and mass flow
- Integrated pressure- and temperature compensation
- Display with indication of flow, consumption, speed, pressure and temperature
- Units freely selectable m³/h, m³/min, l/min, l/s, kg/h, kg/min, kg/s, cfm
- Modbus RTU (RS485) interface
- 3x Analog output 4..20mA free assignable

5.2 Measuring ranges (under operating conditions)

Measuring ranges for Gas and liquids VX 570 under operating conditions										
Pipe Inner diameter			Gas				Liquids			
Inch	mm	DN	Min flow	Max flow	Min flow	Max flow	Min flow	Max flow	Min flow	Max flow
			m ³ /h	m ³ /h	cfm	cfm	m ³ /h	m ³ /h	GPM	GPM
1/2"	15	DN 15	3.8	44.5	2.2	26.2	0.2	4.4	0.8	19.6
3/4"	20	DN 20	6.8	79.1	4	46.6	0.3	7.9	1.5	34.8
1"	25	DN 25	7.1	123.6	4.2	72.7	0.5	12.4	2.3	54.4
1 1/4"	32	DN 32	11.6	202.5	6.8	119.2	0.9	20.2	3.8	89.2
1 1/2"	40	DN 40	9	316.4	5.3	186.2	1.4	31.6	6.0	139.3
2"	50	DN 50	14.1	494.4	8.3	291	2.1	49.4	9.3	217.7
2 1/2"	65	DN 65	23.9	835.5	14	491.7	3.6	83.5	15.8	367.8
3"	80	DN 80	36.2	1265.5	21.3	744.9	5.4	126.6	23.9	557.2
4"	100	DN 100	56.5	1977.4	33.3	1163.9	8.5	197.7	37.3	870.6
5"	125	DN 125	88.3	3089.7	52	1818.5	13.2	309.0	58.3	1360.4
6"	150	DN 150	127.1	4449.2	74.8	2618.7	19.1	444.9	84.0	1958.9
8"	200	DN 200	226	7909.6	133	4655.4	33.9	791.0	149.3	3482.5
10"	250	DN 250	353.1	12358.8	207.8	7274.1	53.0	1235.9	233.2	5441.4
12"	300	DN 300	508.5	17796.6	299.3	10474.7	76.3	1779.7	335.8	7835.6

Measuring range for steam VX 570 under operating conditions in kg/h										
Pipe Inner diameter			T=112 °C		T=121 °C		T=134 °C		T=144 °C	
			P=0.5 bar(g)		P=1 bar(g)		P=2 bar(g)		P=3 bar(g)	
			D=0.8798 kg/m3		D=1.155 kg/m3		D=1.672 kg/m3		D=2.185 kg/m3	
Inch	mm	DN	Min	Max	Min	Max	Min	Max	Min	Max
1/2"	15	DN 15	3.4	39.1	4.4	51.4	6.4	74.4	8.3	97.2
3/4"	20	DN 20	6.0	69.6	7.8	91.4	11.3	132.2	14.8	172.8
1"	25	DN 25	6.2	108.7	8.2	142.7	11.8	206.6	15.4	270.0
1 1/4"	32	DN 32	10.2	178.1	13.4	233.9	19.3	338.6	25.3	442.4
1 1/2"	40	DN 40	8.0	278.4	10.4	365.4	15.1	529.0	19.8	691.3
2"	50	DN 50	12.4	434.9	16.3	571.0	23.6	826.6	30.9	1080.2
2 1/2"	65	DN 65	21.0	735.0	27.6	964.9	39.9	1396.9	52.2	1825.5
3"	80	DN 80	31.8	1113.4	41.8	1461.7	60.5	2116.0	79.0	2765.2
4"	100	DN 100	49.7	1739.7	65.3	2283.9	94.5	3306.2	123.4	4320.6
5"	125	DN 125	77.7	2718.3	102.0	3568.6	147.6	5166.0	192.9	6751.0
6"	150	DN 150	111.8	3914.4	146.8	5138.8	212.5	7439.0	277.8	9721.4
8"	200	DN 200	198.8	6958.9	261.0	9135.6	377.9	13224.9	493.8	17282.5
10"	250	DN 250	310.7	10873.2	407.8	14274.4	590.4	20663.8	771.5	27003.9
12"	300	DN 300	447.4	15657.5	587.3	20555.1	850.2	29755.9	1111.0	38885.6

Measuring range for steam VX 570 under operating conditions in kg/h										
Pipe Inner diameter			T=159 °C		T=165 °C		T=171 °C		T=176 °C	
			P=5 bar(g)		P=6 bar(g)		P=7 bar(g)		P=8 bar(g)	
			D=3.182 kg/m3		D=3.671 kg/m3		D=4.218 kg/m3		D=4.723 kg/m3	
Inch	mm	DN	Min	Max	Min	Max	Min	Max	Min	Max
1/2"	15	DN 15	12.1	141.6	14.0	163.3	16.1	187.7	18.0	210.1
3/4"	20	DN 20	21.6	251.7	24.9	290.4	28.6	333.6	32.0	373.6
1"	25	DN 25	22.5	393.3	25.9	453.7	29.8	521.3	33.4	583.7
1 1/4"	32	DN 32	36.8	644.3	42.5	743.3	48.8	854.1	54.6	956.3
1 1/2"	40	DN 40	28.8	1006.7	33.2	1161.4	38.1	1334.5	42.7	1494.3
2"	50	DN 50	44.9	1573.0	51.9	1814.8	59.6	2085.2	66.7	2334.8
2 1/2"	65	DN 65	76.0	2658.4	87.6	3066.9	100.7	3523.9	112.7	3945.8
3"	80	DN 80	115.1	4026.9	132.7	4645.8	152.5	5338.0	170.8	5977.1
4"	100	DN 100	179.8	6292.1	207.4	7259.0	238.3	8340.7	266.8	9339.3
5"	125	DN 125	280.9	9831.4	324.1	11342.2	372.4	13032.3	416.9	14592.6
6"	150	DN 150	404.5	14157.2	466.7	16332.8	536.2	18766.5	600.4	21013.3
8"	200	DN 200	719.1	25168.4	829.6	29036.2	953.2	33362.7	1067.3	37357.1
10"	250	DN 250	1123.6	39325.6	1296.3	45369.0	1489.4	52129.2	1667.7	58370.4
12"	300	DN 300	1618.0	56628.8	1866.6	65331.4	2144.7	75066.1	2401.5	84053.4

Measuring range for steam VX 570 under operating conditions in kg/h										
Pipe Inner diameter			T=185 °C		T=192 °C		T=199 °C		T=210 °C	
			P=10 bar(g)		P=12 bar(g)		P=14 bar(g)		P=18 bar(g)	
			D=5.752 kg/m3		D=6.671 kg/m3		D=7.706 kg/m3		D=9.593 kg/m3	
Inch	mm	DN	Min	Max	Min	Max	Min	Max	Min	Max
1/2"	15	DN 15	21.9	255.9	25.4	296.8	29.4	342.9	36.6	426.8
3/4"	20	DN 20	39.0	455.0	45.2	527.6	52.2	609.5	65.0	758.8
1"	25	DN 25	40.6	710.9	47.1	824.5	54.4	952.4	67.7	1185.6
1 1/4"	32	DN 32	66.6	1164.7	77.2	1350.8	89.2	1560.4	111.0	1942.4
1 1/2"	40	DN 40	52.0	1819.8	60.3	2110.6	69.7	2438.1	86.7	3035.1
2"	50	DN 50	81.2	2843.5	94.2	3297.8	108.8	3809.5	135.5	4742.3
2 1/2"	65	DN 65	137.3	4805.5	159.2	5573.3	183.9	6438.0	229.0	8014.5
3"	80	DN 80	208.0	7279.4	241.2	8442.4	278.6	9752.2	346.9	12140.3
4"	100	DN 100	325.0	11374.0	376.9	13191.2	435.4	15237.9	542.0	18969.2
5"	125	DN 125	507.8	17771.9	588.9	20611.3	680.3	23809.1	846.8	29639.4
6"	150	DN 150	731.2	25591.5	848.0	29680.3	979.6	34285.2	1219.4	42680.7
8"	200	DN 200	1299.9	45496.0	1507.6	52765.0	1741.5	60951.4	2167.9	75876.8
10"	250	DN 250	2031.1	71087.6	2355.6	82445.3	2721.0	95236.6	3387.4	118557.6
12"	300	DN 300	2924.7	102366.1	3392.0	118721.2	3918.3	137140.7	4877.8	170722.9

Measuring range for steam VX 570 under operating conditions in kg/h										
Pipe Inner diameter			T=215 °C		T=233.6 °F		T=249.8 °F		T=273.2 °F	
			P=20 bar(g)		P=7.3 psi(g)		P=14.5 psi(g)		P=29 psi(g)	
			D=10.57 kg/m3		D=0.0034 lb/ft3		D=0.0721 lb/ft3		D=0.1044 lb/ft3	
Inch	mm	Min	Max	Min	Max	Min	Max	Min	Max	
1/2"	15	DN 15	40.3	470.3	7.4	86.3	9.7	113.3	14.1	164.0
3/4"	20	DN 20	71.7	836.0	13.2	153.4	17.3	201.4	25.0	291.6
1"	25	DN 25	74.6	1306.3	13.7	239.7	18.0	314.7	26.0	455.6
1 1/4"	32	DN 32	122.3	2140.3	22.4	392.7	29.5	515.6	42.7	746.4
1 1/2"	40	DN 40	95.5	3344.2	17.5	613.7	23.0	805.6	33.3	1166.2
2"	50	DN 50	149.3	5225.3	27.4	958.9	36.0	1258.8	52.1	1822.2
2 1/2"	65	DN 65	252.3	8830.7	46.3	1620.5	60.8	2127.3	88.0	3079.6
3"	80	DN 80	382.2	13376.7	70.1	2454.7	92.1	3222.5	133.3	4664.9
4"	100	DN 100	597.2	20901.1	109.6	3835.4	143.9	5035.1	208.3	7289.0
5"	125	DN 125	933.1	32658.0	171.2	5992.8	224.8	7867.4	325.4	11389.0
6"	150	DN 150	1343.6	47027.5	246.6	8629.7	323.7	11329.1	468.6	16400.2
8"	200	DN 200	2388.7	83604.5	438.3	15341.7	575.4	20140.5	833.0	29155.8
10"	250	DN 250	3732.3	130632.1	684.9	23971.4	899.1	31469.6	1301.6	45556.0
12"	300	DN 300	5374.6	188110.2	986.3	34518.8	1294.7	45316.2	1874.3	65600.6

Measuring range for steam VX 570 under operating conditions in kg/h										
Pipe Inner diameter			T=291.2 °F		T=318.2 °F		T=329 °F		T=339.8 °F	
			P=43.5 psi(g)		P=72.5 psi(g)		P=87 psi(g)		P=101.5 psi(g)	
			D=0.1364 lb/ft3		D=0.1986 lb/ft3		D=0.2292 lb/ft3		D=0.2633 lb/ft3	
Inch	mm	Min	Max	Min	Min	Max	Min	Max	Min	Max
1/2"	15	DN 15	18.4	214.3	26.8	312.1	30.9	360.1	35.5	413.7
3/4"	20	DN 20	32.7	381.0	47.6	554.9	54.9	640.1	63.0	735.5
1"	25	DN 25	34.0	595.3	49.5	867.0	57.2	1000.2	65.7	1149.3
1 1/4"	32	DN 32	55.7	975.4	81.2	1420.5	93.6	1638.8	107.6	1882.9
1 1/2"	40	DN 40	43.5	1524.1	63.4	2219.5	73.2	2560.6	84.1	2942.1
2"	50	DN 50	68.0	2381.3	99.1	3467.9	114.3	4000.9	131.3	4597.0
2 1/2"	65	DN 65	115.0	4024.5	167.5	5860.8	193.2	6761.5	222.0	7768.9
3"	80	DN 80	174.2	6096.2	253.7	8877.9	292.6	10242.2	336.2	11768.4
4"	100	DN 100	272.2	9525.3	396.3	13871.7	457.2	16003.4	525.4	18388.0
5"	125	DN 125	425.2	14883.3	619.3	21674.5	714.4	25005.4	820.9	28731.3
6"	150	DN 150	612.3	21432.0	891.8	31211.3	1028.8	36007.7	1182.1	41373.1
8"	200	DN 200	1088.6	38101.4	1585.3	55486.7	1829.0	64013.8	2101.5	73552.2
10"	250	DN 250	1701.0	59533.4	2477.1	86698.0	2857.8	100021.5	3283.6	114925.3
12"	300	DN 300	2449.4	85728.1	3567.0	124845.2	4115.2	144031.0	4728.4	165492.4

Measuring range for steam VX 570 under operating conditions in kg/h										
Pipe Inner diameter			T=348.8 °F		T=365 °F		T=377.6 °F		T=390.2 °F	
			P=116 psi(g)		P=145 psi(g)		P=174 psi(g)		P=203 psi(g)	
			D=0.2948 lb/ft3		D=0.3591 lb/ft3		D=0.4165 lb/ft3		D=0.4811 lb/ft3	
Inch	mm	Min	Max	Min	Min	Max	Min	Max	Min	Max
1/2"	15	DN 15	39.7	463.3	48.4	564.2	56.1	654.3	64.8	755.9
3/4"	20	DN 20	70.6	823.6	86.0	1003.0	99.7	1163.3	115.2	1343.7
1"	25	DN 25	73.5	1286.8	89.6	1567.2	103.9	1817.6	120.0	2099.6
1 1/4"	32	DN 32	120.5	2108.4	146.7	2567.7	170.2	2978.0	196.6	3440.0
1 1/2"	40	DN 40	94.1	3294.3	114.6	4012.1	132.9	4653.1	153.6	5375.0
2"	50	DN 50	147.1	5147.4	179.1	6268.9	207.7	7270.4	240.0	8398.4
2 1/2"	65	DN 65	248.5	8699.1	302.7	10594.4	351.1	12287.0	405.5	14193.3
3"	80	DN 80	376.5	13177.3	458.5	16048.3	531.8	18612.3	614.3	21500.0
4"	100	DN 100	588.3	20589.6	716.4	25075.4	830.9	29081.7	959.8	33593.7
5"	125	DN 125	919.2	32171.2	1119.4	39180.3	1298.3	45440.2	1499.7	52490.2
6"	150	DN 150	1323.6	46326.5	1612.0	56419.7	1869.5	65433.9	2159.6	75585.9
8"	200	DN 200	2353.1	82358.2	2865.8	100301.6	3323.6	116326.8	3839.3	134374.9
10"	250	DN 250	3676.7	128684.7	4477.8	156721.3	5193.2	181760.7	5998.9	209960.7
12"	300	DN 300	5294.5	185306.0	6448.0	225678.6	7478.2	261735.4	8638.4	302343.4

Measuring range for steam VX 570 under operating conditions in kg/h						
Pipe Inner diameter			T=410 °F		T=419 °F	
			P=261 psi(g)		P=290 psi(g)	
			D=0.5989 lb/ft3		D=0.6599 lb/ft3	
Inch	mm	Min	Max	Min	Max	Max
1/2"	15	DN 15	80.7	940.9	88.9	1036.8
3/4"	20	DN 20	143.4	1672.8	158.0	1843.2
1"	25	DN 25	149.4	2613.7	164.6	2879.9
1 1/4"	32	DN 32	244.7	4282.4	269.6	4718.5
1 1/2"	40	DN 40	191.2	6691.2	210.6	7372.7
2"	50	DN 50	298.7	10455.0	329.1	11519.8
2 1/2"	65	DN 65	504.8	17668.9	556.2	19468.4
3"	80	DN 80	764.7	26764.8	842.6	29490.6
4"	100	DN 100	1194.9	41819.9	1316.5	46079.1
5"	125	DN 125	1867.0	65343.7	2057.1	71998.6
6"	150	DN 150	2688.4	94094.9	2962.2	103678.0
8"	200	DN 200	4779.4	167279.8	5266.2	184316.4
10"	250	DN 250	7467.8	261374.7	8228.4	287994.4
12"	300	DN 300	10753.7	376379.5	11848.9	414711.9

6 Technical data

6.1 Technical data and environmental conditions

Measurement values	Flow rate, total consumption, pressure, temperature, velocity
Measuring medium	Primarily single-phase gases, mixed gases, saturated steam, superheated steam and liquids
Sensor technology	Vortex frequency measurement
Measuring range	See chapter 5.2 (measuring ranges)
Accuracy Volume flow m ³ /h	Gas / Steam ±1 % f.m. (Re > 20000) ** ±2 % f.m. (10000 < Re < 20000) ** Liquid ±0,75 % f.m. (Re > 20000) ** ±2 % f.m. (10000 < Re < 20000) **
Accuracy Mass flow (kg/h) Standard volume flow Nm ³ /h	Gas / Steam ±1,5 % f.m. (Re > 20000) ** ±2,5 % f.m. (10000 < Re < 20000) **
Media temperature	-40 ... 350 °C
Ambient temperature	-20 ... 60 °C
Storage temperature	-40 ... 80 °C
Process pressure	Up to 40 bar (63bar on request)
Power supply	18 to 36 VDC via SELV supply, 5 W
Signal output	Modbus-RTU (RS-485) 3x 4...20 mA (flow, pressure, temperature or velocity) Option: Ethernet
Measuring span	Gas: 1:30 Steam: 1:35 Liquid: 1:23
Viscosity	DN15 ≤ 4mPas DN25 ≤ 5 mPas DN40..DN300 ≤ 7mPas
Protection class	IP 67
Process connection	Flange DIN EN1092-1 Flange ANSI Intermediate flange(wafer)

** f.m. = of measured value | f.e. = of final value

7 Installation

7.1 General notes for the Installation



Information!

Check the packaging carefully for damage. In case of damage, please contact the carrier or CS Instruments GmbH & Co.KG.



Information!

Check the completeness of the delivery.

7.2 Storage

- Store the sensor in a dry and dust-free place
- Store the sensor in the original packaging
- The permissible storage temperatures are -40°C ... 80°C

7.3 Transport



Attention!

- There is a risk of injury from unsecured devices.
During transport, prevent the device from slipping or turning unintentionally.
- Do not use transport chains, as these will damage the housing.
- The unit must not be lifted by the housing head for transport.
- For transport, use carrying straps which you place around both process connections.

7.4 Pipe/tube requirements

- Correctly sized gaskets
- Correct aligned flanges and gaskets
- Diameter mismatch at the pipe junctions should be avoided but must be less than 1mm. For further information see ISO 14511
- Ensure clean pipes after installation

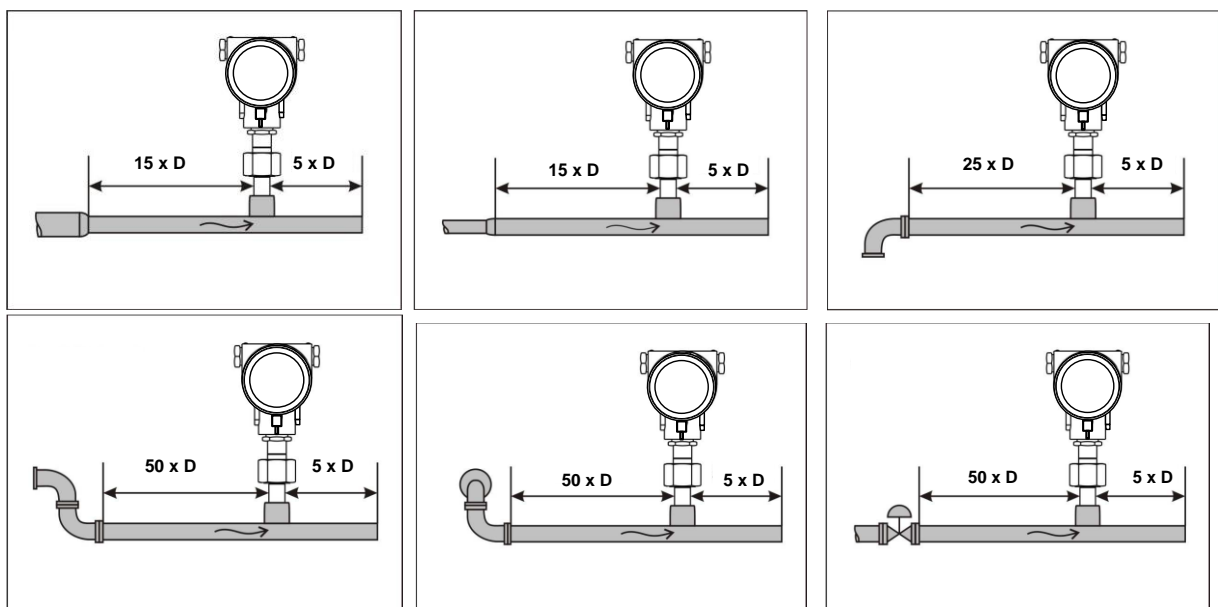
7.5 Inlet / Outlet runs

In order to maintain the accuracy stipulated in the data sheets, the sensor must be inserted in the center of a straight pipe section with an undisturbed flow progression.

An undisturbed flow progression is achieved if the sections in front of the sensor (inlet) and behind the sensor (outlet) are sufficiently long, straight and without any obstructions such as edges, seams, curves etc.

Therefore, it is necessary to ensure the recommended inlet and outlet runs.

Flow obstruction before the measurement section	Min length Inlet run (L1))	Min length Outlet run (L2))
Slight curve (elbow < 90°)	15 x D	5 x D
Reduction (Pipe narrows to the measurement section)	15 x D	5 x D
Expansion (Pipe expands to the measurement section)	15 x D	5 x D
90° elbow or T-piece	25 x D	5 x D
2x elbow á 90° in einer Ebene	50 x D	5 x D
2x elbow á 90° 3-dimensional	50 x D	5 x D
Control valve	50 x D	5 x D



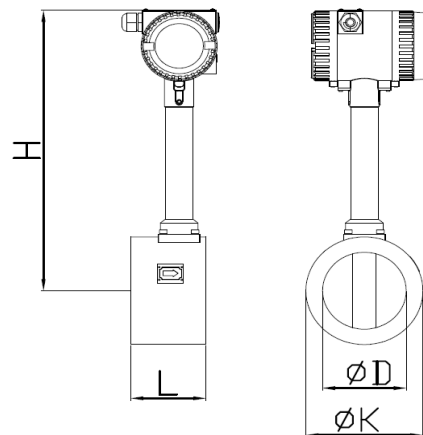
The values represent the min. lengths. In case the min. inlet / outlet runs could not be ensured, it must be expected to get increased or significant deviations of the measurement values.

8 Commissioning

- Depressurize the system
- Ensure correct direction of flow during installation
- Maintain an undisturbed flow course while observing the required calming distances in the measuring range, see section 7.5

9 Dimension

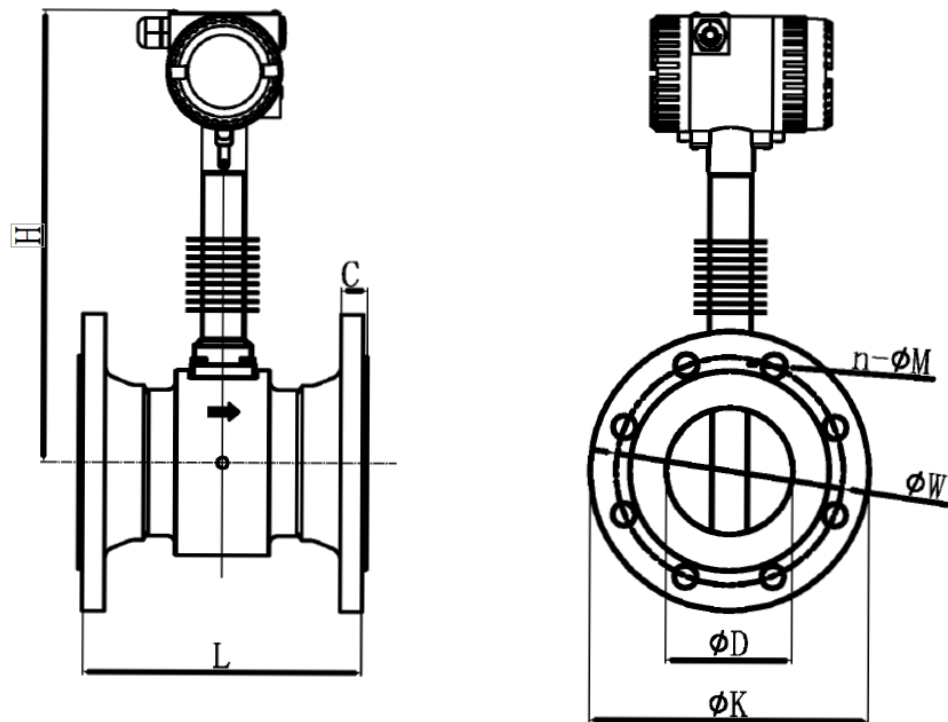
9.1 Intermediate (wafer) version



Intermediate (wafer) Version

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Height H		
				150°C	250°C	350°C
15	15	75	65	294	335	475
20	20	75	65	294	335	475
25	25	75	65	289	330	470
32	32	80	65	293	334	474
40	40	84	65	296	337	477
50	50	94	65	301	342	482
65	65	105	65	309	350	490
80	80	120	65	316	357	497
100	100	140	90	327	368	508
125	125	165	65	341	382	522
150	150	190	65	353	534	534
200	200	240	85	378	559	559
250	250	290	100	404	585	585
300	300	340	120	429	609	609

9.2 Flange version (without temperature- / pressure-sensor)



Flange-Version

9.2.1 PN 16

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	165	65	16	14	4	294	335	475
20	20	105	170	75	18	14	4	294	335	475
25	25	115	170	85	18	14	4	294	335	475
32	32	140	175	100	18	18	4	294	335	475
40	40	150	180	110	18	18	4	296	337	477
50	50	165	180	125	18	18	4	301	342	482
65	65	185	180	145	18	18	8	309	350	490
80	80	200	200	160	20	18	8	316	357	497
100	100	220	215	180	20	18	8	327	368	508
125	125	250	245	210	22	18	8	341	382	522
150	150	285	270	240	22	22	8	353	534	534
200	200	340	345	295	24	22	12	378	559	559
250	250	405	410	355	26	26	12	404	585	585
300	300	460	475	410	28	26	12	429	610	610

9.2.2 PN 25

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	165	65	16	14	4	294	335	475
20	20	105	170	75	18	14	4	294	335	475
25	25	115	170	85	18	14	4	294	335	475
32	32	140	175	100	18	18	4	294	335	475
40	40	150	180	110	18	18	4	296	337	477
50	50	165	185	125	20	18	4	301	342	482
65	65	185	195	145	22	18	8	309	350	490
80	80	200	215	160	24	18	8	316	357	497
100	100	235	240	190	24	22	8	327	368	508
125	125	270	270	220	26	26	8	341	382	522
150	150	300	310	250	28	26	8	353	534	534
200	200	360	380	310	30	26	12	378	559	559
250	250	425	445	370	32	30	12	404	585	585
300	300	485	505	430	34	30	16	429	610	610

9.2.3 PN 40

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	165	65	16	14	4	294	335	475
20	20	105	170	75	18	14	4	294	335	475
25	25	115	170	85	18	14	4	294	335	475
32	32	140	175	100	18	18	4	294	335	475
40	40	150	180	110	18	18	4	296	337	477
50	50	165	185	125	20	18	4	301	342	482
65	65	185	195	145	22	18	8	309	350	490
80	80	200	215	160	24	18	8	316	357	497
100	100	235	240	190	24	22	8	327	368	508
125	125	270	270	220	26	26	8	341	382	522
150	150	300	310	250	28	26	8	353	534	534
200	200	375	395	320	34	30	12	378	559	559
250	250	450	480	385	38	33	12	404	585	585
300	300	515	550	450	42	33	16	429	610	610

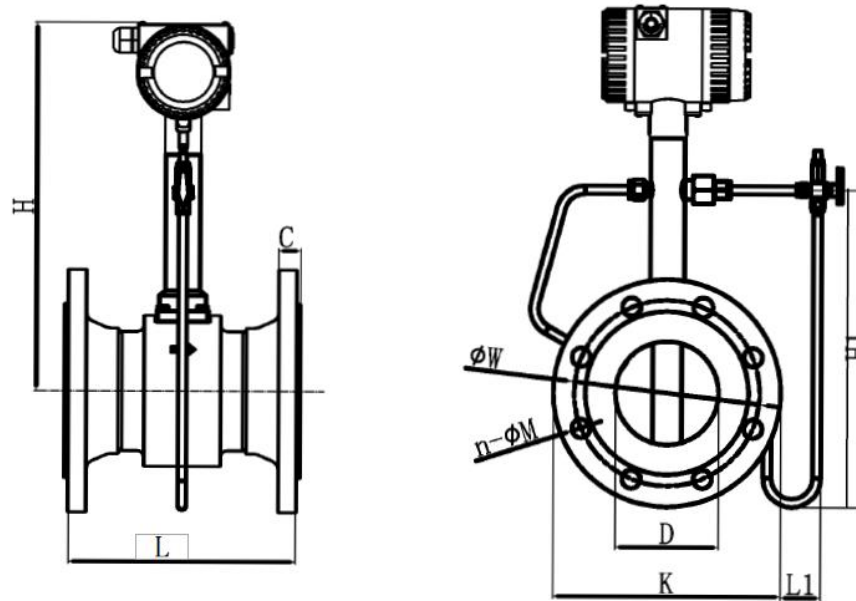
9.2.4 ANSI Class150

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	90	180	60.3	11.6	15.9	4	294	335	475
20	20	100	180	69.9	13.2	15.9	4	294	335	475
25	25	110	180	79.4	14.7	15.9	4	294	335	475
32	32	117.3	180	88.9	16.3	15.9	4	294	335	475
40	40	127	180	98.4	17.9	15.9	4	296	337	477
50	50	152.4	180	120.7	19.5	19	4	301	342	482
65	65	180	200	139.7	22.7	19	4	309	350	490
80	80	190.5	200	152.4	24.3	19	4	316	357	497
100	100	230	200	190.5	24.3	19	8	327	368	508
125	125	255	220	215.9	24.3	22.2	8	341	382	522
150	150	280	220	241.3	25.9	22.2	8	353	534	534
200	200	345	220	298.5	29	22.2	8	378	559	559
250	250	406.4	250	362	30.6	25.4	12	404	585	585
300	300	485	300	431.8	32.2	25.4	12	429	610	610

9.2.5 ANSI Class300

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95.2	180	66.7	14.7	15.9	4	294	335	475
20	20	117.5	180	82.6	16.3	19	4	294	335	475
25	25	125	180	88.9	17.9	19	4	294	335	475
32	32	135	180	98.4	19.5	19	4	294	335	475
40	40	156	180	114.3	21.1	22.2	4	296	337	477
50	50	165.1	180	127	22.7	19	8	301	342	482
65	65	191	200	149.2	25.9	25.9	8	309	350	490
80	80	210	200	168.3	29	29	8	316	357	497
100	100	255	200	200	32.2	32.2	8	327	368	508
125	125	280	220	235	35.4	35.4	8	341	382	522
150	150	320	220	269.9	37	37	12	353	534	534
200	200	381	220	330.2	41.7	41.7	12	378	559	559
250	250	445	250	387.4	48.1	48.1	16	404	585	585
300	300	521	300	450.8	51.3	51.3	16	429	610	610

9.3 Flange Version with temperature- / pressure-sensor



Flange-Version

9.3.1 PN 16

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	165	65	16	14	4	76	294	335
20	20	105	170	75	18	14	4	294	335	475
25	25	115	170	85	18	14	4	294	335	475
32	32	140	175	100	18	18	4	294	335	475
40	40	150	180	110	18	18	4	296	337	477
50	50	165	180	125	18	18	4	301	342	482
65	65	185	180	145	18	18	8	309	350	490
80	80	200	200	160	20	18	8	316	357	497
100	100	220	215	180	20	18	8	327	368	508
125	125	250	245	210	22	18	8	341	382	522
150	150	285	270	240	22	22	8	353	534	534
200	200	340	345	295	24	22	12	378	559	559
250	250	405	410	355	26	26	12	404	585	585
300	300	460	475	410	28	26	12	429	610	610

9.3.2 PN 25

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	165	65	16	14	4	294	335	475
20	20	105	170	75	18	14	4	294	335	475
25	25	115	170	85	18	14	4	294	335	475
32	32	140	175	100	18	18	4	294	335	475
40	40	150	180	110	18	18	4	296	337	477
50	50	165	185	125	20	18	4	301	342	482
65	65	185	195	145	22	18	8	309	350	490
80	80	200	215	160	24	18	8	316	357	497
100	100	220	240	190	24	22	8	327	368	508
125	125	250	270	220	26	26	8	341	382	522
150	150	285	310	250	28	26	8	353	534	534
200	200	340	380	310	30	26	12	378	559	559
250	250	405	445	370	32	30	12	404	585	585
300	300	460	505	430	34	30	16	429	610	610

9.3.3 PN 40

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	165	65	16	14	4	294	335	475
20	20	105	170	75	18	14	4	294	335	475
25	25	115	170	85	18	14	4	294	335	475
32	32	140	175	100	18	18	4	294	335	475
40	40	150	180	110	18	18	4	296	337	477
50	50	165	185	125	20	18	4	301	342	482
65	65	185	195	145	22	18	8	309	350	490
80	80	200	215	160	24	18	8	316	357	497
100	100	220	240	190	24	22	8	327	368	508
125	125	250	270	220	26	26	8	341	382	522
150	150	285	310	250	28	26	8	353	534	534
200	200	340	395	320	34	30	12	378	559	559
250	250	405	480	385	38	33	12	404	585	585
300	300	460	550	450	42	33	16	429	610	610

9.3.4 ANSI Class150

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95.2	180	60.3	11.6	15.9	4	294	335	475
20	20	117.5	180	69.9	13.2	15.9	4	294	335	475
25	25	125	180	79.4	14.7	15.9	4	294	335	475
32	32	135	180	88.9	16.3	15.9	4	294	335	475
40	40	156	180	98.4	17.9	15.9	4	296	337	477
50	50	165.1	180	120.7	19.5	19	4	301	342	482
65	65	191	200	139.7	22.7	19	4	309	350	490
80	80	210	200	152.4	24.3	19	4	316	357	497
100	100	255	200	190.5	24.3	19	8	327	368	508
125	125	280	220	215.9	24.3	22.2	8	341	382	522
150	150	320	220	241.3	25.9	22.2	8	353	534	534
200	200	381	222	298.5	29	22.2	8	378	559	559
250	250	445	250	362	30.6	25.4	12	404	585	585
300	300	521	300	431.8	32.2	25.4	12	429	610	610

9.3.5 ANSI Class300

Pipe [DN]	ØD [mm]	ØK [mm]	L [mm]	Flange- Dimension [mm]				Height H [mm]		
				ØW	C	ØM	Qty [n]	150°C	250°C	350°C
15	15	95	180	66.7	14.7	15.9	4	294	335	475
20	20	100	180	82.6	16.3	19	4	294	335	475
25	25	125	180	88.9	17.9	19	4	294	335	475
32	32	135	180	98.4	19.5	19	4	294	335	475
40	40	140	180	114.3	21.1	22.2	4	296	337	477
50	50	155	180	127	22.7	19	8	301	342	482
65	65	175	200	149.2	25.9	25.9	8	309	350	490
80	80	185	200	168.3	29	29	8	316	357	497
100	100	210	200	200	32.2	32.2	8	327	368	508
125	125	250	220	235	35.4	35.4	8	341	382	522
150	150	280	220	269.9	37	37	12	353	534	534
200	200	330	220	330.2	41.7	41.7	12	378	559	559
250	250	400	250	387.4	48.1	48.1	16	404	585	585
300	300	445	300	450.8	51.3	51.3	16	429	610	610

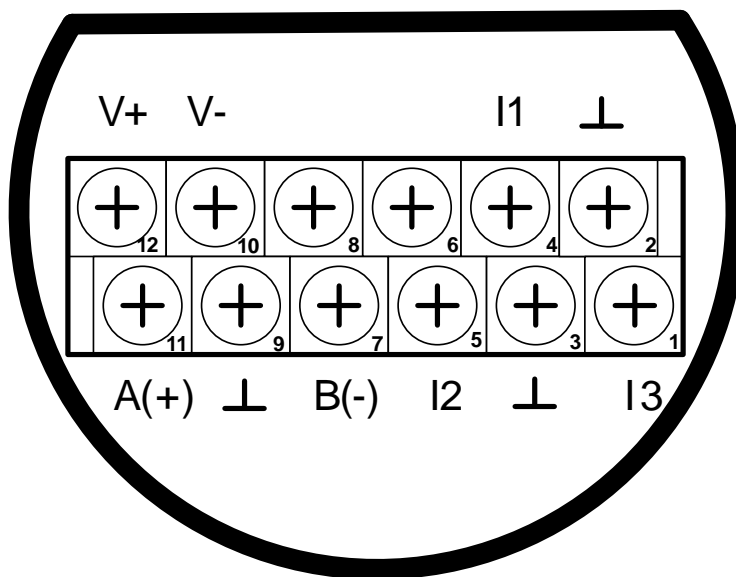
10 Electrical wiring

10.1 Cable glands – clamping range

For ensuring the tightness and strain relief, connector cables with the following diameters must be used.

VX 570 Standard clamping range : Ø 5- 9mm

10.2 Connector pin assignment



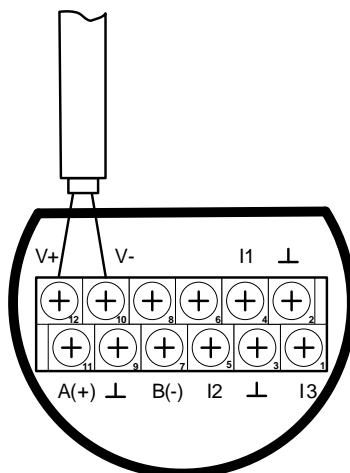
Pin	Signal Description
1	I3+ Aktive
2	GND
3	GND
4	I1+ Aktive
5	I2+ Aktive
6	Not used
7	Modbus B (-)
8	Not used
9	GND
10	VB - (negative power supply GND)
11	Modbus A (+)
12	VB+ (positive power supply)

10.3 Wiring

10.3.1 General

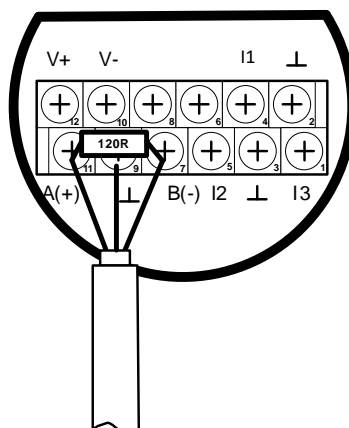
- Wiring to be done in strain less state only.
- Length of cable skinning to be minimized
- Not used cable entries must be closed with end caps
- Use of cables with cross section of $\geq 0.25\text{mm}^2$

10.3.2 Power supply



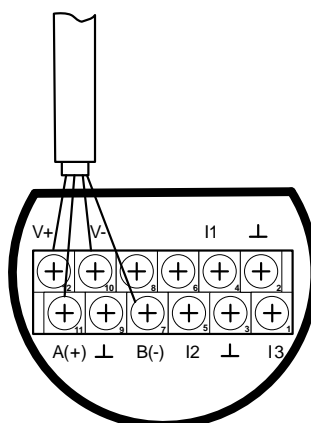
10.3.3 Modbus RTU:

If the sensor placed at the end of the Modbus system a termination is required. Therefore, the enclosed 120R resistor is to be connected at Pin 7 and Pin11.



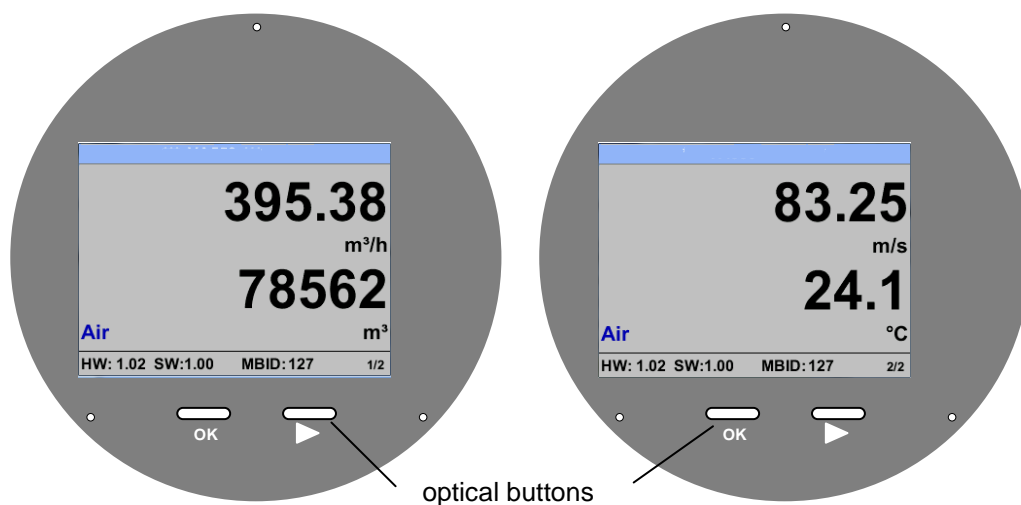
10.3.4 Service Software Interface

- V+ braun/ brown
- V- blau / blue
- Modbus A (+) weiß/white
- Modbus B(-) schwarz / black



11 Operation

The operation of the VX 570 is carried out by 2 optical keys through the glass cover. Thus, the VX 570 can be operated from the outside without opening the cap.



Selection of the individual menu items is done by pressing the ">" and confirm by pressing "OK".

Inputs or changes can be made with all white deposit fields, selected filed will be highlighted with yellow background.

Words in **green font** refer mainly to the pictures in the section of the chapter, but also on important menu paths or menu items that are related to are in **green font**.

The menu navigation is generally in a **green font**!

The table of contents and chapter references in **blue font** contain links to the respective chapter title.

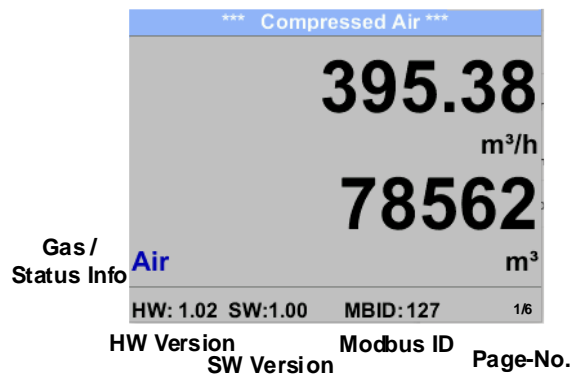
11.1 Main menu (Home)

11.1.1 Initialization

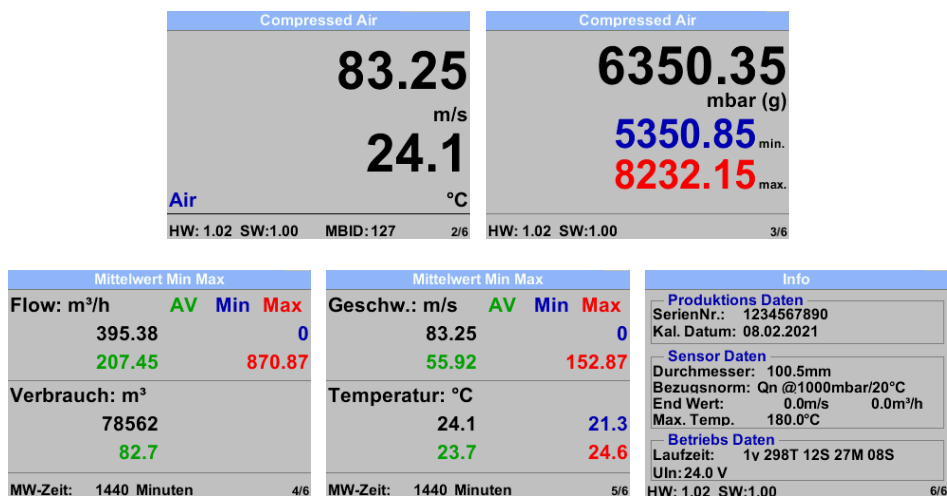


After switching on the VX 570 the initialization takes place, see right followed the main menu.

11.2 Value screens (after switching on)



Switching to pages 2-6 or back by pressing key „>“



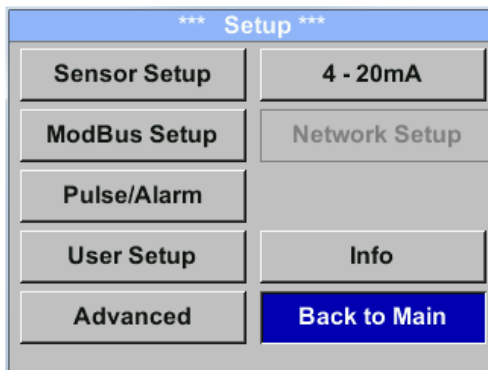
AV-Time (Period for average value calculation) could be changed under *Sensor Setup-Advanced- AV-Time*.

11.3 Settings

The settings menu could accessed by pressing the key „OK“.
 But the access to the *settings menu* is password protected.



Factory settings for password at the time of delivery: 0000 (4 times zero).
 If required the password could be changed at *Setup–User setup-Password*.



Selection of a menu item or to change a value is done with the key „>“, a final move to the chosen menu item or takeover of the value change needs the confirmation by pressing the key „OK“

11.3.1 Sensor Setup

Setup → Sensor Setup

The screenshot shows a menu titled "Sensor Setup" with the following items:

Diameter	53.1 mm
Total Counter	0.00m ³
ZP Adjust	----
Units	
Ext. Setup	Back

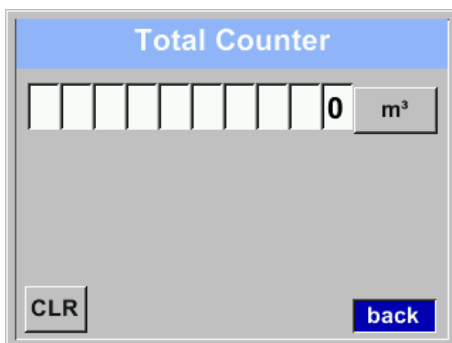
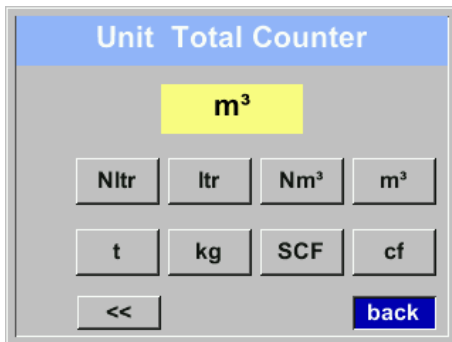
For changes, first select the menu item with key „>“ and then confirm it with “OK“.

11.3.1.1 Input / change tube diameter

With VX 570 not changeable(locked) because adjusted to the integrated measuring section.

11.3.1.2 Input / change consumption counter

Setup → Sensor Setup → Total Counter → Unit button



In order to change, e.g. the unit, first select by pressing key „>“ the button **“Unit”** and then key **“OK”**.

Select with the key „>“ the correct unit and then confirm selection by pressing 2x **„OK”**.

Entering / changing the consumption counter via button „>“, select the respective position and activate the position with the **“OK”** button. By pressing „>“ the position value is incremented by 1. Complete with **“OK”** and activate next number position.

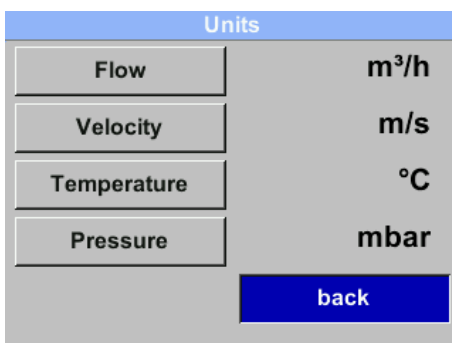
Confirm entry by pressing **„OK”**.

Important!

When the counter reach 10000000 m³ the counter will be reset to zero.

11.3.1.3 Definition of the units for flow, velocity, temperature and pressure

Setup → Sensor Setup → Units



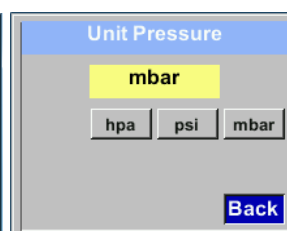
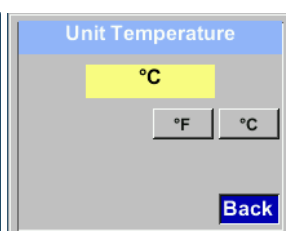
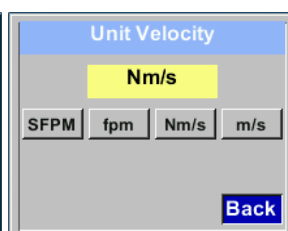
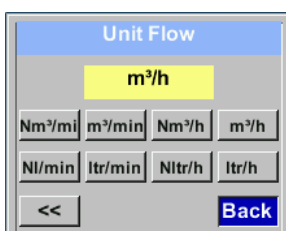
To make changes to the unit for the respective measurement value, first select by pressing „>“ the field of the „measurement value“ and activate „it with **„OK”** .

Selection of the new unit with „>“

In case the quantity of units selectable are not presentable on one page, pleas move to next page by pressing **„<<”**.

Confirm selection by pressing 2x **„OK”**.

Procedure for all 4 measurement-variables is analogous.

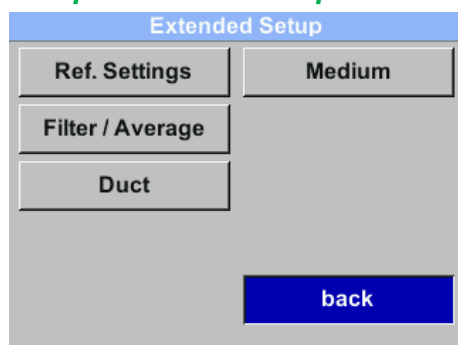


11.3.1.4 Extended Sensor Settings

11.3.1.4.1 Definition of the reference settings

Here can be defined the desired measured media reference conditions for pressure, temperature and times for the filter and averaging.

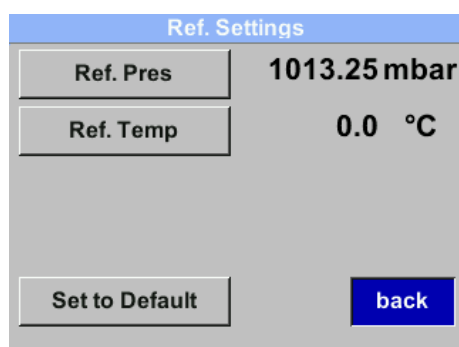
Setup → Sensor Setup → Advanced



Remark:

- Factory pre-setting for reference temperature and reference pressure are 20 °C, 1000 hPa
- All volume flow values (m³/h) and consumption values indicated in the display are related to 20 °C and 1000 hPa (according to ISO 1217 intake condition)
- Alternatively 0 °C and 1013 hPa (=standard cubic meter) can also be entered as a reference.
- **Do not enter the operation pressure or the operation temperature under reference conditions!**

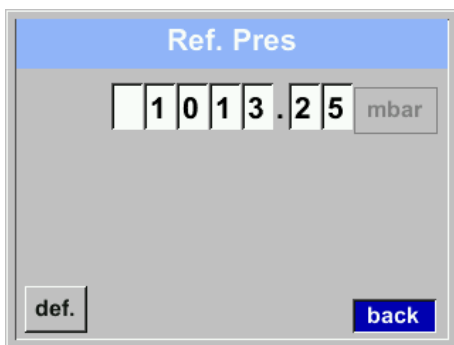
Setup → Sensor Setup → Advanced → Ref. Settings



To make changes, first select a menu item with the „>“ key and then select it with the „OK key.

With „set to Default“ the reference conditions are set back to **1000mbar / 20°C**.

Setup → Sensor Setup → Advanced → Ref. Settings → Ref. Pres.

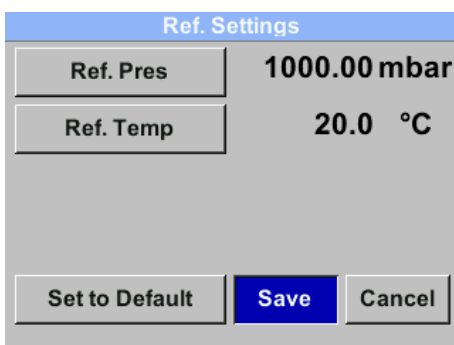


Enter / change the value by pressing the „>“ key to select the respective numerical position and activate it by pressing the „OK“ key. Pressing „>“ increases the value by 1. Confirm with "OK" and activate the next numerical position. Complete the entry by pressing the „OK“ button

Setup → Sensor Setup → Advanced → Ref. Settings → Ref. Temp



The procedure for changing the reference temperature is analogous.

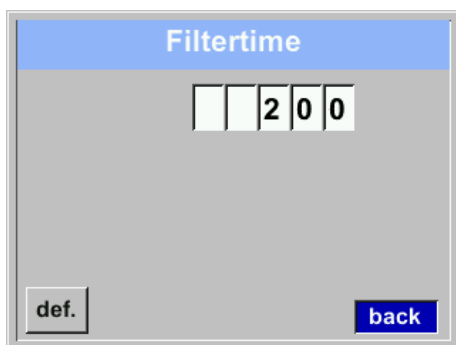


Changes made are accepted with „Save“ and finally by confirming with „OK“.

With „set to Default“ the reference conditions are set back to **1000mbar / 20°C**.

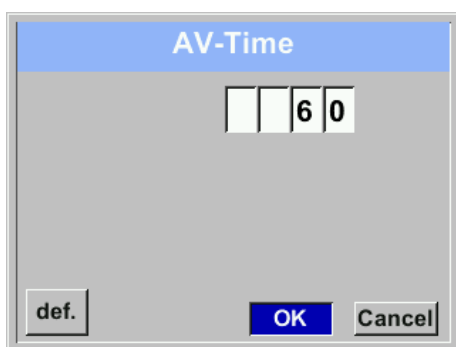
11.3.1.4.2 Setting Filter- / AV-Time

Setup → Sensor Setup → Advanced → Filter/Average → Filtertime



Under item **"Filtertime"** an attenuation can be defined.
Input values of 0 -10000 in [ms] are possible

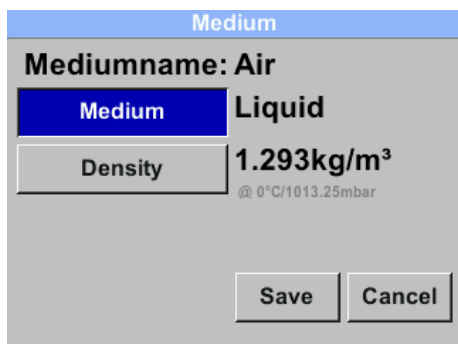
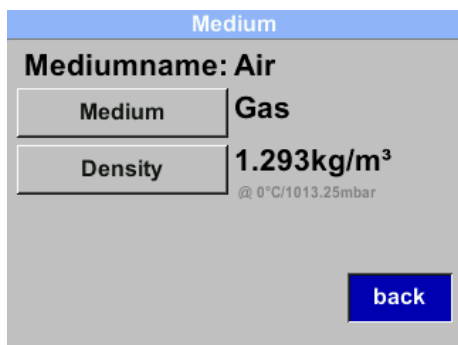
Setup → Sensor Setup → Advanced → Filter/Average → AV-Time



The time period for averaging can be entered here.
Input values of -1440 1 [minutes] are possible.
For average values, see display window 3 + 4.

11.3.1.4.3 Definition of used Measuring-Medium

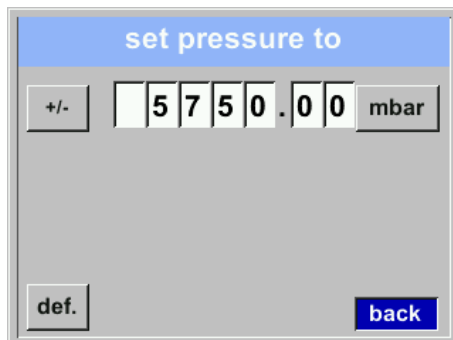
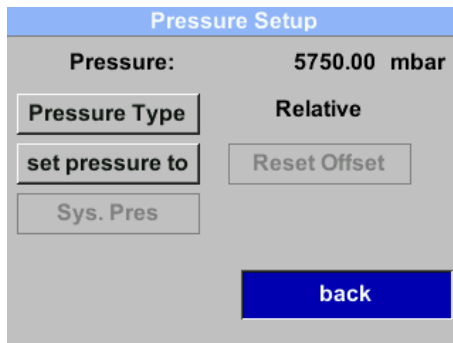
Setup → Sensor Setup → Advanced → Medium



The range of application can be defined under the item "Medium".
Select the "Medium" key with ">" and change medium (gas, liquid or steam) with **"OK"**.
Define the medium density by selecting the "Density" key with ">" and activating it with **"OK"**.
Enter / change the value by selecting the respective numerical position with the ">" key and activating it with **"OK"**.
Pressing ">" increases the value by 1 each time. Confirm changes with **"OK"** and activate the next numerical position.
Complete the entry by pressing the **"OK"** button.
Changes made are accepted with **"Save"** and finally by confirming with **"OK"**.

11.3.1.5 Pressur Setup

Setup → Sensor Setup → Pressure Setup →



Under the point "**Pressure Type**" the pressure type is defined, i.e. **relative or absolute pressure**.

Select the "**Pressure Type**" key with ">" and change with "**OK**".

With "**set pressure to**" a pressure correction (offset) is possible.

Select the "**Set pressure to**" key with ">" and activate with "**OK**".

Enter / change the value by pressing the ">" key to select the respective numerical position and activate it by pressing the "**OK**" key.

Pressing ">" increases the value by 1.

Conclude with "**OK**" and activate the next numerical position.

Confirm the entry by pressing the "**OK**" button.

11.3.2 Modbus RTU

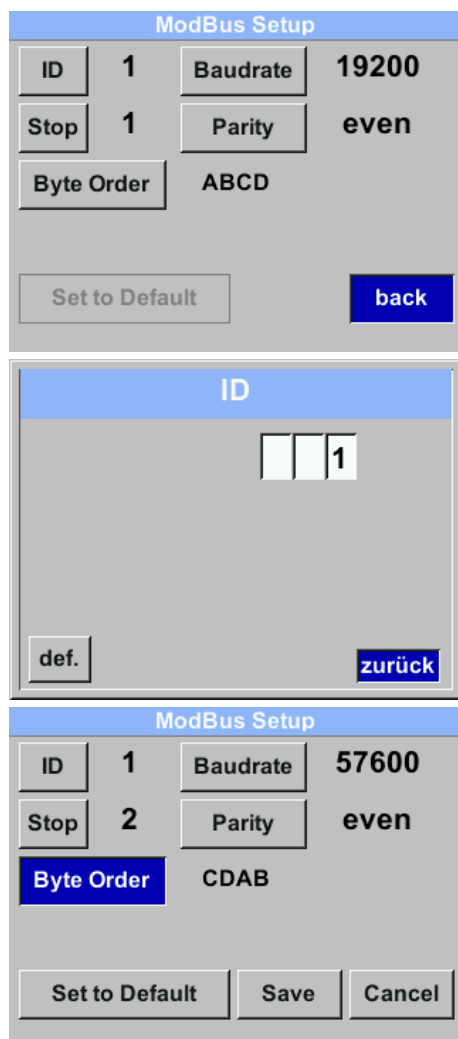
11.3.2.1 Setup

The Flow sensors VX 570 comes with a Modbus RTU Interface. Before commissioning the sensor the communication parameters

- Modbus ID, Baud rate, Parity und Stop bit

must be set in order to ensure the communication with the Modbus master.

Settings → Modbus Setup



For changes, e.g. the sensor ID, first select by pressing key „>“ the field “ID” and then key “OK”.

Select the desired position by pressing the ">" and select with "OK" button.

Change values by pressing the „>“ values takeover by pressing "OK".

Settings or baud rate, stop bit and parity by selecting the item with ">" and changing wit "OK".

By means of the button "Byte Order" it is possible to change the data format (Word Order). Possible formats are "ABCD" (Little Endian) and "CDAB" (Middle Endian)

Saving the changes by pressing "Save", therefore select it with key „>“ and then confirm it with "OK".

Reset to the default settings by activating "Set to Default"-

Default values out of factory:

Modbus ID: 1
 Baud rate: 19200
 Stopbit: 1
 Parity: even
 Byte Order: ABCD

Remark: If the sensor placed at the end of the Modbus system, a termination is required. Therefore, the enclosed 120R resistor is to be connected at Pin7 and Pin 11...

11.3.2.2 Modbus Settings (2001...2005)

Modbus Register	Register Adresse	No.of Byte	Data Type	Description	Default Setting	Read Write	Unit /Comment
2001	2000	2	UInt16	Modbus ID	1	R/W	Modbus ID 1...247
2002	2001	2	UInt16	Baudrate	4	R/W	0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200 5 = 38400
2003	2002	2	UInt16	Parity	1	R/W	0 = none 1 = even 2 = odd
2004	2003	2	UInt16	Number of Stopbits		R/W	0 = 1 Stop Bit 1 = 2 Stop Bit
2005	2004	2	UInt16	Word Order	0xABCD	R/W	0xABCD = Big Endian 0xCDAB = Middle Endian

11.3.2.3 Values Register (1001 ...1500)

Modbus Register	Register Adresse	No.of Byte	Data Type	Description	Def ault	Read Write	Unit /Comment
1101	1100	4	Float	Flow in m³/h		R	
1109	1108	4	Float	Flow in Nm³/h		R	
1117	1116	4	Float	Flow in m³/min		R	
1125	1124	4	Float	Flow in Nm³/min		R	
1133	1132	4	Float	Flow in ltr/h		R	
1141	1140	4	Float	Flow in Nltr/h		R	
1149	1148	4	Float	Flow in ltr/min		R	
1157	1156	4	Float	Flow in Nltr/min		R	
1165	1164	4	Float	Flow in ltr/s		R	
1173	1172	4	Float	Flow in Nltr/s		R	
1181	1180	4	Float	Flow in cfm		R	
1189	1188	4	Float	Flow in Ncfm		R	
1197	1196	4	Float	Flow in kg/h		R	
1205	1204	4	Float	Flow in kg/min		R	
1213	1212	4	Float	Flow in kg/s		R	
1221	1220	4	Float	Flow in kW		R	

Modbus Register	Register Adresse	No.of Byte	Data Type	Description	Default	Read Write	Unit /Comment
1269	1268	4	UInt32	Consumption m ³ before comma	x	R	
1275	1274	4	UInt32	Consumption Nm ³ before comma	x	R	
1281	1280	4	UInt32	Consumption ltr before comma	x	R	
1287	1286	4	UInt32	Consumption Nltr before comma	x	R	
1293	1292	4	UInt32	Consumption cf before comma	x	R	
1299	1298	4	UInt32	Consumption Ncf before comma	x	R	
1305	1304	4	UInt32	Consumption kg before comma	x	R	
1311	1310	4	UInt32	Consumption kWh before comma	x	R	
1347	1346	4	Float	Velocity m/s			
1355	1354	4	Float	Velocity Nm/s			
1363	1362	4	Float	Velocity Ft/min			
1371	1370	4	Float	Velocity NFt/min			
1419	1418	4	Float	GasTemp °C			
1427	1426	4	Float	GasTemp °F			

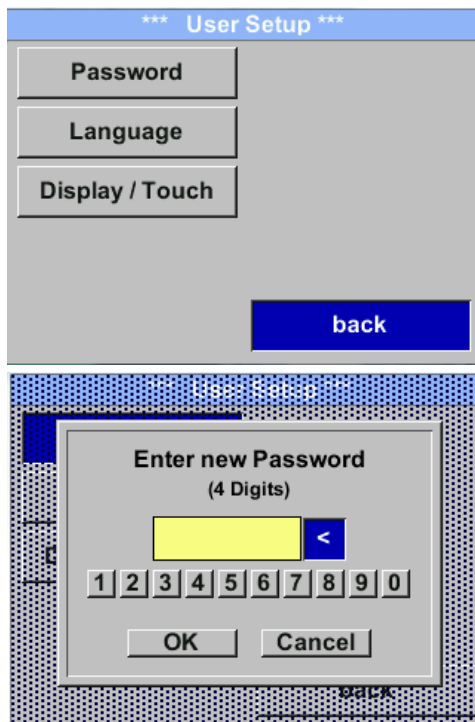
Notice:

- For DS400 / DS 500 / Handheld devices - Modbus Sensor Data Type R4-32 Corresponds to „Data Type Float“
- For additional/further Modbus values see VA5xx_Modbus_RTU_TCP Installation_1.09_DE.doc

11.3.3 User Setup.

11.3.3.1 Password

Settings → User Setup → Password



To make changes, first select a menu with button „>“ and confirm selection by pressing „OK“ .

It is possible to define a password. The required password length is 4 digits. Please select with button „>“ a figure and confirm it with „OK“ .Repeat this 4 times.

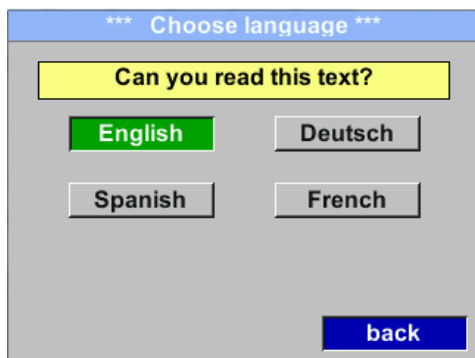
With „<“ the last figure could be deleted. Password input have to be inserted twice.

Confirmation of input/password by pressing „OK“.

Factory settings for password at the time of delivery: 0000 (4 times zero).

11.3.3.2 Language

Settings → User Setup → Language

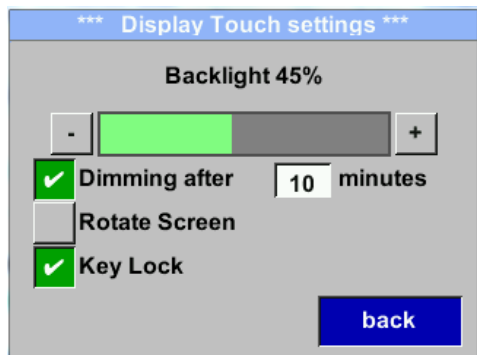
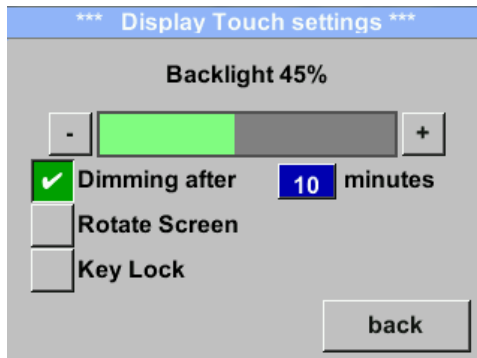


Currently 4 languages have been implemented and could be selected with button „>“ .

Change of language by confirming with “OK” . Leaving the menu with button “back”.

11.3.3.3 Display / Touch

Settings → User Setup → Display / Touch



With the button „-“ and with button „+“ it is possible to adjust the backlight / display brightness. The actual / adjusted backlight brightness is shown in the graph „Backlight.“

By activation “Dimming after” and entering a time a display dimming could be set.

With „Rotate Screen“ the display information could be rotated by 180°.

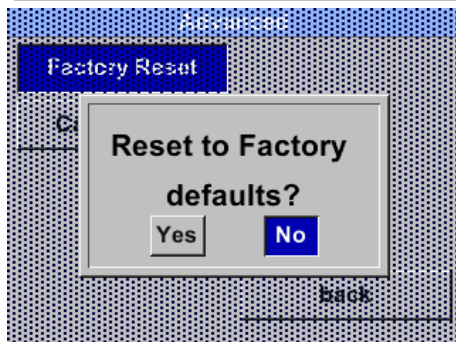
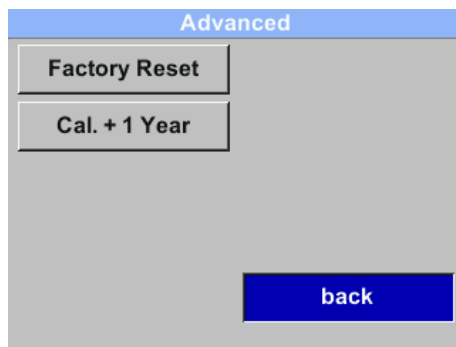
By activation of „Key Lock“ the operation of the sensor locked.

Unlocking the keyboard is only possible by restarting the sensor and calling the operating menu within the first 10s. To do this, use the “OK” button to enter the operating menu during this period.

11.3.4 Advanced

11.3.4.1 Factory Reset / Calibration date

Settings → Advanced → Factory Reset
Settings → Advanced → Cal + 1 Year



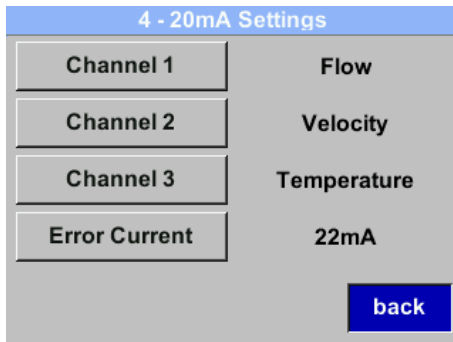
With key “Factory reset” you are able to reset the sensor to the factory settings.

In case the set calibration date has been reached, this can be extended by another year. With key “Cal +1 year” the extension is activated.

For safety reasons, a confirmation query is carried out again for both functions.

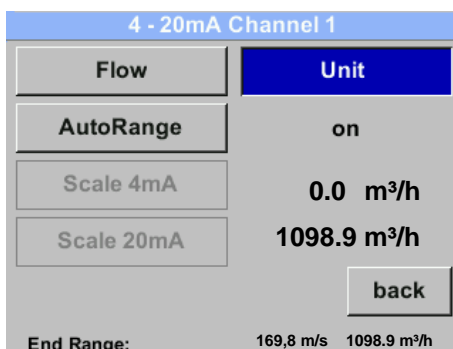
11.3.5 Settings Outputs 4..20mA

Settings → 4-20mA



To make changes, first select an item with „>“ and confirm selection by pressing „OK“ .

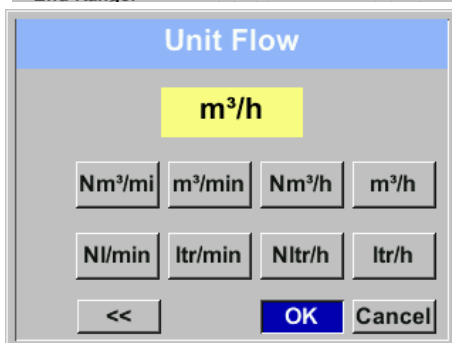
Settings → 4-20mA → Channel 1



The 4-20 mA Analogue output of the Sensor VX 570 can be individually adjusted.

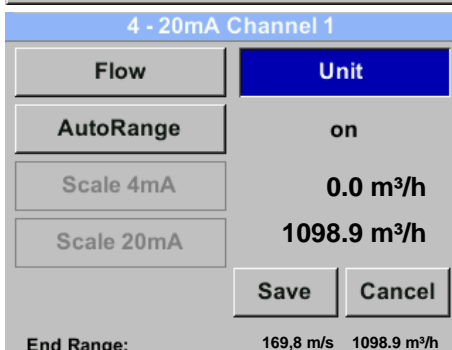
It is possible to assign following values „Temperature“, „Velocity“, „Flow“ and „Pressure“ to the channel.

To make changes, select the menu item with the „>“ key and then select the corresponding measured variable with the "OK" key or deactivate the 4-20mA output with "free".



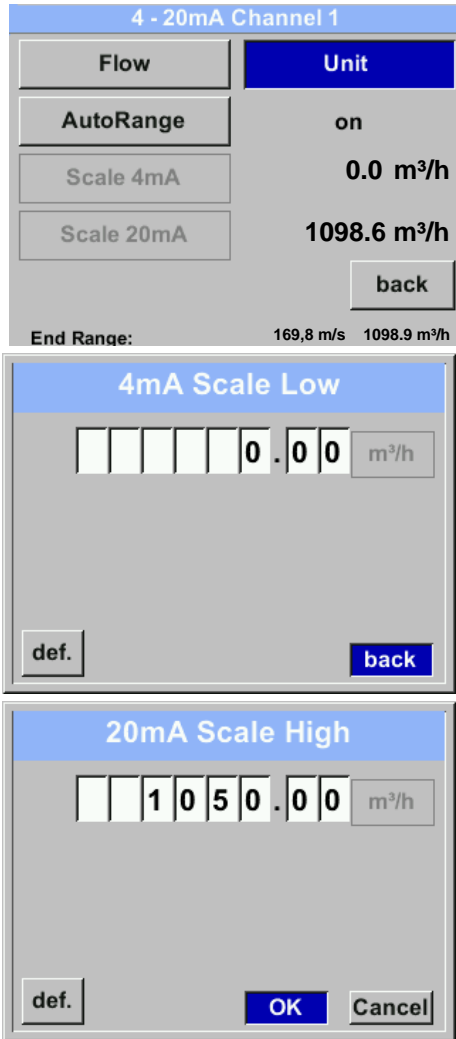
For the selected measurand, the corresponding units can be selected under "Unit". Select with key ">" and afterwards select with key "OK" the corresponding measurand.

Here example for flow rate, procedure for flow velocity, temperature and pressure is analog.



Accept the entries by pressing "Save", discard the changes by pressing "Cancel". Change to the settings menu with "Back".

Settings → 4-20mA → Channel 1 → Auto Range



The scaling of the 4-20mA channel can be done automatically "Auto Range = on" or manual "AutoRange = off".

With button „>“ select the menu item „AutoRange“ select with „OK“ the desired scaling method. (Automatically or manually)

"Scale 4mA" and "Scale 20mA" allows to define the desired scaling, condition is Auto scaling =off.

Select the display "Scaling 4mA" or "Scaling 20mA" with key ">" and then select with key "OK"..

Input of the scaling values will be analogous as described before for value settings.

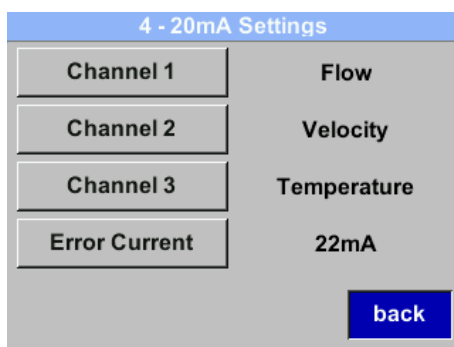
Using „def“ clears up the complete settings at once.

For „Auto on“, the max. scaling is calculated based on the inner tube diameter, max. measurement range and the reference conditions settings.

Take over of the inputs with „Save“ or discard the changes with "Cancel"

Leaving the menu with „Back“.

Settings → 4 -20mA → Error Current



This determines what is output in case of an error at the analog output.

- 2 mA Sensor error / System error
- 22 mA Sensor error / System error
- None Output according to Namur (3.8mA – 20.5 mA)
 < 4mA to 3.8 mA Measuring range under range
 >20mA to 20.5 mA Measuring range exceeding

To make changes first select a menu item "Current Error" with button „>“ and then select by pressing the „OK“ the desired mode

For saving the changes done press button „Save“ to discard the changes press button "Cancel".

11.3.6 VX 570 Info

Settings → Info

Info

Production Data

Serial No.: 1234567890 Details

Cal. Date: 10.01.2013

Sensor Data

Sensor Type: VXC 2.0

Max. Velocity 0.0m/s 0.0 m³/h

Max. Temp. 180.0 °C

Live Data

Run Time: 663d 14h 11m 34s

VIn: Temp.: °C

back

Calibration Details

Calibration Conditions

Ref. Pres 1000.00 mbar

Ref. Temp 0.00 °C

Diameter 0.00 mm

Pressure 6000.00 mbar

Temperature 0.00 °C

Executing Standard

back

Short description of the sensor data incl. calibration data.

The calibration conditions are also available under *Details*.

12 Status / Error messages

12.1 Status messages

- **CAL**

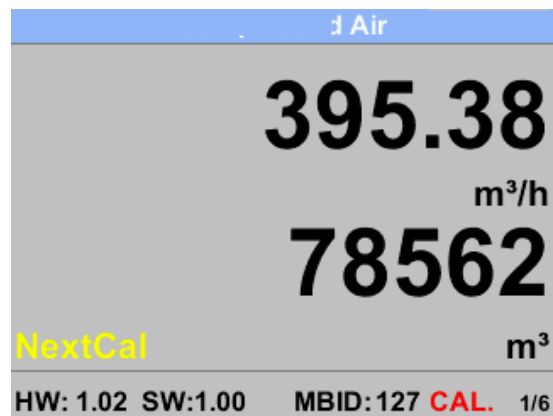
CS Instruments GmbH & Co.KG recommends a regular re-calibration, see chapter 13.

This means that the date at which the next recalibration is recommended is entered internally on delivery.

When this date is reached, the status message "Cal" is displayed.

Note: Measurement continues without interruption or restriction.

Status message:



12.2 Error messages

- **Low Voltage**

If the supply voltage is lower than 11V, the warning message "**Low Voltage**" is displayed.

This means that the sensor can no longer work / measure properly and therefore no measured values for measured values for flow rate, consumption, speed, pressure and temperature are available.

- **Internal Error**

In case of this message "**Internal Error**" the sensor has detected an internal read error on e.g. EEPROM, AD converter etc.

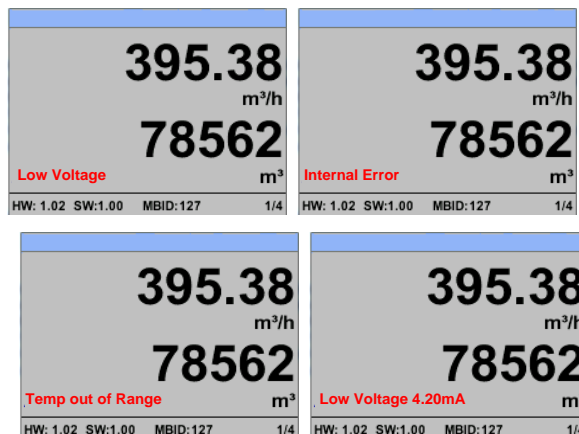
- **Temp out of Range**

In case of media temperatures outside the specified temperature range, the status message „**Temp out of Range**" status message. This leads to incorrect measured values (outside the sensor specification).

- **Low Voltage 4-20mA**

Sensors with a galvanically isolated 4-20mA output require a minimum supply voltage of 17.5V. If this is not reached, the error message "**Low Voltage 4-20mA**" is displayed.

Error messages:



13 Re-Calibration

If no customer specifications have been made, we recommend a calibration interval of 12 months. The sensor must be sent to CS Instruments for this purpose.

14 Spare parts and repair

Spare parts are not available for reasons of measuring accuracy. In case of defects, the sensors must be sent to the supplier for repair.

When using the measuring instruments in plants which are important for operation, we recommend keeping a spare measuring system on hand.

15 Calibration

Within the scope of DIN ISO certification, we recommend having the measuring instruments calibrated and, if necessary, adjusted at regular intervals. The calibration cycles should be based on your internal specifications. Within the scope of DIN ISO certification, we recommend a calibration cycle of one year for the VX 570.

On request, calibration certificates can be issued for a fee. Here, the precision is given and verifiable by DKD-certified volumetric flow meters.

16 Warranty

Defects which are demonstrably due to a factory defect will of course be repaired free of charge. The prerequisite is that you report this defect immediately upon discovery and within the warranty period granted by us. Damage caused by improper use or by non-compliance with the operating instructions is excluded from this warranty. are excluded from this warranty.

The warranty is also void if the measuring device has been opened - unless this is expressly described in the operating instructions for maintenance purposes - or if serial numbers in the device have been changed, damaged or removed.

The warranty period for VX 570 consumption meters is 12 months. Unless otherwise defined, 6 months apply to accessories. Warranty services do not cause an extension of the warranty period. If necessary, repairs, adjustments or the like have been carried out in addition to the warranty service, the warranty services are free of charge, but the other services will be charged, as will transport and packaging. Further or other claims, especially in case of damages not concerning the device, are excluded - as far as liability is not mandatory by law.

Services after the warranty period

Of course, we are also there for you after the warranty period has expired. In case of malfunctions, please send us your measuring device with a short description of the error.)