

210

Huba Control
FOR FINE PRESSURE AND FLOW MEASUREMENT

Flow sensor for liquids media

Nominal diameters
DN 8 / 10 / 15 / 20 / 25

Temperature measurement
-40 ... +125 °C

Flow range
0.9 ... 150 l/min

In comparison to the OEM flow sensor (type 200) the type 210 is available with a larger variety concerning power supply and outputs. You can choose between various versions as integrated temperature measurement.

This flow sensor without moving parts is insensitive to pollution and persuaded by very few loss of pressure and a very high accuracy.



- Flow measuring with voltage, current or frequency output
- Temperature non-sensitive measuring principle
- Excellent media resistance (measuring element not in contact with the media)
- CE conformity
- Excellent EMC characteristics
- Wide application temperature range
- Marginal loss of pressure
- Measuring element not sensitive to debris
- Direct temperature measurement in the medium
- Drinking water approval
KTW, W270, WRAS

Technical overview

Flow measurement

Measuring principle	vortex principle	piezoelectric sensor element
Measuring range		0.9 ... 150 l/min
Nominal diameters		DN 8 / 10 / 15 / 20 / 25
Accuracy at < 50% fs (water)		≤ 1% fs
Accuracy at > 50% fs (water)		≤ 2% measuring value
Response time	Immediately with the first vortices. Therefore suitable for spigot use.	Frequency output
		Signal delay < 100 ms
		Response time < 5 ms
		Voltage and current output
		Signal delay < 2 s
		Response time < 500 ms

Temperature measurement

Measuring principle	Resistance	PT1000
Measuring range		-40 ... +125 °C
PT1000	Accuracy	class B DIN EN 60751
		@ T = 0 °C ± 0.3 K
		@ T ≠ 0 °C ± 0.3 K ± 0.005 * T
0 ... 10 V	Measuring range	-25 ... +125 °C
	Accuracy	± 0.5 K ± 0.005 * T
	Calculation	At temperature output 0 ... 10 V: T = 150 °C
		10 V * U _{OUT,T} - 25 °C
Other temperature failures	Measurement flow in temperature sensor	1 K/mW
	Conduction resistance	0.8 Ohm

Operating conditions

Medium	Suitable for heating circuit water with the usual additives Drinking water	other medium an request
temperature	Ambient	-15 ... +85 °C
	Storage	-30 ... +85 °C
	Media	≤ +125 °C
	(for lifetime)	12 bar at +40 °C
Max. pressure and medium temperature	(for lifetime)	6 bar at +100 °C
	(for 600 hours)	4 bar at +125 °C
	(for 2 hours)	4 bar at +140 °C
	(max. test pressure)	18 bar at +40 °C
Cavitation	The following equation is valid to prevent cavitation:	P _{abs outlet} / P _{difference} > 5.5

Electrical overview

		Frequency output	Voltage output	Current output
Power supply	U _{IN}	4.75 ... 33 VDC	11.5 ... 33 VDC	8 ... 33 VDC
Output Flow (Q)	Output signal	U _{OUT,Q} / I _{OUT}	≤ 0.5 ... ≥ U _{IN} - 0.5 V	0 ... 10 V
	Last/Load against GND or IN	≤ 1 mA / ≤ 100 nF	≤ 6 mA / ≤ 100 nF	≤ (U _{IN} - 8 V) / 20 mA
	Current consumption last free (I _{IN})	≤ 2mA	≤ 5 mA	–
	Resistant signal	R _{OUT,PT1000}	PT1000	PT1000
Output temperature (T)	Voltage signal	U _{OUT,T}	0 ... 10 V	–
Electrical connection		M12x1 (IP 65)	M12x1 (IP 65)	M12x1 (IP 65)
Electromagnetic compatibility		CE-conform acc. to EN 61326-2-3	CE-conform acc. to EN 61326-2-3	CE-conform acc. to EN 61326-2-3

Characteristic line:	Frequency output		Voltage output	current output
DN 8	Characteristic line Q = 0.0350 * f - 0.3	Frequency range ~ 34 ... 437 Hz	Quantity per puls ~ 0.56 ml	Characteristic line Q = 1.5 * U _{OUT,Q}
DN 10	Q = 0.0845 * f - 0.2	~ 24 ... 382 Hz	~ 1.40 ml	Q = 3.2 * U _{OUT,Q}
DN 15	Q = 0.1870 * f - 0.2	~ 19 ... 269 Hz	~ 3.09 ml	Q = 5.0 * U _{OUT,Q}
DN 20	Q = 0.3730 * f - 0.3	~ 14 ... 229 Hz	~ 6.22 ml	Q = 8.5 * U _{OUT,Q}
DN 25	Q = 0.7440 * f - 0.2	~ 12 ... 202 Hz	~ 12.40 ml	Q = 15.0 * U _{OUT,Q}

Nominal diameters dependent variables

	Measuring range	Flow rate	Pressure drop ^{1), 2)}	Weight
DN 8	0.9 ... 15 l/min	0.30 ... 5.0 m/s	P _v = 85.00 * Q ²	~ 47 g
DN 10	1.8 ... 32 l/min	0.32 ... 5.6 m/s	P _v = 22.50 * Q ²	~ 57 g
DN 15	3.5 ... 50 l/min	0.33 ... 4.7 m/s	P _v = 6.70 * Q ²	~ 68 g
DN 20	5.0 ... 85 l/min	0.29 ... 5.0 m/s	P _v = 2.50 * Q ²	~ 92 g
DN 25	9.0 ... 150 l/min	0.33 ... 5.5 m/s	P _v = 0.92 * Q ²	~ 100 g

Materials in contact with medium (FDA-konform)

Sensor paddle	ETFE
Case with damming body	PA6T/6I (Grivory 40% GF)
Sealing material	EPDM (perox.)

Test / Admissions

Drinking water approval	KTW / W270 WRAS
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Packaging

Multiple packaging	DN 8 / 10 / 15 DN 20 / 25	Blister packs à 30 pcs. Blister packs à 20 pcs.
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¹⁾ incl. 3 * Di inlet and outlet side

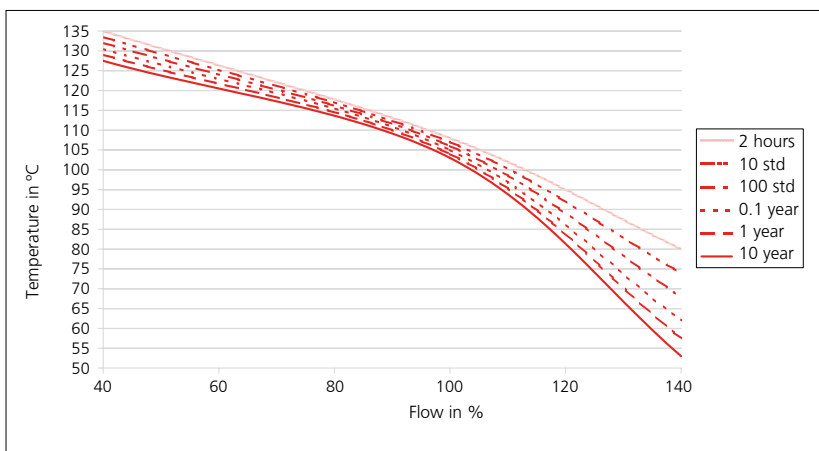
²⁾ P_v in Pa; Q in l/min

Order code selection table							210.	X	X	X	X	X	X	X
Version	Flow						9							
	Flow and temperature (PT1000 class B, DIN EN 60751)						8							
	Flow and temperature (0 ... 10 V)						6							
Nominal diameters and flow range	DN 8	0.9 ... 15 l/min.						0	8					
	DN 10	1.8 ... 32 l/min.						1	0					
	DN 15	3.5 ... 50 l/min.						1	5					
	DN 20	5.0 ... 85 l/min.						2	0					
	DN 25	9.0 ... 150 l/min.						2	5					
Output and power supply	Frequency output (Square pulse signal)		4.75 ... 33 VDC				8,9			2				
	Analogue signal 0 ... 10 V		11.5 ... 33 VDC							3				
	Analogue signal 4 ... 20 mA		8. ... 33 VDC				8,9			4				
Electrical connection	3-pole circular connector	M12x1	(condensation protection)	IP 65			9				4			
	5-pole circular connector	M12x1	(condensation protection)	IP 65			8,6				5			
Sealing material	EPDM Ethylene propylene rubber (peroxidically cross-linked)											1		
Tube connection	Plastic PA6T / 6I	connection copper tube (max. DN 20)											N	
	Plastic PA6T / 6I	outside thread small											K	
	Plastic PA6T / 6I	outside thread large											G	

Accessories ¹⁾

						Order number
Connection kit ²⁾ DN 8, 10 with copper tube						113775
Connection kit ²⁾ DN 8, 10 with adapter Rp $\frac{3}{8}$						113776
Connection kit ²⁾ DN 15 with copper tube						113777
Connection kit ²⁾ DN 15 with adapter Rp $\frac{1}{2}$						113778
Connection kit ²⁾ DN 20 with copper tube						113779
Connection kit ²⁾ DN 20 with adapter Rp $\frac{3}{4}$						113780
Straight-wire box for circular connector M12x1 with cable		3-pole	200 cm			114605
Corner-wire box for circular connector M12x1 with cable		3-pole	200 cm			114604
Straight-wire box for circular connector M12x1 with cable		5-pole	200 cm	(with temperature)		114564
Corner-wire box for circular connector M12x1 with cable		5-pole	200 cm	(with temperature)		114563
Straight-wire box for circular connector M12x1 screwing terminal						115024
Clip for DN 8,10						112116
Clip for DN 15						110941
Clip for DN 20						112122
O-Ring for DN 8, DN 10		EPDM	$\varnothing$ 13.95 x 2.62	Copper tube and adapter		112124
O-Ring for DN 15		EPDM	$\varnothing$ 17.86 x 2.62	Copper tube and adapter		112265
O-Ring for DN 20		EPDM	$\varnothing$ 21.89 x 2.62	Copper tube and adapter		112723
O-Ring for DN 20, 25		EPDM	$\varnothing$ 31 x 3	(as a replacement, already assembled)		112792
Connection copper tube for DN 8, 10		L=150 mm				112121
Connection copper tube for DN 15		L=150 mm				112211
Connection copper tube for DN 20		L=150 mm				112306
Adapter for DN 8 und DN 10		Rp $\frac{3}{8}$	Stainless steel 1.4305/AISI 303			112655
Adapter for DN 15		Rp $\frac{1}{2}$	Stainless steel 1.4305/AISI 303			112660
Adapter for DN 20		Rp $\frac{3}{4}$	Stainless steel 1.4305/AISI 303			112661

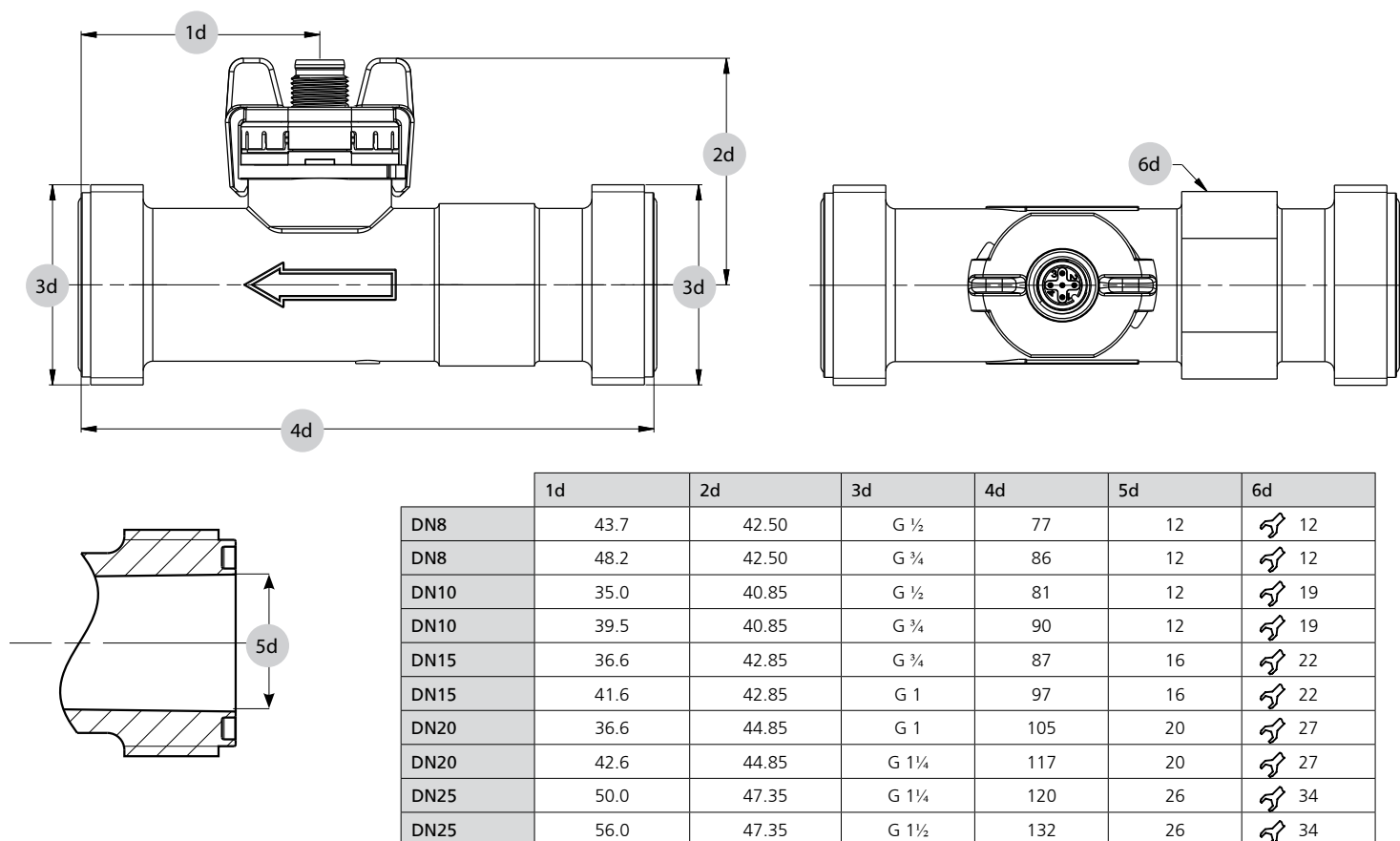
Minimum life span on high flow rate and high temperature



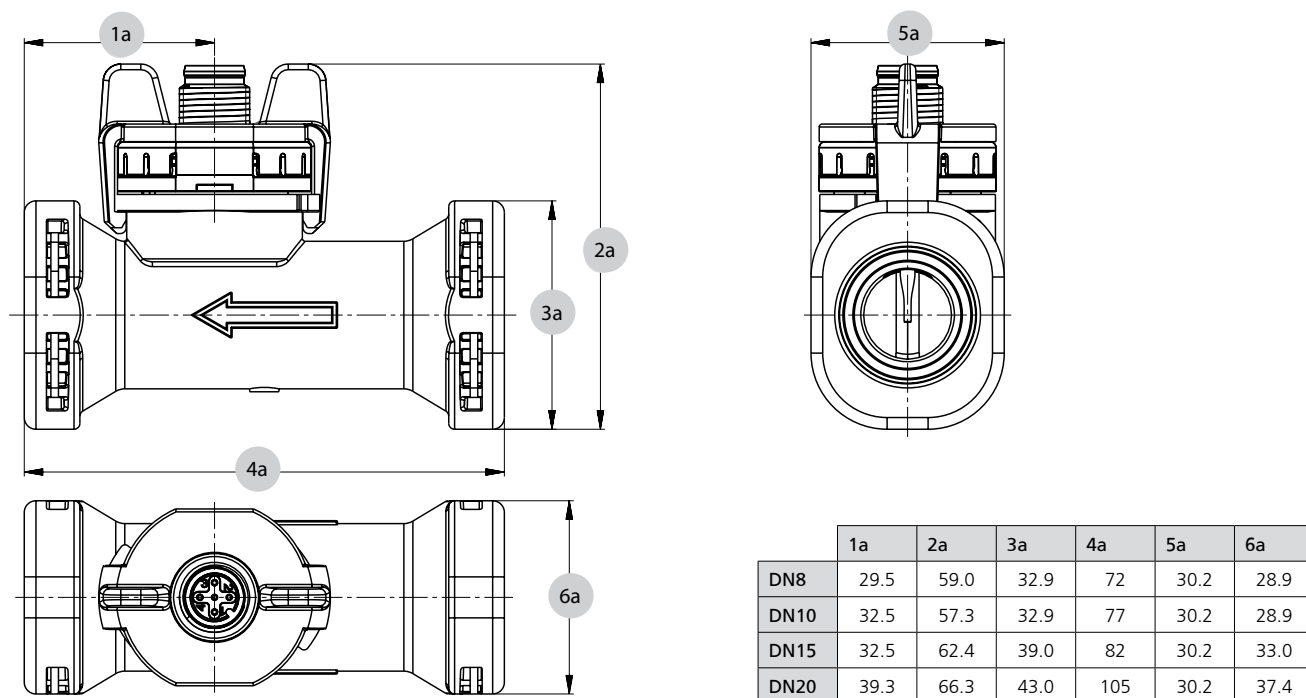
¹⁾ Accessories supplied loose

²⁾ Connection set includes: 2x Clip, 2x Copper tube or Adapter and 2x O-Ring

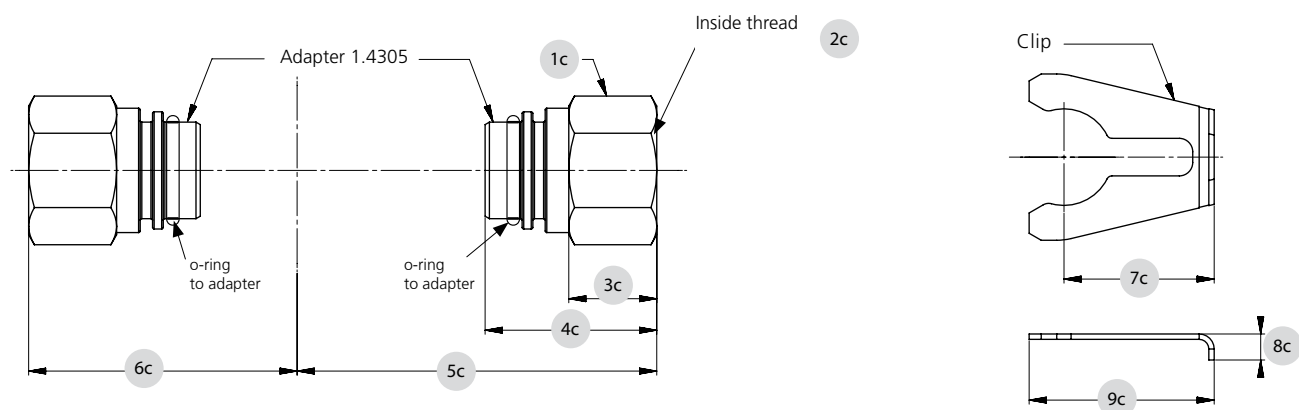
Dimension diagram DN 8, 10, 15, 20, 25



Dimension diagram DN 8, 10, 15, 20

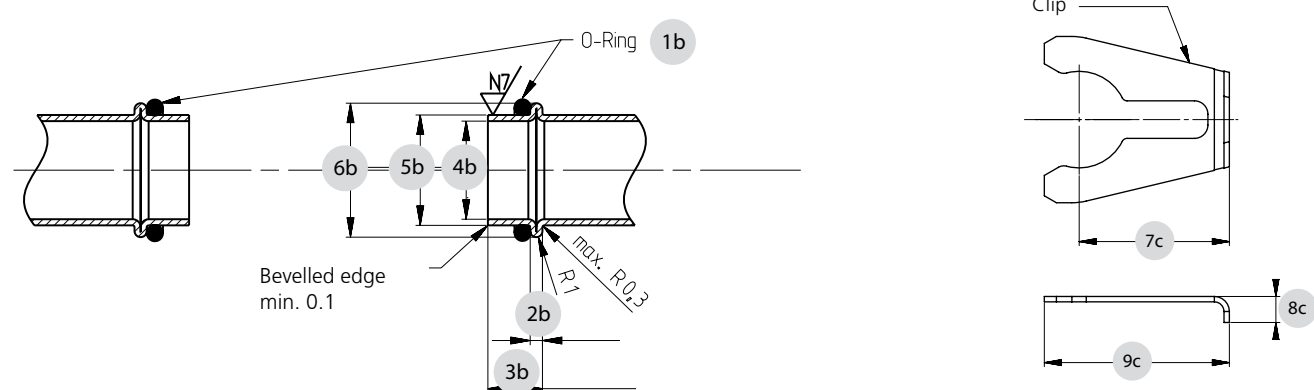


Accessories DN 8, 10, 15, 20



	1c	2c	3c	4c	5c	6c	7c	8c	9c
DN8	22	Rp 3/8 DIN 2999 length min. 9	14.0	29	57.65	44.65	24.5	6.00	30.8
DN10	22	Rp 3/8 DIN 2999 length min. 9	14.0	29	59.65	47.55	24.5	6.00	30.8
DN15	24	Rp 1/2 DIN 2999 length min. 11.5	16.4	32	67.05	50.05	28.0	4.85	34.5
DN20	30	Rp 3/4 DIN 2999 length min. 13	18.5	38	82.25	58.85	28.0	8.00	34.5

Geometry of customers connection tube DN 8, 10, 15, 20

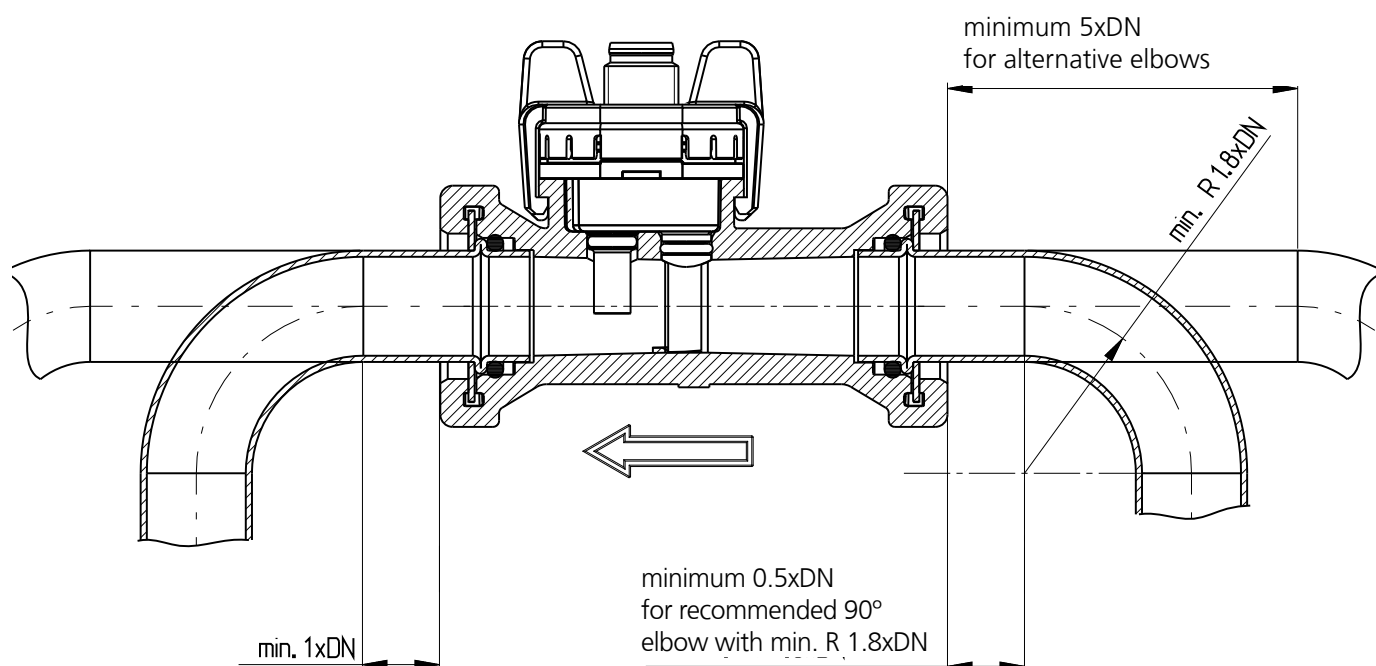


	1b	2b	3b	4b	5b	6b	7c	8c	9c
DN8	ø 13.95x262	2 ± 0.2	8.9 ± 0.2	ø 13 ± 0.2	ø 15.00 ± 0.08	ø 18.88 ± 0.1	24.5	6.00	30.8
DN10	ø 13.95x262	2 ± 0.2	8.9 ± 0.2	ø 13 ± 0.2	ø 15.00 ± 0.08	ø 18.88 ± 0.1	24.5	6.00	30.8
DN15	ø 17.86x2.62	2 ± 0.2	8.9 ± 0.3	ø 16 ± 0.2	ø 18.00 ^{+0.08} / _{-0.06}	ø 21.85 ± 0.1	28.0	4.85	34.5
DN20	ø 21.89x2.62	2 ± 0.2	12.9 ± 0.3	ø 20 ± 0.2	ø 22.00 ^{+0.08} / _{-0.06}	ø 25.85 ± 0.1	28.0	8.00	34.5

Tube mounting instructions

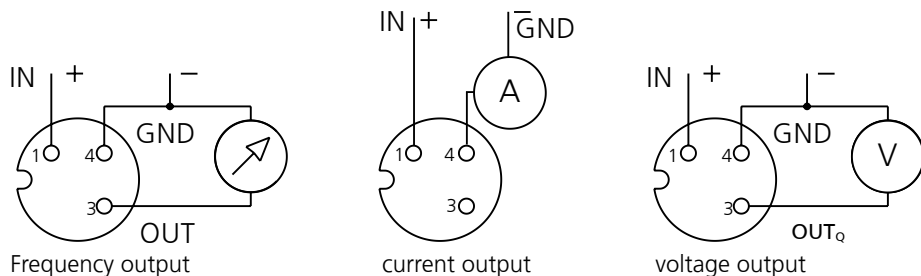
Consider the following instructions to assure a correct function of the sensor:

- Dimension differences only from large to small allowed.
- Avoid repeated elbows in the same level at entryside

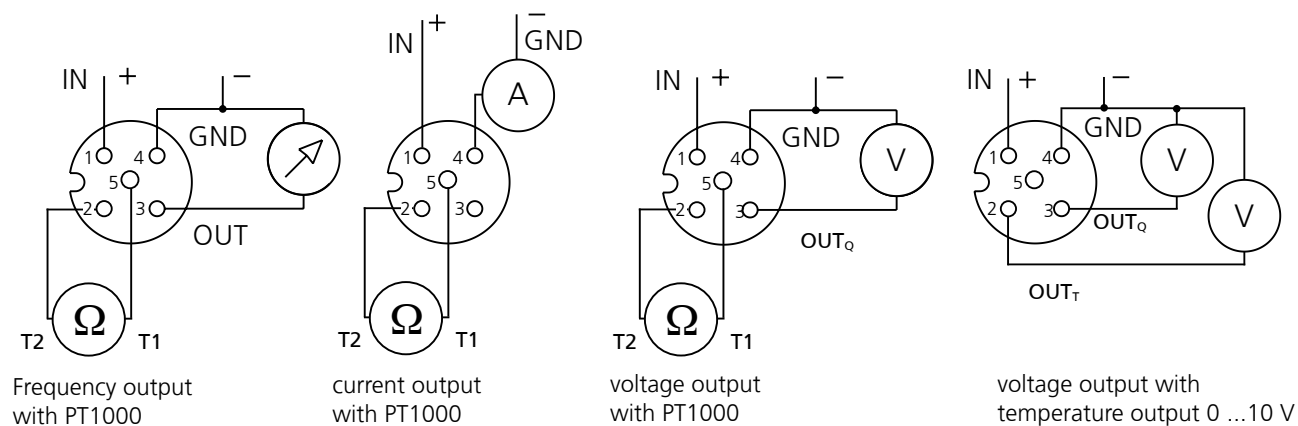


Electrical connection

3-pole circular connection M12x1 without temperature measurement



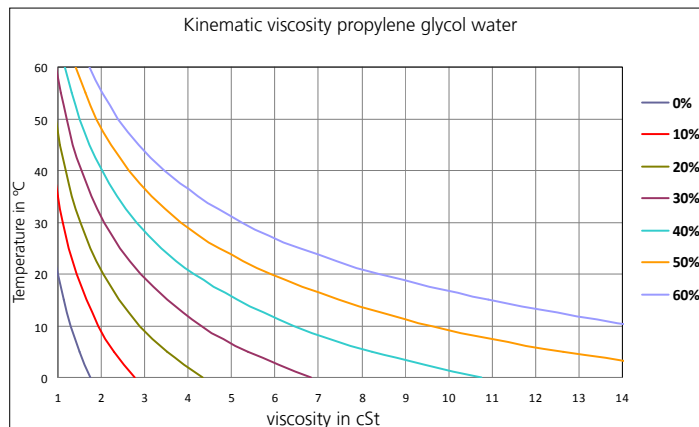
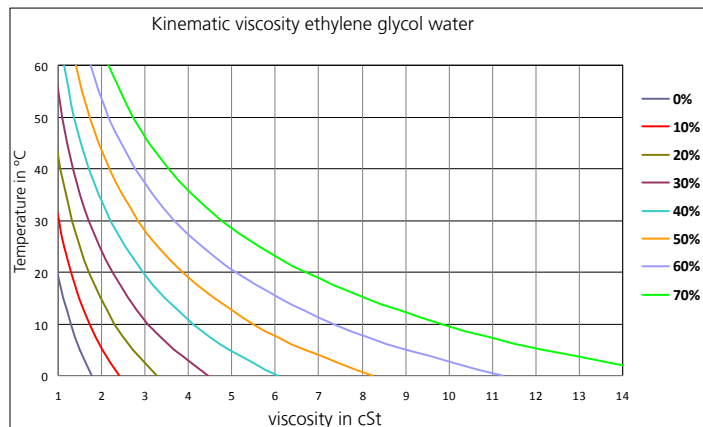
5-pole circular connection M12x1 with temperature measurement



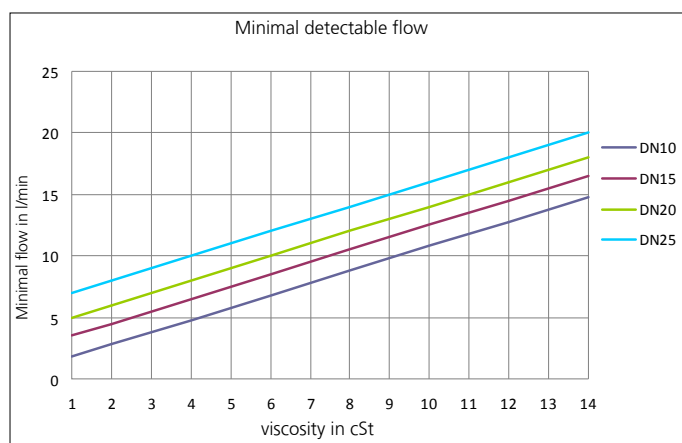
Influence of glycol

With the following definitions we are able to correct the influence of media with higher viscosity than water (= media viscosity > 1.8 cSt) best possible in order to reach a measuring accuracy of 3% fs in the range of 1.8 - 4 cSt and of 4 - 14 cSt (ν = viscosity in cSt).

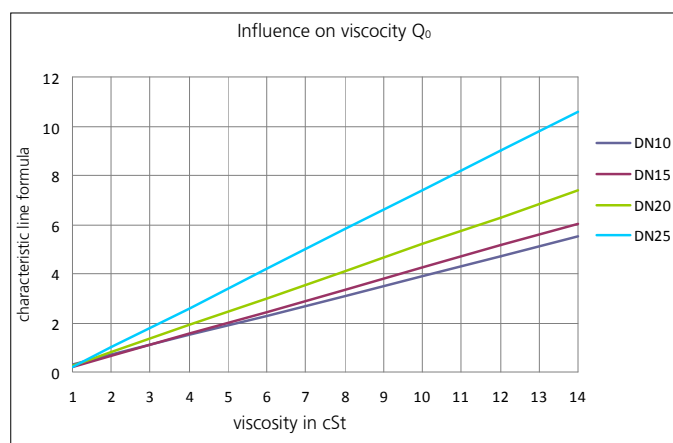
Definition of viscosity of glycol-water-compound



Definition of respond threshold Q_{min}



Definition of characteristic line formula $Q = k * f - Q_0$



Formula respond threshold Q_{min} in l/min

DN 10: $Q_{min} = \nu + 0.8$
 DN 15: $Q_{min} = \nu + 2.5$
 DN 20: $Q_{min} = \nu + 4.0$
 DN 25: $Q_{min} = \nu + 6.0$

Formula characteristic line for $Q \geq Q_{min}$ in l/min

Frequency output:

DN10: $Q = 0.0845 * f - 0.40\nu + 0.20$
 DN15: $Q = 0.1870 * f - 0.45\nu + 0.25$
 DN20: $Q = 0.3730 * f - 0.55\nu + 0.25$
 DN25: $Q = 0.7440 * f - 0.80\nu + 0.60$

Voltage output 0 ... 10 V

DN10: $Q = 3.2 * U_{Out} - 0.40\nu + 0.40$
 DN15: $Q = 5.0 * U_{Out} - 0.45\nu + 0.45$
 DN20: $Q = 8.5 * U_{Out} - 0.55\nu + 0.55$
 DN25: $Q = 15.0 * U_{Out} - 0.80\nu + 0.80$

Current output 4 ... 20 mA (I in mA)

DN10: $Q = 2.000 * (I - 4 \text{ mA}) - 0.40\nu + 0.40$
 DN15: $Q = 3.125 * (I - 4 \text{ mA}) - 0.45\nu + 0.45$
 DN20: $Q = 5.313 * (I - 4 \text{ mA}) - 0.55\nu + 0.55$
 DN25: $Q = 9.375 * (I - 4 \text{ mA}) - 0.80\nu + 0.80$

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