



Vortex Flow sensor

WELOTEC

Flow sensor for liquid media

210 906441K

210 905451K

210 815451K



Flow range

0.5 ... 150 l/min

Nominal diameters

DN 6 / 8 / 10 / 15 / 20 / 25

Temperature measurement

-40 ... +125 °C

- + Flow measuring with voltage, current, pulse or frequency output
- + Temperature non-sensitive measuring principle
- + Excellent media resistance (measuring element not in contact with the media)
- + Wide application temperature range
- + Marginal loss of pressure
- + Measuring element not sensitive to debris
- + Direct temperature measurement in the medium

Technical overview

Flow measurement

Measuring principle	Vortex		Piezoelectric sensor element
Measuring range			0.5 ... 150 l/min
Nominal diameters			DN 6 / 8 / 10 / 15 / 20 / 25
Accuracy at < 50% fs (water)			< 1% fs
Accuracy at > 50% fs (water)			< 2% measuring value
Response time	Immediately. Therefore suitable for spigot use.	Frequency output (unfiltered)	Signal delay < 100 ms
			Response time < 5 ms
	Frequency output (filtered)	Analogue output	Signal delay < 2 s
			Response time < 500 ms

Operating conditions

Medium	Suitable for heating circuit water with the usual additives <u>Drinkingwater</u>	Other medium on request
Temperature	Media < +125 °C	
	Ambient -15 ... +85 °C	
	Ambient (2x 4 ... 20 mA) -15 ... +65 °C	
	Storage -30 ... +85 °C	
Max. pressure and medium temperature	(for lifetime) 12 bar at +40 °C	
	(for lifetime) 6 bar at +100 °C	
	(for 600 hours) 4 bar at +125 °C	
	(for 2 hours) 4 bar at +140 °C	
Cavitation	The following equation is valid to prevent cavitation:	$P_{abs\ outlet} / P_{difference} > 5.5$

Materials in contact with medium (FDA-conform)

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

Electrical connection

Connector M12x1	Protection standard IP 65
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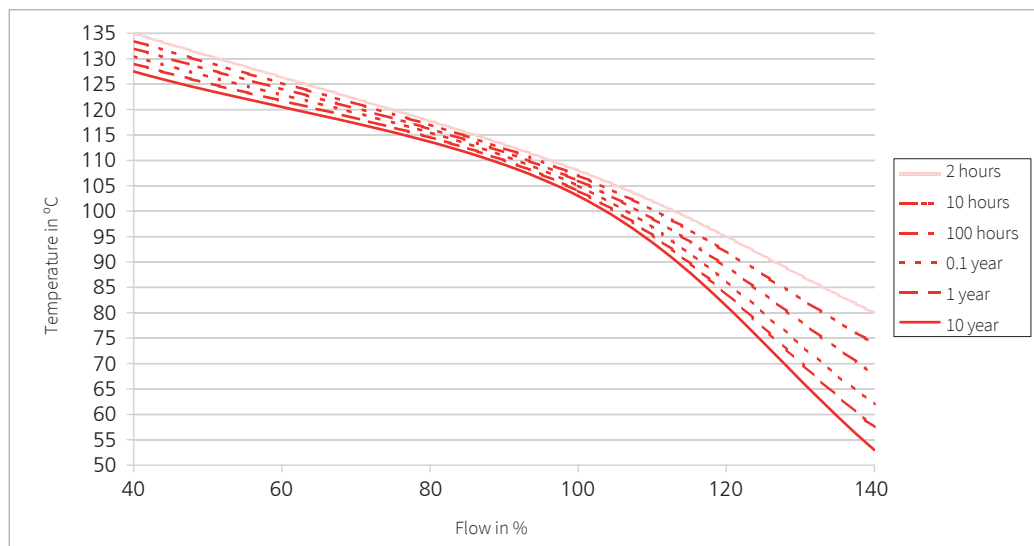
Weight

DN 6 / 8	~ 47 g
DN 10	~ 57 g
DN 15	~ 68 g
DN 20	~ 92 g
DN 25	~ 100 g

Test / Admissions

Electromagnetic compatibility	CE conformity acc. EN 61326-2-3
	WRAS
Drinking water approval	Plastic parts with KTW and W270 approval
	ACS

Minimum life span on high flow rate and high temperature



Analog output - Electrical overview

Temperature measurement (≥ 8 DN)

Measuring principle	Resistance	PT1000
	Measuring range	-40 ... +125 °C
PT1000	Accuracy	class B DIN EN 60751
		@ T = 0 °C
		@ T ≠ 0 °C
	Measuring range	± 0.3 K ± 0.005 * ΔT
	Accuracy	-25 ... +125 °C
0 ... 10 V		± 0.5 K ± 0.005 * ΔT
	Calculation temperature	T (°C) = $\pm 150 \frac{^{\circ}\text{C}}{10\text{V}} \cdot U_{\text{OUT,T}} - 25 \text{ }^{\circ}\text{C}$
	Measuring range	-25 ... +125 °C
4 ... 20 mA	Accuracy	± 0.5 K ± 0.005 * ΔT
	Calculation temperature	T (°C) = $\frac{I_{\text{OUT,T}} - 4 \text{ mA}}{16 \text{ mA}} \cdot 150 \text{ }^{\circ}\text{C} - 25 \text{ }^{\circ}\text{C}$

Electronic	Voltage output	Current output	Dual power output
Power supply	11.5 ... 33 VDC	8 ... 33 VDC	10 ... 33 VDC
Output flow (Q)	0 ... 10 V	4 ... 20 mA	4 ... 20 mA
Output temperature (T)	0 ... 10 V	–	4 ... 20 mA
Load against GND or IN	< 6 mA / < 100 nF ¹⁾	< (U _{IN} - 8 V) / 20 mA	< (U _{IN} - 10 V) / 20 mA
Current consumption load free (I _{IN})	< 5 mA	–	–
Electrical reliability	Short circuit, reverse voltage and external voltage protected within the admissible supply voltage.		

Analogue output - Nominal diameters dependent variables

DN	Measuring range [l/min]	Flow range [m/s]	Pressure drop ^{2),3)}	K _U $\left[\frac{\text{L}}{\text{V} \cdot \text{min}} \right]$	K _I $\left[\frac{\text{L}}{\text{mA} \cdot \text{min}} \right]$
6	0.5 ... 10	0.074 ... 1.474	240.00*Q ²	1.0	0.625
8	0.9 ... 15	0.133 ... 2.210	85.00*Q ²	1.5	0.938
10	1.8 ... 32	0.265 ... 4.716	22.50*Q ²	3.2	2.000
10	2.0 ... 40	0.295 ... 5.895	22.50*Q ²	4.0	2.500
15	3.5 ... 50	0.290 ... 4.145	6.70*Q ²	5.0	3.125
20	5.0 ... 85	0.265 ... 4.509	2.50*Q ²	8.5	5.313
25	9.0 ... 150	0.283 ... 4.709	0.92*Q ²	15.0	9.375

Characteristic line formula current output

$$Q_V = K_I \cdot (I_{\text{OUT}} - 4 \text{ mA})$$

Characteristic line formula voltage output

$$Q_V = K_U \cdot U_{\text{OUT}}$$

Legend

Q _V	Volume flow rate	[l/min]
K _U	Coefficient voltage output	[(l/min) / V]
K _I	Coefficient current output	[(l/min) / mA]
U _{OUT}	Voltage	[V]
I _{OUT}	Current	[mA]

		1	2	3	4	5	6	7
Analog output - Order code selection table		210.	X	X	X	X	X	X
Version	Flow	9			3,4	4		
	Flow and temperature (PT1000)	8			3,4	5		
	Flow and temperature (2x 0 ... 10 V)	6			3	5		
	Flow and temperature (2x 4 ... 20 mA)	5			5	5		
Nominal diameters and Flow range	DN 6 0.5 ... 10 l/min.	9	0	6				K,G
	DN 8 0.9 ... 15 l/min.		0	8				
	DN 10 1.8 ... 32 l/min.		1	0				
	DN 10 2.0 ... 40 l/min.		1	1				
	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				K,G
Output / power supply	Analogue output 0 ... 10 V 11.5 ... 33 VDC	9,8,6			3			
	Analogue output 4 ... 20 mA 8 ... 33 VDC	9,8			4			
	Analogue output 4 ... 20 mA 10 ... 33 VDC	5			5			
Electrical connection	Connector M12x1 3-pole (with condensation protection)	9			3,4	4		
	5-pole (with condensation protection)	8,6,5				5		
Sealing material	EPDM Ethylene propylene rubber (peroxidically cross-linked)						1	
	FPM ⁴⁾ Fluoro elastomer						2	
Tube connection	connection copper tube (max. DN 20)							N
	outside thread K (see dimension diagram)							K
	outside thread G (see dimension diagram)							G

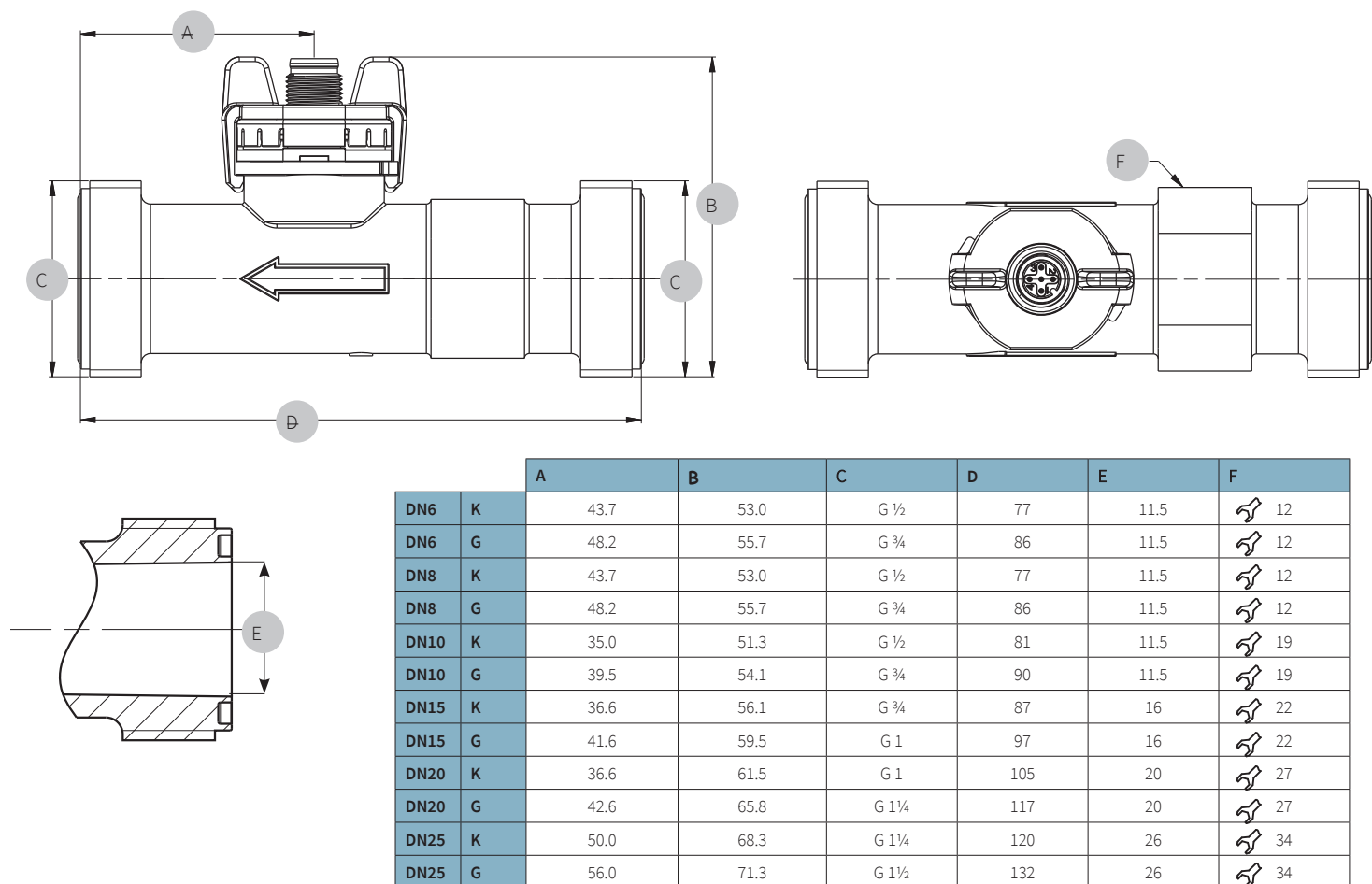
¹⁾ against GND only

²⁾ incl. 3xDi inlet and outlet side

³⁾ Pv in Pa; Q in l/min

⁴⁾ No drinking water approval

Dimension diagram DN 6, 8, 10, 15, 20, 25



Electrical connection

Connector M12x1 without temperature measurement

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