

N4 orifice flowmeter



- Insert the differential pressure sensor with gaskets concentrically between the pipe flanges, and tighten uniformly
- Loosen the union nut (G2), and align the display unit vertically downwards. Tighten the union nut again
- When using floats with magnets and contact switches for the first time, move the float completely past the contact to permit polarization.

Maintenance

Contamination, especially around the bypass orifice, may lead to faults in the measurement. The bypass orifice plate can be dismantled and cleaned without interrupting the main flow if the ball valves are closed first.

Contact assembly

The bistable contact assembly K18 consists of a contact spring set sealed in a glass tube filled with protective gas. The contact springs are polarized by a fixed magnet such that they exhibit a bistable response.

Retrofitting of contact switches is only possible if the floats used are equipped with magnets.

Two contacts can be selected:

- K18 A: contact closes when the limit is fallen below
- K18 B: contact closes when the limit is exceeded.

Application

The N4 orifice flowmeter is used to measure the flow of transparent liquids in closed piping. Any mounting location, position and flow direction can be selected for the flowmeter. The flowmeter can also be used for flow monitoring if equipped with limit contacts.

Design and mode of operation

The N4 orifice flowmeter primarily consists of an orifice plate as the sensor and a float as the display element. A differential pressure is produced across the orifice plate which is fitted in the main stream between two flanges in the piping. In a bypass, this differential pressure produces a volume flow in a variable area meter. The height of the float indicates the flow rate. The flow is read at the position of the float's widest diameter.

Special features

- Suitable for any mounting positions without reduction in accuracy
- Complies with requirements for treatment and disinfection of swimming/bathing pools (DIN 19 643)
- Simple installation
- Direct visualization of flow rate in bypass.

Installation and startup

- Observe the recommendations with respect to inlet and outlet pipe sections for the orifice plate according to DIN EN ISO 5167 (delta p: Inlet and outlet pipe sections").
- Align the orifice plate with the sharp edge (+ sign) towards the inlet side

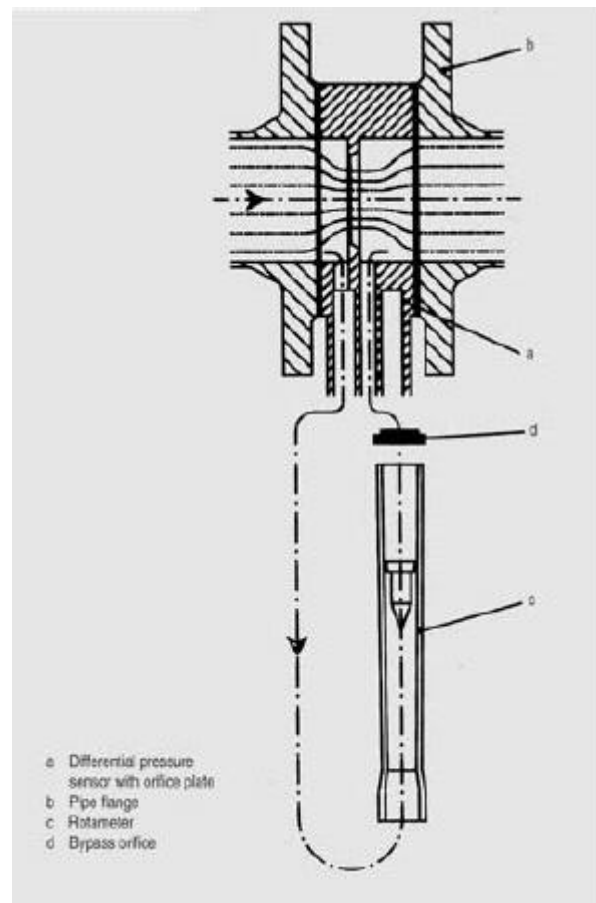


Fig. 3/102 Measuring principle

N4 orifice flowmeter

Technical data of N4 orifice flowmeter

Application	See page 1
Mode of operation	See page 1
Measuring principle	Orifice plate as differential pressure
Input	
Flow	Any
Rated operating conditions	
<u>Ambient conditions</u>	
Temperature and pressure limits	
<ul style="list-style-type: none"> • With water and non-corrosive liquids 	≤ 40 °C (104 °F) 10 bar (145 psi) 50 °C (122 °F) 6.25 bar (94.25 psi) 60 °C (140 °F) 2.5 bar (36.25 psi)
<ul style="list-style-type: none"> • With corrosive liquids 	≤ 20 °C (68 °F) 10 bar (145 psi) 40 °C (104 °F) 4 bar (58 psi) 60 °C (140 °F) 1 bar (14.5 psi)
Medium conditions	
<ul style="list-style-type: none"> • Accuracy 	±2% of full-scale value
<ul style="list-style-type: none"> • Measuring range 	See Table 1
- For liquids	11.2 to 1600 m ³ /h/ 5.28 to 7045 USgpm A special scale must be provided for liquids with a density other than 1 kg/l (62.43 lbs/cu.ft)
<ul style="list-style-type: none"> • Dimension for measured variable 	m ³ /h
Viscosity limits for all measuring ranges	1,0 bis 1,3 mPa·s (cp)
Design	
Metering tube connections	Ring between DIN flanges of nominal pressure rating PN 10 (MWP 145 psi) DN 40 (1½") to DN 400 (16") (DIN 2501)
Inlet and outlet pipe sections	According to DIN EN ISO 5167, see also SITRANS F O delta p: Inlet and outlet pipe sections
Wetted parts materials	
<ul style="list-style-type: none"> • Ring 	PVC
<ul style="list-style-type: none"> • Orifice plate 	PVC; stainless steel, mat. No. 1.4571/316Ti, as option
<ul style="list-style-type: none"> • Flow tube 	Trogamid T can be used with water up to 50 °C (122 °F), otherwise up to 60 °C (140 °F), or polysulfone for use up to 60 °C
<ul style="list-style-type: none"> • Ball cocks 	PVC
<ul style="list-style-type: none"> • Connecting tube 	PVC
<ul style="list-style-type: none"> • Float 	Stainless steel, mat. No. 1.4305/303, optional: stainless steel, mat. No. 1.4571/316Ti, PVC
<ul style="list-style-type: none"> • Limits 	Polysulfone
<ul style="list-style-type: none"> • Gasket 	Buna N/neoprene
<ul style="list-style-type: none"> • Bypass orifice plate 	Stainless steel, mat. No. 1.4571/316Ti, optional PVC
Certificates and approvals	For liquids of fluid group 2; complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)
Classification according to pressure equipment guideline (DGRL 97/23/EC)	

Contacts	
K 18 A	Closes when the limit is fallen below
K 18 B	Opens when the limit is fallen below
Housing/plug	PP/PA 6
Contact material	Rhodium
Degree of protection	IP65
Ambient temperature	-20 to +60 °C (-4 to 140 °F)
Max. switching frequency	5/min
max. Schaltleistung K18 A/B	AC 250 V/0.5 A/10 VA DC 250 V/0.5 A/5 W Rating data apply to resistive loads; a suppressor circuit is required for inductive loads

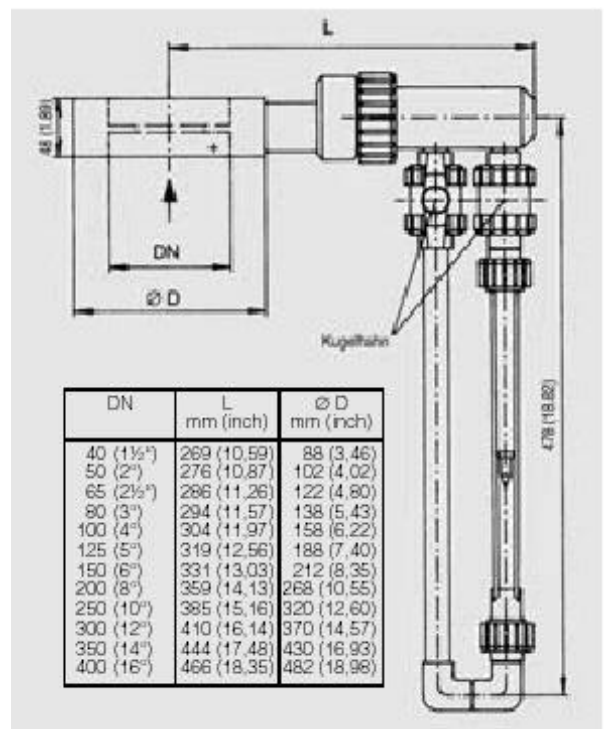


Fig. 3/103 N4, dimensions in mm (inches)

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Measuring ranges (liquids)

Nominal diameter		Measuring range (Vordruck [≈] 0,5 bar (7,25 psi))		Pressure consumption		Diameter ratio	Weight	
DN	(inch)	m ³ /h	(Usgpm)	Dp mbar	(psi)	β	kg	(lb)
40	(1½)	1,2 bis 6	(5,28 bis 26,4)	335	(4,86)	0,48	1,5	(3,31)
		2 bis 10	(8,8 bis 44)	275	(3,99)	0,60		
		3,2 bis 16	(14,1 bis 70)	200	(2,90)	0,73		
50	(2)	2 bis 10	(8,8 bis 44)	330	(4,79)	0,48	1,6	(3,53)
		3 bis 15	(13,2 bis 66)	280	(4,06)	0,59		
		5 bis 25	(22 bis 110)	200	(2,90)	0,73		
65	(2½)	3,2 bis 16	(14,1 bis 70)	330	(4,79)	0,48	1,8	(3,97)
		6 bis 30	(26,4 bis 132)	250	(3,63)	0,64		
		8 bis 40	(35 bis 176)	210	(3,05)	0,72		
80	(3)	5 bis 25	(22 bis 110)	330	(4,79)	0,49	1,9	(4,19)
		10 bis 50	(44 bis 220)	240	(3,48)	0,66		
		13 bis 65	(57 bis 286)	200	(2,90)	0,74		
100	(4)	10 bis 50	(44 bis 220)	300	(4,35)	0,55	2	(4,41)
		16 bis 80	(70 bis 352)	235	(3,41)	0,67		
		20 bis 100	(88 bis 440)	200	(2,90)	0,73		
125	(5)	13 bis 65	(57 bis 286)	325	(4,71)	0,50	2,3	(5,07)
		24 bis 120	(106 bis 528)	245	(3,55)	0,66		
		32 bis 160	(141 bis 704)	200	(2,90)	0,74		
150	(6)	20 bis 100	(88 bis 440)	315	(4,57)	0,52	2,5	(5,51)
		32 bis 160	(141 bis 704)	245	(3,55)	0,64		
		50 bis 250	(220 bis 1100)	180	(2,61)	0,76		
200	(8)	34 bis 170	(150 bis 749)	320	(4,64)	0,51	3,1	(6,83)
		60 bis 300	(264 bis 1321)	250	(3,63)	0,65		
		80 bis 400	(352 bis 1761)	200	(2,90)	0,73		
250	(10)	50 bis 250	(320 bis 1100)	250	(3,63)	0,50	3,5	(7,72)
		80 bis 400	(352 bis 1321)	270	(3,92)	0,61		
		130 bis 650	(572 bis 2862)	195	(2,83)	0,74		
300	(12)	80 bis 400	(352 bis 1321)	315	(4,57)	0,52	4,1	(9,04)
		120 bis 600	(528 bis 2642)	265	(3,84)	0,62		
		200 bis 1000	(881 bis 4403)	180	(2,61)	0,76		
350	(14)	100 bis 500	(440 bis 2202)	325	(4,71)	0,50	5,1	(11,24)
		200 bis 1000	(881 bis 4403)	235	(3,41)	0,67		
		270 bis 1300	(1189 bis 5724)	190	(2,76)	0,75		
400	(16)	140 bis 700	(616 bis 3082)	320	(4,64)	0,51	5,8	(12,79)
		240 bis 1200	(1057 bis 5284)	250	(3,63)	0,65		
		320 bis 1600	(1409 bis 7045)	200	(2,90)	0,73		

Standard measuring ranges for liquid (ρ = 1 kg/l (62,43 lbs/cu.ft), viscosity 1 mPa·s (1 cp))