DG01

Flow indicator with or without rotor, with wiper for cleaning of sight glass

- **May be used for liquids and gases**
- **Compact design**
- **Available in brass and stainless steel**
- **May be installed in any position**
- **Available with or without rotor for visual flow confirmation**
- **With internal wiper blades for easy cleaning of the inside of the sight glass**

Description:

Model series DG01 flow indicators are used to provide visual confirmation of flow in a pipe system. The flowing gas or liquid can be monitored through a sight glass. A rotor that is set in motion by the gas or liquid to provide visual confirmation of flow is available as an option. Wiper blades mounted in the flow indicator are pressed against the inside of the sight glass. The inside of the sight glass can easily be cleaned of deposits, algae or calcinations by simply rotating it by hand. This design feature allows regular cleaning without having to interrupt the process being monitored, making time-consuming and costly maintenance and cleaning unnecessary (no downtime).

Typical Applications:

DG01 mechanical flow indicators are used to monitor the flow of liquids of low to medium viscosity (up to 150 cSt) in pipe systems. The version of the DG01 with ball bearings is also suitable for use with gases.

Models:

DG 01.x.1: without rotor
DG 01.x.2: with rotor

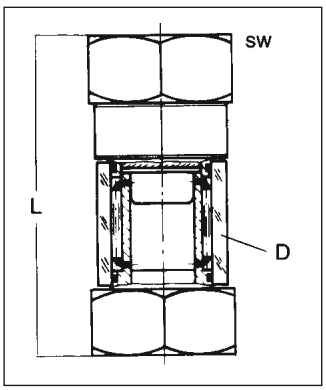
Materials: Available in brass or stainless steel

Nominal sizes and flow rates:

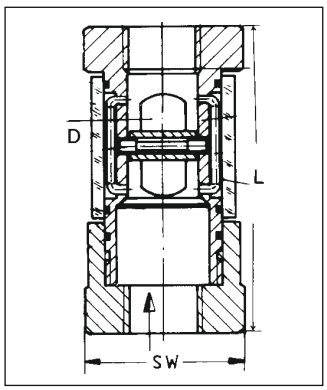
Con-nec-tion G	without rotor Qmax. (GPM / l/min)	with rotor Qmin. (GPM / l/m) 1 cSt	Qmin. (GPM / l/m) 40 cSt	Qmin. (GPM / l/m) 41-150 cSt	Qmax. (GPM/ l/m)
1/4	3.20 / 12	0.10 / 0.4	0,53 / 2.0	0.80 / 3.0	1.0 / 4.0
3/8	4.75 / 18	0.16 / 0.6	0.53 / 2.0	0.80 / 3.0	2.1 / 8.0
1/2	7.90 / 30	0.26 / 1.0	0.80 / 3.0	0.92 / 3.5	3.2 / 12
3/4	16.0 / 60	0.26 / 1.0	0.80 / 3.0	0.92 / 3.5	6.6 / 25
1	24.0 / 90	0.42 / 1.6	0.80 / 3.0	0.92 / 3.5	10 / 40
1 1/4	40.0 / 150	2.10 / 8.0	1.00 / 4.0	1.32 / 5.0	21 / 80
1 1/2	58.0 / 220	2.10 / 8.0	1.32 / 5.0	1.32 / 5.0	26 / 100

Dimensions:

DG01.x.1



DG01.x.2



DG01.x. 1 (without rotor)				
Connection (G)	**L (inch / mm)**	**A/F (inch / mm)**	**D (inch / mm)**	**Weight (lbs / kg)**
1/4	2.80 / 71	1.42 / 36	1.18 / 30	0.66 / 0.3
3/8	2.80 / 71	1.42 / 36	1.18 / 30	0.66 / 0.3
1/2	3.39 / 86	1.81 / 46	1.57 / 40	1.32 / 0.6
3/4	3.70 / 94	1.81 / 46	1.57 / 40	1.32 / 0.6
1	4.09 / 104	1.81 / 46	1.57 / 40	1.32 / 0.6
1 1/4	4.72 / 120	2.56 / 65	2.56 / 65	3.30 / 1.5
1 1/2	5.12 / 130	2.56 / 65	2.56 / 65	3.52 / 1.6
DG01.x. 2 (with rotor)				
Connection (G)	**L (inch / mm)**	**A/F (inch / mm)**	**D (inch / mm)**	**Weight (lbs / kg)**
1/4	2.76 / 70	1.42 / 36	1.18 / 30	0.66 / 0.3
3/8	2.80 / 71	1.42 / 36	1.18 / 30	0.66 / 0.3
1/2	3.35 / 85	1.81 / 46	1.57 / 40	1.32 / 0.6
3/4	3.74 / 95	1.81 / 46	1.57 / 40	1.32 / 0.6
1	4.13 / 105	1.81 / 46	1.57 / 40	1.32 / 0.6
1 1/4	4.72 / 120	2.76 / 70	2.56 / 65	3.30 / 1.5
1 1/2	5.12 / 130	2.76 / 70	2.56 / 65	3.52 / 1.6

Model Coding:

Order Number: **DG01 | F. | 2. | 3. | M**

Flow indicator (with wiper-type cleaning system)

Monitored media (liquid, gas): (for version without rotor, select 0)
F = Liquids
G = Gases

Models:
1 = without rotor
2 = with rotor

Connection:
1 = G1/4 female thread
2 = G3/8 female thread
3 = G1/2 female thread
4 = G3/4 female thread
5 = G1 female thread
6 = G1-1/4 female thread
7 = G1-1/2 female thread

Materials:
M = Brass
E = Stainless steel

Technical Specifications:

Max. pressure: 232 psi / 16 bar

Pressure loss:
DG01.x.1: 2.9 psi / 0.2 bar
DG01.x.2: 3.6 psi / 0.25 bar

Max. Temperature: 212 °F / 100 °C

Materials:

Housing
DG01.x.x.x.M: Brass MS 58 nickel platted
DG01.x.x.x.E: Stainless steel 1.4305

Sight Glass
DG01.x.1: Duran glass
DG01.x.2: Borosilicate glass

Wipers:
DG01.x.x.x.M: Buna
DG01.x.x.x.E: Viton

O-Ring:
DG01.x.x.x.M: Buna
DG01.x.x.x.E: Viton

Rotor (DG01.x.2.x.x only): PVDF, red; Nylon, white for G 1 1/4 - G 1 1/2

Bearing: Sleeve bearing made of PEEK for liquids; Ball bearing, grease-free, for gases

Installation position: any

Sight glasses for smaller flows and higher operating temperatures are available upon request.

DG02

Rotor-Type Flow Indicator

- **Sturdy, robust design**
- **Available in red bronze or stainless steel**
- **Resistant to high heat**

Description:

The DG02 mechanical flow indicator is used for visual verification of liquid flow. The rotational speed of the rotor is proportional to the liquid flow rate. The domed sight glass allows the rotor to be easily seen at any time. These devices are made of high-quality materials, allowing them to be used with a great variety of liquids.

Typical Applications:

DG02 mechanical flow indicators are used to monitor the flow of liquids of low to medium viscosity in pipe systems.

Models:

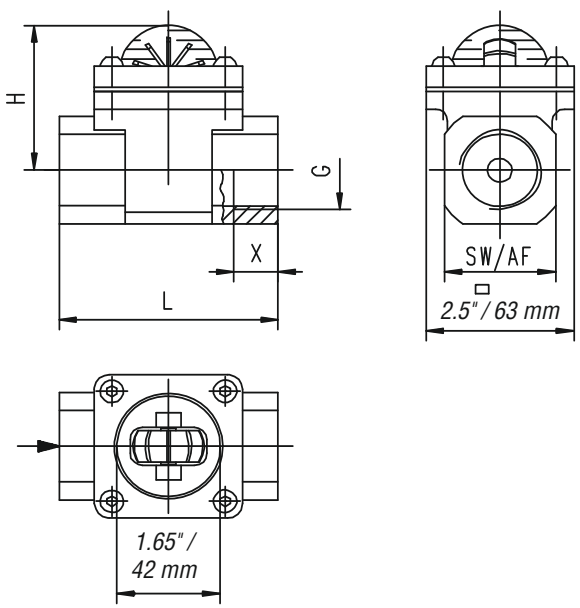
Materials: Red bronze or stainless steel

Flow Rates:

NPT / G	Pmax. (psi / bar)	Qmax GPM / l/min water	Rotor Start l/min water
1/4"	232 / 16	7.9 / 30	0.18 / 0.7
3/8"	232 / 16	10.5 / 40	0.21 / 0.8
1/2"	232 / 16	14.5 / 55	0.26 / 1.0
3/4"	232 / 16	24 / 90	0.32 / 1.2
1"	232 / 16	37 / 140	0.40 / 1.5

Dimensions:

NPT / G	L in inch / mm	H in inch / mm	X in inch / mm	Weight in lbs / kg
1/4"	3 / 76	2 / 53	0.47 / 12	1.54 / 0.70
3/8"	3 / 76	2 / 53	0.63 / 16	1.43 / 0.65
1/2"	3 / 76	2 / 53	0.55 / 14	1.43 / 0.65
3/4"	3.5 / 89	2.6 / 66	0.71 / 18	2.75 / 1.25
1"	3.5 / 89	2.6 / 66	0.71 / 18	2.64 / 1.20



Model Key:

Order Number: **DG02.** | **R.** | **10.** | **0**

Rotor-Type Flow Indicator

Materials:
R = Red bronze
E = Stainless steel

Connections:

08N = 1/4" NPT	08 = G 1/4
10N = 3/8" NPT	10 = G 3/8
15N =1/2" NPT	15 = G 1/2
20N = 3/4" NPT	20 = G 3/4
25N = 1" NPT	25 = G 1

Special features:
0 = None
1 = Please specify in writing.

Technical Specifications:

Max. pressure: 232 psi / 16 bar
Pressure loss: 0.73 psi / 0.05 bar at Qmax.
Max. temperature: 392 °F / 200 °C

Materials:

DG02.R:
Housing: Red bronze
Housing cover: Brass
Sight glass: Borosilicate glass
Pins: Stainless steel
Rotor: PPS
Gasket: Klingersil C-4400

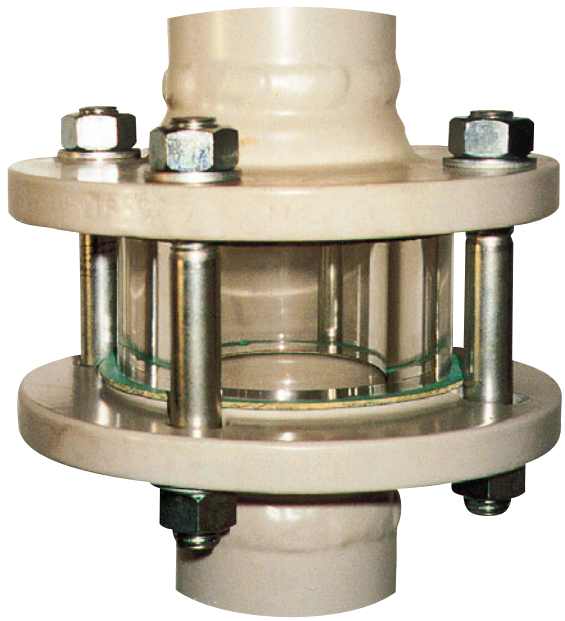
DG02.E:
Housing: Stainless steel
Housing cover: Stainless steel
Sight glass: Borosilicate glass
Pins: Stainless steel
Rotor: PPS
Gasket: Klingersil C-4400

Installation position:

This device is only of limited suitability for downward vertical flows; otherwise, it may be installed in any position.

DG04

Flow sight glass for installation between two flanges



- **Easy installation between two DIN or ANSI flanges**
- **Economical acrylic cylinder**
- **Available in borosilicate glass for caustic/corrosive liquids**
- **Insensitive to contamination**
- **Maximum rated pressure of 232 psi / 16 bar**
- **For liquid temperatures up to 572 °F / 300 °C**

Description:

Model series DG04 sight glasses are distinguished by their rugged construction and wide range of applications. They feature 0.94", 1.18", or 1.97" / 24, 30, or 50 mm long transparent cylinders made of acrylic, soda-lime or borosilicate glass with very high wall thickness. These cylinders are intended to be clamped between two existing flanges. Their dimensions match those of the sealing face on the raised area of the flange. This sizing makes support from a separate metal housing unnecessary. In addition, this design allows the flow to be viewed and monitored from any direction. The flange bolts also offer additional protection against mechanical damage.

The borosilicate glass version can be installed in devices used with very caustic/corrosive liquids. They are insensitive to contamination because the inner surface is constantly being rinsed by the flowing liquid. In particular, the larger nominal sizes are very cost effective solutions since they only require the transparent cylinder and no metal housing with flanges.

Designs:

DG04.A:
- Material: acrylic
- Max. temperature 176 °F / 80 °C
- Economical design

DG04.N:
- Material: soda-lime glass
- Max. temperature 300 °F / 150 °C
- High resistance to chemicals

DG04.B:
- Material: borosilicate
- Max. temperature 572 °F / 300 °C
- For caustic / corrosive liquids and high temperatures

Dimensions:

Nominal size	DG04 for DIN flanges Diameter (inch / mm)		DG04 for ANSI flanges Diameter (mm)		Permitted process pressure
	Outside	Inside	Outside	Inside	
Sight-glass length: DG04.A... / DG04.B...: 1.18" / 30 mm DG04.N...: 0.94" / 24 mm					
3/8" / DN 10	1.57 / 40	0.55 / 14	–	–	232 / 16
1/2" / DN 15	1.77 / 45	0.71 / 18	1.38 / 35	0.63 / 16	232 / 16
3/4" / DN 20	2.28 / 58	0.91 / 23	1.69 / 42	0.83 / 21	232 / 16
1" / DN 25	2.68 / 68	1.14 / 29	1.97 / 50	1.06 / 27	232 / 16
Sight-glass length: DG04.A... / DG04.B...: 1.97" / 50 mm DG04.N...: 0.94" / 24 mm					
1 1/4" / DN 32	3.11 / 79	1.50 / 38	2.48 / 63	1.38 / 35	232 / 16
1 1/2" / DN 40	3.47 / 88	1.73 / 44	2.87 / 73	1.61 / 41	232 / 16
2" / DN 50	4.02 / 102	2.17 / 55	3.62 / 92	2.09 / 53	232 / 16
2 1/2" / DN 65	4.80 / 122	2.80 / 71	4.13 / 105	2.48 / 63	232 / 16
3" / DN 80	5.43 / 138	3.27 / 83	5.00 / 127	3.07 / 78	232 / 16
4" / DN 100	6.22 / 158	4.25 / 108	6.18 / 157	4.02 / 102	232 / 16
5" / DN 125	7.40 / 188	5.20 / 132	7.32 / 186	5.04 / 128	232 / 16
6" / DN 150	8.35 / 212	6.30 / 160	8.50 / 216	6.06 / 154	232 / 16
8" / DN 200	10.55 / 268	8.19 / 208	10.63 / 270	8.00 / 203	145 / 10
10" / DN 250	12.60 / 320	10.28 / 261	12.75 / 324	10.04 / 255	145 / 10
12" / DN 300	14.57 / 370	12.20 / 310	15.00 / 381	12.00 / 305	145 / 10

The pressure values apply to borosilicate glass exposed to liquid temperatures up to 150°C. If higher liquid temperatures are anticipated in the application, please consult us first.

Model coding:

Order number: **DG04. A. D. 025. 0**

Flow sight glass for installation between two flanges

Design:
A = Acrylic
N = Soda-lime glass
B = Borosilicate glass

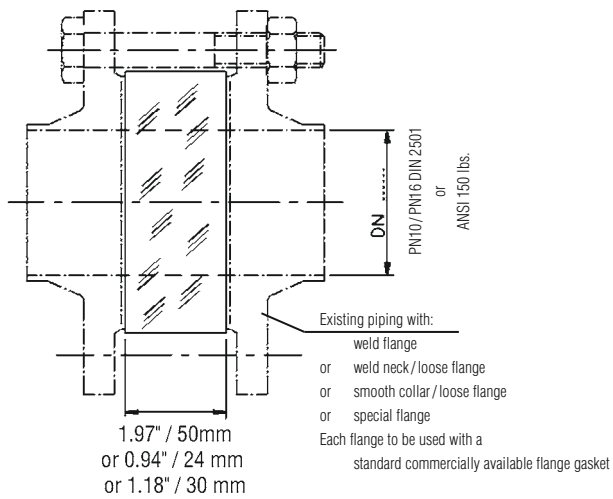
Connection:
D = for flange PN 10/16 as per DIN 2501
A = for ANSI flange, RF, 150 lbs
S = for special flanges

Nominal size:
010...300 = Nominal size as per "Dimensions" table

Special versions:
0 = None
1 = Please specify in writing

Assembly

Design DG04.A, N or B



DG08

Ball-Type Flow Indicator

- **Sturdy, robust design**
- **Available in red bronze or stainless steel**
- **Resistant to high heat**
- **Domed sight glass for easy view of ball**

Description:

The DG08 mechanical flow indicator is used for visual verification of the flow of liquids or gases. The liquid or gas being monitored lifts the PTFE ball from its valve seat.
As the flow increases, the ball in the domed sight glass becomes increasingly visible. These devices are made of high-quality materials, allowing them to be used with a great variety of liquids or gases.

Typical Applications:

DG08 mechanical flow indicators are used to monitor the flow of liquid or gaseous media. These devices are especially suited for use in industrial systems and for process monitoring as well as for basic monitoring of compressors, ventilators, fans and many other types of similar equipment.

Models:

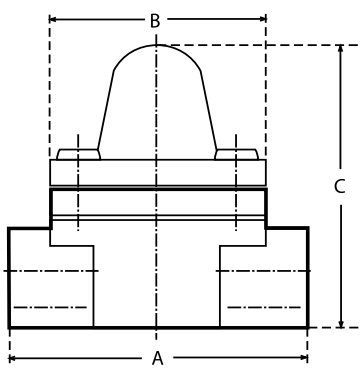
Materials: Red bronze or stainless steel

Flow Rates:

	Water GPM / l/min	
NPT / G	Ball/ initial movement	Ball/ fully visible
1/4"	0.03 / 0.1	0.26 / 1.0
3/8"	0.03 / 0.1	0.26 / 1.0
1/2"	0.03 / 0.1	0.26 / 1.0
3 /4"	0.63 / 2.4	1.37 / 5.2
1"	0.71 / 2.7	1.45 / 5.5
1 1/4"	2.90 / 11	4.23 / 16
1 1/2"	4.23 / 16	5.55 / 21

Dimensions:

NPT / G	A in inch / mm	B in inch / mm	C in inch / mm	Weight in lbs. / kg
1/4"	3.00 / 76	2.48 / 63	3.10 / 79	1.60 / 0.72
3/8"	3.00 / 76	2.48 / 63	3.10 / 79	1.50 / 0.69
1/2"	3.00 / 76	2.48 / 63	3.10 / 79	1.43 / 0,65
3 /4"	3.50 / 89	2.48 / 63	3.75 / 95	2.86 / 1.30
1"	3.50 / 89	2.48 / 63	3.75 / 95	2.75 / 1.25
1 1/4"	4.60 / 117	2.95 / 75	4.90 / 125	5.50 / 2.50
1 1/2"	4.60 / 117	2.95 / 75	4.90 / 125	5.18 / 2.35



Model Key:

Order Number: **DG08. | E. | 10. | 0**

Ball-Type Flow Indicator

Materials:
R = Red bronze
E = Stainless steel

Connections:

08N = 1/4" NPT	08 = G 1/4
10N = 3/8" NPT	10 = G 3/8
15N = 1/2" NPT	15 = G 1/2
20N = 3/4" NPT	20 = G 3/4
25N = 1" NPT	25 = G 1
32N = 1 1/4" NPT	32 = G 1 1/4
40N = 1 1/2" NPT	40 = G 1 1/2

Special Features:
0 = None
1 = Please specify in writing.

Technical Specifications:

Max. pressure: 232 psi / 16 bar
Max. temperature: 392 °F / 200 °C

Materials:

DG08.R:

Housing: Red bronze
Sight glass: Borosilicate glass
Pins: Stainless steel
Indicator ball: PTFE
Gasket: Klingersil C-4400

DG08.E:

Housing: Stainless steel
Sight glass: Borosilicate glass
Pins: Stainless steel
Indicator ball: PTFE
Gasket: Klingersil C-4400

DG10

Flow Sight Glass with Threaded Connections

- Standard models with fully clear bore or drip tube, flap or rotor optionally available
- Materials: Cast iron, cast steel or stainless steel
- For pipe sizes from 1/4” to 2”
- For liquid temperatures up to 300 °F / 150 °C, higher ratings up to 536 °F / 280 °C optionally available
- Pressure rating: 232 psi / 16 bar, higher ratings optionally available
- Process connection available with NPT or G thread

Description:

DG10 sight glasses are used to visually monitor the flow of liquids in pipe systems.
Depending on the type of liquid and flow volume, these devices are used with a fully clear bore or with a flap or rotor (for transparent liquids).
DG10 sight glasses permit reliable monitoring of the function and performance of single devices or entire systems.

Typical Applications:

Because they are available in a variety of materials and designs, DG10 sight glasses can be used in almost any kind of pipe system.

Models:

DG10.S: Standard model with fully clear bore, sizes 1-1/4" and above with drip tube (can be installed in any position)

DG10.K: with flap (can only be installed horizontally or for upward vertical flows)

DG10.RK with rotor made of POM (Tmax. 248 °F / 120 °C, can be installed in any position)

DG10.RP with rotor made of PTFE (Tmax. 500 °F / 260 °C, can be installed in any position)

Housing Materials (having contact with monitored liquid):

DG10.x.G: Cast iron A48-40B / GG 25 (EN-GJL-250)

DG10.x.S: Cast steel A216 Gr. WCC / GS-C 25 (WN 1.0619)

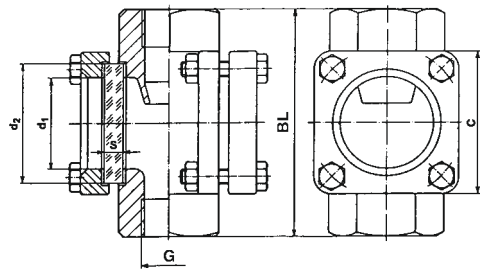
DG10.x.E: Stainless steel AISI 316 / WN 1.4408

Sight Glass Materials:

DG10.x.x.N: Soda-lime glass (Tmax. 300 °F / 150 °C)

DG10.x.x.B: Borosilicate glass (Tmax. 536 °F / 280 °C)

Dimensions:



Cast iron (DG10.x.G)					
Connection (female thread)	**BL (inch / mm)**	**d1 (inch / mm)**	**d2 (inch / mm)**	**S (inch / mm) 232 psi / 16 bar**	**C (inch / mm)**
1/4" 1/2"	3.94 / 100	1.26 / 32	1.77 / 45	0.39 / 10	2.76 / 70
3/4" 1"	4.72 / 120	1.89 / 48	2.48 / 63	0.39 / 10	3.45 / 85
1-1/4" 1-1/2"	6.30 / 160	2.56 / 65	3.15 / 80	0.47 / 12	4.57 / 116
2"	7.09 / 180	3.15 / 80	3.94 / 100	0.59 / 15	4.72 / 120

Cast steel (DG10.x.S) or stainless steel (DG10.x.E)							
Con-nection	**BL (inch / mm)**	**d1 (inch / mm)**	**d2 (inch / mm)**	**S (inch/mm) 232 psi / 16 bar**	**363 psi / 25 bar**	**580 psi / 40 bar**	**C (inch / mm)**
1/4" 3/8" 1/2" 3/4"	3.94 / 100	1.89 / 48	2.48 / 63	0.39 / 10	0.47 / 12	0.59 / 15	2.76 / 70 3.54 / 90 2.76 / 70
1" 1-1/4"	5.12 / 130 6.30 / 160	2.56 / 65	3.15 / 80	0.47 / 12	0.59 / 15	0.79 / 20	3.35 / 85 4.57 / 116
1-1/2"	6.30 / 160	2.56 / 65	3.15 / 80	0.47 / 12	0.59 / 15	0.79 / 20	4.57 / 116
2"	9.06 / 130	3.15 / 80	3.94 / 100	0.59 / 15	0.79 / 20	0.98 / 25	4.72 / 120

Model Coding:

Order Number: DG10. RK. E. B. 25. 16. 0. 0

Flow Sight Glass with Threaded Connections (Female)

Models:
S = Standard design with fully clear bore(sizes 1-1/4" and above with drip tube)
K = with flap
RK = with plastic rotor (POM)
RP = with plastic rotor (PTFE)

Housing Materials:
G = Cast iron
S = Cast steel
E = Stainless steel

Sight Glass Materials:
N = Soda-lime glass
B = Borosilicate glass

Process connection:

08N = 1/4" NPTF	08 = G 1/4 female thread
10N = 3/8" NPTF	10 = G 3/8 female thread
15N = 1/2" NPTF	15 = G 1/2 female thread
20N = 3/4" NPTF	20 = G 3/4 female thread
25N = 1" NPTF	25 = G 1 female thread
32N = 1-1/4" NPTF	32 = G 1-1/4 female thread
40N = 1-1/2" NPTF	40 = G 1-1/2 female thread
50N = 2" NPTF	50 = G 2 female thread

Pressure Rating:
16 = 232 psi / 16 bar (Standard)
25 = 363 psi / 25 bar (in cast steel or stainl. steel only)
40 = 580 psi / 40 bar (in cast steel or stainl. steel only)

Options:
0 = None
9 = Please specify in writing

Special Models:
0 = None
9 = Please specify in writing

Technical Specifications:

Materials: Housing and Sight Glass: see description, gaskets: graphite (other gasket materials available upon request)

max. pressure: 232 psi / 16 bar Standard
363 psi / 25 bar and 580 psi / 40 bar optional

max. temperature:

DG10.S/K...: 300 °F / 150 °C (536 °F / 280 °C with borosilicate glass)

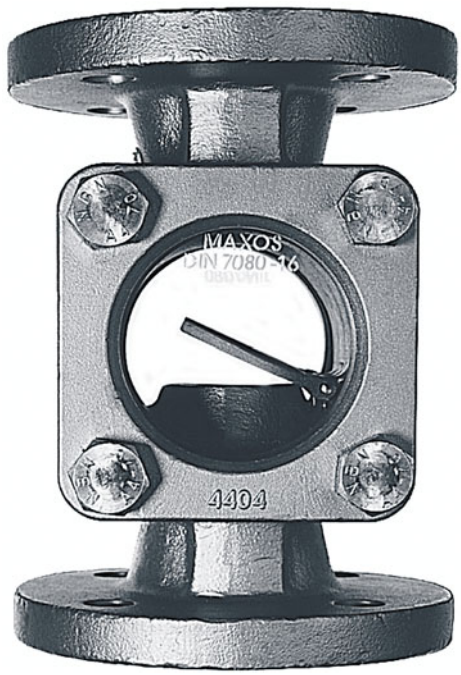
DG10.RK...: 248 °F / 120 °C

DG10.RP...: 300 °F / 150 °C (500 °F / 260 °C with borosilicate glass)

DG11

Sight Flow Indicator

- **Available with DIN or ANSI flanges**
- **Standard with drip tube, flap or rotor optionally available**
- **Materials: Cast iron, cast steel or stainless steel**
- **For pipes from 1/2" / DN15 to 10" / DN250**
- **For liquid temperatures up to 300 °F / 150 °C, higher ratings up to 546 °F / 280 °C optionally available**
- **Pressure rating: 232 or 145 psi / PN16 or PN10, higher ratings optionally available**



Description:

DG11 sight glasses are used to visually monitor the flow of liquids in pipe systems.
Depending on the type of liquid and flow volume, these devices are used with a fully clear bore or with a flap or rotor (for transparent liquids).
DG11 sight flow indicator permits reliable monitoring of the function and performance of single devices or entire systems.

Applications:

Because they are available in a variety of materials and designs, DG11 sight glasses can be used in almost any kind of pipe system.

Models

DG11.S: Standard model with drip tube (can be installed in any position)

DG11.K: with flap (can only be installed horizontally or for upward vertical flows)

DG11.RK with rotor made of POM (Tmax. 248 °F / 120 °C, can be installed in any position)

DG11.RP with rotor made of PTFE (Tmax. 500 °F / 260 °C, can be installed in any position)

Housing Materials (contacting monitored liquid):

DG11.x.G: Cast iron A48-40B / GG 25 (EN-GJL-250)

DG11.x.S: Cast steel A216 Gr. WCC / GS-C 25 (WN 1.0619)

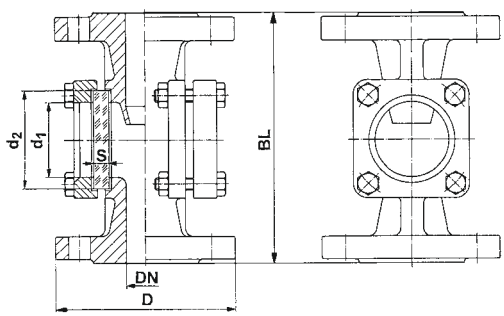
DG11.x.E: Stainless steel (AISI 316 / WN 1.4408)

Sight Glass Materials:

DG11.x.x.P: Soda-lime glass (Tmax. 300 °F / 150 °C)

DG11.x.x.B: Borosilicate glass (Tmax. 536 °F / 280 °C)

Dimensions:



Connection (DN / ANSI)	D (inch / mm)	BL (inch / mm)	d1 (inch / mm)	d2 (inch / mm)	S (inch / mm) 16 bar
15 / 1/2"	3.74 / 95	5.12 / 130	1.26 / 32	1.77 / 45	0.39 / 10
20 / 3/4"	4.13 / 105	5.91 / 150	1.26 / 32	1.77 / 45	0.39 / 10
25 / 1"	4.53 / 115	6.30 / 160	1.89 / 48	2.48 / 63	0.39 / 10
32 / 1 1/4"	5.51 / 140	7.09 / 180	2.56 / 65	3.15 / 80	0.47 / 12
40 / 1 1/2"	5.91 / 150	7.87 / 200	2.56 / 65	3.15 / 80	0.47 / 12
50 / 2"	6.50 / 165	9.06 / 230	3.15 / 80	3.94 / 100	0.59 / 15
65 / 2 1/2"	7.28 / 185	11.42 / 290	3.15 / 80	3.94 / 100	0.59 / 15
80 / 3"	7.87 / 200	12.20 / 310	3.94 / 100	4.92 / 125	0.79 / 20
100 / 4" ***	8.66 / 220	13.78 / 350	4.92 / 125	5.91 / 150	0.98 / 25
125 / 5" ***	9.84 / 250	15.75 / 400	5.91 / 150	6.89 / 175	0.98 / 25
150 / 6"	11.22 / 285	18.90 / 480	6.89 / 175	7.87 / 200	1.18 / 30*
200 / 8" ***	13.39 / 340	23.62 / 600	6.89 / 175	7.87 / 200	1.18 / 30**
250 / 10" ***	15.94 / 405	28.74 / 730	6.89 / 175	7.87 / 200	1.18 / 30**

*) Pmax 145 psi / 10 bar with soda-lime glass, Pmax. 232 psi / 16 bar with borosilicate glass

**) with DIN flanges: PN 10 or PN 16 (PN 16 with borosilicate glass only)

***) ANSI flanges not available in cast iron

Dimension "D" indicated for DIN flanges, may be different with ANSI flanges

Ordering Code:

Order Number: DG11. RK. E. B. 25. D16. 0. 0

Sight Flow Indicator

Models
S = Standard model (with drip tube)
K = With flap
RK = With plastic rotor (POM)
RP = With plastic rotor (PTFE)

Housing Materials:
G = Cast iron
S = Cast steel
E = Stainless steel

Sight Glass Materials:
N = Soda-lime glass
B = Borosilicate glass

Process Connections:
15 to 250 = ANSI 1/2" to ANSI 10" / DN 15 to DN250
See "Dimensions" table

Connection Flanges:
A = ANSI, 150 lbs
D16 = DIN PN16 (DN200 with borosilicate glass only)
D10 = DIN PN10
S = Special models for higher pressure levels

Options:
0 = None
9 = Please specify in writing

Special Models:
0 = None
9 = Please specify in writing

Technical Specifications:

Materials: Housing and sight glass: see description
Gaskets: graphite (other gasket materials available upon request)

Max. pressure: 232 psi / 10/16 bar (higher pressure ratings optionally available)

Max. temperature:

DG11.S/K…: 300 °F / 150 °C (536 °F / 280 °C with borosilicate glass)
DG11.RK…: 248 °F / 120 °C
DG11.RP…: 300 °F / 150 °C (500 °F / 260 °C with borosilicate glass)

DS01

Miniature Variable Area Flowmeter And Switch

- small mounting dimensions
- materials brass or stainless steel
- scales for water and air
- universal mounting position
- high switching accuracy
- very small switch hysteresis

Description:
The flowmeter and switch model DS01 works according to a modified variable area principle.
The float is guided in a cylindrical measuring glass by means of a spring. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via a burnt-in scale on the measuring glass.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full switching range of the meter.

Application:
The variable area flowmeter and switch model DS01 is used for measuring and monitoring the flow of low viscosity liquids and gases, i. e. in cooling cicuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Switching hysteresis:
By careful selection of the Reed contacts the switching hysteresis could be reduced to only 0.02" - 0.06" / 0.5 - 1.5 mm float movement.

Measuring Ranges:

Water: 0.08 - 0.95 GPH ... 16 - 40 GPM
5 - 60 ml/min ... 60 -150 l/min
Air: 0.4 - 2.75 SCFH ... 7.0 - 22.0 SCFM
0.2 -1.3 Nl/min ... 200 - 625 Nl/min
(at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Materials:
brass or stainless steel

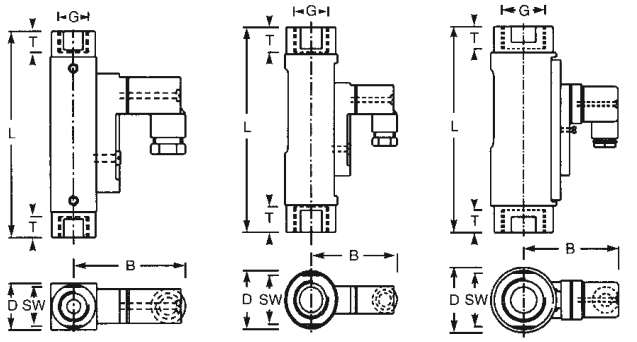
Contacts:

Contact function	DS01.1	DS01.2	DS01.3 / DS01.4 DS01.5
N/O	200V, 1A, 20VA	230 V, 3A, 60 VA	250 V, 3 A, 100 VA
SPDT	200 V, 1A, 20VA	250 V, 1.5A, 50 VA	250 V, 1.5 A, 50 VA
N/O*			250 V, 2A, 60VA
SPDT*			250 V, 1A, 30VA

* according to Atex 100a Ex II 2 G, EEx m II T6

Dimensions:

Model	Mounting dimensions in inch / mm						Weight (lbs / g)
	SW	D	B	NPT / G	T	L	
DS01.1	0.67 / 17	0.79 / 20	1.93 / 49	1/4	0.39 / 10	3.54 / 90	0.31 / 140
DS01.2	1.06 / 27	1.26 / 32	2.09 / 53	1/2	0.55 / 14	4.89 / 114	0.66 / 300
DS01.3	1.61 / 41	1.97 / 50	3.03 / 77	3/4	0.67 / 17	5.47 / 139	1.98 / 900
DS01.4	1.61 / 41	1.97 / 50	3.03 / 77	1	0.67 / 17	6.22 / 158	1.98 / 900
DS01.5	1.61 / 41	1.97 / 50	3.03 / 77	1 1/4	0.67 / 17	6.54 / 166	2.03 / 920



DS01.1 **DS01.2** **DS01.3 / DS01.4**

Electrical connection

Technical Specifications:

max. pressure: DS01.1: 230 psi / 16 bar
DS01.2 / DS01.3 / DS01.4: 145 psi / 10 bar
pressure drop: DS01.1: 0.29-2.9 psi / 0.02-0.2 bar
DS01.2: 0.29-4.35 psi / 0.02-0.3 bar
DS01.3 / DS01.4: 0.29-5.8 psi / 0.02-0.4 bar
max. temperature: 212 °F / 100 °C (optionally 320 °F / 160 °C) for liquids, 194 °F / 90 °C for gases
materials: measuring glass: Duran 50
housing: anodized alumin
O-rings: Buna, (optionally: Viton,EPDM)
electr. connection: plug acc. to DIN 43650 (optionally: 1 m cable connection for DS01.1, N/O only)
accuracy: ± 10% f.s.
analog output: see model DSxx-A in section "accessory"

Ordering Code:

Order number: **DS01. | 1. | 1. | 1. | W13. | 1. | 1. | 0**

Miniature variable area flowmeter and switch

Connection:

1N = 1/4" NPTF	1 = G 1/4 female
2N = 1/2" NPTF	2 = G 1/2 female
3N = 3/4" NPTF	3 = G 3/4 female
4N = 1" NPTF	4 = G 1 female
5N = 1 1/4" NPTF	5 = G 11/4 female

Material:
1 = brass, spring of st. steel 304 / 1.4310
2 = all stainless steel 316 TI / 1.4571

Scale:
1 = for water
2 = for air (14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Measuring ranges:

DS01.1 only:

Water:	WU101 = 0.08-0.95 GPH	W101 = 5-60 ml/min
	WU102 = 0.4-2.0 GPH	W102 = 20-140 ml/min
	WU106 = 1.6-9.5 GPH	W106 = 0.1-0.6 l/min
	WU11 = 3-19 GPH	W11 = 0.2-1.2 l/min
	WU12 = 0.1-0.5 GPM	W12 = 0.4-2 l/min
	WU13 = 0.13-0.8 GPM	W13 = 0.5-3 l/min
	WU15 = 0.25-1.3 GPM	W15 = 1.0-5 l/min
Air:	LU1001 = 0.4-2.75 SCFH	L1001 = 0.2 -1.3 Nl/min
	LU1002 = 1.05-4.25 SCFH	L1002 = 0.5-2.0 Nl/min
	LU1003 = 1.7-6.4 SCFH	L1003 = 0.8-3 Nl/min
	LU1005 = 3.5-10.5 SCFH	L1005 = 1.5-5.0 Nl/min
	LU1008 = 4.5-17.0 SCFH	L1008 = 2-8 Nl/min
	LU1012 = 6.5-25.0 SCFH	L1012 = 3-12 Nl/min
	LU1014 = 7.5-29.5 SCFH	L1014 = 3.5-14 Nl/min
	LU1020 = 12-42 SCFH	L1020 = 5.5-20 Nl/min
	LU1024 = 15-50 SCFH	L1024 = 7-24 Nl/min
	LU1035 = 21-74 SCFH	L1035 = 10-35 Nl/min
	LU1042 = 21-89 SCFH	L1042 = 10-42 Nl/min

DS01.2 only:

Water:	WU205 = 1.6-8 GPH	W205 = 0.1-0.5 l/min
	WU21 = 3.2-16 GPH	W21 = 0.2-1 l/min
	WU22 = 0.1-0.4 GPM	W22 = 0.4-1.6 l/min
	WU24 = 0.25-1.0 GPM	W24 = 1-4 l/min
	WU28 = 0.55-2.0 GPM	W28 = 2-8 l/min
	WU215 = 1.1-4.0 GPM	W215 = 4-15 l/min
	WU220 = 1.5-5.5 GPM	W220 = 5-22 l/min
	WU228 = 1.5-7.5 GPM	W228 = 6-28 l/min
Air:	LU2012 = 6,5-25,0 SCFH	L2012 = 3-12 Nl/min
	LU2030 = 15-64 SCFH	L2030 = 7-30 Nl/min
	LU2040 = 25-85 SCFH	L2040 = 12-40 Nl/min
	LU2125 = 1.0-4.4 SCFM	L2125 = 28-125 Nl/min
	LU2200 = 1.8-7.0 SCFM	L2200 = 50-200 Nl/min
	LU2420 = 3.5-14.8 SCFM	L2420 = 100-420 Nl/min
	LU2480 = 4.2-17 SCFM	L2480 = 120-480 Nl/min

DS01.3, DS01.4 and DS01.5:

Water:	WU3030 = 2.1-8.0 GPM	W3030 = 8 - 30 l/min
	WU3045 = 4.0-12.0 GPM	W3045 = 15-45 l/min
	WU3090 = 8.0-24.0 GPM	W3090 = 30-90 l/min
Air:	LU30080 = 48-170 SCFH	L30080 = 22.5-80 Nl/min
	LU30130 = 105-275 SCFH	L30130 = 50-130 Nl/min
	LU30420 = 4.6-14.8 SCFM	L30420 = 130-420 Nl/min
	LU30625 = 7.0-22.0 SCFM	L30625 = 200-625 Nl/min

DS01.4 or DS01.5:

Water:	WU3150 = 16-40 GPM	W3150 = 60-150 l/min

No. of contacts:
1 = 1 contact
2 = 2 contacts

Contact function:
1 = N/O
2 = SPDT
3S = Ex-N/O (EEx m II T6), DS01.3, DS01.4, DS01.5 only
3U = Ex-SPDT (EEx m II T6), DS01.3, DS01.4, DS01.5 only

Options:
0 = without
1 = please indicate

DS02

Miniature Variable Area Flow Switch

- small mounting dimensions
- materials brass or stainless steel
- scales for water and air
- universal mounting position
- high switching accuracy
- very small switch hysteresis

Description:
The flow switch model DS02 works according to a modified variable area principle.
The float is guided in a cylindrical measuring tube by means of a spring. The flowing medium moves the float in the flow direction.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full switching range of the meter.

Application:
The variable area flow switch model DS02 is used for monitoring the flow of low viscosity liquids and gases, i e. in cooling cicuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Switching hysteresis:
By careful selection of the Reed contacts the swiching hysteresis could be reduced to only 0.02" - 0.06" / 0.5 - 1.5 mm float movement.

Measuring Ranges:

Water: 0.08 - 0.95 GPH … 16 - 40 GPM
5 - 60 ml/min … 60 -150 l/min
Air: 0.4 - 2.75 SCFH … 7.0 - 22.0 SCFM
0.6 -2.2 Nl/min … 200 - 650 Nl/min
(at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Materials:
brass or stainless steel

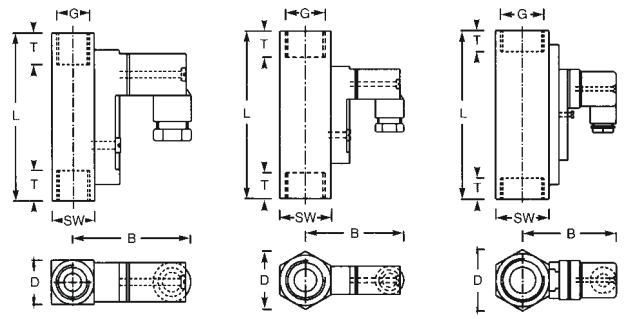
Contacts:

Contact function	DS02.1	DS02.2	DS02.3 / DS02.4
N/O	200 V, 1A, 20 VA	230 V, 3A, 60 VA	250 V, 3 A, 100 VA
SPDT	200 V, 1A, 20 VA	250 V, 1.5 A, 50 VA	250 V, 1.5 A, 50 VA
N/O*			250 V, 2A, 60VA
Ex-SPDT*			250 V, 1A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6

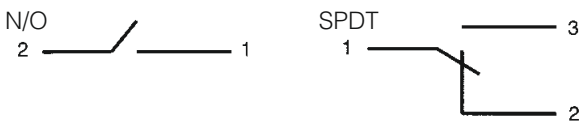
Dimensions:

Model	Mounting dimensions in inch / mm						Weight
	SW	D	B	NPT / G	T	L	(lbs / g)
DS02.1	0.67 / 17	0.67 / 17	1.85 / 47	1/4	0.39 / 10	2.56 / 65	0.31 / 140
DS02.2	1.06 / 27	1.22 / 31	2.05 / 52	1/2	0.55 / 14	3.53 / 90	0.77 / 350
DS02.3	1.61 / 41	1.85 / 47	2.99 / 76	3/4	0.83 / 21	5.98 / 152	2.43/1100
DS02.4	1.61 / 41	1.85 / 47	2.99 / 76	1	0.67 / 17	5.12 / 130	2.65/1200



DS02.1 **DS02.2** **DS02.3 / DS02.4**

Electrical connection



Technical Specifications:

max. pressure: DS02.1/2 4350 psi / 300 bar (brass), 5000 psi / 350 bar (stainless steel) DS02.3/4 3600 psi / 250 bar (brass), 4350 psi / 300 bar (stainless steel)

pressure drop: DS02.1: 0.29-2.9 psi / 0.02-0.2 bar DS02.2: 0.29-4.35 psi / 0.02-0.3 bar DS02.3/4: 0.29-5.8 psi / 0.02-0.8 bar

max. temperature: 212 °F / 100 °C (optionally 320 °F / 160 °C) for liquids, 194 °F / 90 °C for gases

materials:
brass version: housing: nickel plated brass
st. steel version: stainless steel: 316 Ti / 1.4571

electr. connection: plug acc. to DIN 43650 (optionally: 1m cable connection for DS02.1, N/O only)

accuracy: ± 10% f.s.

analog output: see model DSxx-A in section “accessory”

Ordering Code:

Order number: **DS02. | 1. | 1. | 1. | W13 | 1. | 1. | 0**

Miniature variable area flow switch

Connection:
2N = 1/2" NPTF
3N = 3/4" NPTF
1 = G 1/4 female
2 = G 1/2 female
3 = G 3/4 female
4 = G 1 female

Material:
1 = brass, spring of st. steel 304 / 1.4310
2 = all stainless steel 316 Ti / 1.4571

Scale:
1 = for water
2 = for air (14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Measuring ranges:

DS02.1 only:

Water:	WU101	= 0.08-0.95 GPH	W101	= 5-60 ml/min
	WU102	= 0.65-2.05 GPH	W102	= 40-130 ml/min
	WU106	= 1.6-9.5 GPH	W106	= 0.1-0.6 l/min
	WU11	= 3-19 GPH	W11	= 0.2-1.2 l/min
	WU12	= 6.5-41.5 GPH	W12	= 0.4-2 l/min
	WU13	= 8.0-48.0 GPH	W13	= 0.5-3 l/min
	WU15	= 16.0-80.0 GPH	W15	= 1.0-5 l/min
Air:	LU1002	= 1.30-4.70 SCFH	L1002	= 0.6-2.2 Nl/min
	LU1006	= 3.50-12.70 SCFH	L1006	= 1.7-6.0 Nl/min
	LU1008	= 5.3-17.0 SCFH	L1008	= 2.5-8.0 Nl/min
	LU1012	= 6.5-25.5 SCFH	L1012	= 3-12 Nl/min
	LU1022	= 6.0-47.0 SCFH	L1022	= 3-22 Nl/min
	LU1024	= 15.0-51.0 SCFH	L1024	= 7-24 Nl/min
	LU1034	= 25.0-72.0 SCFH	L1034	= 12-34 Nl/min
	LU1056	= 34-119 SCFH	L1056	= 16-56 Nl/min
	LU1080	= 42-170 SCFH	L1080	= 20-80 Nl/min

DS02.2 only:

Water:	WU202	= 0.30-3.35 GPH	W202	= 0.02-0.2 l/min
	WU206	= 3.20-9.50 GPH	W206	= 0.2-0.6 l/min
	WU21	= 6.5-28.5 GPH	W21	= 0.4-1.8 l/min
	WU23	= 13.0-51.0 GPH	W23	= 0.8-3.2 l/min
	WU27	= 32.0-111 GPH	W27	= 2-7 l/min
	WU213	= 48.0-205 GPH	W213	= 3-13 l/min
	WU220	= 65.0-315 GPH	W220	= 4-20 l/min
	WU230	= 130-480 GPH	W230	= 8-30 l/min
Air:	LLU2010	= 5.5-21.0 SCFH	L2010	= 2.5-10 Nl/min
	LU2020	= 12.0-42.0 SCFH	L2020	= 5.5-20 Nl/min
	LU2030	= 17.0-64.0 SCFH	L2030	= 8-30 Nl/min
	LU2035	= 21.0-74.0 SCFH	L2035	= 10-35 Nl/min
	LU2090	= 50.0-190 SCFH	L2090	= 24-90 Nl/min
	LU2220	= 115-465 SCFH	L2220	= 55-220 Nl/min
	LU2240	= 140-510 SCFH	L2240	= 65-240 Nl/min
	LU2300	= 170-640 SCFH	L2300	= 80-300 Nl/min
	LU2525	= 5.00-18.50 SCFM	L2525	= 140-525 Nl/min

DS02.3 or DS02.4:

Water:	WU3030	= 160-480 GPH	W3030	= 11-30 l/min
	WU3045	= 240-710 GPH	W3045	= 15-45 l/min
	WU3060	= 320-950 GPH	W3060	= 20-60 l/min
	WU3090	= 8.00-24.0 GPM	W3090	= 30-90 l/min
Air:	LU30180	= 125-380 SCFH	L30180	= 60-180 Nl/min
	LU30300	= 210-635 SCFH	L30300	= 100-300 Nl/min
	LU30650	= 7.00-23.0 SCFM	L30650	= 200-650 Nl/min

DS02.4 only:

Water:	WU3150	= 16.0-40.0 GPM	W3150	= 60-150 l/min

No. of contacts:
1 = 1 contact
2 = 2 contacts

Contact function:
1 = N/O
2 = SPDT
3S = Ex-N/O (EEx m II T6), DS02.3, DS02.4 only
3U = Ex-SPDT (EEx m II T6), DS02.3, DS02.4 only

Options:
0 = without
1 = please indicate

DS03

Variable Area Flowmeter And Switch

- small mounting dimensions
- materials brass or stainless steel
- scales for water and air
- high switching accuracy
- very small switch hysteresis
- measuring glass with burnt-in scale

Description:
The flowmeter and switch model DS03 works according to a modified variable area principle.
The float is guided in a cylindrical measuring glass. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via a burnt-in scale on the measuring glass.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full measuring range of the meter.

Application:
The variable area flowmeter and switch model DS03 is used for measuring and monitoring the flow of low viscosity liquids and gases, i. e. in cooling cicuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Measuring Ranges:

Water: 1.6-23.8 GPH…60…790 GPH
0.1-1.5 l/min … 4-50 l/min
Air: 6.5-63.5 SCFH…7-56.5 SCFM
3-30 Nl/min … 200-1600 Nl/min
at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C

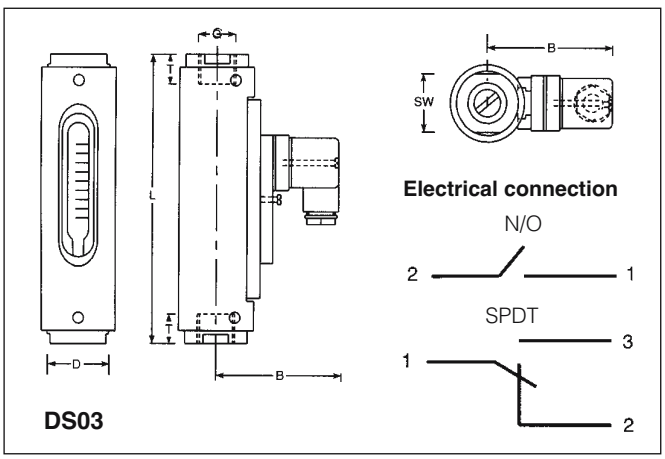
Materials: brass or stainless steel

Contacts:
N/O: 250 V, 3 A, 100 VA
SPDT: 250 V, 1.5 A, 50 VA
Ex- N/O*: 250 V, 2 A, 60 VA
Ex-SPDT*: 250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6

Dimensions:

Model	Mounting dimensions in inch / mm						Weight
	SW	D	B	NPT / G	T	L	lbs / g
DS03.1.x.x.x	1.26 / 32	1.69 / 43	2.87 / 73	1/4	0.55 / 14	5.20 / 132	1.38 / 625
DS03.2.x.x.x	1.26 / 32	1.69 / 43	2.87 / 73	1/2	0.59 / 15	5.31 / 13	1.38 / 625
DS03.2.x.x.05	1.26 / 32	1.69 / 43	2.87 / 73	1/2	0.59 / 15	6.42 / 163	1.43 / 650
DS03.3.x.x.05	1.26 / 32	1.69 / 43	2.87 / 73	3/4	0.63 / 16	6.57 / 167	1.43 / 650
DS03.3.x.x.06/07	1.61 / 41	1.97 / 50	2.99 / 76	3/4	0.71 / 18	6.46 / 164	2.21 / 1000
DS03.4.x.x.06/07	1.61 / 41	1.97 / 50	2.99 / 76	1	0.75 / 19	7.24 / 184	2.21 / 1000
DS03.4.x.x.08	1.61 / 41	1.97 / 50	2.99 / 76	1	0.79 / 20	7.87 / 200	2.43 / 1100



DS03

Technical Specifications:

max. pressure: 145 psi / 10 bar

pressure drop: 0.15-2.9 psi / 0.01-0.2 bar

max. temperature: 212 °F / 100 °C
(320 °F / 160 °C optionally) for liquids, 194 °F / 90 °F for gases

materials: Measuring glass: Duran 50
Housing: anodized aluminium
O-rings: Buna,
(optionally: Viton, EPDM)

electrical connections: plug acc. to DIN 43650
(optionally: 1 m cable connection)

accuracy: ± 5% f. s.

ananlog output: see model DSxx-A
in section "accessory"

Ordering Code:

Order number: DS03. 3. 1. 1. WA06. 1. 1. 0

Variable area flowmeter and switch

Connection:
1N = 1/4" NPT female — 1 = G 1/4 female
2N = 1/2" NPT female — 2 = G 1/2 female
3N = 3/4" NPT female — 3 = G 3/4 female
4N = 1" NPT female — 4 = G 1 female

Material:
1 = brass
2 = all st. steel 316 Ti / 1.4571

Scale:
1 = for Water
2 = for air (at 14.7 psia / 1.013 bar abs., 68 °F / 20 °C)

Measuring ranges:

DS03.1 and DS03.2:

Water WU01 = 1.6 - 23.8 GPH — WA01 = 0.1 - 1.5 l/min
WU02 = 3.2 - 47.5 GPH — WA02 = 0.2 - 3 l/min
WU03 = 5.0 - 127 GPH — WA03 = 0.3 - 8 l/min
WU04 = 16 - 190 GPH — WA04 = 1 - 12 l/min

Air LU01 = 6.5 - 63.5 SCFH — LA01 = 3 - 30 Nl/min
LU02 = 13 - 127 SCFH — LA02 = 6-60 Nl/min
LU03 = 13 - 340 SCFH — LA03 = 6-160 Nl/min
LU04 = 42 - 465 SCFH — LA04 = 20-220 Nl/min

DS03.2 and DS03.3:

Water WU05 = 32 - 285 GPH — WA05 = 2 - 18 l/min

Air LU05 = 85 - 760 SCFH — LA05 = 40 - 360 Nl/min

DS03.3 and DS03.4:

Water WU06 = 48 - 550 GPH — WA06 = 3 - 35 l/min
WU07 = 60 - 790 GPH — WA07 = 4 - 50 l/min

Air LU06 = 2.1 - 24.7 SCFM — LA06 = 60 - 700 Nl/min
LU07 = 2,0 - 29,0 SCFM — LA07 = 60 - 825 Nl/min

DS03.4 only:

Water LU08 = 7 - 56.5 SCFM — LA08 = 200 - 1600 Nl/min

No. of contacts:
0 = without contact
1 = 1 contact
2 = 2 contacts

Contact function:
0 = without contact
1 = N/O
2 = SPDT
3S = Ex-N/O (EEx m II T6)
3U = Ex-SPDT (EEx m II T6)

Options:
0 = without
1 = please indicate

DS04

Variable Area Flowmeter And Switch For High Pressure Applications

- small mounting dimensions
- materials brass or stainless steel
- scales for water and air
- high switching accuracy
- very small switch hysteresis
- robust design without glass measuring tube
- suitable for pressures up to 4350 psi / 300 bar

Description:
The flowmeter and switch model DS04 works according to a modified variable area principle.
The float is guided in a cylindrical measuring tube by means of a slotted nozzle. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time. The Reed contact is adjustable over the full measuring and switching range of the meter.

Application:
The variable area flowmeter and switch model DS04 is used for measuring and monitoring the flow of low viscosity liquids and gases, i. e. in cooling cicuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Versions:

- flow switch only with Reed contact
- optionally as flow meter and switch with external pointer indicator and contact

Measuring Ranges:
Water: 1.5-23.8 GPH … 65-790 GPH
Air: 2-59 SCFH … 7-51 SCFM
(at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

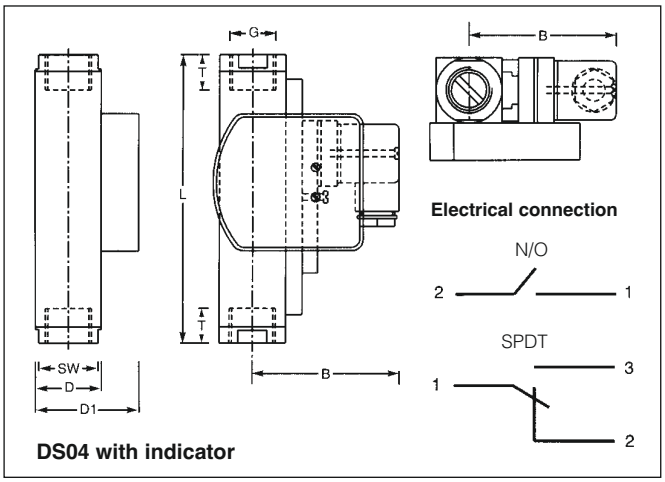
Materials: brass or stainless steel

Contacts:
N/O: 250 V, 3 A, 100 VA
SPDT: 250 V, 1.5 A, 30 VA
Ex- N/O*: 250 V, 2 A, 60 VA
Ex-SPDT*: 250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6

Dimensions:

Model	Mounting dimensions in inch / mm							Weight (lbs / g)	
	SW	D	D1	B	NPT / G	T	L	without	with indication
DS04.1.x.x.x	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/4"	0.55 / 14	5.12 / 130	1.76 / 800	1.87 / 850
DS04.2.x.x.x	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/2"	0.59 / 15	5.12 / 130	1.76 / 800	1.87 / 850
DS04.2.x.x.05	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/2"	0.59 / 15	5.83 / 148	1.87 / 850	1.98 / 900
DS04.3.x.x.x	1.34 / 34	1.57 / 40	2.24 / 57	2.80 / 71	3/4"	0.71 / 18	5.98 / 152	2.97 / 1350	3.08 / 1400
DS04.4.x.x.06/07	1.42 / 36	1.42 / 36	2.09 / 53	2.99 / 76	1"	0.75 / 19	6.14 / 156	2.31 / 1050	2.42 / 1100
DS04.4.x.x.08	1.97 / 50	1.97 / 50	2.64 / 67	2.99 / 76	1"	0.79 / 20	7.87 / 200	6.06 / 2750	6.17 / 2800



DS04 with indicator

Technical Specifications:

max. pressure: brass version: 2900 psi / 200 bar
st. steel version: 4350 psi / 300 bar
pressure drop: 0.29-5.8 psi / 0.02-0.4 bar
max. temperature: 212 °F / 100 °C (320 °F / 160 °C on request) for liquids, 194 °F / 90 °C for gases
materials:
wetted parts:
brass version: nickel plated brass
st. steel version: st. steel 316 Ti / 1.4571
O-rings: Buna (optionally: Viton, EPDM)
electrical connection: plug acc. to DIN 43650 (optionally: 1m cable connection)
accuracy: ± 5% f. s. for water, ± 10% f. s. for air
analog output: see model DSxx-A in section "accessories"

Ordering Code:

Order number: DS04. 4. 1. 1. WA06. 1. 1. 1. 0

Variable area flowmeter and switch

Connection:
1N = 1/4" NPT female
2N = 1/2" NPT female
3N = 3/4" NPT female
4N = 1" NPT female
1 = G 1/4 female
2 = G 1/2 female
3 = G 3/4 female
4 = G 1 female

Material:
1 = brass
2 = all st. steel AISI 316 Ti / 1.4571

Scale:
1 = for water
2 = for air (at 14.7 psia / 1.013 bar abs. and 68 °F / 20 °C)

Measuring ranges:

DS04.1 and DS04.2:

Water	WU01 = 1.5 – 23.8 GPH	WA01 = 0.1 - 1.5 l/min
	WU02 = 3.0 – 47.5 GPH	WA02 = 0.2 - 3 l/min
	WU03 = 1.0 – 127 GPH	WA03 = 0.3 - 8 l/min
	WU04 = 16 – 190 GPH	WA04 = 1 - 12 l/min
Air	LU01 = 2 – 59 SCFH	LA01 = 1 - 28 Nl/min
	LU02 = 8 – 127 SCFH	LA02 = 4 - 60 Nl/min
	LU03 = 15 – 340 SCFH	LA03 = 6 - 160 Nl/min
	LU04 = 40 – 510 SCFH	LA04 = 20 - 240 Nl/min

DS04.2 and DS04.3:

Water	WU05 = 32 – 285 GPH	WA05 = 2 - 18 l/min
Air	LU05 = 80 – 760 SCFH	LA05 = 40 - 360 Nl/min

DS04.3 and DS04.4:

Water	WU06 = 50 – 555 GPH	WA06 = 3 - 35 l/min
	WU07 = 65 – 790 GPH	WA07 = 4 - 50 l/min
Air		LA06 = 60 - 700 Nl/min
	LU07 = 2 – 24.5 SCFM	LA07 = 80 - 1000 Nl/min

DS04.4 only:

Air	LU08 = 7 – 51 SCFM	LA08 = 200 - 1400 Nl/min

Version:
0 = switch only, without flow rate indication
1 = flow meter and switch, with side indicator

No. of contacts:
0 = without contact
1 = 1 contact
2 = 2 contacts

Contact function:
0 = without contact
1 = N/O
2 = SPDT
3S = Ex-N/O (EEx m II T6)
3U = Ex-SPDT (EEx m II T6)

Options:
0 = without
1 = please indicate

DS05

Variable Area Flowmeter And Switch, Mounting Independent

- any mounting position without recalibration
- small mounting dimensions
- materials brass or stainless steel
- high switching accuracy
- very small switch hysteresis
- measuring glass with burnt-in scale

Description:
The flowmeter and switch model DS05 works according to a modified variable area principle.
The float is guided in a cylindrical measuring glass by means of a spring. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via a burnt-in scale on the measuring glass.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full switching range of the meter.

Mounting Position and Reliability:
The built-in spring and the magnetic float guarantee an absolute reliability of the meter. This spring, which pushes the float back towards its zero position against the flow makes it possible to use the meter in any mounting position. The spring is artificially aged, thus eliminating the need for recalibration to the different mounting positions.

Application:
The variable area flowmeter and switch model DS05 is used for measuring and monitoring the flow of low viscosity liquids, i. e. in cooling cicuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Measuring Ranges:

3.0-63 GPH ... 9.0-66 GPM water
0.2 - 4 l/min ... 35 - 250 l/min water

Materials: brass or stainless steel

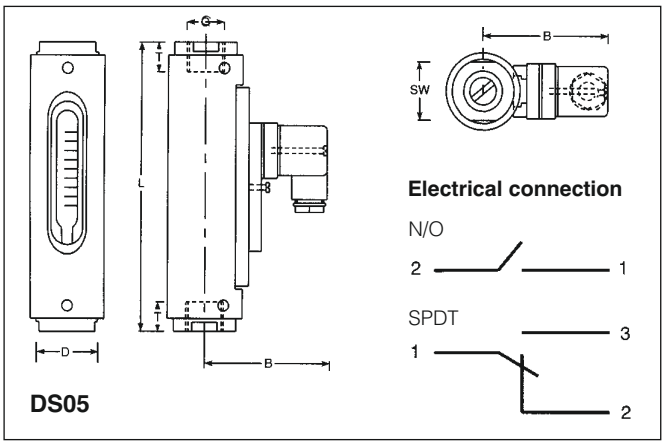
Contacts:

N/O:	250 V, 3 A, 100 VA
SPDT :	250 V, 1.5 A, 30 VA
Ex-N/O* :	250 V, 2 A, 60 VA
Ex-SPDT*:	250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6

Dimensions:

Model	Mounting dimensions in inch / mm						Weight
	SW	D	B	NPT / G	T	L	(lbs / g)
DS05.1.x.x.x	1.26 / 32	1.69 / 43	2.87 / 73	1/4"	0.55 / 14	5.20 / 132	1.38 / 625
DS05.2.x.x.x	1.26 / 32	1.69 / 43	2.87 / 73	1/2"	0.59 / 15	5.31 / 135	1.38 / 625
DS05.2.x.x.05	1.26 / 32	1.69 / 43	2.87 / 73	1/2"	0.59 / 15	6.42 / 163	1.43 / 650
DS05.3.x.x.06	1.26 / 32	1.69 / 43	2.87 / 73	3/4"	0.71 / 18	6.57 / 167	1.87 / 850
DS05.3.x.x.07	1.61 / 41	1.97 / 50	2.99 / 76	3/4"	0.71 / 18	5.98 / 152	2.20 / 1000
DS05.4.x.x.07	1.61 / 41	1.97 / 50	2.99 / 76	1"	0.75 / 19	6.14 / 156	2.20 / 1000
DS05.4.x.x.08/09	1.61 / 41	1.97 / 50	2.99 / 76	1"	0.75 / 19	7.48 / 190	2.20 / 1000
DS05.5.x.x.10	1.81 / 46	2.36 / 60	3.19 / 81	1 1/4"	0.83 / 21	8.27 / 210	3.08 / 1400
DS05.5.x.x.11	1.81 / 46	2.17 / 55	3.11 / 79	1 1/4"	0.83 / 21	8.74 / 222	3.08 / 1400



DS05

Technical Specifications:

max. pressure: 145 psi / 10 bar

pressure drop: 0.15-11.6 psi / 0.01-0.8 bar

max. temperature: 212 °F / 100 °C
(320 °F / 160 °C on request)

materials: Measuring glass: Duran 50
Housing: anodized aluminium
O-rings: Buna
(optionally: Viton, EPDM)

electr. connection: plug acc. to DIN 43650
(optionally: 1 m cable connection)

accuracy: ± 5% f. s.

analog output: see model DSxx-A
in section "accessory"

Ordering Code:

Order number: DS05. 3. 1. 1. 06. 1. 1. 0

Variable area flowmeter and switch

Connection:

1N = 1/4" NPT female	1 = G 1/4 female
2N = 1/2" NPT female	2 = G 1/2 female
3N = 3/4" NPT female	3 = G 3/4 female
4N = 1" NPT female	4 = G 1 female
5N = 1 1/4" NPT female	5 = G 1 1/4 female

Material:
1 = brass, spring of steel 1.4310
2 = all st. steel 1.4571

Scale:
1 = for water

Measuring ranges (water):

DS05.1 and DS05.2:

01U = 3.0 - 63 GPH	01 = 0.2 - 4 l/min
02U = 8.0 - 95 GPH	02 = 0.5 - 6 l/min
03U = 8.0 - 127 GPH	03 = 0.5 - 8 l/min
04U = 8.0 - 222 GPH	04 = 0.5 - 14 l/min

DS05.2 only:

05AU = 32 - 350 GPH	05A = 2 - 22 l/min
05U = 16 - 444 GPH	05 = 1 - 28 l/min

DS05.3 only:

06U = 40 - 710 GPH	06 = 2 - 45 l/min

DS05.3 and DS05.4:

07U = 0.5 - 21 GPM	07 = 2 - 80 l/min
07AU = 1.6 - 23.8 GPM	07A = 6 - 90 l/min.

DS05.4 only:

08U = 1.6 - 29 GPM	08 = 6 - 110 l/min

DS05.5 only:

09U = 4 - 39.5 GPM	09 = 15 - 150 l/min
10U = 8 - 58 GPM	10 = 30 - 220 l/min
11U = 9 - 66 GPM	11 = 35 - 250 l/min

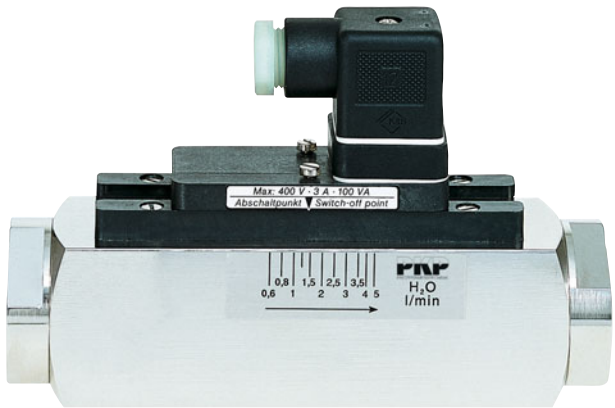
No. of contacts:
0 = without contact
1 = 1 contact
2 = 2 contacts

Contact function:
0 = without contact
1 = N/O
2X = SPDT for SPS application
3S = Ex-N/O (EEx m II T6)
3U = Ex-SPDT (EEx m II T6)

Options:
0 = without
1 = please indicate

DS06

Variable Area Flowmeter And Switch For High Pressure Applications, Mounting Independent



- any mounting position without recalibration
- small mounting dimensions
- materials brass or stainless steel
- high switching accuracy
- very small switch hysteresis
- robust design without glass measuring tube
- suitable for pressures up to 4350 psi / 300 bar

Description:
The flowmeter and switch model DS06 works according to a modified variable area principle.
The float is guided in a cylindrical measuring tube by means of a slotted nozzle. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full switching range of the meter.

Mounting Position and Reliability:
The built-in spring and the magnetic float guarantee an absolute reliability of the meter. This spring, which pushes the float back towards its zero position against the flow makes it possible to use the meter in any mounting position. The spring is artificially aged, thus eliminating the need for recalibration to the different mounting positions.

Application:
The variable area flowmeter and switch model DS06 is used for measuring and monitoring the flow of low viscosity liquids and gases, i. e. in cooling cicuits of welding machines and laser systems, for pump monitoring, compressors and many other applications.

Versions:

- flow switch only with Reed contact
- optionally as flow meter and switch with external pointer indicator and contact

Measuring ranges:
3.0 - 63.5 GPH ... 9 - 66 GPM
0.2 - 4 l/min ... 35 - 250 l/min

Materials: brass or stainless steel

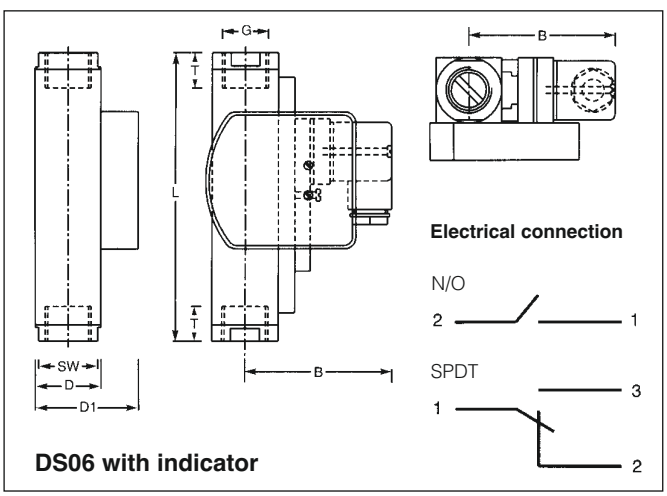
Contacts:

N/O:	250 V, 3 A, 100 VA
SPDT:	250 V, 1.5 A, 50 VA
Ex-N/O*:	250 V, 2 A, 60 VA
Ex-SPDT*:	250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6

Dimensions:

Model	Mounting dimensions in inch / mm							Weight (lbs / g)	
	SW	D	D1	B	G	T	L	without indication	with
DS06.1.x.x.x	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/4"	0.55 / 14	5.12 / 130	1.67 / 800	1.87 / 850
DS06.2.x.x.x	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	1/2"	0.55 / 14	5.12 / 130	1.87 / 850	1.98 / 900
DS06.2.x.x.07/08	1.06 / 27	1.18 / 30	1.85 / 47	2.80 / 71	3/4"	0.63 / 16	5.83 / 148	1.98 / 900	2.09 / 950
DS06.3.x.x.x	1.34 / 34	1.57 / 40	2.24 / 57	2.99 / 76	3/4"	0.71 / 18	5.98 / 152	3.08 / 1400	3.19 / 1450
DS06.4.x.x.9-11	1.42 / 36	1.42 / 36	2.09 / 53	2.99 / 76	1"	0.75 / 19	6.14 / 156	2.42 / 1100	2.53 / 1150
DS06.5.x.x.x	1.97 / 50	1.97 / 50	2.64 / 67	2.95 / 75	1 1/4"	0.83 / 21	7.87 / 200	6.61 / 3000	6.72 / 3050
DS06.6.x.x.x	2.17 / 55	2.17 / 55	2.83 / 72	3.07 / 78	1 1/2"	0.94 / 24	7.87 / 200	8.37 / 3800	8.48 / 3850



DS06 with indicator

Technical Specifications:

max. pressure:

brass version:	2900 psi / 200 bar
st. steel version:	4350 psi / 300 bar
pressure drop:	0.29-11.6 psi / 0.02-0.8 bar
max. temperature:	212 °F / 100 °C, (320 °F / 160 °C on request)

materials:

wetted parts:	
brass:	nickel plated brass
st. steel:	st. steel 316 Ti / 1.4571
O-rings:	Buna (opt. Viton, EPDM)

electr. connection: plug acc. DIN 43650 (optionally: 1m cable connection)

accuracy: ± 5% f. s.

analog output: see model DSxx-A in section "accessories"

Ordering Code:

Order number DS06. | 3. | 1. | 1. | 09. | 1. | 1. | 1. | 0

Variable area flowmeter and switch

Connection:

1N = 1/4" NPT female	1 = G 1/4 female
2N = 1/2" NPT female	2 = G 1/2 female
3N = 3/4" NPT female	3 = G 3/4 female
4N = 1" NPT female	4 = G 1 female
	5 = G 1 1/4 female
	6 = G 1 1/2 female

Material:
1 = brass, spring st. steel 304 / 1.4310
2 = all st. steel 316 Ti / 1.4571

Scale:
1 = for water

Measuring ranges:

DS06.1 and DS06.2:	
01U = 3.0 – 63.5 GPH	01 = 0.2 - 4 l/min water
	02 = 0.4 - 4.5 l/min water
03U = 9.5 – 79 GPH	03 = 0.6 - 5 l/min water
04U = 8 – 127 GPH	04 = 0.5 - 8 l/min water
05U = 15 – 222 GPH	05 = 1 - 14 l/min water
06U = 15 – 445 GPH	06 = 1 - 28 l/min water
DS06.2 and DS06.3:	**DS06.2 and DS06.3:**
07U = 30 – 635 GPH	07 = 2 - 40 l/min water
08U = 60 – 870 GPH	08 = 4 - 55 l/min water
DS06.3 and DS06.4:	**DS06.3 and DS06.4:**
09U = 0.30 – 18.5 GPM	09 = 1 - 70 l/min water
10U = 2.1 – 23.8 GPM	10 = 8 - 90 l/min water
11U = 1.3 – 29 GPM	11 = 5 - 110 l/min water
DS06.5 only:	**DS06.5 only:**
12U = 2.6 – 39.5 GPM	12 = 10 - 150 l/min water
DS06.5 and DS06.6:	**DS06.5 and DS06.6:**
13U = 9 – 58 GPM	13 = 35 - 220 l/min water
14U = 9 – 66 GPM	14 = 35 - 250 l/min water

Version:
0 = switch only, without flow rate indication
1 = flow meter and switch, with side indicator

No. of contacts:
0 = without contact
1 = 1 contact
2 = 2 contacts

Contact function:
0 = without contact
1 = N/O
2X = SPDT for SPS application
3S = Ex-N/O (EEx m II T6)
3U = Ex-SPDT(EEx m II T6)

Options:
0 = without
1 = please indicate

attention: please indicate flow-direction and mounting position.

DS07

Viscosity Compensated Variable Area Flowmeter And Switch, Mounting Independent

- for viscous media up to 600 cSt
- mounts in any position without recalibration
- compact design
- materials brass or stainless steel
- high switching accuracy
- very small switch hysteresis
- measuring glass with burnt-in scale

Description:
The flowmeter and switch model DS07 works according to a modified variable area principle.
The float is guided in a cylindrical measuring glass by means of a spring. The flowing medium moves the float in the flow direction. The upper edge of the float shows the momentary flow via a burnt-in scale on the measuring glass.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full measuring range of the meter.

Viscosity compensation, mounting position and reliability:
The built-in spring and the magnetic float guarantee an absolute reliability of the meter. This spring, which pushes the float back towards its zero position against the flow makes it possible to use the meter in any mounting position. The spring is artificially aged, thus eliminating the need for recalibration to the different mounting positions.
The strong spring and an orifice in the float work together to limit the effects of viscosity changes to an absolute minimum compared to regular variable area flowmeters.

Application:
The variable area flowmeter and switch model DS07 is used for measuring and monitoring the flow of viscous liquids, i. e. in central lubricating systems, any other lubricating circuitry, hydraulics, transformer oils etc.

Measuring Ranges:

8-27 GPH … 8-24 GPM
0.2 - 0.8 l/min … 30 - 90 l/min
for viscosities up to max. 600 cSt

Materials: brass or stainless steel

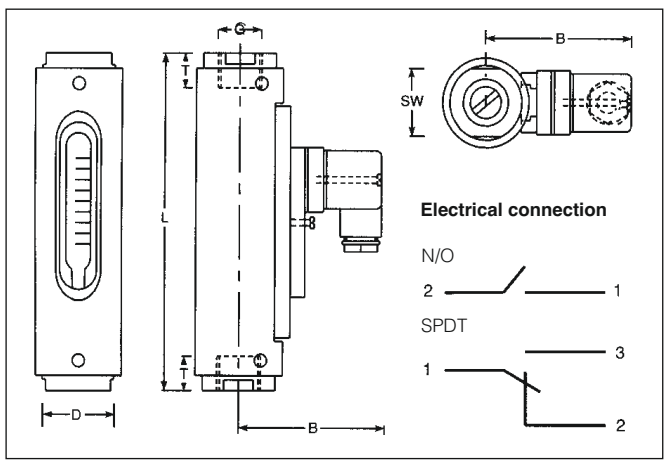
Contacts:

N/O:	250 V, 3 A, 100 VA**
SPDT:	250 V, 1.5 A, 50 VA***
Ex-N/O*:	250 V, 2 A, 60 VA
Ex-SPDT*:	250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6 and II 2D IP67 T80 °C
** for DS07.S.2/3/4...(230V, 1 A, 50 VA)
*** 250V, 1A, 50 VA (TYPE:2X)

Dimensions:

Model	Mounting dimensions in inch / mm						Weight
	SW	D	B	NPT / G	T	L	(lbs / g)
DS07.S.1	1.61 / 41	1.97 / 50	3.03 / 77	1/4"	0.67 / 17	5.71 / 145	1.87 / 850
DS07.S.2	1.61 / 41	1.97 / 50	3.03 / 77	1/2"	0.67 / 17	5.71 / 145	1.87 / 850
DS07.M.1	1.06 / 27		2.07 / 53	1/2"	0.55 / 14	4.49 / 114	0.66 / 300
DS07.S.3	1.61 / 41	1.97 / 50	3.03 / 77	3/4"	0.67 / 17	5.47 / 139	1.87 / 850
DS07.S.4	1.61 / 41	1.97 / 50	3.03 / 77	1"	0.67 / 17	6.22 / 158	1.87 / 850



Technical Specifications:

max. pressure: 232 psi / 16 bar (DS07.M)
145 psi / 10 bar (DS07.S)

pressure drop: 0.29 - 2.9 psi / 0.02 - 0.2 bar (DS07.M)
0.29 - 5.8 psi / 0.02 - 0.4 bar (DS07.S)

max. temperature: 248 °F / 120 °C
(320 °F / 160 °C on request)

materials: Measuring glass: Duran 50
Housing: anodized aluminium
O-rings: Perbunan
(optionally: Viton, EPDM)

elektr. connection: plug acc. to DIN 43650
(optionally: 1m cable connection)

accuracy: ± 10% f. s.

analog output: see model DSxx-A
in section "accessory"

Ordering Code:

Order number: DS07. M. 2. 1. 1. 05. 1. 1. 0

Viscosity compensated variable area flowmeter and switch

Size:
M = miniature
S = standard

Connection:

1N = 1/4" NPT female	1 = G 1/4 female
2N = 1/2" female	2 = G 1/2 female
3N = 3/4" female	3 = G 3/4 female
4N = 1" female	4 = G 1 female

Material:
1 = brass, spring st. steel 1.4310
2 = all st. steel 1.4571

Scale:
1 = for viscous media

Measuring ranges:

DS07.M 1/2" only:	
01U = –	01 = 0.2 - 0.8 l/min
02U = 3.2 - 15.9 GPH	02 = 0.2 - 1 l/min
03U = 8 -27 GPH	03 = 0.5 - 1.7 l/min
04U = 21 - 63 GPH	04 = 1.3 - 4 l/min
05U = 40 - 127 GPH	05 = 2.5 - 8 l/min
DS07.S 1/4" only:	
06AU = 1.6 - 12.7 GPH	06 A = 0.1 - 0.8 l/min
07AU = 8 - 24 GPH	07 A = 0.5 - 1.5 l/min
08AU = 16 - 63 GPH	08 A = 1 - 4 l/min
DS07.S 1/2", 3/4", 1":	
06U = 1.6 - 12.7 GPH	06 = 0.1 - 0.8 l/min
07U = 8 - 24 GPH	07 = 0.5 - 1.5 l/min
08U = 16 - 63 GPH	08 = 1 - 4 l/min
09U = 32 - 127 GPH	09 = 2 - 8 l/min
10U = 48 - 159 GPH	10 = 3 - 10 l/min
11U = 80 - 240 GPH	11 = 5 - 15 l/min
12U = 125 - 380 GPH	12 = 8 - 24 l/min
DS07.S 3/4", 1":	
13U = 160 - 475 GPH	13 = 10 - 30 l/min
14U = 240 - 710 GPH	14 = 15 - 45 l/min
15U = 320 - 950 GPH	15 = 20 - 60 l/min
16U = 8 - 24 GPM	16 = 30 - 90 l/min

No. of contacts:
0 = without contact
1 = 1 contact
2 = 2 contacts

Contact function:
0 = without contact
1 = N/O
2 = SPDT
3S = Ex-N/O, not available for DS07.M (EEx m II T6)
3U = Ex-SPDT, not available for DS07.M (EEx m II T6)

Options:
0 = without
1 = please indicate

DS08

Viscosity Compensated Variable Area Flowmeter And Switch For High Pressure Applications, Mounting Independent

- for viscous media up to 600 cSt
- mounts in any position without recalibration
- small mounting dimensions
- materials brass or stainless steel
- high switching accuracy
- very small switch hysteresis
- robust design without glass measuring tube
- suitable for pressures up to 5000 psi / 350 bar

Description:
The flowmeter and switch model DS08 works according to a modified variable area principle.
The float is guided in a cylindrical measuring tube by means of a spring. The flowing medium moves the float in the flow direction. An externally mounted pointer indicator is magnetically coupled to the float and thus, following the float position, indicates the flow rate on a scale.
A Reed contact is mounted outside the meter in a sealed housing. When the float reaches the position of the Reed contact the switch will close. With higher flows the float moves further upward until it reaches a built-in float stop, still keeping the switch closed. This ensures a bistable switch function at any time.
The Reed contact is adjustable over the full switching range of the meter.

Viscosity compensation, mounting position and reliability:
The built-in spring and the magnetic float guarantee an absolute reliability of the meter. This spring, which pushes the float back towards its zero position against the flow makes it possible to use the meter in any mounting position. The spring is artificially aged, thus eliminating the need for recalibration to the different mounting positions.
The strong spring and an orifice in the float work together to limit the effects of viscosity changes to an absolute minimum compared to regular variable area flowmeters.

Application:
The variable area flowmeter and switch model DS08 is used for measuring and monitoring the flow of viscous liquids, i. e. in central lubricating systems, any other lubricating circuitry, hydraulics, transformer oils etc.

Versions:

- flow switch only with Reed contact
- optionally as flow meter and switch with external pointer indicator and contact

Measuring ranges: 1.6-12.7 GPH ... 9.5-29 GPM
0.1-0.8 l/min ... 35-110 l/min
for viscosities up to 600 cSt

Materials: brass or st. Steel

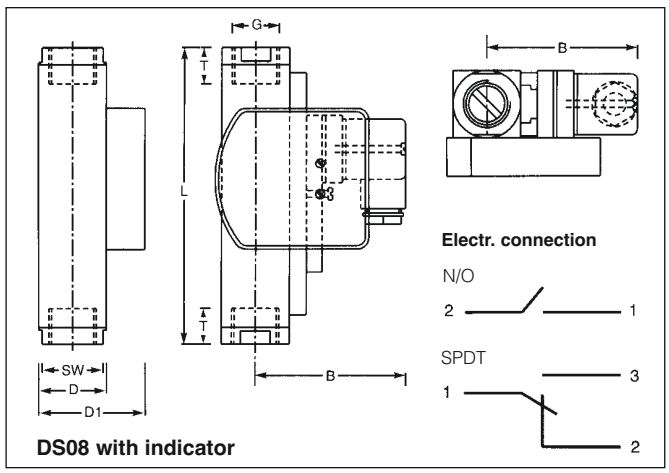
Contacts:

N/O:	250 V, 3 A, 100 VA**
SPDT:	250 V, 1.5 A, 50 VA***
Ex-N/O* :	250 V, 2 A, 60 VA
Ex-SPDT*:	250 V, 1 A, 30 VA

* according to Atex 100a Ex II 2 G, EEx m II T6 and II 2D IP67 T80 °C
** for DS08.S...(230V, 1 A, 50 VA) ***250V, 1A, 50 VA (TYPE:2X)

Dimensions:

Model	Mounting dimensions in inch / mm							Weight (lbs / g) without	with indication
	SW	D	D1	B	NPT/G	T	L		
DS08.M	1.06 / 27	1.22 / 31	1.89 / 48	1.89 / 48	1/2"	0.55 / 14	3.54 / 90	0.77 / 350	–
DS08.S	1.57 / 40	1.57 / 40	2.24 / 57	2.68 / 68	1"	0.67 / 17	5.12 / 130	2.20 / 1000	2.31 / 1050
Special connection									
DS08.M					1/4"	0.55 / 14	3.86 / 98	0.88 / 400	–
					3/8"	0.55 / 14	4.25 / 108	0.99 / 450	–
DS08.S					1/4"	0.83 / 21	5.98 / 152	2.42 / 1100	2.53 / 1150
					1/2"	0.83 / 21	5.98 / 152	2.42 / 1100	2.53 / 1150
					3/4"	0.83 / 21	5.98 / 152	2.42 / 1100	2.53 / 1150



DS08 with indicator

Technical Specifications:

max pressure:

brass version: 4350 psi / 300 bar (DS08.M),
3600 psi / 250 bar (DS08.S)

st. steel version: 5000 psi / 350 bar (DS08.M),
4350 psi / 300 bar (DS08.S)

pressure drop: 0.29-5.8 psi / 0.02-0.4 bar (DS08.M),
0.29-2.9 psi / 0.02-0.2 bar (DS08.S)

max. temp.: 248 °F / 120 °C, 320 °F / 160 °C optionally

materials: wetted parts:

brass version: nickel plated brass

st. steel version: stainless steel 316 Ti / 1.4571

O-rings (for DS08.-.xR… only):
DS08.x.x 1: Buna, optionally: EPDM, Viton
DS08.x.x.2: Viton, optionally: EPDM, Buna

electrical connection: plug acc.to DIN 43650 (optionally: 1m cable connection) (optionally: circular plug M 12x1 to EN 50044

accuracy: ± 10% f. s.

analog output: see model DSxx-A in section “accessory”

Ordering Code:

Order number: DS08. S. 4. 1. 1. 06. 1. 1. 1. 0

All metal viscosity compensated variable area flowmeter and switch

Size:
M = miniature
S = standard

Connection:
1RN = reduction to 1/4" NPT female
2RN = reduction to 1/2" NPT female, for DS08.S only
3RN = reduction to 3/4" NPT female, for DS08.S only
1R = reduction to G 1/4 female
2R = reduction to G 1/2 female
2 = G 1/2 female
3R = reduction to G 3/4 female
4 = G 1 female

Material:
1 = brass, spring st. steel 304 / 1.4310
2 = all st. steel 316 Ti / 1.4571

Scale:
1 = for viscous media up to 600 cST

Measuring ranges:

DS08.M. only

01U = 1.6-12.7 GPH	01 = 0.1 - 0.8 l/min
03U = 8.0-25.5 GPH	03 = 0.5 - 1.6 l/min
04U = 13-48 GPH	04 = 0.8 - 3 l/min
05U = 32-111 GPH	05 = 2 - 7 l/min

DS08.S. only

06U = 1.6-12.7 GPH	06 = 0.1 - 0.8 l/min
07U = 8-24 GPH	07 = 0.5 - 1.5 l/min
08U = 16-63 GPH	08 = 1 - 4 l/min
09U = 32-127 GPH	09 = 2 - 8 l/min
10U = 48-160 GPH	10 = 3 - 10 l/min
11U = 80-240 GPH	11 = 5 - 15 l/min
12U = 125-380 GPH	12 = 8 - 24 l/min
12AU = 15-320 GPH	12A = 1 - 20 l/min
13U = 160-480 GPH	13 = 10 - 30 l/min
13AU = 60-630 GPH	13A = 4 - 40 l/min
14U = 240-710 GPH	14 = 15 - 45 l/min
14AU = 80-790 GPH	14A = 5 - 50 l/min
15U = 320-950 GPH	15 = 20 - 60 l/min
15AU = 130-950 GPH	15A = 8 - 60 l/min
16U = 8.0-24.0 GPM	16 = 30 - 90 l/min
16AU = 3.2-18.5 GPM	16A = 12 - 70 l/min
17U = 9.5-29.0 GPM	17 = 35 - 110 l/min
17AU = 4.0-21.1 GPM	17A = 15 - 80 l/min

Version:
0 = switch only, without flow rate indication
1 = flow meter and switch, with side indicator (for DS08.S only)

No. of contacts:
0 = without contact (for flowmeters with indicator only)
1 = 1 contact
2 = 2 contacts

Contact function:
0 = without contact (for flowmeters with indicator only)
1 = N/O
2 = SPDT
3U = Ex-N/O, not available for DS08.M (EEx m II T6)
3S = Ex-SPDT, not available for DS08.M (EEx m II T6)

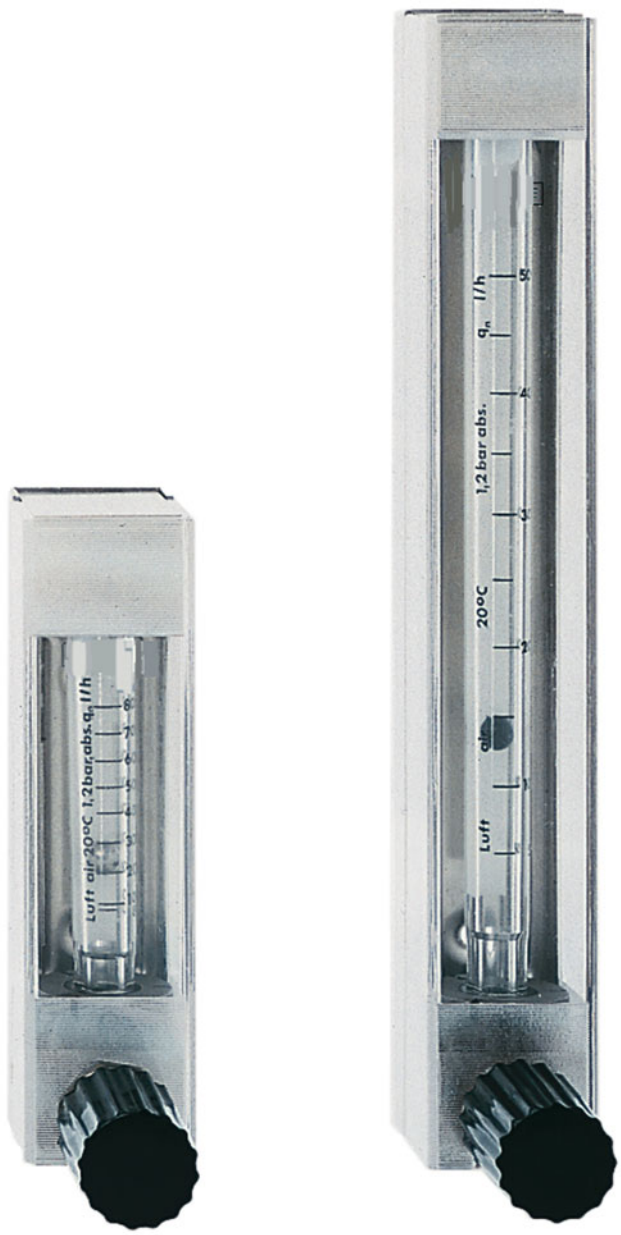
Options:
0 = without
1 = please indicate

attention: Please indicate flow-direction and mounting position.
Analog output 4-20 mA for DS08.S on request.

DS10

Variable Area Flowmeter For Low Flows With Glass Measuring Tube

- for liquids and gases
- body brass or st. steel
- with integrated needle valve
- limit switch optionally
- accuracy class 2.5 or 4.0



Description:
The flowmeters DS10 operate according to the proven variable area principle. The flowing media moves a float upwards against gravity in a conical measuring tube.
The height of the float indicates the flow rate and may be read off a burnt-in scale on the measuring tube.
Optional inductiv contacts, which are mounted on the measuring tube, may be used for flow rate limit detection.
All meters are equipped with an integrated needle valve for exactly regulating the flow rate.

Applications:
Variable area flowmeters model DS10 are mainly used for measuring and monitoring the flow rate of low- viscous liquid and gaseous media.
Scales for water or air at standard operating conditions have already been defined. For other media or different process conditions special scales are available.

Versions:

DS10.1: Miniature version, height 111 mm
accuracy class 4

DS10.2: Standard version, height 146 mm
accuracy class 2,5

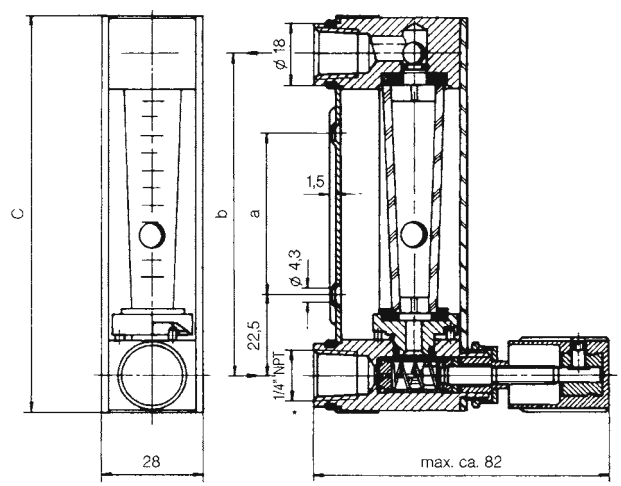
Ranges:

Range no.	Range Nl/h air, 20°C, 1.2 bar abs.	Contact-version	DS10.1 Miniature	DS10.2 Standard
01	0,5...5	A	x	x
02	0,8...8	A	x	x
03	1,6...16	A	x	x
04	4...40	A	x	x
05	6...60	A	x	x
06	10...100	B	x	x
07	25...250	B	x	x
08	50...500	B	x	x
09	80...800	B	x	x
10	100...1000	B	-	x
11	180...1800	B	-	x
12	240...2400	B	-	x
13	300...3000	B (min.)	-	x
14A	400...4000	B (min.)	-	x
15A	500...5000	B (min.)	-	x
	l/h water			
16	0,25...2,5	A	x	x
17	0,5...5	B	x	x
18	1,2...12	B	x	x
19	2,5...25	B	x	x
20	4...40	B	x	x
21	6...60	B	x	x
22	10...100	B (min.)	x	x
23	12...120	B (min.)	x	x
24	16...160	B (min.)	x	x

x = available - = unavailable

Contacts: The contact version is defined by the measuring range.
(min.) = Contact only available for minimum monitoring

Dimensions:



Version	a (mm)	b (mm)	c (mm)
DS10.1	45	90	111
DS10.2	80	125	146

Ordering code:

Order no: **DS10. 2. 2. 1. 1. 06. 1. 1. 0**

Variable area flowmeter with glass measuring tube

Version
1 = Miniature
2 = Standard

Process connection
1 = G 1/4 female on back
2 = 1/4“ NPT on back

Material
1 = brass
2 = st. steel

O-rings
1 = Viton (standard)
2 = PTFE / FFKM

Ranges
01...24 = according to table
99 = special range

Valve
0 = without
1 = valve on inlet side (Standard)
2 = valve on outlet side

Limit switch
0 = without
1 = 1 contact (version A)
2 = 2 contacts (version A)
3 = 1 contact (version B)
4 = 2 contacts (version B)

Options (multiple selection possible)
0 = without
1 = panel mounting set
2 = cable connector housing
for meters with contact

Special process connections (hose connectors, SWAGELOK, ERMETO or others) on request.

For operation of the limit switches transmitter relays model KFA...SR2-Ex1.W for 1 contact or KFA...SR2-Ex2.W for 2 contacts are available. Technical specifications and prices on request.

Technical Specifications:

max. pressure: 10 bar

max. temperatur: 100 °C (80 °C with contact)

materials: Armature and valve brass or st. steel, float st. steel, O-rings Viton or PTFE / FFKM, glass Borosilikate

Accuracy class: DS10.1: Klasse 4
DS10.2: Klasse 2,5

DS15

Plastic Variable Area Flowmeter

- for industrial applications
- for liquid and gaseous media
- simple and robust construction with high reliability
- measuring tubes in PVC, PA, PS or PVDF
- low pressure loss
- simple mounting
- scale with high resolution
- alarm contacts or analog output optionally

Description

The flowmeters model DS15 works according to the proven variable area principle. The float is moved upward by the flowing medium and its upper edge indicates the flow rate by means of a scale affixed onto the measuring tube.
By using a float with an integrated magnet optional alarm contacts or an analog output transducer may be operated.
All flowmeters have a male thread on the measuring tube and are additionally equipped with PVC glue-in connectors. Also possible are connectors with female thread (bsp) made of PVC, PP, PVDF, brass or st. steel.

Applications

The variety of different materials used and the simple to exchange measuring scales make these meters universally suitable for most liquid and gaseous media.
Main applications are in the water treatment industry, in waste water applications, chemical and food industry and many more.

Materials

Measuring tube	PVC-U transparent, Polyamide, Polysulfone or PVDF (with alarm contacts or analog output transducer only)
Float	PVDF, optionally st. steel AISI 304 and PVDF with integrated magnet
O-rings	EPDM, optionally Viton
Pipe connections	PVC, optionally PP, PVDF, brass (cap-nuts galvanized steel), st. steel

Technical Specifications

max. pressure 10 bar at 20 °C

max. temperature:

without connectors:

PVC:	60 °C
Polyamid:	75 °C
Polysulfon:	100 °C
PVDF:	110 °C

with connectors made of:

PVC:	60 °C
PP:	according to the temperature limits of the measuring tube, however max. 80 °C
PVDF, brass, st. steel:	according to the temperature limits of the measuring tube

mounting position: vertically, flow from bottom to top

mounting: with straight pipe, 5-7 x pipe dia. in front and behind meter

measuring accuracy: class 4 acc. to VDI/VDE 3513, Bl. 2 (+/- 4% f.s.)

Accessories

alarm contacts	bistable, N/C or N/O contact function
analog output	transducer with output 4-20 mA, RS-232 interface

Attention: alarm contacts or analog output transducer only operate if a float with integrated magnet is used.

Order Code

Order No.: **DS15. 2. 1. 202. 102. 1. 0**

Plastic Variable Area Flowmeter

material of measuring tube:
1 = PVC-U (scales for water only)
2 = Polyamid
3 = Polysulfon
4 = PVDF

Scale:
1 = water
2 = air (0 bar g)
3 = air (1 bar g)
4 = air (2 bar g)
5 = air (3 bar g)
9 = special scale

Measuring ranges:
101... 612 = acc. to table 1

Process connections:
acc. to table 2

Floats:
1 = PVDF (Standard)
2 = st. steel AISI 304
3 = PVDF with integrated magnet (for meters with alarm contacts or analog output only)

Options:
00 = without
11 = 1 alarm contact (N/C)
21 = 2 alarm contacts (N/C)
12 = 1 alarm contact (N/O)
22 = 2 alarm contacts (N/O)
50 = analog output transducer, 4...20 mA

Scales

Water scales (in LPH) and air scales (in Nm^3/h) referenced to 0, 1, 2, or 3 bar g and 20 °C are standard.

For other media, i.e. gases with higher pressures, HCL (30%), NaOH (30%) as well as other units of measurement (m^3/h, l/sec, USGPM or IGPM) special scales may be supplied.

These special scales may be easily affixed later on the meter, thus making the unit suitable for changed operating conditions or other media.

Also special scales for other media and operating conditions may be calculated if the following data are known:

– medium
– operating pressure
– operating temperature
– operating density
– operating viscosity

Table 1 – Measuring Ranges

Measuring tube	Range no.	Measuring range				
		Water (l/h)	Air at 20 °C (Nm³/h) not for PVC measuring tubes			
			0 bar rel.	1 bar rel.	2 bar rel.	3 bar rel.
1	101	3-24	0.2-1	0.2-1.2	0.25-1.55	0.3-1.75
	102	5-60	0.2-2.5	0.4-3.2	0.2-3.8	0.3-4.4
	103	10-100	0.6-3.6	0.6-5.0	0.75-6.0	0.8-7.0
	104	25-250	0.5-9.0	1.0-13.0	1.0-16.0	1.5-19.5
2	201	5-50	0.4-2.8	0.2-3.2	0.4-3.6	0.3-4.0
	202	15-150	0.8-6.2	1.0-9.0	1.0-11.0	1.5-12.0
	203	25-250	0.9-9.5	1.0-13.0	1.0-16.0	2.0-20.0
	204	40-400	2.0-15.0	2.0-20.0	3.0-26.0	3.0-30.0
3	301	15-150	0.5-5.5	1.0-9.0	1.0-11.0	1.0-10.5
	302	40-400	2.0-14.0	2.0-20.0	3.0-26.0	3.0-30.0
	303	60-600	2.5-22.0	4.0-31.0	4.0-38.0	5.0-45.0
	304	100-1000	4.0-34.0	5.0-45.0	6.0-58.0	7.5-67.5
4	401	25-250	1.0-8.0	1.5-13.0	1.5-16.0	1.5-19.5
	402	40-400	2.0-14.0	2.0-20.0	3.0-26.0	3.0-30.0
	403	100-1000	4.0-34.0	5.0-45.0	5.0-55.0	6.0-66.0
	404	150-1500	5.0-50.0	6.0-70.0	7.5-86.0	7.5-98.0
5	501	15-150	0.7-5.0	1-7.5	1-9	1.6-10
	502	60-600	2.5-20	3.5-28	4-35	5-40
	503	100-1000	4-34	5-50	8-60	8-70
	504	200-2000	8-70	12-90	10-120	15-130
	505	300-3000	10-90	15-140	20-160	20-190
	506	600-6000	22-190	30-260	40-380	40-400
	507	1000-10000	35-300	50-420	60-510	70-600
	508	2500-25000	80-720	115-1050	140-1240	166-1400
	509	10000-50000	400-1500	500-2100	600-2500	700-2900
6	601	15-150	0.7-5.5	1-7.5	1-9	1.6-10
	602	30-300	1-10	1.5-14	2-18	2.8-20
	603	60-600	2.5-20	3.5-28	4-35	5-40
	604	100-1000	4-34	5-50	8-60	8-70
	605	150-1500	5-50	7.5-67	9.5-83	11-96
	606	250-2500	8.5-76	10-115	14-131	17-152
	607	400-4000	14-125	10-170	24-210	28-245
	608	600-6000	22-190	30-260	40-380	40-400

Alarm Contacts

version: Reed contact, bistable

contact function: N/O or N/C with rising flow

mounting: adjustable on measuring tube

contact rating: max. 220 VAC, max. 0,5 A, max. 10 A / 10 VA

operating temperature: 0...+55 °C

hysteresis: 3 mm of float height

electrical connection: 2-wire, independent of polarity

Analog Output Transducer

The optional analog output transducer is mounted onto the measuring tube of the DS15 flowmeter and registers the height of the float by means of an analog Hall sensor. The integrated electronic converts this signal to a 4-20 mA output.

To utilize the analog output transducer, the standard float must be exchanged against a float with integrated magnet.

The transducer is equipped with an EPROM which is programmed especially for the application. Therefore it is not possible to change the transducers without consulting the manufacturer.

Features:

– 2-wire system
– ananlog output 4...20mA
– supply votage 8...28VDC
– programmed individually to DS15
– 11 point calibration
– non volatile storage of parameters
– 0-push button for compensation of environmental magnetic influences.
– factory set low-cutoff value (0-99%)
– factory set low-pass-filter (0,1....2,5s)
– accuracy better than 0,5 % f.s.

Table 2 – Process Connections

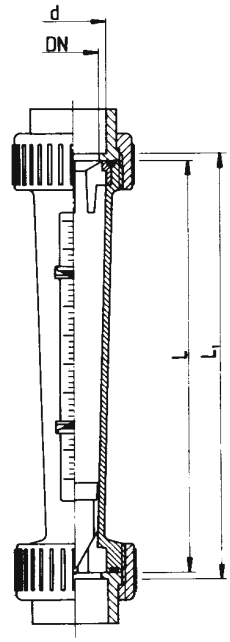
Measuring tube no. (L in mm)	Range no.	Male thread (R)	Connectors						Connection no.
			Standard glue-in connection (mm)	Female thread (G)					
				PVC	PP		Brass	St. steel	
				material no.					
		0	1	2	3		5	6	
1 (165)	101 102 103 104	3/4“	d : 16 DN: 10 L1:171	3/8					**01**
2 (170)	201 202 203 204	1“	d : 20 DN: 15 L1:176	1/2					**02**
3 (185)	301 302 303 304	1 1/4“	d : 25 DN: 20 L1:191	3/4					**03**
4 (200)	401 402 403 404	1 1/2“	d : 32 DN: 25 L1:206	1					**04**
5 (335)	501 502 503	1 1/2“	d : 32 DN: 25 L1:341	1					**05**
	504 505	2 1/4“	d : 50 DN: 40 L1:341	1 1/2					**06**
	506 507	2 3/4“	d : 63 DN: 50 L1:341	2					**07**
	508 509	3 1/2“	d : 75 DN: 65 L1:341	2 1/2 measuring range 610...612 screw G 2 1/2 female in cast iron and st. steel only					**08**
6 (350)	601 602 603 604	1 1/2“	d : 32 DN: 25 L1:356	1					**09**
	605 606	2“	d : 40 DN: 32 L1:356	1 1/4					**10**
	607 608 609	2 3/4“	d : 63 DN: 50 L1:356	2					**11**
	610 611 612	3 1/2“	d : 75 DN: 65 L1:356	2 1/2 measuring range: 610...612 screw G2 1/2 female in cast iron and st. steel only					**12**

Attention: PVDF has measuring tube as different dimensions L and L1.

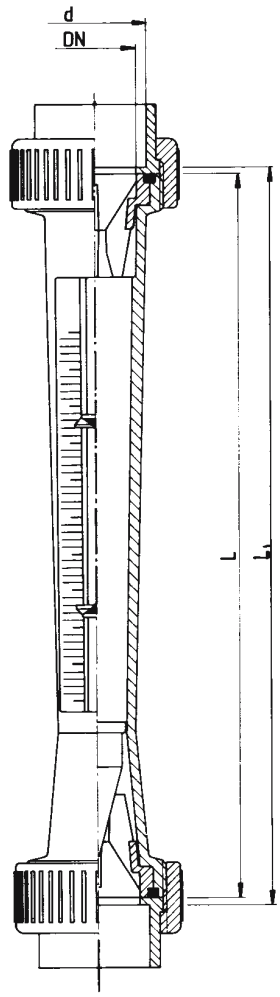
The connection code consists of the no. for the material and the connector no.

Example: PVC female thread G1 for measuring tube no. 5: material no: 2, connector no. 05, connetion code 205

Measuring tubes no 1 - 4

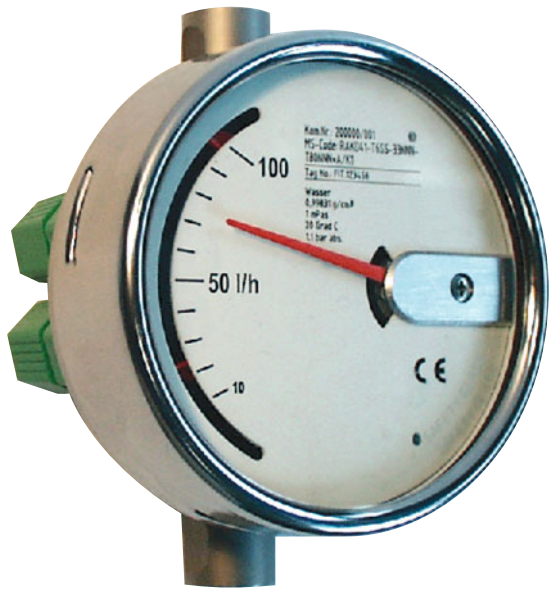


Measuring tubes no. 5 - 6



DS20

Float-Type Flow Meter
For low flow volumes
Compact construction



- **For liquids and gases**
- **Maximum process pressure: 160 bar, Maximum operating temperature: 200°C**
- **Scales for all operating conditions designed as required**
- **Local display, min./max. contacts or analog output**
- **Measuring tube completely of stainless steel 1.4571**
- **Optionally available with valve**

Description

Model series DS20 flow meters work according to the suspended-float principle of measurement. The device has a cone-shaped float that moves within a cylindrical measuring tube. The flowing gas or liquid moves the float in the direction of flow. The movement of the float is transmitted magnetically to a dial indicator mounted outside the measuring tube. The indicator is fitted with a scale appropriate for the operating range encountered. If necessary, the indicator can also be fitted with contacts or an analog output.

Applications

Model series DS20 flow meters are intended to measure and monitor gases or low-viscosity liquids, such as those found in applications like cooling systems for welding machines, laser and tube systems, pump monitoring, compressors, etc. Since all parts coming in contact with the medium being monitored are made of high-quality stainless steel 1.4571, this device is also suitable for use with caustic/corrosive media.

Versions

- Flow meter with local dial indicator display
- Dial indicator display, 1 MIN contact
- Dial indicator display, 1 MAX contact
- Dial indicator display, 1 MIN contact, 1 MAX contact
- Dial indicator display, analog output: 4 to 20 mA

Process connections

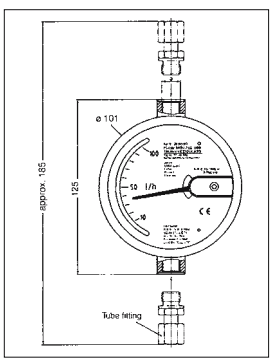
Version without needle valve (connection at top/bottom):
All threaded connections as per model coding, PN 100 (standard) or PN 160, all flange connections

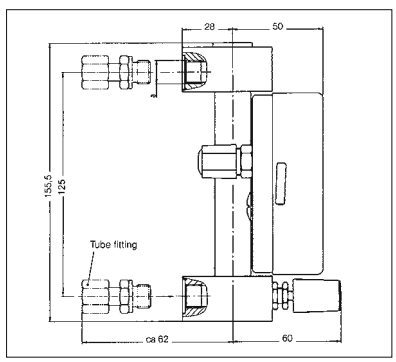
Version with needle valve (connection at back):
All threaded connections as per model coding, PN 40 (standard) or PN 100, flange connections not possible

Measuring Ranges and Process Connection

Measuring Range Number	Water, 20°C (l/h)	Air, 0°C, 1,013 bar abs. (Nl/h)	Pressure loss (mbar)
1	0.1...1	4...40	6
2	0.16...1.6	6...60	6
3	0.25...2.5	10...100	6
4	0.4...4	15...150	6
5	0.6...6	20...200	6
6	1...10	32.5...325	8
7	1.6...16	50...500	8
8	2.5...25	80...800	8
9	4...40	140...1400	11
10	6...60	200...2000	11
11	10...100	325...3250	11
12	16...160	500...5000	13
13	25...250	800...8000	13
Caution: On versions without valve, measuring ranges 12 and 13 come with 3/8" threaded connections (Code 42...)			

Dimensions





Technical Details

Materials:
Parts coming in contact with media are made of stainless steel 1.4571, Housing made of stainless steel 1.4301

Maximum pressure:
20 mA (???)
PN 100 (standard), PN 10, 40, 160 as per model coding

Maximum temperature:
Local display: -80°C to + 200°C (+150°C with valve)
With contacts: -40°C to +150°C
With analog output: -40°C to +150°C

Protection type: IP 65

Accuracy: ± 4% of measured range value

Model coding

Order number: **DS20. | 41G4. | 6. | 0. | 1. | 0**

Float-type flow meter

Process connection:
41G4 = G 1/4 female thread, PN40
41G6 = G 1/4 female thread, PN100
41G7 = G 1/4 female thread, PN160
41T4 = 1/4" NPT female thread, PN40
41T6 = 1/4" NPT female thread, PN100
41T7 = 1/4" NPT female thread, PN160
53C4 = Tube fitting, 6 mm, PN40
53C6 = Tube fitting, 6 mm, PN100
53C7 = Tube fitting, 6 mm, PN160
53P1 = Hose nipple, 6 mm, PN10
54C4 = Tube fitting, 8 mm, PN40
54C6 = Tube fitting, 8 mm, PN100
54C7 = Tube fitting, 8 mm, PN160
54P1 = Hose nipple, 8 mm, PN10
55C4 = Tube fitting, 10 mm, PN40
55C6 = Tube fitting, 10 mm, PN100
55C7 = Tube fitting, 10 mm, PN160
56C4 = Tube fitting, 12 mm, PN40
56C6 = Tube fitting, 12 mm, PN100
56C7 = Tube fitting, 12 mm, PN160
01D4 = Flanges, DN15, PN40
02D4 = Flanges, DN25, PN40
01A1 = Flanges, ANSI 1/2", 150 lbs RF
02A1 = Flanges, ANSI 1", 150 lbs RF
01A2 = Flanges, ANSI 1/2", 300 lbs RF
02A2 = Flanges, ANSI 1", 300 lbs RF

Measuring range:
1 to 13 = According to table
99 = Special measuring range

Valve:
0 = None
1 = Valve on input side, silver valve seat
2 = Valve on input side, PCTFE valve seat
3 = Valve on output side, silver valve seat
4 = Valve on output side, PCTFE valve seat

Display:
1 = Local dial indicator display
2 = Local dial indicator display, 1 MIN contact
3 = Local dial indicator display, 1 MAX contact
4 = Local dial indicator display, 1 MIN contact, 1 MAX contact
5 = Local dial indicator display, analog output 4 to 20 mA

Options:
0 = None
9 = Please specify in writing

Contacts

Type: Inductive (NAMUR as defined per EN 50227)

Nominal voltage: 8 VDC
Recommended for operating the contacts: isolation and switch unit SKF (see data sheet SKF)

Analog output

Power supply: 13.5…30 VDC
Output: 4…20 mA
Load impedance: (U-13.5V)/20 mA
Electrical connection: QUIKON quick connects

DS25

Variable Area Flowmeter With Flange Connection, Insensitive To Viscosity Changes

- for liquids and gases
- operating pressure PN40 and PN100 bar standard, higher pressures up to 320 bar on request
- operating temperatures up to 370 °C
- individual calibration for all operating conditions
- local indication, min. - max. alarms, anologue output
- measuring tube completely stainless steel 1,4404
- PTFE coating for wetted parts optionally

Description:

The flow meters model DS25 work according to the proven variable area principle.The float is guided in a conical measuring tube and is nearlyindependent of the viscosity of the medium. The flowingmedium moves the float in the flow direction. An externallymounted pointer indicator is magnetically coupled to thefloat and thus, following the float position, indicates the flow rate on a scale.This indicator assembly is equipped with a scale calibrated to the operating conditions in the system and additionallymay contain alarm contacts or an ananlog output.

Application:

The variable area flowmeter model DS25 is used formeasuring and monitoring the flow of all kinds of liquids orgases. By using only stainless steel 1,4571 for the wetted parts the meter is especially suited for agressive media or for use in food and drink applications (with Tri-Clamp or other hygienic process connections)

Meter selection procedure:

1. **Define materials of wetted parts**
2. **Select process connection (table 2)**
3. **Select measuring range**
4. **Select indicator and output signals**
5. **Select options**

1. Material version (wetted parts):

The flow meters model DS25 may be supplied either completely in stainless steel 1.4571 (DS25.1) or with PTFE-coating (DS25.2)

Other materials like Monel, Hastelloy or Tantal on request (DS25.9)

2. process connection:

Nom. bore (NB)	process connection	Meas. tube No.	Conn. Code No.	Length L (mm)
15 (1/2")	Flanges DN15 PN40	1	101	250
	Flanges ANSI 1/2" 150 lbs.	1	102	250
	Flanges ANSI 1/2" 300 lbs.	1	103	250
	G 1/2 IG	1	104	295
	1/2" NPT IG	1	105	295
	Flanges DN15 PN40	2	206	250
	Flanges ANSI 1/2" 150 lbs.	2	207	250
	Flanges ANSI 1/2" 300 lbs.	2	208	250
20 (3/4")	Flanges DN20 PN40	1	111	250
	Flanges ANSI 3/4" 150 lbs.	1	112	250
	Flanges ANSI 3/4" 300 lbs.	1	113	250
	Flanges DN20 PN40	2	216	250
	Flanges ANSI 3/4", 150 lbs.	2	217	250
	Flanges ANSI 3/4", 300 lbs.	2	218	250
	G 3/4 IG	2	219	250
	3/4" NPT IG	2	220	250
25 (1")	Flanges DN25 PN40	1	121	250
	Flanges ANSI 1" 150 lbs.	1	122	250
	Flanges ANSI 1" 300 lbs.	1	123	250
	threaded conn. DN25 PN40 (IG) to DIN 11851	1	126	275
	Tri-Clamp DN25 / 1"	1	127	250
	Flanges DN25 PN40	2	228	250
	Flanges ANSI 1" 150 lbs.	2	229	250
	Flanges ANSI 1" 300 lbs.	2	230	250
	threaded conn. DN25 PN40 (IG) to DIN 11851*	2	233	275
	Tri-Clamp DN25 / 1"	2	234	250
	Flanges DN25 PN40	3	335	250
	Flanges ANSI 1", 150 lbs.	3	336	250
	Flanges ANSI 1", 300 lbs.	3	337	250
	G 1 IG	2	338	250
	1" NPT IG	2	339	250

Nom. bore (NB)	process connection	Meas. tube No.	Conn. Code No.	Length L (mm)
32 (1 1/4")	Flanges DN32 PN40	1	140	250
	Tri-Clamp DN32	1	141	250
	Flanges DN32 PN40	2	242	250
	Flanges ANSI 1 1/4" 150 lbs.	2	243	250
	Flanges ANSI 1 1/4" 300 lbs.	2	244	250
	Tri-Clamp DN32	2	245	250
	Flanges DN32 PN40	3	346	250
	Flanges ANSI 1 1/4", 150 lbs.	3	347	250
	Flanges ANSI 1 1/4", 300 lbs.	3	348	250
	G 1 14 IG	3	349	250
	1 1/4" NPT IG	3	350	250
40 (1 1/2")	Tri-Clamp DN40 / 1 1/2"	1	151	250
	Tri-Clamp DN40 / 1 1/2"	2	252	250
	Flanges DN40 PN40	3	353	250
	Flanges ANSI 1 1/2", 150 lbs.	3	354	250
	Flanges ANSI 1 1/2" 300 lbs.	3	355	250
	G 1 1/2 IG	3	364	250
	1 1/2" NPT IG	3	365	250
50 (2")	Flanges DN50 PN40	3	356	250
	Flanges ANSI 2" 150 lbs.	3	357	250
	Flanges ANSI 2" 300 lbs.	3	358	250
	Gewindestutzen DN50 PN25 (IG) to DIN 11851	3	359	275
	Tri-Clamp DN50 / 2"	3	360	250
	Flanges DN50 PN40	4	461	250
	Flanges ANSI 2" 150 lbs.	4	462	250
	Flanges ANSI 2" 300 lbs.	4	463	250
65 (2 1/2")	threaded conn. DN65 PN25 (IG) to DIN 11851	4	466	275
	G 2 1/2 IG	4	467	250
	2 1/2" NPT IG	4	468	250
80	threaded conn. DN80 PN25 (IG) to DIN 11851	4	469	275
	Tri-Clamp DN80 / 3"	4	470	300
	Flanges DN80 PN40	5	571	250
	Flanges ANSI 3", 150 lbs.	5	572	250
	Flanges ANSI 3", 300 lbs.	5	573	260
100 (4")	threaded conn. DN100 PN25 (IG) to DIN 11851	5	574	300
	Tri-Clamp DN100 / 4"	5	575	250
	Flanges DN100 PN16	6	676	250
	Flanges DN100 PN40	6	677	250
	Flanges ANSI 4", 150 lbs.	6	678	250

3. Measuring ranges:

Reference conditions: Water, 20°C
Air, 20 °C, 1,013 bar abs.

a) DS25.1 - stainless steel version

Meas. tube No.	Range code	Water / Liquids					Air / Gases			
		Range (m^3/h)	Meas.-cone No.	Float No.	pressure loss (mbar)	max. viscosity (mPas)	Range (Nm^3/h)	Meas.-cone No.	Float No.	press. loss (mbar)
1	101	**0.0025-0.026**	43	S0	40	2.9	**0.075-0.75**	43	S0	45
	102	**0.004-0.04**	44	S0	40	4.5	**0.12-1.2**	44	S0	45
	103	**0.0063-0.063**	47	S0	40	6.4	**0.18-1.8**	47	S0	45
	104	**0.01-0.1**	51	S0	40	9.2	**0.3-3**	51	S0	45
	105	0.01-0.1	53	L1	6	5.1	-	-	-	-
2	206	0.01-0.1	53	L1	6	5.1	**0.55-5.5**	53	M1	20
	207	**0.016-0.16**	53	M1	15	8.2	**0.4-4**	53	L1	11
	208	0.016-0.16	54	L1	6	7.1	**0.65-6.5**	54	L1	11
	209	**0.025-0.25**	53	S1	40	13	0.75-7.5	53	S1	45
	210	0.025-0.25	57	L1	6	8.8	**1-10**	57	L1	11
	211	**0.04-0.4**	54	S1	40	18	1.3-13	54	S1	45
	212	0.04-0.4	61	L1	6	10	**1.6-16**	61	L1	11
	213	**0.063-0.63**	57	S1	40	23	2-20	57	S1	45
	214	0.063-0.63	61	M1	15	17	**2.5-25**	62	L1	11
	215	**0.1-1**	61	S1	40	27	3-30	61	S1	45
	216	0.1-1	62	M1	15	19	**3.5-35**	62	M1	20
	217	**0.16-1.6**	62	S1	40	31	-	-	-	-
	218	**0.23-2.3**	62	V1	45	-	-	-	-	-
3	319	0.1-1	63	L2	7	17	**4-40**	63	L2	12
	320	0.16-1.6	64	L2	7	20	5-50	63	M2	22
	321	**0.25-2.5**	63	S2	41	44	**7-70**	64	L2	12
	322	0.25-2.5	64	M2	16	16	**9-90**	64	M2	22
	323	**0.4-4**	64	S2	41	50	**13-130**	64	S2	47
	324	**0.6-6**	64	V2	43	-	-	-	-	-
4	425	0.25-2.5	67	L5	8	29	**10-100**	67	L5	14
	426	0.4-4	71	L5	8	33	13-130	67	M5	25
	427	**0.63-6.3**	67	S5	47	72	**16-160**	71	L5	14
	428	0.63-6.3	72	L5	8	37	**20-200**	71	M5	25
	429	**1-10**	71	S5	47	82	20-200	67	S5	54
	430	1-10	72	M5	19	58	**28-280**	72	L5	14
	431	1.6-16	72	S5	47	92	36-360	72	M5	25
	432	**2.3-23**	72	V5	63	-	50-500	72	S5	54
5	533	**2.5-25**	73	V8	60	-	**50-500**	73	L8	30
	534	**4-40**	74	V8	60	-	75-750	73	V8	65
	535	**6-60**	77	V8	60	-	**85-850**	74	L8	30
	536	-	-	-	-	-	120-1200	74	V8	65
	537	-	-	-	-	-	180-1800	77	V8	65
6	638	**10-100**	81	11	70	-	-	-	-	-
	639	**15-130**	81	12	-	-	-	-	-	-

Whenever possible select highlighted ranges

b) DS25.2 – wetted parts PTFE coated

Meas. tube No.	Range code	Water / Liquids				Air / Gases			
		Range (m^3/h)	Meas.-cone No.	Float No.	pressure loss (mbar)	Range (Nm^3/h)	Meas.-cone No.	Float No.	press. loss (mbar)
2	250	0.01 - 0.1	51	A1	16	0.35 - 3.5	51	A1	20
	251	0.016 - 0.16	52	A1	16	0.5 - 5	52	A1	20
	252	0.025 - 0.25	53	A1	16	0.85 - 8.5	53	A1	20
	253	0.04 - 0.4	54	A1	16	1.3 - 13	54	A1	20
	254	0.063 - 0.63	57	A1	16	2 - 20	57	A1	20
	255	0.1 - 1	61	V1	18	3.4 - 34	61	V1	22
3	356	0.16 - 1.6	62	A2	20	5 - 50	62	A2	25
	357	0.25 - 2.5	63	A2	20	8.5 - 85	63	A2	25
	358	0.4 - 4	63	V2	22	-	-	-	-
4	459	0.4 - 4	64	A5	20	13 - 130	64	A5	25
	460	0.63 - 6.3	67	A5	20	20 - 200	67	A5	25
	461	1 - 10	71	A5	20	35 - 350	71	A5	25
	462	1.6 - 16	71	V5	22	-	-	-	-
5	563	1.6 - 16	72	V8	25	50 - 500	72	27	12
	564	2.5 - 25	73	V8	25	85 - 850	73	27	22
	565	4 - 40	74	V8	25	-	-	-	-
6	666	6.3 - 63	77	10	30	-	-	-	-

Technical specifications (measuring tube):

measurable media: liquids and gases

ranges: see tables 3a and 3b

turndown ratio: 10 : 1

accuracy:
DS25.1: 1.6% f.s.
DS25.2: 2.5% f.s.

process connection: see Table 2

max. pressure: see Table 2

media temperature:
DS25.1: -180°C...370°C
DS25.2: -80°C... 130°C
(the actual operating temperature also depends on the max. permissible temperatures for the indicator and the options utilized in the unit)

materials:
DS25.1: all wetted parts stainless steel (AISI 316 L)
DS25.2: all wetted parts stainless steel AISI 316 L with PTFE coating

mounting: vertical

flow direction: from bottom to top

mounting length: see table “process connection”

straight pipe runs:
DN 15-65 none
DN 80-100 min. 5D

electrical protection: IP 65

4. Indicator:

The indicator part of the DS25 consists of n aluminium orpolyamide housing with a pointer assembly magnetically coupled to the float. The scale may be calibrated in flow units or in percent. Additionally, transducers and alarm contacts may bemounted in the indicator housing.

4a. Housing versions

Material:	Code No.
Polyamid	1
Aluminium	2

4b. Alarm contacts

Contact version:	Code No.
without	0
1 min contact	1
1 max contact	2
1 min. and 1 max. contact	3
2 max. contacts	5

4c. Ananlog output signals

Typ:	Code No.
without	0
electrical transducer	1
electrical transducer (Ex)	2
pneumatic transducer	3

4d. Supply voltage and output signals

Typ:	Code No.
without	00
115 VAC, 0...20 mA, 4-wire	01
115 VAC, 4...20 mA, 4-wire	02
230 VAC, 0...20 mA, 4-wire	03
230 VAC, 4...20 mA, 4-wire	04
24 VDC, 0...20 mA, 3-wire	07
24 VDC, 4...20 mA, 2-wire	08
24 VDC, 4...20 mA, 3-wire	09
24 VDC, 0...20 mA, 4-wire	10
24 VDC, 4...20 mA, 4-wire	11
pneumatic 0,2...1,0 bar	12
pneumatic 3...15 psi	13

Technical specifications (indicator assembly):

Mecanical indicator assembly

Umgebungstemperatur:

PA-housing (Code 1): -25°C ...100°C
Al-housing (Code 2): -25°C ...130°C

(for higher or lower operating temperatures use option “temperature isolation (DS25.A)” on next page)

Alarm contacts

model: inductive proximity switch, SJ3,5-N acc. to DIN 19234 (NAMUR)

ambient temperature:

-25°C ...100°C (for higher or lower operating temperatures use option “temperature isolation”)

rated voltage:

8 VDC (Ri = 1 kOhm)

output signal:

≤1 mA = 0, ≥3mA = 1

explosion protection:

EEx ia IIC T6, set II category 2G (on request)

dust explosion protection:

EEx iaD 20 T 108°C, set II category 1D

recommended accessories:

contact protection relaymodel SE01
(see “Options” on next page)

Electronic transducer

output signal: 0...20 mA, 4 - 20 mA

indication: LCD display, 8 digits
(programmable for indication of flow rate or as non-resettable totalizer)

supply voltage: see table 4d

max. load: 4-wire: ≥500 Ohm

2/3-wire: $\frac{(U-13,5\ V)}{20\ mA}$

operating temperature: 0°C...100°C

(for higher or lower operating temperatures use option “temperature isolation (DS25.A)” on next page)

electrical connection: M16 X 1,5 or 1/2" NPT

Intrinsically safe electronic transducer

Technical specifications as standard unit, however:

output signal: 4...20 mA, 2-wire

operating temperature: -25°C...70°C

(for higher or lower operating temperatures use option "temperature isolation (DS25.A)" on next page)

Ex-protection:

EEx ia IIC T6, set II category 2G (on request)

dust explosion protection:

EEx II 3D; set II; category 3D, max;
surface temperature: 80 °C

recommended accessories:

intrinsically safe power supply
(see "Options" on next page)

Intrinsically safe electronic transducer

on request

5. Options

5a. Temperature isolation (DS25.A)

For media temperatures outside the limits given in the technical specifications for the indicator assembly themeasuring tube and the indicator assembly may be temperature isolated by mounting the indicator at a distance of 60 mm apart from the measuring tube.This ensures that the unit may be operated at media temperatures as high as stated in the specifications for the measuring tube.

5b. Damping (DS25.D):

A float damping is recommended for gas applications to prevent erratic up and down movement (only for DS25.1).

5c. Heating:

Heating assemblies (steam jackets) are used to keep themedium in the measuring tube at a reqired temperature.Steam jackets are available with three different processconnections:

Connection:	Code:
DIN flanges DN15 PN40	DS25.H.1
DIN flanges DN 25 PN 40	DS25.H.2
threaded conn. R 1/4":	DS25.H.3

5d. Oxygene applications (DS25.F):

For use with oxygene the meters may be supplied oil- and greese-free.

5e. Certificates

on request

5f. Tags:

Stainless steel tags with customer specified text are optionally available

5g. Contact protection relays (model SKF): SKF…

material version:

according to DIN 19234

supply voltage

according data specification SKF

breaking capacity

max. 250 VAC, max. 2 A

control circuit

intrinsically safe (EEx ia) IIC:

5h. Power supply for intrinsically safetransducer (model SE11):

Output signal:

0 / 4...20 mA, galvanically separated

Supply voltage:

SE11.1: 230 VAC
SE11.2: 24 V AC/DC

max. load:

750 Ohm

control circuit:

intrinsically safe [EEx ia] IIC

Ordering Code

Order no.:	DS25.	1.	121.	1.	321.	1.	0.	104.

Variable area flowmeter

Material version:

1 = stainless steel
2 = wetted parts PTFE coated

Process connection:

101...678 = according to table 2
999 = special connection

Medium:

1 = water / liquids
2 = air / gases

Measuring range:

101...666 = according to table 3a or 3b
999 = special range

Indicator housing:

1...2 = according to table 4a

Alarm contacts:

0...5 = according to table 4b

Ananlog output and supply voltage:

1st digit:
0...3 = ananlog output according to table 4c
2nd and 3rd digit:
00...13 = supply voltage and output signal according to table 4d

Options: please indicate in writing

Ordering Information:

Important: for complete identification of. the meter the following information must be specified:

- order no. according to table above
- name of medium
- temperature (operational, max.)
- pressure (operational, max.)
- viscosity (for liquids only)
- specific gravity of medium
- for gases only: reference conditions
- options: model no. ac. to tables 5a. to 5h.
- additional customer specific information

Dimensions:

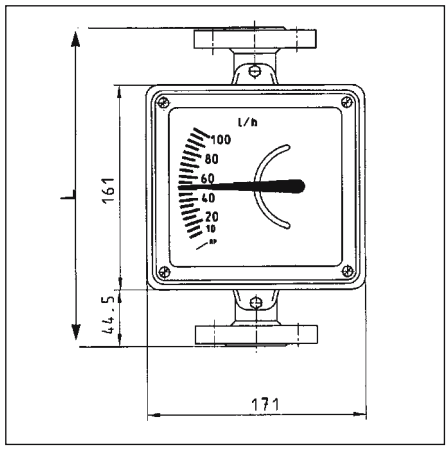


Fig. 1: front view

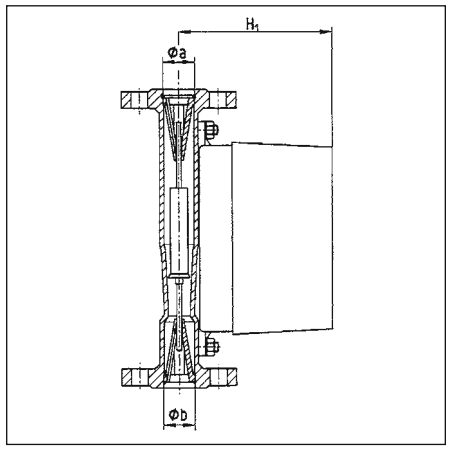


Fig. 2: stainless steel measuring tube

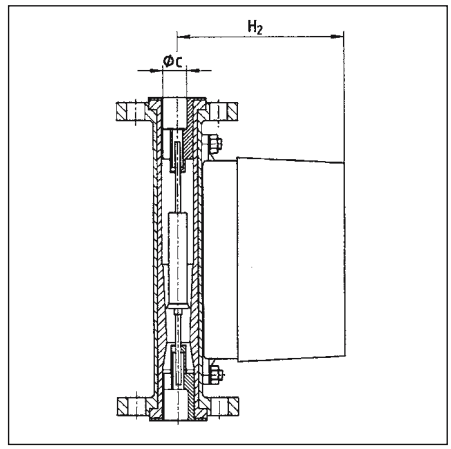


Fig. 3: measuring tube PTFE coated

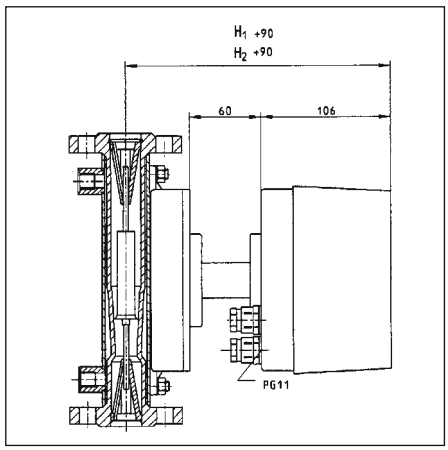


Fig. 4: Option DS25.H... (steam jacket and DS25.A (temperature isolation)

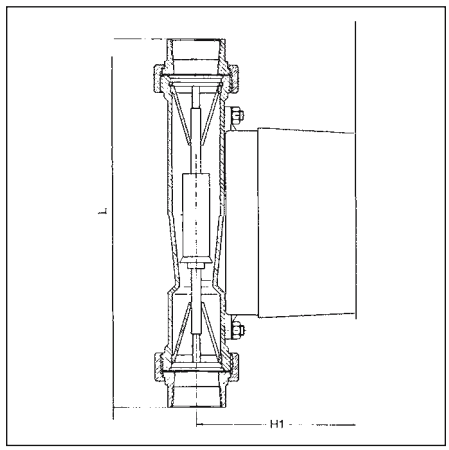


Fig. 5: measuring tube with threaded connection (R or NPT)

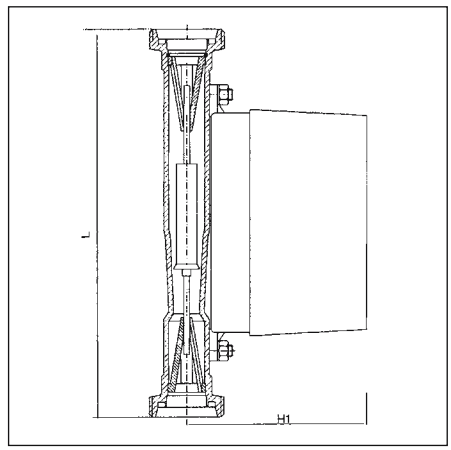


Fig. 6: measuring tube with hygienic connection acc. to DIN 11851

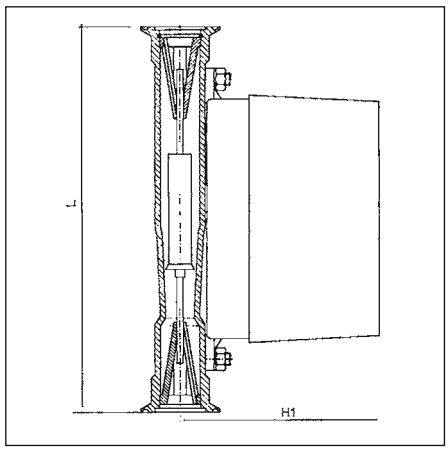
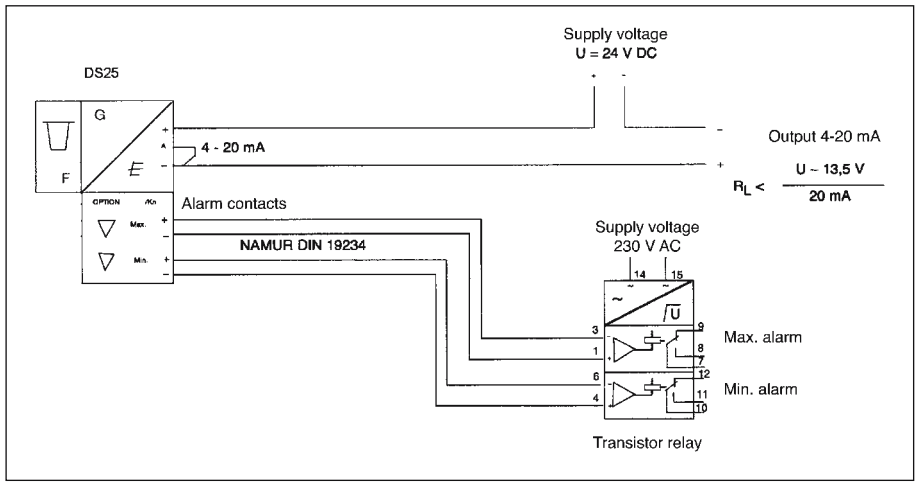


Fig. 7: measuring tube with Tri-Clamp connection

Measuring tube No.	H1 (mm)	H2 (mm)	Weight (kg)
1	122	122	5
2	123	127	5
3	131	136	6,5
4	147	152	11
5	161	168	16
6	170	176	20

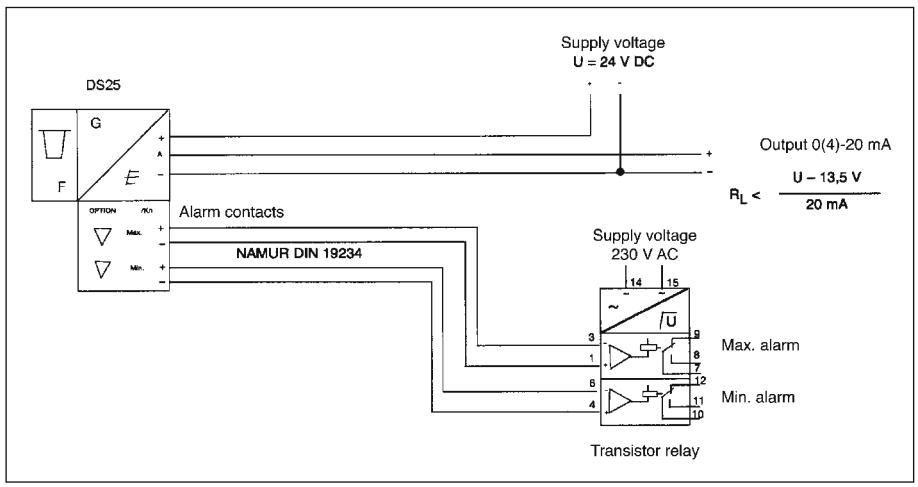
Dimension “L”: see table 2 (process connections)

Electrical connections:



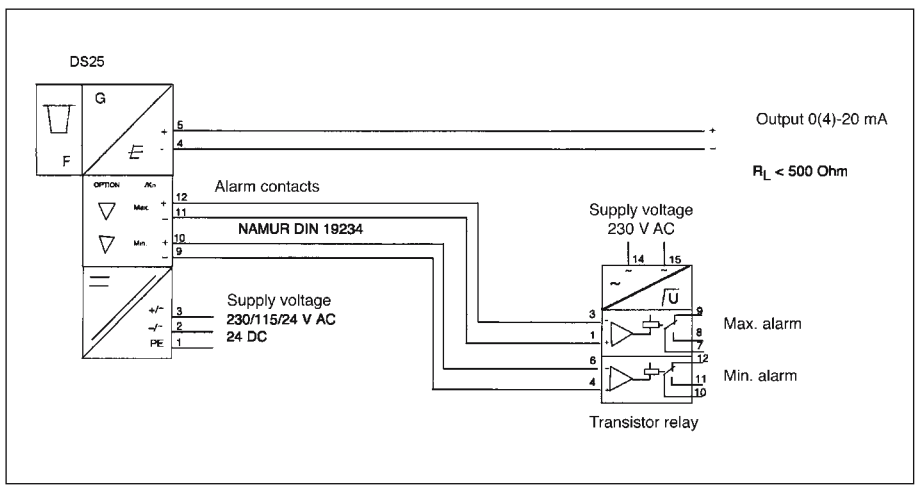
electronic transducer, 2-wire

2 alarm contacts with contact protection relay



electronic transducer, 3-wire

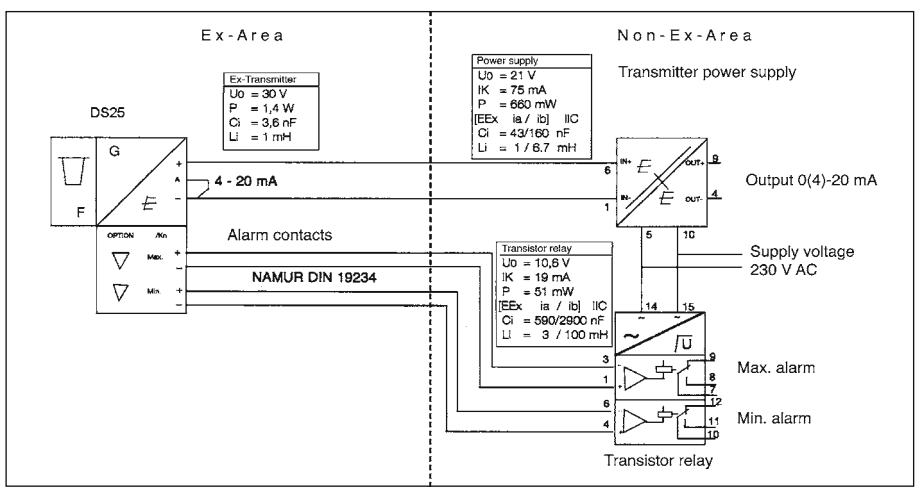
2 alarm contacts with contact protection relay



electronic transducer, 4-wire

2 alarm contacts with contact protection relay

EEx application:



electronic transducer [EEx], 2-wire

2 alarm contacts with contact protection relay

DS50

OEM

Piston Type Flow Switch for Low Flow Applications

- for low-viscosity fluids
- low-cost model
- switching point factory-set at 0.5 or 1 l/min
- compact design
- wetted parts made of plastic/brass
- mounting independent

Description

The model DS50 flow switches are sturdy, heavy-duty devices that are to a great extend immune to faults. Fluid passing through the switch forces a piston with integral permanent magnet against a stainless steel spring in the direction of flow. This action operates a reed contact that is embedded in the case. The contact is closed with flow, and opens when the flow drops below a fixed, preset value.

Applications

DS50 flow switches are typically used to monitor flows of low-viscosity fluids at low cost.
Typical applications include:

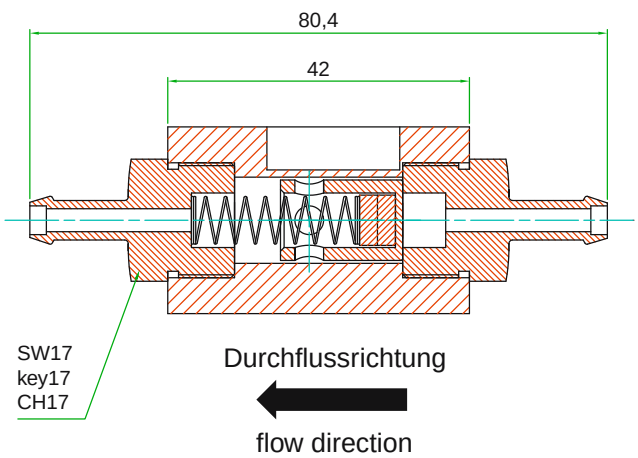
- cooling circuits
- heating installations
- welding equipment
- laser cooling systems

Models

DS50.K: Plastic housing
Process connections: G 1/4 male thread,
Nipple for 6 or 9 mm hose
Switching points: 0.5 or 1 l/min water,
decreasing flow rate

Other materials, process connections,
and switching points available upon request

Dimensions



Total length at G 1/4" (80,4 mm)

Model Coding

Order number: **DS50.** **K.** **G08.** **1.** **0**

Piston type flow switch

Model:

K = Polyacetal (POM) case, brass connections

S = special version

Process connection:

G08 = G 1/4 male thread

T6 = hose connector, 6 mm

T9 = hose connector, 9 mm

S = special connection

Switching point:

1 = 0.5 l/min water, decreasing flow rate

2 = 1.0 l/min water, decreasing flow rate

9 = special switching point

Special feature:

0 = none

9 = please specify in writing

Technical Specifications

Materials:

Housing:	POM
Piston:	POM
Spring:	stainless steel 1.4401
Magnet:	hard ferrite, sintered
Connection:	brass

Max. pressure:

Threaded connection:	10 bar, 16 bar(short term only)
Hose connection:	6 bar

Max. temperature: 80 °C

Pressure loss: 0.5 l/min: 0.07 bar
2 l/min: 0.25 bar
5 l/min: 1.2 bar

Switching points: 0.5 or 1 l/min, for decreasing flow of water

Mounting position: Any

Contact: Reed contact (NO), encapsulated, 400V / 0.5A / 10VA / 10W

Electrical connection: 2-core stranded cable, LIYY, 0.14^2 30 cm

DP01

Paddle-type flow switch

- **With and without T fitting, for piping from 1/4” to 6”**
- **Constructed of brass, stainless steel and with T fitting of PVC**
- **Upper part with T fitting can be removed, allowing cleaning or replacement without requiring readjustment**
- **Causes only slight pressure loss**
- **Available with reed contact or microswitch**
- **Switching function depends only on flow, not on pressure and temperature of fluid**

Description:

The flow switches model DP01 operate according to the paddle principle. The flowing liquid pushes against the surface area of a paddle mounted at the end of a pivoting arm. The dynamic pressure against the plate deflects the arm. This motion causes a permanent magnet attached on the other end of the arm to switch an adjustable reed contact located outside the liquid being monitored.
By moving the reed contact, different switching points can be set.

Fields of application:

The DP01 paddle flow switch is suitable for monitoring the switching point of low-viscosity liquids.
The switching point is normally set as required for the specific process. However, fixed switching points for increasing or decreasing flow rate can also be preset at the factory, if necessary.

Designs, switching ranges and dimensions:

Nominal size (DN)	Connection (G)	Switch on at (l/min H_2O)	Switch off at (l/min H_2O)	Max. flow rate (l/min H_2O)	l_1 (mm)	Size A/F 1 brass (mm)	Size A/F 1 stainless steel (mm)
DP01.1: with brass or stainless steel T fitting and reed contact							
8	1/4	2.1…2.7	1.8…2.4	45	11	27	27
10	3/8	2.5…3.2	2.2…2.9	60	11	19	27
15	1/2	3.4…4.2	3.0…3.8	67	11	19	27
20	3/4	7.0…9.1	6.4…8.2	180	15	27	32
25	1	13.5…17	12…15.5	195	15	32	41
32	1 1/4	15.5…20.5	14.5…19	240	15	46	46
40	1 1/2	26.5…34.5	25.5…32.5	400	15	55	55
50	2	39.5…51	39…50	400	15	70	70

Nominal size (DN)	Connection (G)	Switch on at (l/min H_2O)	Switch off at (l/min H_2O)	Max. flow rate (l/min H_2O)	l_1 (mm)	l (mm)	h (mm)
DP01.2: with PVC T fitting and reed contact							
15	DN15	5.1…6.9	4.9…6.5	50	16	54	113
20	DN20	9.4…12.3	9.1…11.9	100	19	66	118
25	DN25	10.7…15.2	10.4…14.8	100	22	78	127
32	DN32	17.0…22.6	16.8…22.5	150	26	98	155
40	DN40	21.8…30.1	21.6…40.8	200	31	118	166
50	DN50	29.0…40.0	28.6…49.8	260	38	144	180

Nominal size (DN)	Connection (G)	Switch off at (l/min H_2O)	Max. flow rate (m^3/h H_2O)	l (mm)	H (mm)
DP01.3: with brass T fitting and microswitch					
10	3/8 female thread	4.0…5.0	10	50	85.5
15	1/2 female thread	5.0…6.0	20	50	85.5
15	1/2 male thread	4.0…5.0	20	60	85.5
20	3/4 female thread	8.0…10.0	40	50	85.5
25	1 female thread	17.0…20.0	60	50	92.5
32	1 1/4 female thread	24.0…28.0	100	50	95
40	1 1/2 female thread	43.0…50.0	150	50	97.5
50	2 female thread	69.0-83.0	250	50	108

Nominal size (DN)	Switch on at (l/min H_2O)	Switch off at (l/min H_2O)	Max. flow rate (l/min H_2O)	l_3 (mm)
DP01.4: without T fitting, 1/2" male thread, installation length 51 mm, reed contact				
50	1.9…2.7	1.8…2.6	30	51 +/- 1
80	5.0…8.0	4.9…7.9	80	51 +/- 1
100	8.3…12.5	8.2…12.4	150	51 +/- 1
150	17.5…25.0	17.4…24.9	200	51 +/- 1
DP01.5: without T fitting, 1/2" male thread, installation length, reed contact				
100	5.7…6.3	5.6…6.2	100	111 +/- 1
150	11.0…13.0	10.9…12.9	150	111 +/- 1
200	25.0…27.0	24.9…26.9	200	111 +/- 1
DP01.6: without T fitting , soldering or welding nipple, installation length 24 mm, reed contact				
50	3.8…4.9	3.7…4.8	30	24 +/- 1
80	9.0…14.3	8.9…14.2	100	24 +/- 1
100	13.0…18.8	12.7…18.4	150	24 +/- 1
150	33.0…46.0	32.9…45.9	200	24 +/- 1

Ordering Code:

Order number: DP01. | 1. | 2. | 25. | 0. | 0

Paddle-type flow switch

Version:
1 = With T fitting, brass or stainless steel
2 = With PVC T fitting
3 = With brass T fitting and microswitch
4 = With 1/2" male thread, brass or stainless steel, installation length 51 mm
5 = With 1/2" male thread, brass or stainless steel, installation length 111 mm
6 = With soldering connector (brass) or welding connector (stainless steel), installation length 24 mm

Material:
1 = Brass (not DP01.2)
2 = Stainless steel (not DP01.2, DP01.3)
3 = PVC (DP01.2 only)

Nominal size:
DP01.1 only
08 = 1/4"
DP01.1 and DP01.3
10 = 3/8"
DP01.3 only
14 = 1/2" male thread
DP01.1, DP01.2, DP01.3
15 = 1/2"
20 = 3/4"
25 = 1"
32 = 1 1/4"
40 = 1 1/2"
50 = 2"
DP01.4, DP01.5 and DP01.6
00 = All nominal sizes from 2" to 6" as per table

Preset switching point:
0 = None
1 = Factory-set switching point (increasing)
2 = Factory-set switching point (decreasing)

Options:
0 = None
1 = Please specify in writing

Technical Specifications:

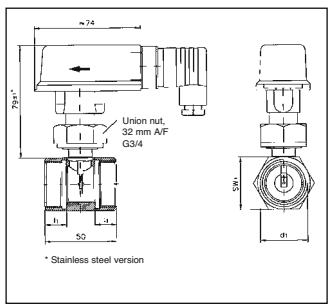
Max. pressure: 10 bar* (brass and stainless steel)
2.5 bar (PVC)
* reduced pressure stage equipment with cooper pipe section

Max. temperature: 110°C (brass and stainless steel)
100°C (DP01.3)
60°C PVC

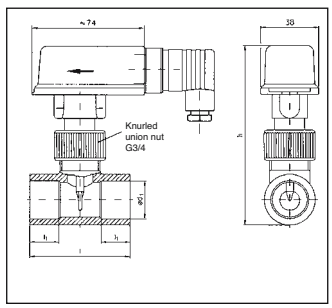
Reed contact:
Contact operation: NC contact/NO contact
Switching capacity: 230 VAC / 48 VDC, 1A, 20W/26 VA

Microswitch:
Contact operation: Changeover contact
Switching capacity: 250 VA, 5A, 1250 VA

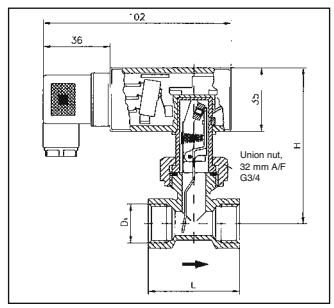
DP01.1



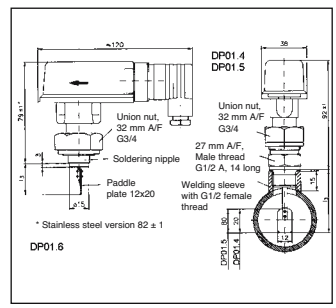
DP01.2



DP01.3



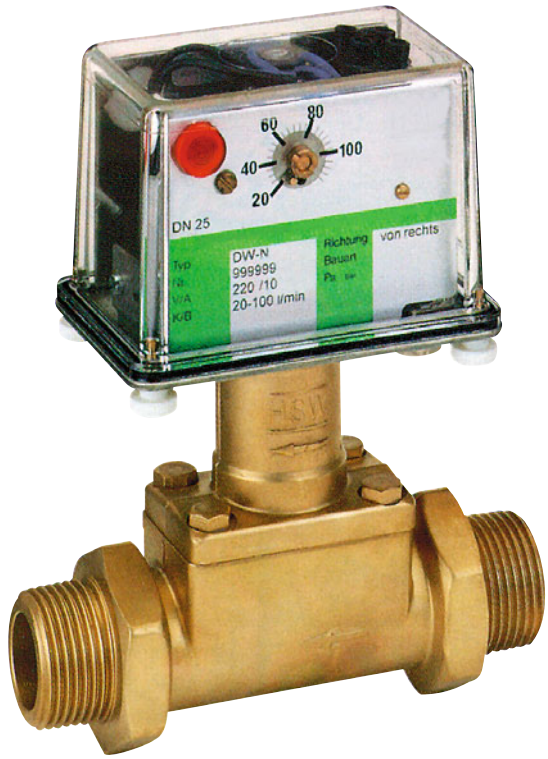
DP01.4 / DP01.5 / DP01.6



DP05

Paddle-bellows flow switch for liquids, with variable switching point

- **Easy switch-point adjustment over the entire switching range**
- **Bellows keeps liquid hermetically separated from the switching element**
- **Insensitive to dirty/contaminated fluids**
- **Very high reliability**
- **High electrical loading capacity through use of 1 or 2 independently adjustable microswitches**
- **Insensitive to electromagnetic fields**
- **Easy installation, for piping up to DN 600**



Description:

The flow switches model DP05 operate according to paddle-bellows principle. The flowing liquid pushes against the surface area of a paddle mounted at the end of a pivoting arm. The arm is deflected against the force of a spring. This deflection is mechanically transmitted to an adjustable contact unit. A bellows systems hermetically seals the liquid off from the mechanism.
In case of malfunction, the spring returns the paddle plate to the zero position (no flow), which causes the system to automatically signal a fault.

Fields of application:

The DP05 paddle-bellows flow switch is suitable for monitoring thin and low-viscosity liquids in average to large flow volumes. For nominal pipe sizes over DN50, installation with a special intermediate mounting flange yields a price/performance ratio of exceptional economy.

Designs:

Each of the 3 types of DP05 flow switches are available in 3 material combinations:

DP05.R... with T fitting and pipe-thread connection from G 3/8 to G 2 male thread

DP05.F... with T fitting and DIN flange from DN10 to DN50

Material combination A:
T fitting of brass
Pivoting system of brass
Bellows of 1.4571 stainless steel
Flange of galvanized steel

Material combination B:
T fitting of 1.4571 stainless steel
Pivoting system of 1.4305 stainless steel
Bellows of 1.4571 stainless steel
Flange of 1.4571 stainless steel

Material combination C:
T fitting of PVC
pivoting system of 1.4305 stainless steel
Bellows of 1.4571 stainless steel
Flange of PVC

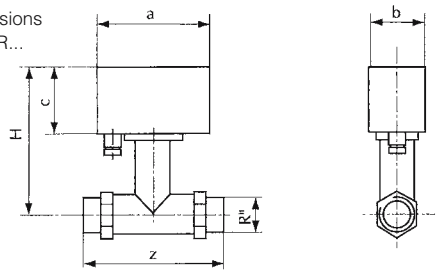
DP05.A… with weld-on flange for nominal pipe size DN65 to DN600

Material combination A:
Housing of brass
Pivoting system of brass
Bellows of 1.4571 stainless steel
Weld-on flange of carbon steel, painted

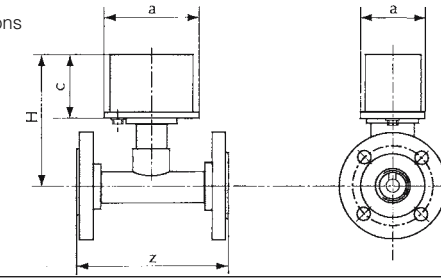
Material combination B:
Housing of 1.4571 stainless steel
Pivoting system of 1.4305 stainless steel
Bellows of 1.4571 stainless steel
Weld-on flange of 1.4571 stainless steel

Dimensions:

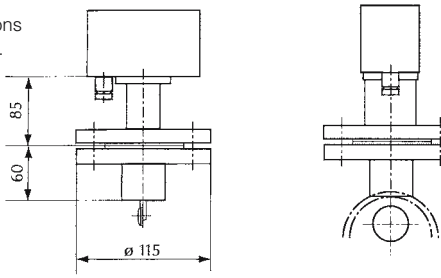
Dimensions DP05.R...



Dimensions DP05.F...



Dimensions DP05.A...



Ordering Code:

Order number: DP05. | R025. | B. | 1. | 20-100

Paddle-bellows flow switch

Process connection (xx=nominal pipe size):
R0xx = With male thread (G 3/8 to G2 only)
F0xx = With flange (DN10 to DN50 only)
Axxx = With weld-on flange (from DN65 to DN600)

Material combination:
A = Brass / stainless steel (galvanized steel)
B = Completely of stainless steel
C = PVC / stainless steel (not for DP05.A..).

Switching output:
1 = 1 microswitch (250 V / 10 A)
2 = 2 microswitch (250 V / 5 A)

Switching range:
xxxx-xxxx = min. - max. switching point (refer to „Measuring Ranges" table)

Additional specifications:

- Liquid density and viscosity (if not water)
- Process pressure and temperature
- Mounting position and direction of flow
- Ratings of electrical connections

Measuring ranges:

Process connection DP05.R... DP05.F...	Flow rate (l/min)		Flow ratio	Process connection DP05.A...	Flow rate (m^3/h)		Flow ratio
	min.	max.			min.	max.	
3/8"/DN10	1	25	1:5	DN 65	4,8	60	1:4
1/2"/DN15	1	55	1:5	DN 80	7,2	90	1:4
3/4"/DN20	5	100	1:5	DN 100	12	144	1:4
1"/DN25	6	150	1:5	DN 125	18	255	1:4
1 1/4"/DN32	10	250	1:5	DN 150	24	330	1:4
1 1/2"/DN40	20	400	1:5	DN 200	42	600	1:4
2"/DN50	50	600	1:5	DN 250	72	900	1:4
Switching ranges apply to water at 20°C. Within the specified limits, all switching ranges can be achieved, provided that the max./min. ratio for the switching point is not exceeded.				DN 300	102	1.200	1:4
				DN 350	150	1.800	1:4
				DN 400	180	2.400	1:4
				DN 500	300	3.600	1:4
				DN 600	420	4.500	1:4

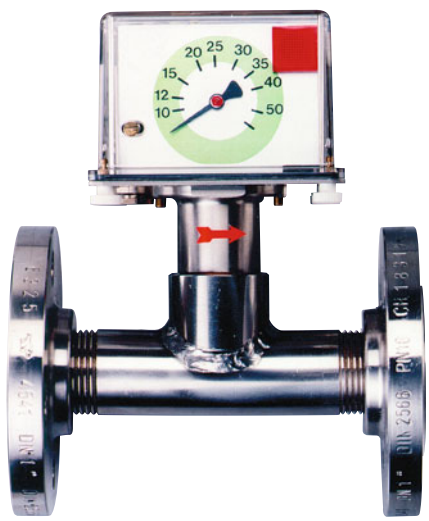
Nominal size	Installation length Z (in mm)		installation clearance H (in mm)
	DP05.R...	DP05.F...	
3/8"/DN10	135	155	145
1/2"/DN15	135	155	145
3/4"/DN20	135	160	145
1"/DN25	135	160	145
1 1/4"/DN32	170	190	150
1 1/2"/DN40	170	190	155
2"/DN50	170	190	160

Technical specifications:

Max. pressure:	16 bar
Max. temperature:	100 °C
Repeat accuracy:	+/- 5% to 20 l/min +/- 4% from 21 to 200 l/min +/- 3% > 200 l/min
Switching hysteresis:	10% (to 2 bar)
Contacts:	microswitch, 250 V, 10 A or 5 A
Status display:	low-voltage lamp or LED (depends on the voltage rating)

DP06

Paddle-bellows flow meter and switch for liquids



- **Large 270° dial gauge display for flow rate**
- **Simple switch-point adjustment over the entire switching range on a separate small dial**
- **Bellows keeps liquid hermetically separated from the switching element**
- **Insensitive to dirty/contaminated fluids**
- **Very high reliability**
- **High electrical loading capacity through use of 1 or 2 independently adjustable microswitches**
- **Insensitive to electromagnetic fields**
- **Easy installation, for piping up to DN 600**

Description:

The flow meters and switches model DP06 operate according to the paddle-bellows principle. The flowing liquid pushes against the surface area of a paddle mounted at the end of a pivoting arm.
The arm is deflected against the force of a spring. This deflection is mechanically transmitted to a 270° dial-gauge display and a separately adjustable contact unit.
A bellows system seals the liquid off from the mechanism. In case of malfunction, the spring returns the paddle plate to the zero position (no flow), which causes the system to automatically signal a fault.

Fields of application:

The DP06 paddle-bellows flow meter and switch is suitable for monitoring thin and low-viscosity liquids in average to large flow volumes. For nominal pipe sizes over DN50, installation with an intermediate mounting flange yields a price/performance ratio of exceptional economy.

Designs:

Each of the 3 types of DP06 flow meters and switches are available in 3 material combinations:

DP06.R... with T fitting and pipe-thread connection from G 3/8 to G 2 male thread

DP06.F... with T fitting and DIN flange from DN10 to DN50

Material combination A:
T fitting of brass
Pivoting system of brass
Bellows of 1.4571 stainless steel
Flange of galvanized carbon steel

Material combination B:
T fitting of 1.4571 stainless steel
Pivoting system of 1.4305 stainless steel
Bellows of 1.4571 stainless steel
Flange of 1.4571 stainless steel

Material combination C:
T fitting of PVC
Pivoting system of 1.4305 stainless steel
Bellows of 1.4571 stainless steel
Flange of PVC

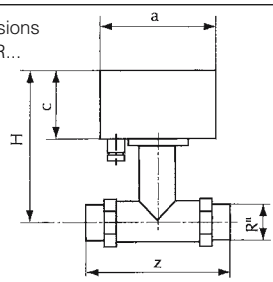
DP06.A... with weld-on flange for nominal pipe size DN65 to DN600

Material combination A:
Housing of brass
Pivoting system of brass
Bellows of 1.4571 stainless steel
Weld-on flange of carbon steel, painted

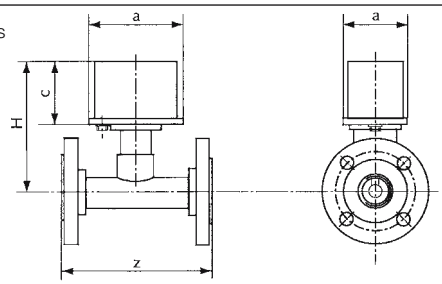
Material combination B:
Housing of 1.4571 stainless steel
Pivoting system of 1.4305 stainless steel
Bellows of 1.4571 stainless steel
Weld-on flange of 1.4571 stainless steel

Dimensions:

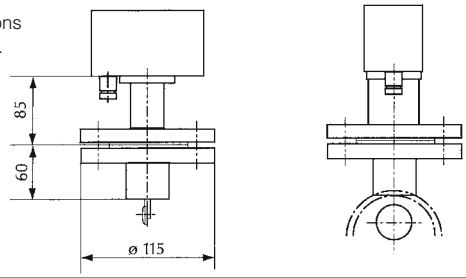
Dimensions DP06.R...



Dimensions DP06.F...



Dimensions DP06.A...



Ordering Code:

Order number: DP06. R025. B. 1. 20-100

Paddle-bellows flow meter and switch

Process connection (xx=nominal pipe size):
R0xx = With male thread (G 3/8 to G2 only)
F0xx = With flange (DN10 to DN50 only)
Axxx = With weld-on flange (from DN65 to DN600)

Material combination:
A = Brass / stainless steel (carbon steel, galvanized)
B = Completely of stainless steel
C = PVC / stainless steel (not for DP06.A..).

Switching output:
1 = 1 microswitch (250 V / 10 A)
2 = 2 microswitch (250 V / 5 A)

Switching range:
xxxx-xxxx = min. - max. flow rate (refer to „Measuring Ranges" table)

Additional specifications:

- Liquid density and viscosity (if not water)
- Process pressure and temperature
- Mounting position and direction of flow
- Ratings of electrical connections

Measuring ranges:

Process connection DP06.R... DP06.F...	Flow rate (l/min)		Flow ratio	Process connection DP06.A...	Flow rate (m^3/h)		Flow ratio
	min.	max.			min.	max.	
3/8"/DN10	1	25	1:5	DN 65	4,8	60	1:4
1/2"/DN15	1	55	1:5	DN 80	7,2	90	1:4
3/4"/DN20	5	100	1:5	DN 100	12	144	1:4
1"/DN25	6	150	1:5	DN 125	18	255	1:4
1 1/4"/DN32	10	250	1:5	DN 150	24	330	1:4
1 1/2"/DN40	20	400	1:5	DN 200	42	600	1:4
2"/DN50	50	600	1:5	DN 250	72	900	1:4
Switching ranges apply to water at 20 °C. Within the specified limits, all switching ranges can be achieved, provided that the max./min. ratio for the switching point is not exceeded.				DN 300	102	1.200	1:4
				DN 350	150	1.800	1:4
				DN 400	180	2.400	1:4
				DN 500	300	3.600	1:4
				DN 600	420	4.500	1:4

Nominal size	Installation length Z (in mm)		installation clearance H (in mm)
	DP06.R...	DP06.F...	
3/8"/DN10	135	155	145
1/2"/DN15	135	155	145
3/4"/DN20	135	160	145
1"/DN25	135	160	145
1 1/4"/DN32	170	190	150
1 1/2"/DN40	170	190	155
2"/DN50	170	190	160

Technical specifications:

Max. pressure:	16 bar
Max. temperature:	100 °C
Repeat accuracy:	+/- 5% to 20 l/min +/- 4% from 21 to 200 l/min +/- 3% > 200 l/min
Switching hysteresis:	10% (to 2 bar)
Contacts:	microswitch, 250 V, 10 and, or 5 A
Status display:	low-voltage lamp or LED (depending on the voltage rating)

DPS10

Paddle-bellows type flow switch

- **Proven technology**
- **Easy installation**
- **Causes only slight pressure loss**
- **Constructed of brass and stainless steel**
- **Can be installed in any position**

Description:

The flow switches model DPS10 transmit the flow-dependent displacement of the paddle installed in the piping by means of a bellows and a spring-loaded rocker mechanically connected to a heavy-duty microswitch. The switching point can be changed by adjusting the spring preload.
The three standard paddles can be used in piping with nominal size of 1" to 3". A fourth paddle can be used for larger nominal sizes or to reduce the switching values through appropriate shortening to the desired length.
In addition, DPS10 is available in a design with a reduced adjustment range, so that it can also be used for minimum switching values.

Fields of application:

DPS10 paddle switches can be used wherever reliable monitoring of liquid flow is required. The switches are used for monitoring both minimum and maximum flow.
Typical application areas are the monitoring of cooling and lubrication circuits, dry-running protection for pumps or for monitoring loss of flow.
Their sturdy construction allows them to be reliably used in many industrial applications.

Designs:

DPS10 Paddle-bellows type flow switch

Material combination: the standard version, DPS10.1, is suitable for monitoring non-caustic/non-corrosive liquids. DPS10.1 has a brass housing, a bellows made of red brass, and 4 variably adjustable paddles made of 1.4301 stainless steel.
The stainless steel version, DPS10.2, is suitable for monitoring caustic/corrosive liquids. DPS10.2 has a housing made of 1.4301 stainless steel, a bellows of 1.4301 stainless steel and 4 variably adjustable paddles made of 1.4301 stainless steel.
The third version, DPS10.3, is suitable for monitoring air flow. DPS10.3 has a brass housing, a bellows made of red brass, and paddle of stainless steel 1.4301 suitable for flow velocities of 1-8 m/s.

Adjustment range: measuring ranges for the standard version and the version with a reduced measuring range are listed in the table below.

Pipe diameter in mm	Type	$Q_{max.}$ in m³/h	Adjustment range in m³/h	Adjustment range reduced in m³/h	Paddle
25	DPS10.1 and DPS10.2	3.6	0.6 - 2	0.2 - 1	1
32	DPS10.1 and DPS10.2	6	0.8 - 2.8	0.25 - 1.4	1
40	DPS10.1 and DPS10.2	9	1.1 - 3.7	0.5 - 1.9	1
50	DPS10.1 and DPS10.2	15	2.2 - 5.7	0.9 - 3.6	1, 2
65	DPS10.1 and DPS10.2	24	2.7 - 6.5	1.2 - 4.9	1, 2
80	DPS10.1 and DPS10.2	36	4.3 - 10.7	2.1 - 7.4	1, 2, 3
100	DPS10.1 and DPS10.2	60	11.4 - 27.7	4.9 - 17.1	1, 2, 3
150	DPS10.1 and DPS10.2	120	35 - 81	9.7 -34	1, 2, 3
200	DPS10.1 and DPS10.2	240	72 - 165	13.6 - 47.6	1, 2, 3
250-300	DPS10.1 and DPS10.2	360	156 - 290	25.7 - 90.1	1, 2, 3
25-300	DPS10.3	1 - 8 m/s air 1 bar			

Technical Specifications:

Max. pressure: 11 bar brass, 30 bar stainl. steel
Max. medium temp.: 120°C (DPS10.3, 85°C)
Max. ambient temp.: 85°C
Mounting position: any
Process connection: DPS10.1 and DPS10.2: G1 A, DPS10.3: mounting plate
Pressure loss: 0.06 to 0.08 bar
Hysteresis: depends on switching value, at least 0.1 l/min

Electrical data:

Switching output: microswitch, changeover contact, 250 VAC, 15 A (8 A inductive)
Thread adapter: PG11
Protection type: IP65

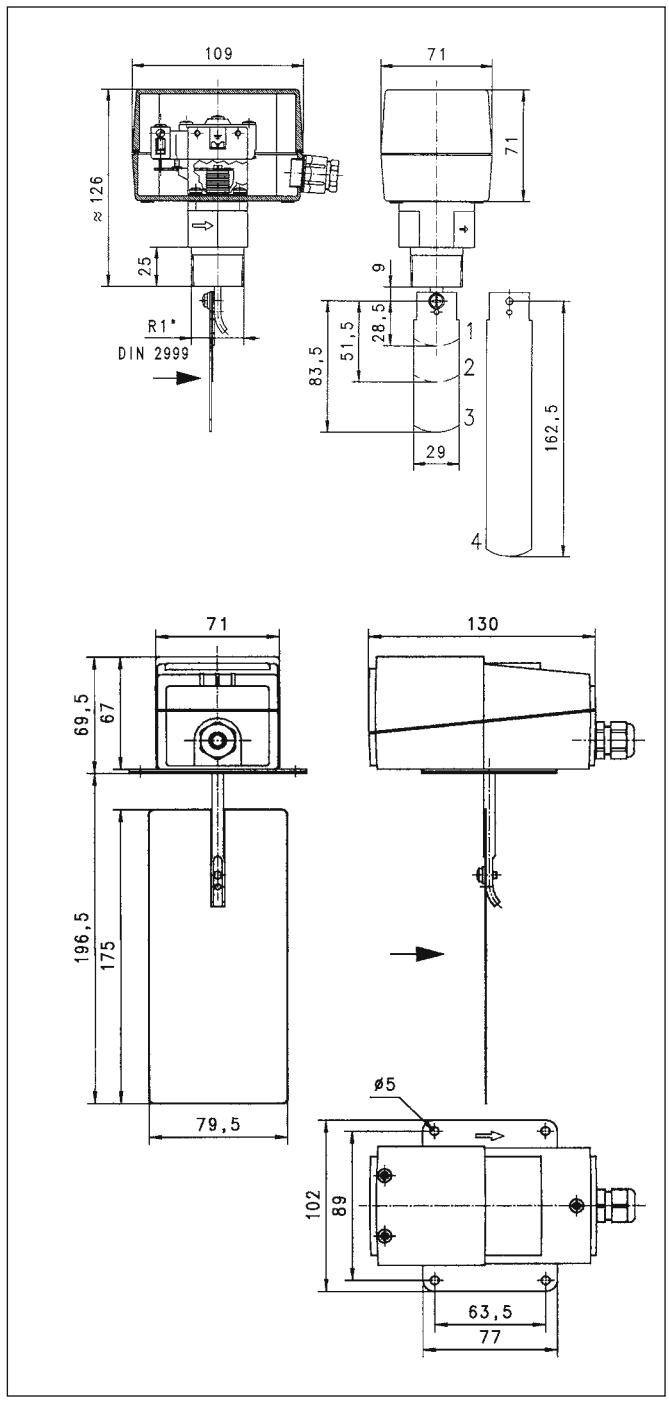
Ordering code:

Order number: **DPS10. 1. 1.**

DPS10 Paddle-bellows type flow switch

Material combination:
1 = Brass housing, stainless steel paddle for water
2 = Stainless steel housing, stainless steel paddle for water
3 = Brass housing, stainless steel paddle for air

Adjustment range:
1 = Standard
2 = Reduced



DR05

Flow Sensor with Plastic Paddle Wheel

- **Made completely of plastic (no metal parts)**
- **For pipe sizes from 1" to 2"**
- **Materials: PP, ECTFE, ceramics, Viton**
- **Output signals: Pulses, 4 to 20 mA or 2 limit switches**
- **Turndown ratio up to 50:1**

Description:

The DR05 paddle-wheel flow sensor measures the flow of water and substances similar to water. The flow sensor consists of a section of polypropylene pipe fitted with a paddle wheel. The paddle wheel, which extends into the area of flow, is set into rotation by the flowing liquid. The rotary motion is detected by a Hall sensor and output as a series of pulses. The output frequency of these pulses is directly proportional to the flow rate. Alternatively, the pulsed output can be converted into an analog signal (4 to 20 mA) or into two limit contacts by optional integrated electronics. DR05 paddle-wheel flow sensors are made completely of plastic; they have no metal parts. These devices are available for pipe sizes of 1" to 2" with turndown ratios of up to 50:1.

Typical Applications:

Model DR05 paddle-wheel flow sensors are used wherever the flow of liquids having low viscosities must be reliably and economically measured, including but by no means limited to, the following cases:

– In cooling systems

– For demineralized water

– For aggressive/caustic liquids in the chemical industry

Models:

DR05.P: Housing made of PP, rotor made of ECTFE, wheel axles and bearing made of ceramics, Viton gaskets (EPDM optional)

Measuring Ranges:

Measuring range (GPM / l/min)	Connection (straight or NPT female thread)	Pulses / L (approx.)
1.3-66 / 5-250	1"	54
2.6-105 / 10-400	1-1/4"	32
4-160 / 15-600	1-1/2"	20
5.3-265 / 20-1000	2"	10

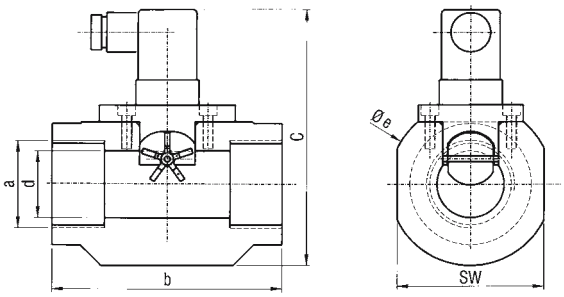
Output Signals:

DR05...P: Pulse output
Rectangular pulse signal

DR05...A: Analog output:
4 to 20 mA, 2-wire

DR05...S: Switched output
2 limit switches (0.1A at 24 VDC), programmable

Dimensions:



Nominal size a	b (inch / mm)	c (inch / mm)	d (inch / mm)	e (inch / mm)	SW (inch / mm)
DN25 / 1"	4.33 / 110	4.69 / 119	0.98 / 25	2.91 / 74	2.76 / 70
DN32 / 1-1/4"	4.33 / 110	4.84 / 123	1.26 / 32	3.07 / 78	2.76 / 70
DN40 / 1-1/2"	4.72 / 120	4.92 / 125	1.57 / 40	3.15 / 80	2.95 / 75
DN50 / 2"	4.92 / 125	5.31 / 135	1.97 / 50	3.50 / 89	2.95 / 75

Electrical Connection:

	DR05...P	DR05...A	DR05...S
Power supply	Pin 1		white
Signal	Pin 2		green
Ground	Pin 3		brown
Relais 1			yellow
Relais 1			grey
Relais 2			pink
Relais 2			blue
4...20mA Signal +		Pin 1	
4...20mA Signal -		Pin 2	

Options:

- Gaskets of EPDM

Ordering Code:

Order Number: **DR05. | P. | V. | 25G. | P. | 0**

Plastic Paddle-wheel flow sensor

Models:
P = PP housing, rotor of ECTFE

Gasket:
V = Viton (standard)
E = EPDM

Measuring range and process connection:

Threaded, NPT female:	Threaded, BSP female:
25N = 1.3 - 66 GPM, 1"	25G = 5 - 250 l/min, 1"
32N = 2.6 - 105 GPM, 1 1/4"	32G = 10 - 400 l/min, 1 1/4"
40N = 4 - 160 GPM, 1 1/2"	40G = 15 - 600 l/min, 1 1/2"
50N = 5.3 - 265 GPM, 2"	50G = 20 - 1000 l/min, 2"

Output Signal:
P = Pulse output
A = Analog output, 4 to 20 mA
S = 2 limit switches and pulse output

Options:
0 = None
9 = Please specify in writing.

Technical Specifications:

Max. pressure: 145 psi / 10 bar

Liquid temperature: 32...176 °F / 0 ... 80°C

Measuring error: ± 3% of end value (full scale)

Repeatability: < ± 0.5% of end value (full scale)

Process connection: 1" to 2" BSP or NPT female thread

Installation position: Any

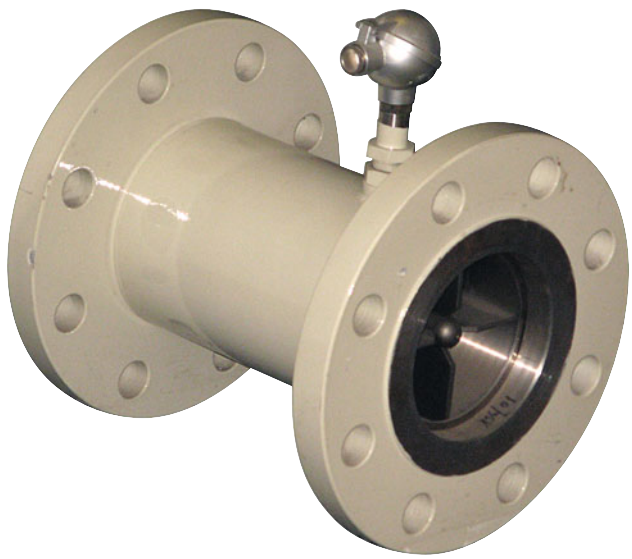
Voltage supply:
- Pulse output: 4.5 to 24 VDC
- Analog output: 15 to 24 VDC
- Limit-value relay: 15 to 24 VDC

Electrical connection:
- Pulse and analog output: 5-pin plug connection as per EN 175301-803A
- Limit switch: Female cable connector with matching plug fitted with 1 meter of cable

DR12

Precision Turbine Flowmeter for Thin, Non-Viscous Liquids

- **Wetted parts made completely of stainless steel**
- **Measuring accuracy: ± 0.5% to ± 1% of measured value**
- **Nominal diameters: 3/8" to 16" / DN10 to DN400 for flows up to 17600 GPM / 4,000 m^3/h**
- **Available for pressures up to 5800 psi / 400 bar and temperatures up to 300 °F / 150°C**
- **Available with threaded or flange connection**



Description:

Model DR12 flowmeters are sturdy turbine-type flow sensors suitable for mobile or permanent installation. A turbine wheel set in motion by a flow parallel to its axis rotates at a speed proportional to the average speed of flow in the piping system. The movement of the turbine wheel is detected by a contactless pickup (coil). The resulting output frequency is a reliable indicator of the flow volume. The turbine body and the measuring unit are made of stainless steel: The bearing is made either of tungsten carbide or teflon. These flow sensors are available with male threaded (max. 2") or flanged connections (max. 16" / DN400).

Typical Applications:

Model DR12 turbine flowmeters are primarily used to detect and measure the flow of thin, non-viscous liquids. The high-quality materials used in the their construction, their ability to withstand high pressures as well as the broad selection of measuring ranges make these devices ideal for use in the greatest variety of applications, including but by no means limited to, engineering, machinery construction and in the chemical, pharmaceutical as well as the food and beverage industries.

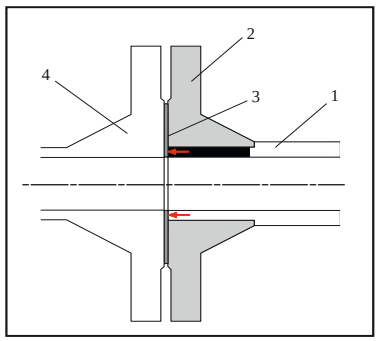
Models:

Model DR12 turbine flowmeters come standard with a housing of stainless steel AISI 321 / 1.4541.

For sizes up to 3" / DN80, the rotor is made of stainless steel AISI 420 / 1.4034. For larger sizes, the rotor is made of stainless steel AISI 321 / 1.4541.

The standard bearings are made of tungsten carbide. PTFE bearings are optionally available.

Sensors with flange connections come standard with flanges made of steel grade AISI 5LX / 1.1106. Flanges made of stainless steel AISI 321 / 1.4541 are optionally available.



The flanges are welded to the sensor body in a manner that ensures that they do not come in contact with the liquid being monitored.

1 = DR12 stainless steel housing
2 = Steel flange
3 = Gasket
4 = Mating flange

Sensor Systems

The following sensor systems are available for the DR12:

- Coil (self-excited),
  Output: Sinusoidal signal, 2-wire, 40 to 400 mV_{eff}
- Coil with preamplifier
  Output: Rectangular pulse signal, 3-wire
  PNP open collector, short-circuit-proof
  Power supply: 10 to 30 VDC
- Coil with preamplifier (as per NAMUR)
  Output: Pulse signals, 2-wire
  Power supply: 8 VDC

If desired, these devices can be fitted with different types of electrical connectors.

- Plug connector (Hirschmann)
  T_{max} = -40 to +230 °F / -40 to +110°C
- Plug connector (Cannon)
  T_{max} = -58 to +300 °F / -50 to +150°C
- Connection head with terminal block
  T_{max} = -58 to +300 °F / -50°C to +150°C

Output Signal

DR12 flowmeters provide an output frequency proportional to the flow rate. This output frequency is converted into a typical pulse/liter figure for each measuring range (see "Measuring Ranges" table).

Due to the production tolerances, the final pulse/liter ratings for identical ranges may vary by up to 10% among individual units. For this reason, every turbine is individually calibrated before delivery and provided with its own pulse/liter rating.

Application Information

To ensure problem-free function, there are several factors to keep in mind when using DR12 turbine flow sensors:

Chemical Resistance:

DR12 flow sensors can be used in all types of liquids that will not corrode the stainless steels used in their construction or the materials used in their turbine bearings.

Viscosity:

In general, the operation of turbine-type flow sensors is affected by liquid viscosity. However, their design will provide problem-free service with liquids having a viscosity of at most 15 cSt. Any additional output errors resulting from use in higher-viscosity liquids will be less than 0.5%

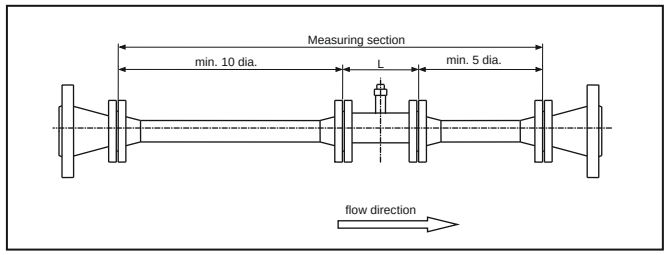
Gas Cavities:

Gas cavities (cavitation) in the liquids being monitored should be absolutely prevented from occurring. Such cavities can result in (additional) measurement errors. These measurement errors will correspond approximately to the volume of the gas bubbles being transported in the liquid.

Contamination:

The amount of solid materials in the liquid being monitored may be at most 50 g/m3 without affecting the measurement accuracy or the service life of the device. 80% of this solid materials should have a particles size no larger than 50µ; the remaining 20% should be no larger than 500 µ. Filament-shaped ("stringy") contamination in the liquid must be absolutely prevented from occurring since this type of material can accumulate and cause the rotor to lock up.

Installation Information:



Measuring Ranges:

Code	Measuring-range (water) GPM	Measuring-range (water) m^3/h	ID (inch / mm)	Pulses per Liter (psi / bar)	Pressure-loss	Signal-level (coil) mV_{eff}
1	0.25-1.25	0,055…0,275	0.24 / 6	17000	5.8 / 0.4	40
2	0.5-2.5	0,11…0,55	0.24 / 6	8500	5.8 / 0.4	40
3	1-5	0,22…1,1	0.47 / 12	4090	5.1 / 0.35	60
4	2-10	0,44…2,2	0.59 / 15	1960	5.1 / 0.35	80
5	3.5-17.5	0,8…4	0.59 / 15	1080	5.1 / 0.35	80
6	7-35	1,6…8	0.71 / 18	562	5.1 / 0.35	200
7	14-70	3,2…16	0.98 / 25	259	4.4 / 0.3	200
8	30-150	6,8…34	1.46 / 37	95,3	4.4 / 0.3	250
9	60-300	13,6…68	1.97 / 50	60,88	4.4 / 0.3	300
10	120-600	27…135	2.95 / 75	16	4.4 / 0.3	400
11	240-1200	54…270	3.94 / 100	12	3.6 / 0.25	200
12	480-2400	110…550	5.91 / 150	5,236	3.6 / 0.25	200
13	960-4800	220…1100	7.87 / 200	3,109	3.6 / 0.25	200
14	1670-8350	380…1900	9.84 / 250	1,8	3.6 / 0.25	200
15	2380-11900	540…2700	11.81 / 300	1,267	3.6 / 0.25	200
16	3500-17500	800…4000	15.75 / 400	0,9	3.6 / 0.25	200

Process Connection:

ID (inch / mm)	Type of Connection		
	Male thread NPT or G	Flange connection	
		ANSI	DIN
0.24 / 6	3/8"	3/8" RF	DN10
0.47 / 12	1/2"	1/2" RF	DN15
0.59 / 15	5/8"	1/2" RF	DN15
0.71 / 18	3/4"	3/4" RF	DN20
0.98 / 25	1"	1" RF	DN25
1.46 / 37	1 1/2"	1 1/2" RF	DN40
1.97 / 50	2"	2" RF	DN50
2.95 / 75	-	3" RF	DN80
3.94 / 100	-	4" RF	DN100
5.91 / 150	-	6" RF	DN150
7.87 / 200	-	8" RF	DN200
9.84 / 250	-	10" RF	DN250
11.81 / 300	-	12" RF	DN300
15.75 / 400	-	16" RF	DN400

Pressure Rating:

Nominal size	Pressure rating (bar)		
	Thread NPT or G	DIN Flange (PN)	ANSI Flange (lbs.)
DN10 / 3/8" - DN15 / 5/8"	3600 / 250 (2300 / 160 for 5/8")	40 / 160 / 250 150 / 300 320 / 400	150 / 300 / 600 / 900 / 1500 / 2500
DN20 / 3/4"	1450 / 100	40	150 / 300
DN25 1" - DN40 / 1 1/2"	1450 / 100 / 250 / 320 / 400	40 / 160 / 600 / 900	150 / 300 / 1500 / 2500
DN50 / 2"	1450 / 100 / 100 / 160 / 250 / 320 / 400	40 / 64 / 600 / 900 / 1500 / 2500	150 / 300
DN80 / 3"	– / 64 / 100 / 160 / 250 / 320 / 400	10 / 40 / 600 / 900 / 1500 / 2500	150 / 300
DN100 / 4"	– / 64 / 100 / 160 / 250	16 / 40 / 600 / 900 / 1500 / 2500	150 / 300
DN150 / 6"	– / 64 / 100 / 160	16 / 40 / 600 / 900 / 1500	150 / 300
DN200 / 8" - DN400 / 16"	– / 64	16 / 40 / 600 / 900	150 / 300

Ordering Code:

Order Number: **DR12. V. 09. 050D40. H. V. 0**

Precision Turbine Flow Sensor

Models:

R = Stainless steel housing, threaded
S = Stainless steel housing, steel flanges
V = Stainless steel housing, stainless steel flanges

Measuring range:

01 to 16 = see "Measuring Range" table

Process connection:

See separate "Process Connection" ordering code below

Bearing:

H = Tungsten-carbide bearing (not for measuring ranges 01 + 02)
P = PTFE bearing

Sensor system with plug connector (Hirschmann):

S = coil, self-exciting, no preamplifier
V = coil with preamplifier, 3-wire, 10 to 30 VDC
N = coil with preamplifier as per NAMUR, 8 VDC

Options:

0 = None
C = Plug connector (Cannon), -58 to +300 °F / -50 to +150°C
B = Connection head with terminal block, -58 to +300 °F / -50 to +150°C
9 = Please specify in writing.

Ordering Code for Process Connections

Connection code: **50 D 40**

Nominal size:

010 = 3/8" / DN10
015 = 1/2" / DN15
018 = 5/8" / DN15
020 = 3/4" / DN20
025 = 1" / DN25
040 = 1 1/2" / DN40
050 = 2" / DN50
080 = 3" / DN80
100 = 4" / DN100
150 = 6" / DN150
200 = 8" / DN200
250 = 10" / DN250
300 = 12" / DN300
400 = 16" / DN400

Type of connection (see "Process Connection" table):

G = male thread, G
N = male thread, NPT
D = DIN flange
A = ANSI flange
S = Special connection

Pressure rating (see "Pressure Rating" table):

10 to 250 = 10 to 250 bar (for DIN flanges only)
150 to 2500 = 150 to 2500 lbs. (for ANSI flanges only)
320 = Special model rated at 320 bar (only with "S" metric high pressure (S) threaded connection for measuring ranges 01 to 07)

Technical Specifications:

Materials:

Housing:	stainless steel AISI 321 / 1.4541
Rotor:	up to DN80: stainless steel AISI 420 / 1.4034 from DN100: stainless steel AISI 321 / 1.4541
Bearing:	tungsten carbide, PTFE optional
Flanges:	steel AISI 5LX / 1.1106, stainless steel AISI 321 / 1.4541 optional
Max. pressure:	as per "Pressure Rating" table and model coding
Liquid temperature:	-58 to +300 °F / -50 to +150°C (-40 to +230 °F / -40 to +110°C with Hirschman plug connection)
Ambient temperature:	-40 to +140 °F / -40 to +60°C

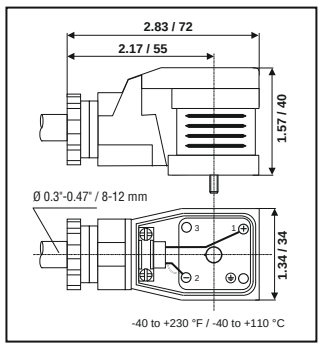
Accuracy:

DR12.-.01 to 03:	± 1% of measured value
DR12.-.04 to 16:	± 0.5% of measured value

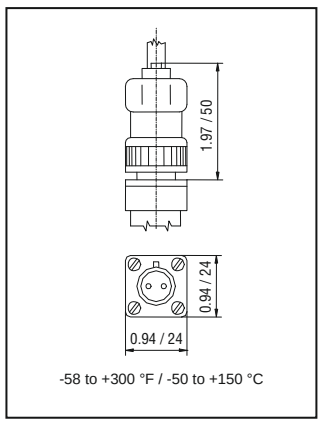
Supply voltage:

DR12...S:	coil without preamplifier, self-exciting
DR12...V:	coil with preamplifier: 10 to 30 VDC
DR12...N:	coil with preamplifier (as per NAMUR) 8 VDC

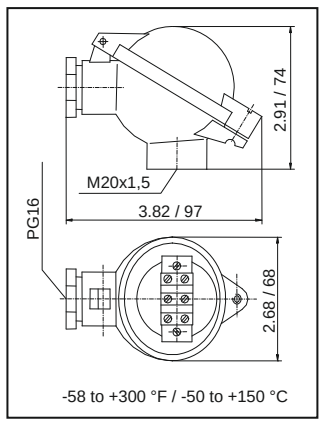
Electrical Connection:



Plug connection (Hirschmann)

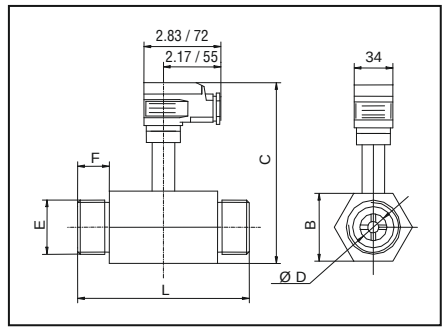


Plug connection (Cannon)



Terminal connector housing

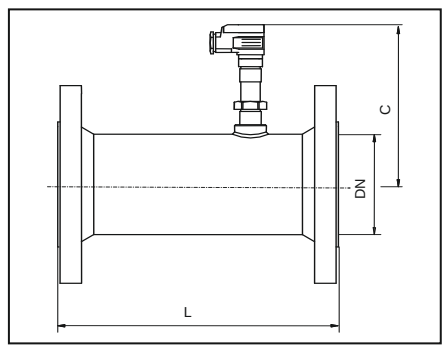
Dimensions:



Threaded connection:

Inner diameter ØD (inch / mm)	B (inch / mm)	C (inch / mm)	L (inch / mm)	E (male thread, NPT or G)	F (inch / mm)
0.24 / 6	0.98 / 25	3.23 / 82	2.00 / 50.8	3/8"	0.50 / 12.7
0.47 / 12	0.98 / 25	3.39 / 86	2.50 / 63.5	1/2"	0.75 / 19
0.59 / 15	0.98 / 25	3.43 / 87	2.50 / 63.5	5/8"	0.75 / 19
0.71 / 18	1.50 / 38	3.50 / 89	3.25 / 82.6	3/4"	0.87 / 22
0.98 / 25	1.50 / 38	3.62 / 92	3.50 / 89.0	1"	0.90 / 23
1.46 / 37	2.20 / 56	3.90 / 99	4.50 / 114	1 1/2"	1.10 / 28
1.97 / 50	2.75 / 70	4.10 / 104	5.25 / 133	2"	1.16 / 29.5

Dimensions for metric high-pressure (S) threaded connections available on request.



Flange connection

Inner diameter ØD (inch / mm)	C (inch / mm)	L (inch / mm)	Inner diameter ØD (inch / mm)	C (inch / mm)	L (inch / mm)
0.24 / 6	3.74 / 95	4.50 / 114	3.15 / 80	5.51 / 140	9.00 / 228
0.47 / 12	4.02 / 102	5.00 / 127	3.94 / 100	6.06 / 154	14.00 / 355
0.59 / 15	4.53 / 115	5.00 / 127	5.91 / 150	7.09 / 180	14.50 / 368
0.71 / 18	4.53 / 115	5.55 / 141	7.87 / 200	9.30 / 236	18.00 / 458
0.98 / 25	4.96 / 126	6.00 / 153	9.84 / 250	10.43 / 265	18.00 / 458
1.46 / 37	4.96 / 126	7.00 / 179	11.81 / 300	11.42 / 290	18.00 / 458
1.97 / 50	5.20 / 132	7.80 / 198	15.75 / 400	13.58 / 345	24.00 / 610

Dimensions apply to DIN flanges.
Dimensions for ANSI flanges may be slightly different.

DOZ01

Flow sensor with oval rotor assembly for small flow volumes

- **Unaffected by viscosity**
- **Compact design, no inlet piping required**
- **Materials: PP, ECTFE or stainless steel**
- **Output signals: pulses, 4 to 20 mA or 2 limit-value relays**

Description:

The model DOZ01 flow sensor with oval rotor assembly measures the flow of liquids, ranging from water to those with a maximum viscosity of 200 cSt, regardless of the actual viscosity of the liquid. In this type of sensor, the flowing liquid sets two toothed oval wheels within a measuring chamber in rotary motion. The rotary motion is detected by a Hall sensor and output as a series of pulses. The output frequency of these pulses is directly proportional to the flow rate. Alternatively, the pulsed output can be converted into an analog signal (4 to 20 mA) or into two limit contacts by optional downstream electronics. The flow sensor housing is available in different material combinations such as PP, ECTFE or stainless steel with the oval wheels made of PEEK. The availability of different oval-wheel axle shafts and gaskets allows the DOZ01 to be compatible with the widest varieties of liquids. The device offers two measuring ranges (2 to 10 GPH / 8 to 40 l/h and 3.7 to 21 GPH / 14 to 80 l/h)

Typical Applications:

Model DOZ01 flow sensors are used wherever the flow of liquids having different viscosities must be reliably and economically measured, such as in the following cases:

– Central lubrication systems
– Transformer oils
– Aggressive/caustic liquids in the chemical industry,

and many more.

Models:

DOZ01.P: Standard model
Housing of PP, oval wheels of PEEK
Axles of zirconium dioxide (ceramics optional)
Viton gaskets (EPDM or Kalrez optional)

DOZ01.E: Model for aggressive/caustic liquids
Housing of ECTFE, oval wheels of PEEK
Axles of zirconium dioxide (ceramics optional)
Viton gaskets (EPDM or Kalrez optional)

DOZ01.V: Made of stainless steel for higher system pressures (up to 290 psi / 20 bar)
Housing of stainless steel AISI 316 / 1.4401, oval wheels of PEEK
Axles of zirconium dioxide (ceramics optional)
Viton gaskets (EPDM or Kalrez optional)

Measuring ranges:

Meas.-range (GPH / l/h	Con-nection (female NPT or G)	Start-up (GPH / l/h)	Width (inch / mm)	Height w/o con-nector (inch / mm)	Depth (inch / mm)	Pulses / L approx.*)
2-10 / 8-40	1/4"	0.5 / 2	2.13 / 54	1.77 / 45	1.77 / 45	6000
3.7-21 / 14-80	1/4"	1.3 / 5	2.13 / 54	1.77 / 45	1.77 / 45	3400

*) Due to manufacturing tolerances, the pulse/liter rating may vary by approx. ± 3%. However, each device is individually checked before delivery and provided with its own exact pulse/liter rating.

Output signals:

DOZ01...P: Pulse output,
rectangular pulse signal

DOZ01...A: Analog output,
4 to 20 mA, 2-wire

DOZ01...S: Switched output
2 limit-value relays (0.1A at 24 VDC)
Programmable, pulse output

Electrical Connection:

	DOZ01P	DOZ01S	DOZ01A
Power supply	Pin 1		white
Signal	Pin 2		green
Ground	Pin 3		brown
Relais 1			yellow
Relais 1			grey
Relais 2			pink
Relais 2			blue
4...20mA Signal +		Pin 1	
4...20mA Signal -		Pin 2	

Options:

- Gaskets of EPDM or Kalrez
- Ceramic axle shafts

Model Coding:

Order Number: **DOZ01 | P. | V. | 1. | P. | 0.**

Flow sensor with oval rotor assembly for small flow volumes

Models:
P = PP housing, PEEK oval wheels
E = ECTFE housing, PEEK oval wheels
V = Stainless steel housing, PEEK oval wheels

Gasket:
V= Viton (standard)
E = EPDM
K = Ceramic

Measuring range:
1 = 2-10 GPH / 8-40 l/h
2 = 3.7-21 GPH / 14-80 l/h

Output signals:
P = Pulse output
A = Analog output, 4 to 20 mA
S = 2 limit-value relays and pulse output

Options:
0 = None
1 = Ceramic axle shafts
N = 1/4" NPT process connection
G = G 1/4 process connection
9 = Please specify in writing.

Technical Specifications:

Max. pressure:

PP:	145 psi / 10 bar
ECTFE:	145 psi / 10 bar
Stainless steel:	290 psi / 20 bar

Liquid temperature: 32 to 176 °F / 0 to 80 °C

Measuring error:

5 to 200 cSt:	± 2,5% of end value
<5 cSt:	± 4%

Process connection: 1/4" female thread, NPT or G

Installation position: Any

Voltage supply:

Pulse output:	4.5 to 24 VDC
Analog output:	15 to 24 VDC
Limit-value relay:	15 to 24 VDC

Electrical connection:

Pulse and analog output:	5-pin plug connection as per EN 175301-803A
Limit-value relay:	female cable connector with matching plug fitted with 1 meter of cable

DV01

Gear-Wheel Flow Sensor for Viscous Liquids, for OEM-Applications

- for media viscosities between 20 - 4000 cSt
- low price
- Aluminium housing, gearwheels steel
- low pressure drop
- max. pressure up to 200 bar
- small mounting dimensions

Description:

The DV01 measuring system consists of a pair of gear-wheels which, accordind to the gear wheel pump principle are rotated by the flowing liquid. The gear wheel bearings a re constructed as radial and axialplain bearings (in the case of the DV01.1 and DV01.3, the DV01.2 uses ball bearings). A magnetoresistive measuring system hermetically sealed from the measuring chamber seses the rotation of the gear wheels and converts it into apulse train.The gear wheel flow meter DV01 causes a very lowpressure drop and emitts especially little noise.

Applications:

The gear wheel flow meters DV01 are mainly used for consumption measurement, the control of dosing applications and for monitoring lubricating points.Because of their small dimensions and their low price theyare especially suited for all kinds of OEM applications.

Versions and measuring ranges

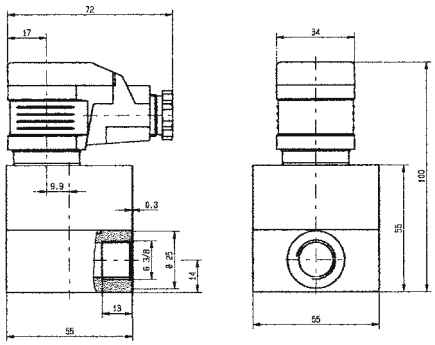
Model	Meas.-range (l/min)	Viskosity-range (cSt)	Con-nection	Meas.-volume (ml/puls)	Resolution (pulse/l)
DV01.0	0.02- 4	20...4000	G 3/8 i	0.04	25,000
DV01.1	0.25...10	20...4000	G 3/8 i	0.2	5,000
DV01.2	0.16...16	20...3000	G 3/8 i	0.25	4,082
DV01.3	1...65	20...4000	G 3/4 i	2	500
DV01.4	1...200	20...4000	G 1 i	5.2	191.5

Materials

Model	Housing	Gear wheels	Bearings
DV01.0A	Aluminium	Stainless steel 1.4462	Ball bearings
DV01.0E	Stainless steel 1.4404	Stainless steel 1.4462	Ball bearings
DV01.1A	Aluminium	Steel	Plain bearings
DV01.1E	Stainless steel 1.4404	Stainless steel 1.4462	Plain bearings
DV01.2A	Aluminium	Steel	Ball bearings
DV01.3A	Aluminium	Steel	multi-layer lightweight floating bearing
DV01.4A	Aluminium	Steel	Ball bearings

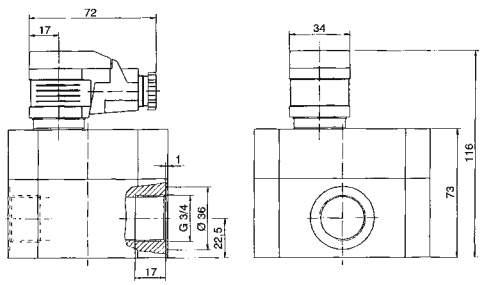
Dimensions:

DV01.0A / DV01.0E and DV01.1A and DV01.1E



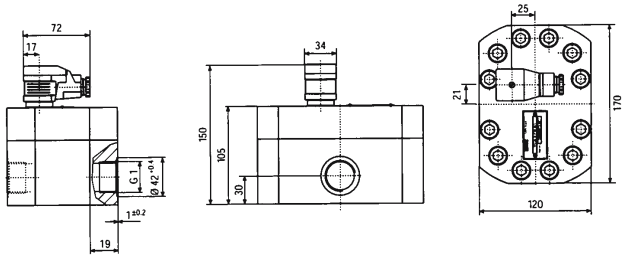
DV01.2A: as DV01.1A, but housing 55 x 65 mm, height 108 mm

DV01.3A



Width x depth: 90 x 100 mm

DV01.4A



Ordering code:

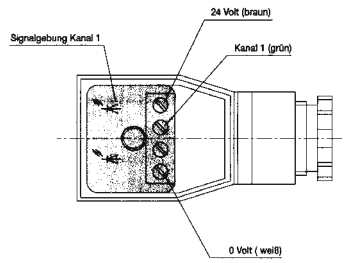
Model number: **DV01. 1A**

Gear wheel flow meter

Measuring range:

0A = 0.02…4 l/min, aluminium
0E = 0.02…4l/min, stainless steel
1A = 0.25…10 l/min, aluminium
1E = 0.25...10 l/min, stainless steel
2A = 0.16…16 l/min,aluminium
3A = 1…65 l/min, aluminium
4A = 1…200 l/min, aluminium

Electrical connection:



Techncal specifications:

max. pressure:

DV01.0A:	200 bar
DV01.0E:	160 bar
DV01.1A and DV01.1E:	160 bar
DV01.2A:	160 bar
DV01.3A:	160 bar
DV01.4A:	80 bar

Temperature range: -10°C … +80°C

Measuring accuracy:

DV01.0A and DV01.0E:	+/- 2%
DV01.1A and DV01.1E:	+/- 3%
DV01.2A:	+/- 0,3%
DV01.3A:	+/- 2,5%
DV01.4A:	+/- 1%

Weight:

DV01.0A and DV01.0E:	0,5 kg
DV01.1A and DV01.1E:	0,5 kg
DV01.2A:	0,7 kg
DV01.3A:	1,9 kg
DV01.4A:	6 kg

Supply voltage: 12...30 VDC, protected polarity

Output signal: square wave pulses, min. 0,8*U_B, duty cycle 1:1 (+/- 15%)

Electrical protection: IP 65

DV04

High-precision Gearwheel flow meter for viscous liquids

- **For fluids with viscosities of at least 20 cSt**
- **Very cost effective**
- **Cast iron or stainless steel designs available**
- **Accuracy better than 0.3% of measured value**
- **High resolution**
- **Pressure-proof construction withstands up to 400 bar**
- **Small installation dimensions**

Description:

The measuring mechanism in the DV04 flow meter consists of a pair of gearwheels that are driven by the fluid stream, much like a gearwheel pump. The measuring mechanism is supported by sleeve bearings or ball bearings. Two anti-magnetic sensors, with a relative phase offset of 90° and hermetically isolated from the measuring chamber, sense the movement of the gear wheels. This two-channel sensing system used with appropriate electronics permits a higher measurement resolution as well as detection of flow direction. All flow meters are optionally available in a explosion-proof design with a separate switching amplifier. The DV04 gearwheel flow meter features very low resistance to flow and particularly low sound pressure levels.

Applications:

Their outstanding measuring accuracy and high resolution make these devices particularly suitable for use in test stands when measuring small and very small flow volumes.

Other areas of application:

- Measuring consumption rates
- Controlling and regulating filling processes
- Dosing of oils and chemicals
- Flow measurement of paints and varnishes
- Controlling the ratio of polyalcohol/polyhydroxy alcohol and isocyanate

Designs (table 1)

Depending on application and medium properties, the DV04 is available in 8 different model ranges:

Series	Material	Minimum viskosity (mm^2/s)	Accuracy (% of measured value)	Medium properties	
				Viskosity	Lubricity
1	GGG40	20	+/- 0.3	low	good
2	GGG40	50	+/- 0.5	average	good
3	GGG40	100	+/- 1.0	high	good
4	GGG40	100	+/- 0.5	average	low
5	stainless steel 1.4404	100	+/- 0.5 DV04.2: +/- 3	average	low
6	stainless steel 1.4404	20	+/- 0.3	low	good
7	GGG40	20	+/- 1	low	low
8	stainless steel 1.4404	20	+/- 1	low	low

Process connection (table 2)

Baureihe	1	2	3	4	5	6	7	8
bearing / Type	ball-bearing	ball-bearing	bronze sleeve-bearing	Hard alloy sleeve-bearing	Hard alloy sleeve-bearing	ball-bearing	Hybrid-ball bearing	Hybrid-ball bearing
DV04.2	G 3/8	-	-	-	G 1/8	G 1/8	G 3/8	G 1/8
DV04.3	G 3/8	-	-	-	-	G 1/4	G 3/8	G 1/4
DV04.4	G 3/8	G 3/8	-	G 3/8	G 3/8	G 3/8	G 3/8	G 3/8
DV04.5	G 1/2 or G 3/4	-	-	G 1/2 or G 3/4	-	-	-	-
DV04.6	G 1/2 or G 3/4	G 1/2 or G 3/4	G 1/2 or G 3/4	G 1/2 or G 3/4	G 1/2	G 1/2	G 1/2 or G 3/4	G 1/2
DV04.7	G 1	G 1	-	G 1	G 1	G 1	-	-
DV04.8	G 1	G 1	G 1	G 1	G 1	G 1	-	-
DV04.9	G 1 1/2	-	-	-	-	-	-	-
DV04.10	G 1 1/2	-	-	-	-	-	-	-

Measuring ranges in l/min (table 3)

Model	Range							
	1	2	3	4	5	6	7	8
DV04.2	0,008-2	-	-	-	0,02 - 2	0,008-2	0,008-2	0,008-2
DV04.3	0,02-4	-	-	-	-	0,02-4	0,02-4	0,02-4
DV04.4	0,16-16	0,16-16	-	0,16-16	0,16-16	0,16-16	0,16-16	0,16-16
DV04.5	0,2-40	-	-	0,2-30	-	-	-	-
DV04.6	0,4-80	0,4-80	0,6-40	0,3-60	0,3-60	0,4-80	0,4-80	0,4-80
DV04.7	0,6-160	0,6-160	-	0,6-100	0,6-100	0,6-160	-	-
DV04.8	1-250	1-250	1,2-80	1-160	1-160	1-250	-	-
DV04.9	2-600	-	-	-	-	-	-	-
DV04.10	3-700	-	-	-	-	-	-	-

Parameters (table 4)

Model	Maximum pressure (bar)	Peak pressure (bar)	Sound pressure level (dB(A))	Resolution impulses / l
DV04.2	400	480	< 60	40.000
DV04.3	400	480	< 60	25.000
DV04.4	400	480	< 60	4.081,63
DV04.5	400	480	< 70	2.500
DV04.6	400	480	< 70	965,25
DV04.7	315	350	< 70	333,33
DV04.8	315	350	< 72	191,5
DV04.9	400	480	< 80	83,33
DV04.10	400	480	< 80	62,5

Model coding:

Order number: **DV04 | 3. | 1. | F. | PS.. | 3. | S. | 0**

Gearwheel flow meter

Measuring ranges:
2…9 = as per table 3

Series:
1…8 = as per table 1

Seal:
F = Viton
E = EPDM
P = PTFE / Kalrez

Connection:
PS = with mounting plate, connection at the side
PU = with mounting plate, connection at bottom
R = without mounting plate, connection at the side (model ranges 5, 6, 8 only)

Process connection:
04 = G 1/8 IG
05 = G 1/4 IG
10 = G 3/8 IG
15 = G 1/2 IG
20 = G 3/4 IG
25 = G 1 IG
40 = G 1 1/2 IG

Electronics:
S = Standard
H1 = High-temperature-design up to 150 °C
H2 = High-temperature-design up to 220°C (FEP-Gasket and clamp-connection)
X = Intrinsically safe with separate switching amplifier (EEx ia IIC)

Special features:
0 = None
1 = Please specify in writing

Technical details:

Viscosity range: 20 to 100000 mm^2/s

Pressure loss: depends on viscosity and load on the device (exact values available upon request)

Temperature range:

Standard design: -30... +120 °C

High-temperature design: -30...+150 °C

Materials:

Series 1-4, 7: housing GGG 40, GGG60 (DV04.9, DV04.10)
Measuring mechanism 1.7139

Series 5, 6, 8: housing stainless steel 1.4404
Measuring mechanism stainless steel 1.4462

Electronics:

Standard: 2 sensors, 90° phase offset

Ex-design: with separate switching amplifier

Supply voltage: 12…30 VDC,
Protected against polarity reversal

Output signal: Square-wave pulse, minimum 0.8*UB, Scanning ratio 1:1 (+/- 15%)

Protection type: IP 65

DM01

Compact Magnetic Inductive Flowmeter

- **independend of viscosity, density, pressure or temperature of medium**
- **maintenance free**
- **practically no pressure drop**
- **high measurement accuracy**
- **turndown ration 1:50**
- **smallest dimensions**

Description

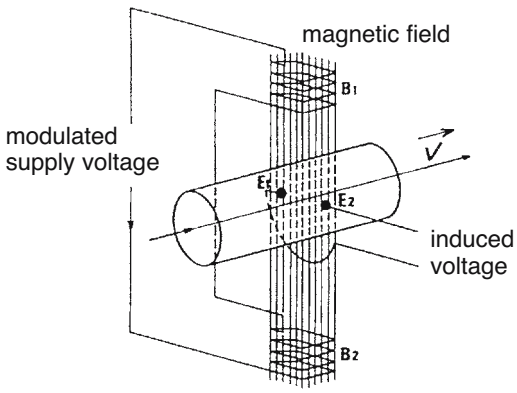
The compact magnetic inductive flowmeter DM01 works without moving parts. It is designed especially for low flow rates and tight mounting conditions.
Ranges from 0.1 l/min to 200 l/min are available.

Advantages

- no moving parts, therefore no maintenance and no wear and tear.
- no parts obstructing the flow in the measuring pipe.
- under normal operating conditions no influence of temperature, viscosity, concentration or pressure changes.
- the high turndown ratio makes the unit universally suitable.
- particles in the medium and viscous or polluted media may be measured without problems.
- the compact design and the low price allows the use for OEM applications.

Operating principle:

The magnetic inductive flow meter works according to Faradays law of induction. The liquid to be measured (which must be electrically conductive) flows perpendicular to a magnetic field.
This induces a voltage in the liquid. This voltage is picked up by means of two electrodes located in the measuring tube and fed into an electronic which converts it into a flow proportional output frequency.



Order Code:

Order no. **DM01. 1. D. 01 0**

Compact Magnetic Inductive Flowmeter

power supply:
1= 24 VDC
2 = 12 VDC

Materials:
D = st. steel / Delrin
P = st. steel / PVDF

Ranges:
01 = 0.1...5 l/min
02 = 1...20 l/min
03 = 2...50 l/min
04 = 5...100 l/min
05 = 10...200 l/min

special version:
0 = without
1 = please describe

Versions:

DM01.D: wetted parts:
measuring tube and electrodes:
st. steel 1.4435
process connections: Delrin

DM01.P: wetted parts:
measuring tube and electrodes:
st. steel 1.4435
process connections: PVDF

Ranges and Dimensions

measuring range (lpm)	width x height (mm)	diameter of measuring tube (mm)	process connection	K-factor (pulses per litre)
0.1...5	84,5 x 123	8	G 1/2 AG	1000
1...20	84,5 x 123	8	G 1/2 AG	800
2...50	90 x 123	14	G 3/4 AG	160
5...100	90 x 123	18	G 1 AG	160
10...200	90 x 123	18	G 1 AG	80

technical specifications:

max. pressure: 6 bar

medium temperature: -10...+40 °C

wetted parts: st. steel, Delrin®
st. steel, PVDF

max. inaccuracy: ± 1,5% of actual value
for range 0.1…5 l/min ± 10%
to 1l/min, ±1,5% ex 1l/min

min. conductivity: 20 µS/cm

supply voltage: 24 VDC +/- 10%
12 VDC +/- 10%

max. current consumption: max. 50 mA

output signal: flow proportional frequency, square wave

electrical protection: IP 65

response time: 50ms

DM10

Magnetic-Inductive Flow Meter

- For nominal sizes from DN25 to DN600
- Linings of polyurethane, hard rubber or PTFE
- Minimum fluid conductivity: 50 µS/cm
- Maximum fluid temperature: 130°C
- Maximum fluid pressure: 40 bar
- Compact or split systems available
- Measuring accuracy: 0.5% of measured value

Description:

Model series DM10 magnetic-inductive flow meters are intended to measure the flow and volumes of all types of fluids with a minimum conductivity of 50 µS/cm. They are designed for absolute reliability and economical service. According to Faraday's Law of Induction, voltage is induced in a wire moving through a magnetic field. With the magnetic-inductive principle of fluid measurement, the flowing liquid corresponds to the moving wire. The voltage thus induced is proportional to the flow velocity. This voltage is connected through two electrodes to a measurement amplifier. The flow volumes are calculated based on the pipe cross-section. The constant magnetic field is generated by a DC current of alternating polarity.

Applications:

The full-bore flow passage and the various lining and electrode materials available make the DM10 flow meter suitable for almost all fluids with the specified minimum conductivity of 50 µS/cm. Fluid viscosity, contaminants and variations in fluid density have no effect on flow measurements. The DM10 is commonly used in the following application areas:

- Potable water
- Waste/grey water
- Sewage sludge
- Acids and alkalis
- Paints

Designs:

Standard design for non-caustic/non-corrosive fluids with polyurethane lining for fluid temperatures of up to 60 °C, or with hard rubber lining for fluid temperatures of up to 80 °C

Special design for caustic/corrosive fluids with PTFE lining for fluid temperatures of up to 130 °C

Compact: Transducer with integrated transmitter
Split system: Transducer and transmitter physically separated and connected by coil-and-signal cable

Measuring Ranges and Process Connections:

Nominal size DN	Mesuring Range		Process Connection			
	Minimum	Maximum	Flanges as per DIN 2501, ST37-2			ANSI B16.5 A105
			PN40	PN16	PN10	Cl.. 150
25	1 - 9 l/min	1 - 300 l/min	A	-	-	L
32	2 - 15 l/min	2 - 500 l/min	A	-	-	-
40	3 - 25 l/min	3 - 700 l/min	A	-	-	L
50	5 - 35 l/min	5 - 1100 l/min	A	-	-	L
65	8 - 60 l/min	8 - 2000 l/min	-	C	-	-
80	12 - 90 l/min	12 - 3000 l/min	-	C	-	L
100	20 - 145 l/min	20 - 4700 l/min	-	C	-	L
125	30 - 220 l/min	30 - 7500 l/min	-	C	-	-
150	2.5 - 20 m³/h	2.5 - 600 m³/h	-	C	-	L
200	5 - 35 m³/h	5 - 1100 m³/h	-	-	D	L
250	7.5 - 55 m³/h	7.5 - 1700 m³/h	-	-	D	L
300	10 - 80 m³/h	10 - 2400 m³/h	-	-	D	L
350	15 - 110 m³/h	15 - 3300 m³/h	-	-	D	L
400	20 - 140 m³/h	20 - 4200 m³/h	-	-	D	L
450	25 - 180 m³/h	25 - 5400 m³/h	-	-	D	L
500	30 - 220 m³/h	30 - 6600 m³/h	-	-	D	L
600	40 - 310 m³/h	40 - 9600 m³/h	-	-	D	L

Electrodes:

Measuring, reference and media monitoring electrodes

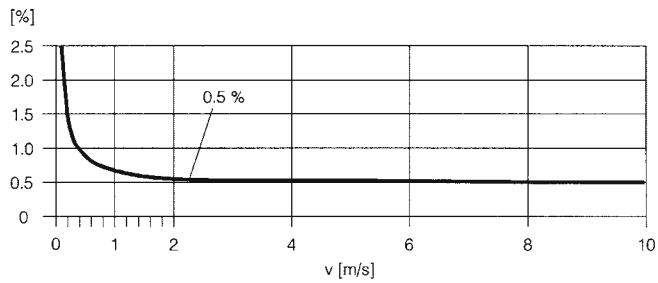
Material:

Stainless steel 1.4435 or C-22 alloy

Measuring Accuracy:

Standard Accuracy:

0.5% of measured value for laminar (streamline) flow (recommended inlet pipe section > 5x DN, outlet pipe section >2 x DN).



Model Coding:

Order number: **DM10. 125. UC. 0A. 1A. A0. A. 4. AA. 0.**

Magnetic-Inductive Flow Meter

Nominal size:

025 to 600 = Nominal pipe size as given in the "Measuring Ranges and Process Connections" table

Linings / Process Connections:

UA = Polyurethane lining, flange DIN PN40
UC = Polyurethane lining, flange DIN PN16
UD = Polyurethane lining, flange DIN PN10
UL = Polyurethane lining, flange ANSI 150 lbs.
HA = Hard rubber lining, flange DIN PN40 (only as of DN65)
HC = Hard rubber lining, flange DIN PN16 (only as of DN65)
HD = Hard rubber lining, flange DIN PN10 (only as of DN65)
HL = Hard rubber lining, flange ANSI 150 lbs. (only as of DN65)
EA = PTFE lining, flange DIN PN40
EC = PTFE lining, flange DIN PN16
ED = PTFE lining, flange DIN PN10
EL = PTFE lining, flange ANSI 150 lbs.

Electrodes / Calibration:

0A = Stainless steel electrodes, calibration 0.5%
1A = C-22 alloy electrodes, calibration 0.5%
9A = Special electrodes, calibration 0.5%

Certifications / Approvals:

1A = None
PA = as per PED*, Cat. II / III (not for DN25)
1R = Ex area, Class I D iv. 2, NT / FM / CSA
*European Union "Pressure Equipment Directive"

Protection Type / Construction:

A0 = Compact design, IP67
G2 = Split design, IP67 with 10 m coil-and-signal cable
G4 = Split design, IP67 with x m coil-and-signal cable
N2 = Split design, IP68 with 10 m coil-and-signal cable
N4 = with x m coil-and-signal cable

Electrical Connection:

A = M20x1.5 cable gland nut
B = 1/2" NPT screw threads for cable gland nut
C = G 1/2 screw threads for cable gland nut

Display / Auxiliary Power / Operation:

0 = Without display, remote parameter assignment, 85 to 250 VAC
1 = Without display, remote parameter assignment, 20 to 28 VAC, 11 to 40 VDC
4 = With display, push-button operation, 85 to 250 VAC
5 = With display, push-button operation, 20 to 28 VAC, 11 to 40 VDC

Software / Outputs:

AA = Standard software, current output, pulse output, HART protocol

Options:

0 = None
1 = Grounding Rings
9 = Please specify in writing

Output Signals:

Pulse/status output, passive, programmable

Open collector, maximum 30 VDC, 250 mA,

maximum pulse frequency: 100 Hz

Current output 4 to 20 mA, active, maximum load: 700 ohm,

HART: > 250 ohm, programmable

Programming by means of push buttons on transmitter or through remote parameter assignment with HART protocol.

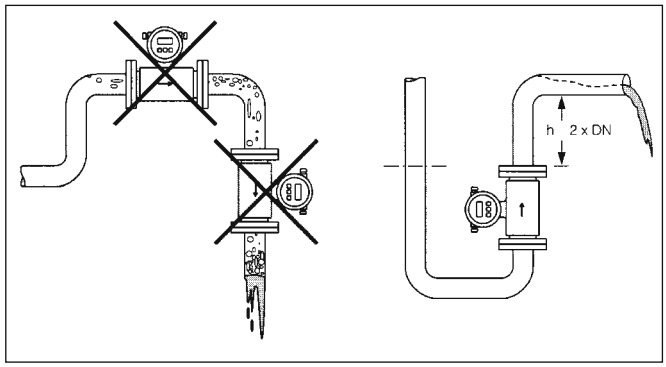
Grounding:

In metallic pipework, through the reference electrode in the measuring tube

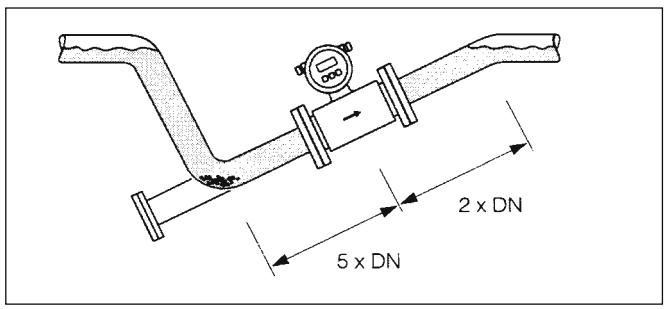
In non-metallic or lined pipework, through optional grounding rings

Installation:

When installing the DM10, the piping should always be completely filled.

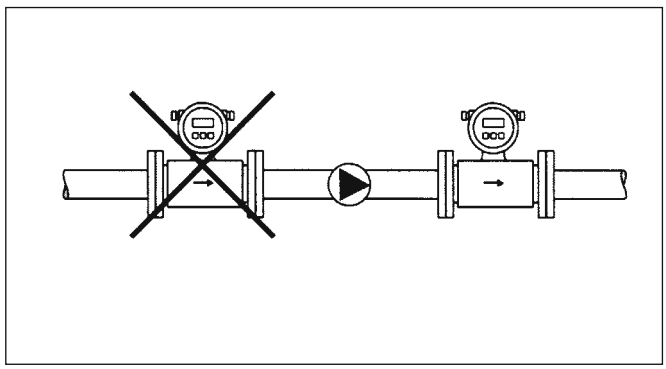


Do not install in a downpipe



Installation in partially filled piping

If at all possible, the DM10 should not be installed on the inlet side of pumps since the resulting vacuum pressure may damage the measuring pipe lining.



Installation on the delivery side of pumps

Weight:

Nominal size (DN)	Compact Design (kg)		Split Design (kg)		
	DIN flange	ANSI flange	Transducer		Trans-mitter
			DIN flange	ANSI flange	
25	5.7	5.7	5.3	5.3	3.1
32	6.4	-	6	-	3.1
40	7.8	7.8	7.4	7.4	3.1
50	9	9	8.6	8.6	3.1
65	10.4	-	10	-	3.1
80	12.4	12.4	12	12	3.1
100	14.4	14.4	14	14	3.1
125	19.9	-	19.5	-	3.1
150	23.9	23.9	23.5	23.5	3.1
200	43.4	43.4	43	43	3.1
250	63.4	73.4	63	73	3.1
300	68.4	108.4	68	108	3.1
350	113.4	173.4	113	173	3.1
400	133.4	203.4	133	203	3.1
450	173.4	253.4	173	253	3.1
500	173.4	283.4	173	283	3.1
600	233.4	403.4	233	403	3.1

Technical Details:

Measuring range: v = 0.01…10 m/s
Dynamic response: to 10,000:1
Auxiliary power: 85…250 VAC, 45…60 Hz
20…28 VAC, 45…60 Hz
11…40 VDC
Measuring accuracy: ± 0.5% of measured value
Repeatability: ± 0.2% ± 2 mm/s
Ambient temperature: -20…+60 °C
Liquid temperature: Polyurethane: -20…+60 °C
Hard rubber: 0…+80 °C
PTFE: maximum –20…+130 °C
Maximum pressure: DN25…DN50: 40 bar
DN65…DN150: 16 bar
DN200…DN600: 10 bar
ANSI 1”…24”: Class 150
Conductivity: Minimum 50 µS/cm
For split design, dependent on length of connecting cable

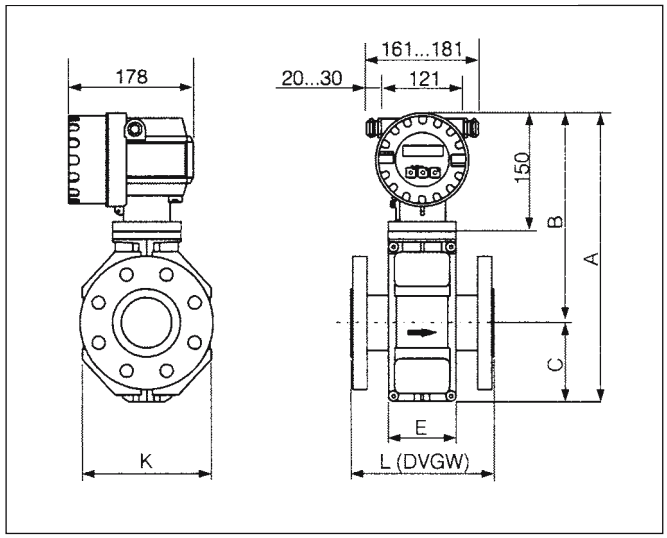
Materials:

Transmitter: Housing: aluminum casting
Transducer: up…DN300: aluminum casting
>DN300: carbon steel, painted
Measuring tube: Stainless steel 1.4301/1.4306
Flanges: DIN: St37-2
ANSI: A105
Grounding rings: (optional) Stainless steel 1.4435 or C-22 alloy

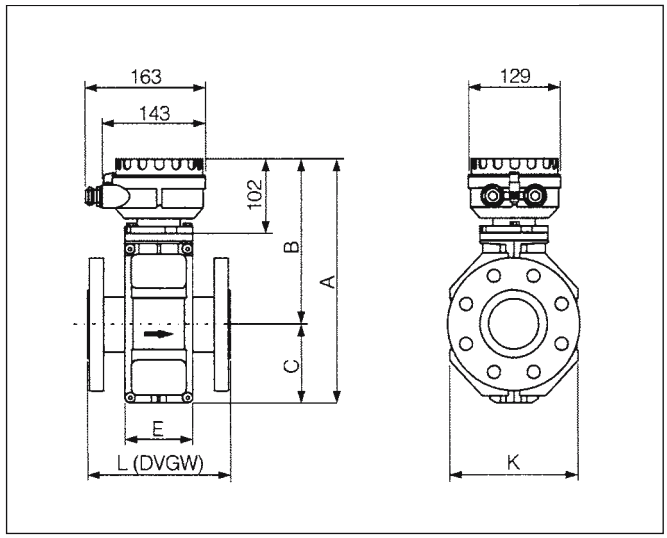
Display: LED, 2-line, 16 characters each, showing flow rate and sum total
Operation: 3 push buttons

Dimensions:

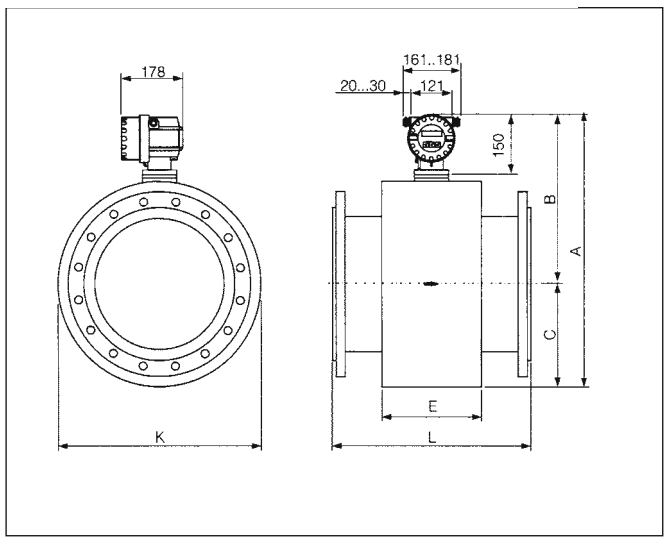
Compact design DN25…DN300:



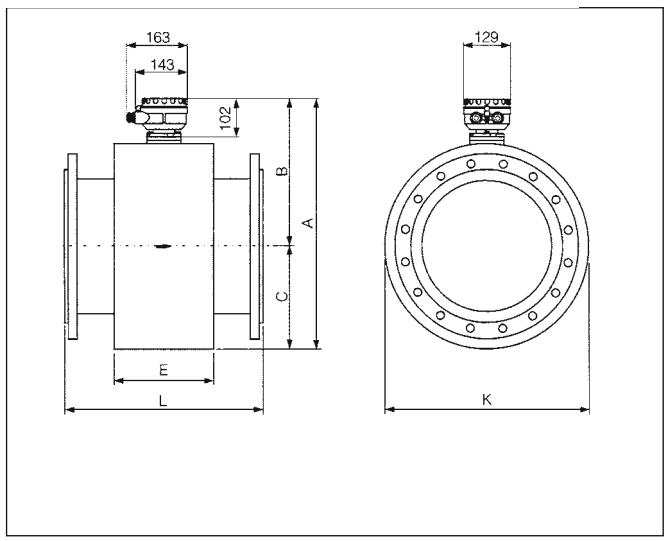
Split design DN25…DN300



Compact design DN350…DN600:



Split design DN350…DN600



DN		L	A	B	C	K	E
DIN	ANSI	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
25	1“	200	381	247	84	120	94
32	-	200	381	247	84	120	94
40	1 1/2“	200	381	247	84	120	94
50	2“	200	381	247	84	120	94
65	-	200	381	272	109	180	94
80	3“	200	381	272	109	180	94
100	4“	250	381	272	109	180	94
125	-	250	462	312	150	260	140
150	6“	300	462	312	150	260	140
200	8“	350	517	337	180	324	156
250	10“	450	567	362	205	400	156
300	12“	500	617	387	230	460	166
350	14“	550	728.5	446.5	282	564	276
400	16“	600	780.5	472.5	308	616	276
450	18“	650	830.5	497.5	333	666	292
500	20“	650	881.5	523	358.5	717	292
600	24“	780	985.5	575	410.5	821	402

DN		L	A	B	C	K	E
DIN	ANSI	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
25	1“	200	286	202	84	120	94
32	-	200	286	202	84	120	94
40	1 1/2“	200	286	202	84	120	94
50	2“	200	286	202	84	120	94
65	-	200	336	227	109	180	94
80	3“	200	336	227	109	180	94
100	4“	250	336	227	109	180	94
125	-	250	417	267	150	260	140
150	6“	300	417	267	150	260	140
200	8“	350	472	292	180	324	156
250	10“	450	522	317	205	400	156
300	12“	500	572	342	230	460	166
350	14“	550	683.5	401.5	282	564	276
400	16“	600	735.5	427.5	308	616	276
450	18“	650	785.5	452.5	333	666	292
500	20“	650	836.5	478	358.5	717	292
600	24“	780	940.5	530	410.5	821	402

DB04

Thermal mass flowmeter for gases without auxiliary power

- **Pressure and temperature-independent measurement**
- **Compact design, no need for straight pipe runs**
- **LCD display, flow rate and bar graph**
- **Needle valve, switch output and totaliser as options**
- **High degree of measuring precision**
- **Turndown ratio up to 50:1**
- **Battery operated – no external power supply needed**

Description:

The DB04 thermal mass flowmeter is a modular system for the measurement of the flow of gases. Due to its being independent of any power supply because of its integrated battery, and its excellent cost-effectiveness, the device can replace conventional variable area flowmeters in many cases. The DB04 can be supplied in a number of versions: as a flowmeter with an integrated regulating valve, a totaliser or with an adjustable limit switch. Depending on the medium, the device can be made of either stainless steel or aluminium.

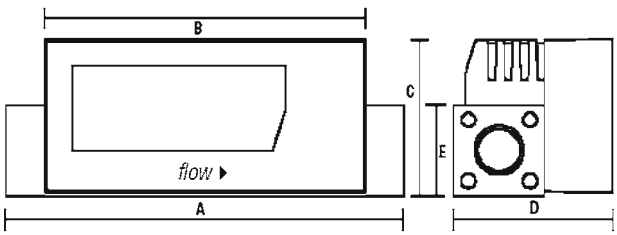
The DB04 measures flows of 4…200 Nml/min up to 4…200 Nl/min. The standard calibration medium is air, but a number of other gases such as O2, N2, He, Ar etc can be measured. A 4-digit LCD display combined with a bar graph display allows the measurements to be read off simply and quickly. The device operates in any position and can be easily cleaned without the need for recalibration.

Versions:

DB04.1: Mass flowmeter (battery-operated)
DB04.2: Mass flowmeter (battery-operated) with integrated manual regulating valve
DB04.3: Mass flowmeter (24V DC externally supplied) with integrated limit switch
DB04.4: Mass flowmeter (24V DC externally supplied) with manual regulating valve and limit switch

Measuring ranges and dimensions:

Measuring-range (NL/min)	Con-nection (G IG)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
0,004...0,2	1/4	114	89	44	44	25
0,01...0,5	1/4	114	89	44	44	25
0,04...2	1/4	114	89	44	44	25
0,1...5	1/4	114	89	44	44	25
0,4...20	1/4	114	89	44	44	25
1...50	1/4	114	89	44	44	25
2...100	1/2	160	89	54	54	35
4...200	1/2	160	89	54	54	35



Materials:

DB04.x.x.A: Aluminium casing, PBT sensor, Viton seal
DB04.x.x.E: Special steel casing, electropolished, PBT sensor, Viton seal

Options:

- Totaliser
- EDPM seals
- 24 V DC supply for DB04.1 and 2
- Calibration protocol
- Medium air, N2, O2
- Other media

Ordering Code:

Order no.:	DB04.	1.	01.	A.	0.	L

Thermal mass flowmeter for gases

Version:
1 = Flowmeter
2 = Flowmeter with manual regulating valve
3 = Flowmeter and switch
4 = Flowmeter and switch with manual regulating valve

Measuring range (air):
01 = 0.004 … 0.2 Nl/min
02 = 0.01… 0.5 Nl/min
03 = 0.04 .. 2 Nl/min
04 = 0.1.. 5 Nl/min
05 = 0.4…20 Nl/min
06 = 1…50 Nl/min
07 = 2… 100 Nl/min
08 = 4 …200 Nl/min

Material:
A = Aluminium casing
E = Stainless steel casing

Options:
0 = without
E = EPDM seals
V = Voltage supply 24V DC for DB04.1/2
K = Calibration protocol

Medium:
L = Standard medium: air
N = Standard medium: N2
O = Standard medium O2
S = Other media (please indicate in block letters)

Technical data:

Max. pressure:	10 bars
Medium temperature:	0…50 °C
Measurement uncertainty:	+/- 1% f.s.d.
Response time:	500 ms
Voltage supply:	Lithium battery type AA (service life approx. 2 years) or 24V DC +/- 10%
Display:	LCD, 4-digit
Installation position:	up to 5 bars: any position, over 5 bars: horizontal
Limit value output:	Potential-free change-over contact (24 V, 1 A)
Function:	MIN or MAX alarm, switching point, delay, hysteresis programmable

DB05

Thermal mass flowmeter and controller for gases

- **Pressure and temperature-independent measurement**
- **Compact design, no need for straight pipe runs**
- **High degree of precision, short response time**
- **Analogue inputs and outputs for set and actual value, serial interface**
- **Turndown ratio up to 100:1**
- **Materials: aluminium or stainless steel**

Description:
The DB04 thermal mass flowmeter and controller is modular system for measuring and regulating the flow of gases.
The device can be supplied as a pure flowmeter, or with an integrated control valve with PI control function. In series production the DB05 has analogue current signals for the momentary flow and the set flow, as well as a serial interface via which the device can be programmed with user-friendly Windows software.
A variety of non-aggressive gases can be measured in measuring ranges from 0..25 ml/min to 0….200 l/min.

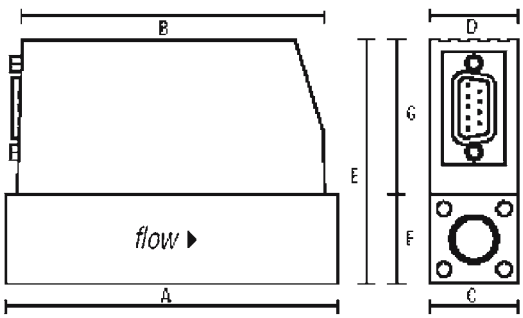
As a result of its modular structure, and due to the fact that it can be installed in any position and can be easily cleaned without the need for recalibration, the DB05 is suitable for the most varied applications, such as analysis devices, in the semiconductor industry, for pneumatic installations, lasers, welding systems or fuel cells.
Depending on the area of application, the device can be supplied with an aluminium or stainless steel casing as well as with a measuring accuracy or 1.5%, or as a precision instrument with an accuracy of 0.5%.

Versions:

DB05.MS: Mass flowmeter
Standard accuracy 1.5% f.s.d.
DB05.CS: Mass flowmeter and controller
Standard accuracy 1.5% f.s.d.
DB05.MH: Mass flowmeter
Increased precision 0.5% f.s.d.
DB05.CH: Mass flowmeter and controller
Increased precision 0.5% f.s.d.

Measuring ranges and dimensions:

Version	Connection (G IG)	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)
DB05.M..	1/4	94	87	25	25	69	25	44
DB05.M..	1/2	145	87	35	25	79	35	44
DB05.C...	1/4	124	117	25	25	69	25	44
DB05.C...	1/2	170	117	35	25	79	35	44



Materials:

DB05.x.x.A: Aluminium casing, PBT sensor, Viton seal
DB05.x.x.E: Stainless steel casing, electropolished, PBT sensor, Viton seal

Options:

- EDPM seals
- Actual value output and set value input 0..20 mA, 0..5 V, 1..5 V, 0..10 V, 4..20 mA Namur
- Special measuring range for medium air, N2, O2
- Special measuring range for medium air, N2, O2 (with real gas calibration)
- Other media (with air calibration)
- Other media (with real gas calibration)

Ordering Code:

Order no.:	DB05.	MS.	01	A.	0.	L

Thermal mass flowmeter and controller for gases

Version
MS = Flowmeter, standard accuracy 1.5% f.s.d.
CS = Flowmeter and controller, standard accuracy 1.5% f.s.d.
MH = Flowmeter, increased accuracy ± 0,3 % of end value 0.5% f.s.d.
CH = Flowmeter and controller, increased accuracy ± 0,3 % of end value 0.5% f.s.d.

Measuring range (air):
01 = 0….25 Nml/min, G 1 / 4 female
02 = 0….50 Nml/min, G 1 / 4 female
03 = 0….100 Nml/min G 1 /4 female
04 = 0….200 Nml/min, G 1 / 4 female
05 = 0….500 Nml/min, G 1 / 4 female
06 = 0….1 Nl/min, G 1 / 4 female
07 = 0….2 Nl/min, G 1 / 4 female
08 = 0….5 Nl/min G 1 / 4 female
09 = 0….10 Nl/min G 1 / 4 female
10 = 0….20 Nl/min G 1 / 4 female
11 = 0….50 Nl/min G 1 / 4 female
12 = 0….50 Nl/min G 1 / 2 female
13 = 0….100 Nl/min G 1 / 2 female
14 = 0….200 Nl/min G 1 / 2 female

Material:
A = Aluminium casing
E = Stainless steel casing

Options:
0 = without
E = EPDM seals
IA = Actual value output deviating from standard (4…20 mA)
SA = Set value input deviating from standard (4…20 mA)
ES = Real gas calibration

Medium:
L = Standard medium: air
N = Standard medium: N2
O = Standard medium O2
S = Other media (please indicate in block letters)

Technical data:

Max. pressure:	10 bar
Medium temperature:	0…50 °C
Response time:	< 150 ms (DB05.C…)
	< 50 ms (DB05.M)
Voltage supply:	24V DC -5%/+ 10%
Electrical connection:	D-sub plug, 9-pin
Installation position:	up to 5 bar: any position,
	over 5 bar: horizontal

DB08

Thermal Mass Flow Meter

- **Stainless steel sensor, also suitable for corrosive gases**
- **Measuring ranges: from 5...100 ml/min to 375...7500 l/min**
- **Measuring system unaffected by temperature and pressure**
- **High accuracy**
- **Direct-flow method, low sensitivity to contamination and moisture**

Description:

The DB08 thermal mass flow meter is a modular measuring system for detecting the mass flow of gases. The device generates a voltage output (0…5 VDC) or a current output (4…20 mA) based on the amount of flow.

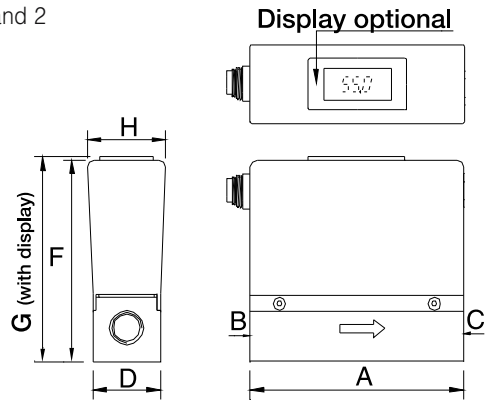
Typical Applications:

Because it has a modular design, can be installed in any position and is extremely easy to clean without requiring recalibration, the DB08 is suitable for use in numerous applications, such as in analytical devices, in the semiconductor industry, in compressed-air systems, laser systems, welding systems or fuel cells. Depending on its intended use, the DB08 can be supplied with an aluminum or stainless steel housing.

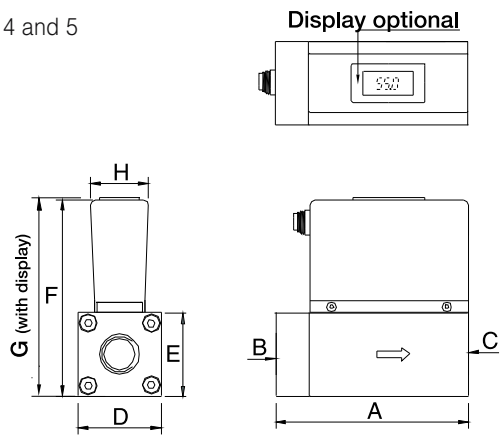
Dimensions:

No.	Models	A	B	C	D	F	G	H
1	DB08.x.08-...	95	G 1/4	G1/4	30	90	92	35
2	DB08.x.15-15 to DB08.x.15-45	95	G1/2	G1/2	30	90	92	35
3	DB08.x.15-55 to DB08.x.15-26	116	G1/2	G1/2	50	123	125	35
4	DB08.x.25-36 to DB08.x.25-56	116	G1	G1	70	141	143	35
5	DB08.x.25-66 to DB08.x.25-76	143	G1	G1	110	171	173	35

Pos. 1 and 2



Pos. 3, 4 and 5



Technical Specifications:

Voltage supply: 24 VDC +/- 10 %
Maximum current values:

Up to measuring range 08-14:	75 mA max.
As of measuring range 08-24:	
Switch-on current:	250 mA max.
Without flow:	75 mA max.
100 % flow:	175 mA max.

Output: 0…5 VDC or 4…20 mA

Model Key:

Order Number: **DB08. | E. | 08-12. | L. | A. | 0**

Thermal Mass Flow Meter

Materials:
A = Aluminum housing (anodized)
E = Stainless steel housing, 1.4435/1.4404

Measuring Ranges: (Air)

Measuring system: bypass

08-12 = 0.005 to 0.1 Nl/min,	G 1/4 female thread
08-22 = 0.010 to 0.2 Nl/min,	G 1/4 female thread
08-52 = 0.025 to 0.5 Nl/min,	G 1/4 female thread
08-13 = 0.05 to 1 Nl/min,	G 1/4 female thread
08-23 = 0.1 to 2 Nl/min,	G 1/4 female thread
08-53 = 0.25 to 5 Nl/min,	G 1/4 female thread
08-14 = 0.5 to 10 Nl/min,	G 1/4 female thread

Measuring system: direct flow

08-24 = 1 to 20 Nl/min,	G 1/4 female thread
08-54 = 2.5 to 50 Nl/min,	G 1/4 female thread
08-15 = 5 to 100 Nl/min,	G 1/4 female thread
15-15 = 5 to 100 Nl/min,	G 1/2 female thread
15-25 = 10 to 200 Nl/min,	G 1/2 female thread
15-45 = 20 to 400 Nl/min,	G 1/2 female thread
15-55 = 25 to 500 Nl/min,	G 1/2 female thread
15-16 = 50 to 1000 Nl/min,	G 1/2 female thread
15-26 = 100 to 2000 Nl/min,	G 1/2 female thread
25-36 = 150 to 3000 Nl/min,	G 1 female thread
25-46 = 200 to 4000 Nl/min,	G 1 female thread
25-56 = 250 to 5000 Nl/min,	G 1 female thread
25-66 = 300 to 6000 Nl/min,	G 1 female thread
25-76 = 375 to 7500 Nl/min,	G 1 female thread

Media:
L = Standard medium: Air
N2 = Standard medium: N_2
O = Standard medium: O_2
S = Pure gas calibration

Output:
A = Analog output, 4 to 20 mA
V = Voltage output, 0 to 5 VDC
S = Special

Special Features:
0 = None
1 = LCD display as flow meter
2 = LCD display as summation counter
99 = Please specify in writing.

Technical Specifications:

Max. pressure:	10 bar (optional 40 bar only for DB08.E)
Max. media temperature:	0 to 70°C
Accuracy:	+/- 3% of end value for air
Repeatability:	+/- 0.5% of end value
Protection type:	IP 40
Connection:	6-pin DIN plug
Time-constant sensor:	0.7 sec (63.2%)

Materials:

Sensor:	1.4435/1.4404
Device housing:	1.4435/1.4404 or anodized aluminum
Strainer/retaining ring:	Stainless steel/PTFE
Gaskets:	Viton (standard), other materials available upon request

DB09

Thermal Mass Flow Meter and Regulator

- **Sturdy, heavy-duty stainless steel sensor, also suitable for corrosive gases**
- **Measuring ranges: from 5...100 ml/min to 50...1000 l/min**
- **Integral proportional control valve**
- **Measuring system unaffected by temperature and pressure**
- **High accuracy**
- **Direct-flow method, low sensitivity to contamination and moisture**

Description:

The DB09 thermal mass flow meter and regulator is a modular measuring system for detecting and regulating the flow of gases. The device features a directly operated integral proportional control valve. The DB09 can be fitted with either a 3-place LCD flow-rate display or an 8-place counter. The device generates a voltage output (0…5 VDC) or a current output (4…20 mA) based on the amount of flow.

Typical Applications:

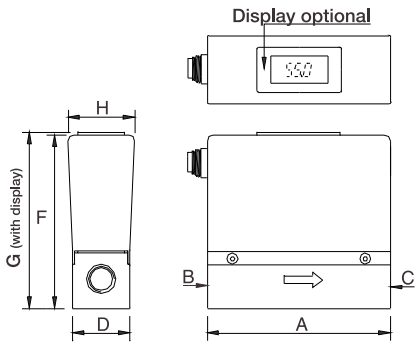
Because it has a modular design, can be installed in any position and is extremely easy to clean without requiring re-calibration, the DB09 is suitable for use in numerous applications, such as in analytical devices, in the semiconductor industry, in compressed-air systems, laser systems, welding systems or fuel cells. Depending on its intended use, the DB09 can be supplied with an aluminum or stainless steel housing.

Dimensions:

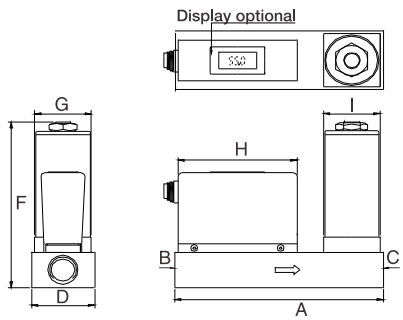
No.	Models	A	B	C	D	F	G	H
1	DB09.x.08-12 to DB09.x.08-15	95	G 1/4	G1/4	30	90	92	35
2	DB09.x.15-15 to DB09.x.15-45	145	G 1/2	G1/2	50	132	45	95
3	DB09.x.15-55 and DB09.x.15-16	*	G 1/2	G 1/2	*	*	*	*

* for dimensions, please inquire

Pos. 1



Pos. 2



Electrical Specifications:

Voltage supply: 24 VDC +/- 10 %

Maximum current values:

up to measuring range 08-14: 325 mA max.
as of measuring range 08-24: Switch-on current: 500 mA max.

Without flow: 325 mA max.
100% flow: 425 mA max.

Output: 0...5 VDC or 4...20 mA

Control range: 5-100 %

Inlet pipe section:

up to measuring range 08-14: 10 x D
as of measuring range 08-24: None required

Technical Specifications:

Max. pressure: 10 bar

Max. media temperature: 0...70 °C

Accuracy: +/- 3% of end value for air

Repeatability: +/- 0,5% of end value

Protection type: IP 40

Connection: 6-pin DIN plug

Model Coding:

Order Number: **DB09. E. 08-12. L. A. 0**

Thermal Mass Flow Meter and Regulator

Materials:

Al = Aluminum housing (anodized)
E = Stainless steel housing,1.4435/1.4404

Measuring Ranges: (Air)

Measuring system: bypass

08-12 = 0.005…0.1 Nl/min, G 1/4 female thread
08-22 = 0.010…0.2 Nl/min, G 1/4 female thread
08-52 = 0.025…0.5 Nl/min, G 1/4 female thread
08-13 = 0.05…1 Nl/min,G 1/4 female thread
08-23 = 0.1…2 Nl/min, G 1/4 female thread
08-53 = 0.25…5 Nl/min, G 1/4 female thread
08-14 = 0.5…10 Nl/min, G 1/4 female thread

Measuring system: direct flow

08-24 = 1…20 Nl/min, G 1/4 female thread
08-54 = 2.5…50 Nl/min, G 1/4 female thread
08-15 = 5…100 Nl/min, G 1/4 female thread
15-15 = 5…100 Nl/min, G 1/2 female thread
15-25 = 10…200 Nl/min, G 1/2 female thread
15-45 = 20…400 Nl/min, G 1/2 female thread
15-55 = 20…500 Nl/min, G 1/2 female thread
15-16 = 50…1000 Nl/min, G 1/2 female thread

Media:

L = Standard-medium: Air
N_2 = Standard-medium: N_2
O = Standard-Medium: O_2
S = Pure-gas calibration

Output:

A = Analog output, 4…20 mA
V = Voltage output, 0…5 VDC
S = Special

Special features:

0 = None
1 = LCD flow-indication display
2 = Counter display
99 = Please specify in writing.

Materials:

Sensor: 1.4435/1.4404

Device housing: 1.4435/1.4404 aluminium anodized

Strainer/retaining ring: Stainless steel / PTFE

Gaskets: Viton (standard)

FS00

Float Level Switch

- low cost version
- simple installation
- vertical or horizontal mounting
- hight switch rating, 10 (8) A, 250 VAC
- N/O, N/C or SPDT versions available
- different cable materials, dependend on medium

Description:
The float level switches FS00 work according to the lift principle.
A hollow float is raised by the rising liquid until it reaches an angle of 45 ° from horizontal when switching takes place. The mercury free float switch can be mounted to the tank or container via a through hole such as a 1/2" cable gland or from the tank top.
The switch point is defined by manipulating placement of an optional ballast weight on the connecting cable or by inserting cable through a tube of the desired length.
The FS00 level switch consists of a polypropylene housing with an integrated watertight and position dependend electromechanical microswitch. Cable connections from different materials and in different lenghts may be chosen to suit the medium and tank dimensions.

Applications:
The FS00 float level switches are compatible to virtually all liquid media which do not affect the materials of the switch or cable. The unit is absolutely independent from the pollution of the medium.
The FS00 may be used as MIN, MAX monitor, to control valves or pumps or as an alarm swich.

Materials and contact ratings

Materials: housing from PP, mirror welded, capnut PG11 from PA
connection cable according to ordering code

Contact function
based on rising level

- FS00.S... N/O, 10 (8) A, 250 VAC
  colour: red
- FS00.O... N/C, 10 (8) A, 250 VAC
  colour: yellow
- FS00.W... SPDT, 6 (4) A, 250 VAC
  colour: orange

Connection cable

3-wire for N/O and N/C versions, 4-wire for SPDT

Cable material:

- Neoprene black
  standard cable for general use
- Polyurethane yellow
  for mineral oil and gasoline
- LAPP-Therm olive
  for bio oil and grease and chemicals
- special cable material
  upon reqest

Electrical connection

- FS00.S... brown = common
  blue = signal, switched through with full tank
  green / yellow = protective ground
- FS00.O... brown = common
  blue = signal, switched through with empty tank
  green / yellow = protective ground
- FS00.W... brown = common
  blue = signal, switched through with full tank
  black = signal, switched through with empty tank
  green / yellow = protective ground

Ballastweight

Material: cast iron, plastic coated (Levasit)
Dimensions: 30x30x190 mm

Ordering code:

Order number:	**FS00.**	**S.**	**N.**	**5.**	**1.**	**0**

Float level switch

Contact function
S = N/O
O = N/C
W = SPDT

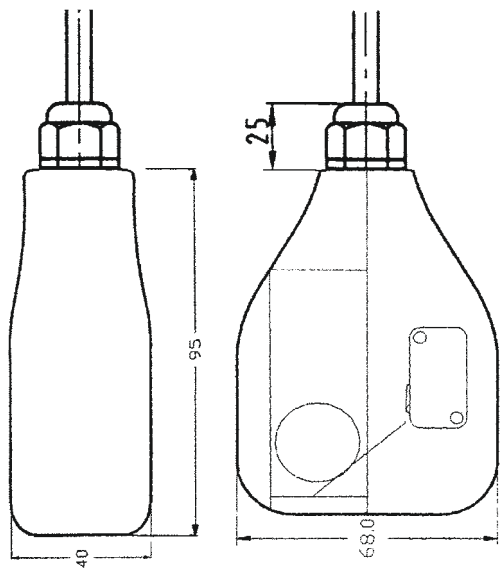
Cable material
N = Neoprene
P = polyurethane
L = LAPP-Therm
S = special material

cable length
5 = 5 m
10 = 10 m
20 = 20 m
99 = other length

Ballast weight
0 = without
1 = with

Options
0 = without
9 = please specify

Dimensions



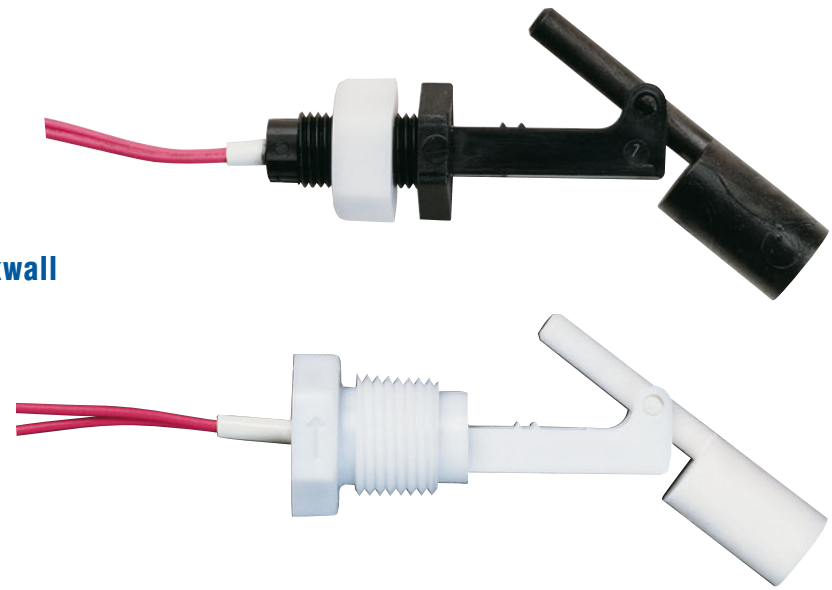
Specifications

Operating temperature: max. 140 °F / 60 °C, with LAPP-Therm cable up to 200 °F / 95 °C
Storage temperature: max. 200 °F / 95 °C
max. pressure: 29 psi / 2 bar
Switching angle: +/- 45°
Electrical protection: IP68
Weight:
Float: 0.24 lbs / 110 g
Ballast: approx. 1.54 lbs / 700 g

FS14

Miniature Plastic Float Level Switch For Horizontal Mounting

- compact design
- only one mechanically moveable component
- mounts horizontally into tankwall
- PP or Nylon version available



Description

The level switches model FS14 work according to the magnetic float principle. The float is lifted upwards by the rising liquid level in the tank until the magnetic field of the integrated permanent magnetactivates a Reed contact. Depending on the way the level switch is mounted this contact may work as a N/O or a N/C switch.

Applications

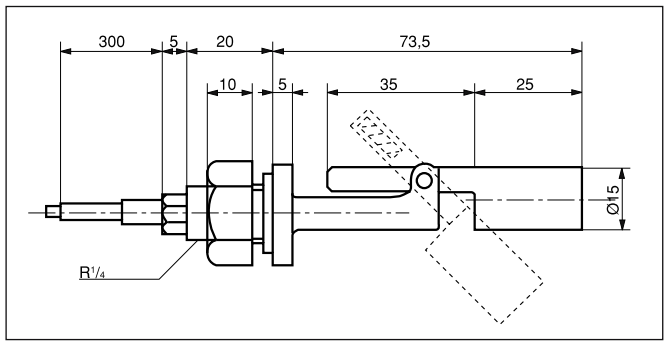
The float level switches FS14 are designed to monitor the level of nearly all liquids which do not affect the used materials, for example as HIGH- or LOW-alarms or for controlling valves and pumps.

Versions

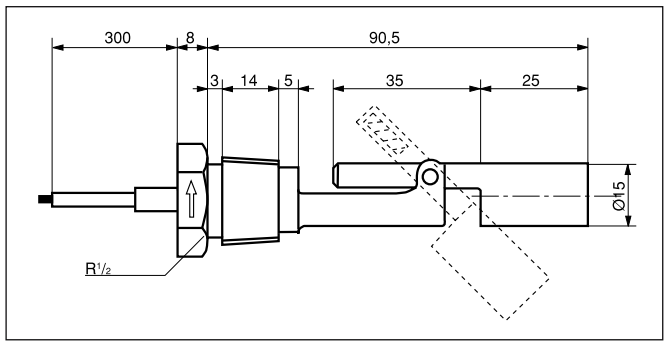
- Low-cost level switch made from PP or Nylon
- Threaded connection R 1/4" or 1/2" NPT

Dimensions

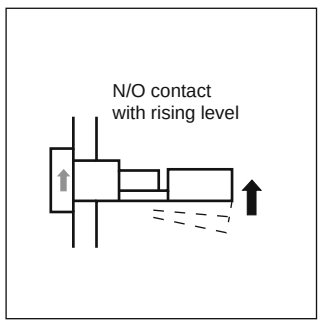
FS14.1

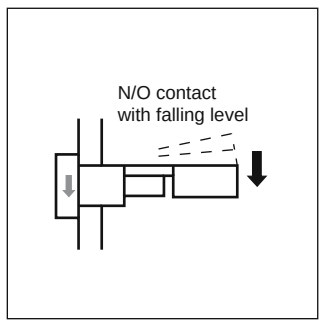


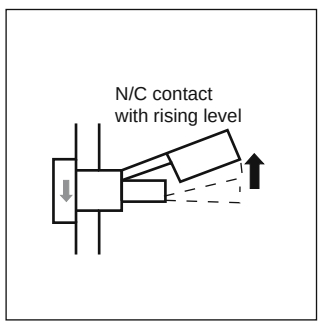
FS14.2

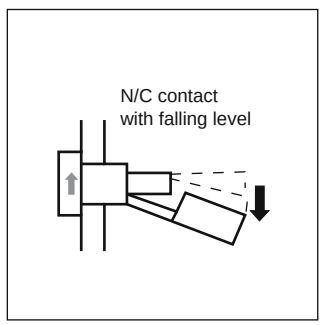


Mounting and contact functions









Ordering Code

Order No. **FS14. 1. 1. 2.**

Miniature float level switch

Connection:

1 = R 1/4" male thread

2 = 1/2" NPT male thread

Material:

1 = Polypropylen

2 = Nylon

Contact rating:

2 = 300 V DC/AC, 0.5 A, 50 VA

Technical Specifications

Connection cable: 0.3 m of PE wire

Threaded connection:

FS14.1: R 1/4" male with nut
FS14.2: 1/2" NPT male

Material:

FS14.x.1: PP
FS14.x.2: 6-Nylon

Contact function: N/C or N/O (300V, 0,5A, 50VA) with rising level, depending on mounting

max. pressure: atmospheric

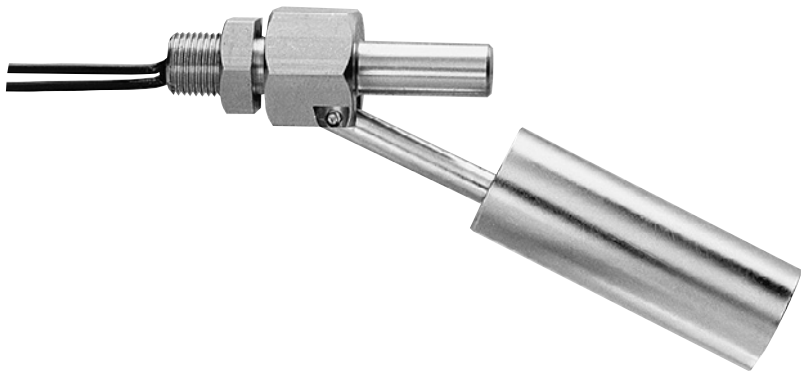
max temperature:

FS14.x.1: -10 … +80°C
FS14.x.2: -10 … +110°C

min. S.G. of medium: 0.7 kg/l

FS15

Miniature Level Switch for horizontal mounting



- compact design
- only one mechanically moveable part
- mounts horizontally into a tank wall
- complete of stainless steel

Description:

The level switch model FS15 works according to the magnetic float principle. The float is liftet upwards by the rising liquid level in the tank until the magnetic field of the integrated permanent magnet activates a Reed contact. Depending on the way the level switch is mounted this contact may work as a N/O or a N/C switch.

Applications:

The float level switch FS15 is designed to monitor the level of nearly all liquids. FS15 may be used as MIN, MAX monitor, to control valves or pumps or as an alarm switch. By the use of potential-free reed contacts the FS15 level switches are the ideally switches for SPS-Contols

Design:

- Level switch for general applications made of st. steel
- Male thread G 1/8 or 1/2" NPT

Ordering Code:

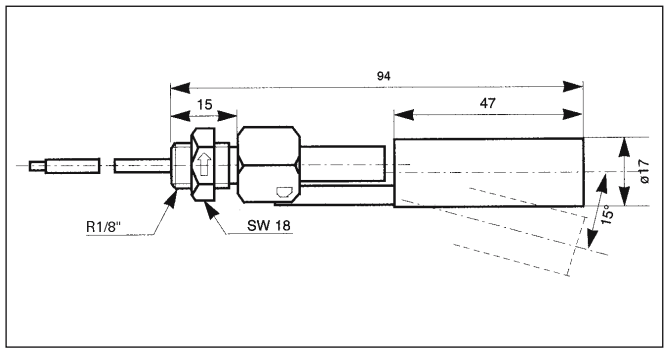
Order No.	**FS15.**	**1.**

Miniature level switch for horizontal mounting

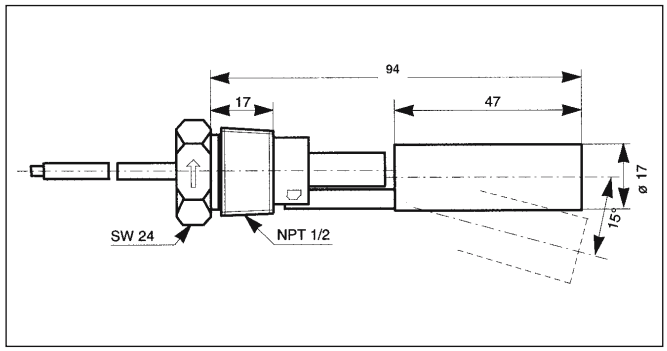
Connection:
1 = G 1/8 male
2 = 1/2" NPT male

Dimensions:

FS15.1



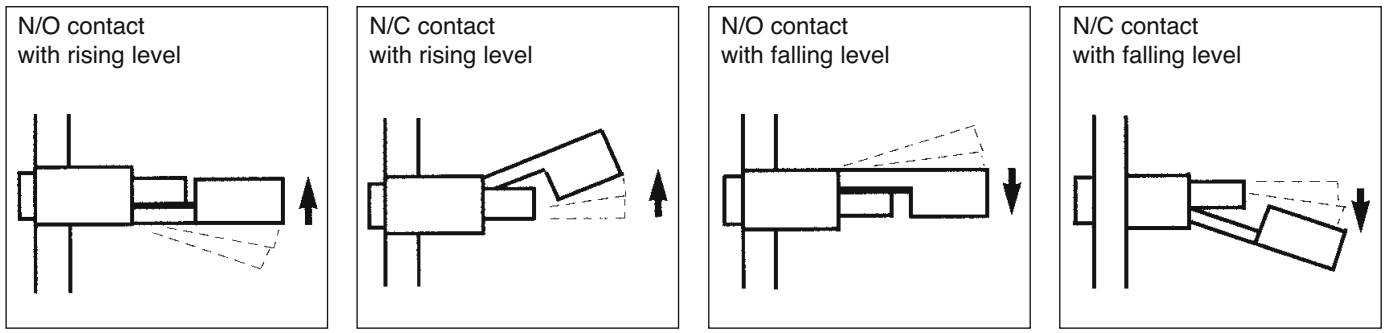
FS15.2



Technical Specifications:

Connection cable:	0.5 m FEP-wire
Threaded connection:	G 1/8 male or 1/2" NPT male
Material:	completly stainless steel 1.4301
Contact function:	N/C or N/O, depending on mounting
Contact rating:	50 VA, 250V, 0.5 A
Max. pressure:	5 bar
Max. temperature:	120°C
Min. density of medium:	0.7 kg/l

Mounting and contact functions:



FK10

Conductive Level Switch

- **Easy installation**
- **Sturdy, heavy-duty plastic or stainless steel housing**
- **Process connection of plastic or stainless steel**
- **Electrode stems made of stainless steel, titanium, Hastelloy B or C**
- **Single or multiple electrodes (up to 5 switching points)**
- **Low-cost OEM model available**
- **Electrode relay for limit values, pump control or pump control with overflow and dry-running protection (see FK01 / FKE data sheet)**

Description:

Model series FK10 conductive level switches are intended to be used with the FKE electrode relay for detecting the level of conductive fluids. An A.C. voltage is applied to an electrode insulated from the tank. When the electrode is wetted by the process fluid, a low current flows from the electrode through the fluid to the tank wall (in the case of plastic tanks, the current flows to a ground electrode). This current flow is detected by the electrode relay and output as a switching signal.

Typical Applications:

- To detect the fill limit in tanks containing conductive fluids
- To report whether the tank is empty or full
- To switch over between two filling heights
- To provide overflow protection
- To provide dry-running protection

Benefits:

- No moving parts
- Not influenced by specific gravity of fluid

Models:

FK10.1: Single/multiple-electrode designs with mounting thread at plastic housing

Stainless steel housing with plastic or stainless steel mounting thread

FK10.2: OEM design with plastic (Delrin) housing as a one- or two-electrode sensor probe, process connection (1/2“ or 1”), and stainless steel electrode(s) with permanently attached connection cable (3 m PUR)

Technical Specifications:

Max. pressure: 10 bar (plastic);
20 bar (stainless steel)

Max. temperature: -20°C…90°C (plastic);
-20°C…100°C (stainless steel)

Protection type: IP65 (FK10.1)
IP68 (FK10.2)

Materials:

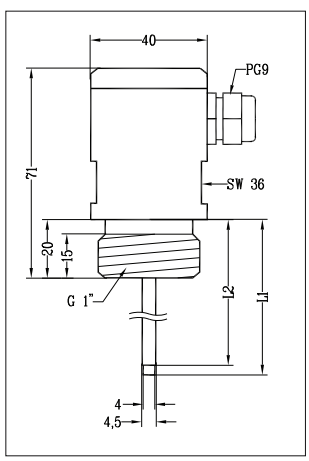
Housing: Delrin, polypropylene, PTFE, stainless steel 1.4571

Process connection: Delrin, polypropylene, PTFE, stainless steel 1.4571

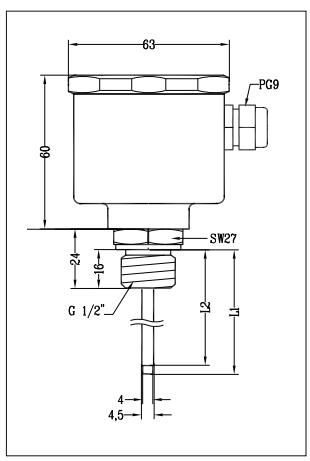
Sensor stem: Stainless steel 1.4404, Hastelloy B,Hastelloy C, titanium

Coating: Polyamide, Halar (PTFE)

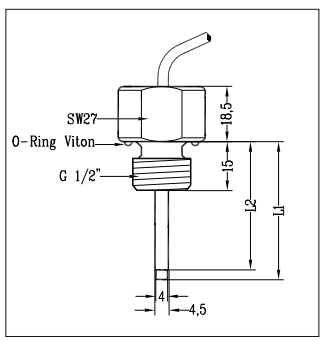
Dimensions:



FK10.1.1.15.1… (plastic)



FK10.1.6 .15.1… (stainless steel)



Model Coding:

Order Number: FK10. 1. 1. 15. 1. 1. 1. 1. LA

Conductive Level Switch

Model:
1 = Standard
2 = OEM design
(minimum order: 20 units; available upon request)

Materials for connector housing / Process connection:
0 = Delrin (OEM-design only)
1 = Delrin (standard)
2 = Delrin / stainless steel 1.4571
3 = Polypropylene, small
4 = Polypropylene, small / stainless steel 1.4571
5 = Polypropylene, large
6 = Polypropylene, small / stainless steel 1.4571
7 = PTFE, small
8 = PTFE, small / stainless steel 1.4571
9 = PTFE, large
10 = PTFE, large / stainless steel 1.4571
11 = Stainless steel 1.4571 / stainless steel 1.457

Process connection:
15 = G1/2 thread (max. 1 electrode)
25 = G1 thread* (max. 3 elctrodes)
32 = G1 1/4 (stainless steel connection only, max. 4 electrodes)
40 = G1 1/2 thread (max. 5 electrodes)
50 = G2 thread
F50 = DIN DN50 flange

Number of electrodes:
1…5

Electrode material:
1 = Stainless steel 1.4404 (standard)
2 = Hastelloy B (4 mm diameter only)**
3 = Hastelloy C (4 mm diameter only)**
4 = Titanium (4, 8, 10 mm diameters only)**

Electrode diameter:
1 = 4 mm (standard)
2 = 6 mm
3 = 8 mm
4 = 10 mm

Electrode insulation:
1 = Polyamid (standard)
2 = Halar (PTFE)

Electrode length (from edge of seat)
LA = length 500 mm
LB = length 1,000 mm
LS = Special order
Example of ordering notation: $L_1$300 / $L_2$400 / $L_3$500, etc.

* max. two electrodes with stainless steel thread

** with electrode isolation from Halar only

FT01

Hydrostatic Submersible Sensor

- **Compact design**
- **Measuring cell highly pressure resistant**
- **Current or voltage output**
- **Corrosion–resistant stainless steel construction**
- **Electrical protection IP 68 (to a depth of 1000 ft. / 300 m)**

Description:

Hydrostatic level sensors measure fluid height and thus its level by means of the hydrostatic pressure applied by the water column directly above the sensor.
A measuring cell at the bottom of the sensor registers this pressure so that the sensor's internal electronics can generate a 4-20 mA or a 0-10 VDC signal proportional to the detected fluid level.
Because all parts of the pressure sensor coming in contact with the liquid being measured are made of stainless steel, this sensor is suitable for unrestricted use in the food industry.
For measurements of caustic/corrosive liquids, a design featuring a teflon-jacketed connetction cable is also available.

Typical Applications:

The FT01 level sensor is used in measuring applications that require provision of a precise, stable and reliable output signal even under extreme operating conditions.
The high electrical protection rating (IP 68) and its high resistance to corrosion make the FT01 level sensor suitable for use in a vast variety of containers, basins, shafts and tanks.
With its large diaphragm surface area, the FT01 has proven to be especially suitable for monitoring wastewater systems.

Electrical Specifications:

Supply voltage: 12 to 30 VDC with current output
17 to 30 VDC with voltage output

Power consumption max: P = 1 Watt

Output: Current output load:
(UB-10V) / 0.02 A
Voltage output load: 100 kOhm

Protection type: IP68 as per EN 60 529 / IEC 529

Electrical protection: Reverse-polarity, overvoltage, short-circuit protection

Technical Specifications:

Materials:
Housing: Stainless steel AISI 316 / 1.4401

Pressure connection: Stainless steel AISI 316 / 1.4401

Protective cap: PA

Process connection
Ballast weight: G 1/2 B

Overload limits: 29 psi / 2 bar up to measuring range R69
58 psi / 4 bar for measuring range R70
188 psi / 13 bar for measuring ranges R72-R74
464 psi / 32 bar for measuring range R75-R78

Max. medium temperature: 14-158 °F / -10 to +70 °C

Max. storage temperature: -22-176 °F / -30 to +80 °C

Compensated range: 32- 158 °F / 0 to +70 °C

Accuracy: Linearity + hysteresis + repeatability
< 0.3% of full scale

Response time: < 10 ms

Cable: Polyurethane, with pressure equalization tube and strain relief connection, jacket made of thermoplastic elastomer (TPE)

Lightening protection: as per IEC 801-5

Model Coding:

Order Number: **FT01. | 1. | 1. | R72. | 01. | 0.**

Hydrostatic submersible sensor

Output signals:
1 = 4-20 mA, 2 wire
2 = 0 to 10 VDC, 3-wire

Accuracy class:
1 = 0,3 %

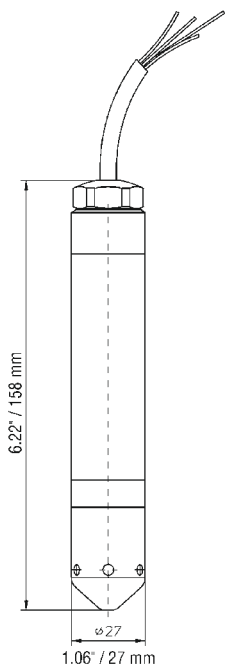
Measuring Ranges:
R63 = 0 to 0.1 bar / 0 to 1.45 psi)
R64 = 0 to 0.16 bar / 0 to 2.32 psi)
R65 = 0 to 0.25 bar / 0 to 3.63 psi)
R66 = 0 to 0.4 bar / 0.5.8 psi)
R67 = 0 to 0.6 bar / 0 to 8.7 psi)
R69 = 0 to 1 bar / 0 to 14.5 psi)
R70 = 0 to 1.6 bar / 0 to 23.2 psi)
R72 = 0 to 2.5 bar / 0 to 36.3 psi)
R73 = 0 to 4 bar / 0 to 58.0 psi)
R74 = 0 to 6 bar / 0 to 87 psi
R75 = 0 to 10 bar / 0 to 145 psi
R76 = 0 t0 16 bar / 0 to 232 psi
R78 = 0 to 25 bar / 0 to 363 psi
9 = Special measuring range: please specify in writing

Cable Length:
01 = Measuring range + 1.5 ft. / 0.5 m
xx = Special length, please specify in writing

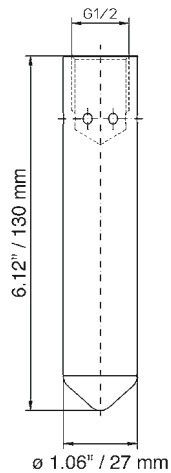
Options and accessories (more than one may be selected)
0 = None
1 = Protective cap of stainless steel
2 = Suspended mount for level sensor
3 = Additional weight of stainless steel 1.4571
4 = Test Certificate

Dimensions:

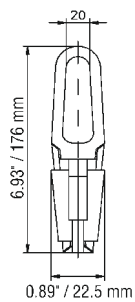
Sensor



Ballast weight



Suspended mounting



FN04

Liquid level sensor with continuous detection

- **Level measurement unaffected by foam formation, conductivity, pressure or temperature**
- **Remote indication over very long distances**
- **Easy installation, with only one calibration required during initial startup**
- **Detects interfaces between liquids with different densities**
- **Semi-flexible sensor also allows installation in tight, cramped spaces**
- **Sensor also available in 3A-compliant design for use in the food industry**

Description:

Model FN04 liquid level measuring sensors utilize a float fitted with permanent magnets to directly transmit information about changes in the liquid level. The sensor float is raised or lowered with the liquid level. The magnetic field exerted by the float magnets operates a reed contact / resistance measuring chain in the guide tube. The output signal is a voltage value proportional to the fluid level.

Typical Applications:

Model FN04 liquid level sensors are suitable for measuring and monitoring the level of almost all types of fluids that will not corrode or damage the sensor materials. They may be used in containers up to six meters high.

Function

The sensor float contains a ring magnet. The magnetic field exerted by this magnet penetrates the wall of the guide tube and operates very small reed contacts that continuously pick up a measured voltage from a resistance measuring chain (voltage divider). This voltage is proportional to the liquid level. The resistance measuring chain, which is made up of very small chips soldered to a circuit board, is correspondingly very finely graduated (very fine spacing between chips). This construction means that the measured voltage is essentially continuous.
Depending on the design of the measuring sensor, the chip spacing (distance from chip to chip) can be from 5 to 15 mm.

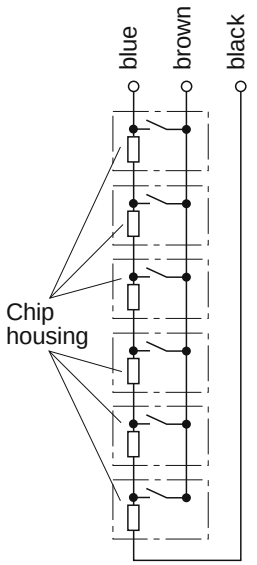


Diagram of internal circuit in the fluid level sensor

Measuring accuracy

The principle of operation for the liquid level sensor means that the measuring accuracy cannot be indicated as a constant factor. Instead, the accuracy depends on the measuring length and the chip spacing on the resistance measuring chain.
The maximum measuring error can be calculated with the following formula:

$$\frac{\text{Spacing}}{\text{Measuring length in mm}} \times 100 \quad \text{Example:} \quad \frac{12.7\ \text{mm}}{2{,}000\ \text{mm}} \times 100 = 0.635\%$$

Models

Every liquid level sensor consists of the following three main components. Different versions of these components are available to meet the technical needs of the specific application:

- Guide tube
- Float
- Process connection

There are also secondary components such as transducers, limit contact sensors, displays and isolating transformers (Zener barriers) that complete the measuring system.

Guide tube

The guide tube is the heart of the liquid level measuring sensor. It contains the measuring chain and is available in a selection of materials, diameters and resistance-chain chip spacings.
Materials and diameters:

- Brass (Ø 0.47" / 12 mm)
- Stainless steel (Ø 0.47" / 12 mm, 0.55" / 14 mm, 0.71" / 18 mm)
- PVC (Ø 0.63" / 16 mm, 0.79" / 20 mm)
- PP (Ø 0.63" / 16 mm, 0.79" / 20 mm)
- PVDF (Ø 0.63" / 16 mm, 0.79" / 20 mm)

Guide tubes made of PP with a Ø 0.63" / 16 mm are also available with semi-flexible, bendable stems for installation in tight, cramped locations.

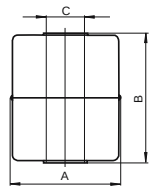
Spacing distance:

Depending on the guide tube diameters, measuring length and design (materials), the following chip spacings are available: 0.2" / 5 mm, 0.4" / 10 mm, 0.5" / 12.7 mm, 0.5" / 15 mm

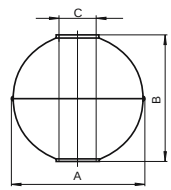
Floats

The selection of the float depends on the properties of the fluid to be monitored (corrosive/caustic properties, density), the process parameters (pressure, temperature) as well as the guide tube material and diameter.
The following float types are available:

Type	Material	Form	Ø (inch / mm)	min. density (kg/m³)	max. pressure (psi / bar)	max. temp. (°F / °C)
1	Buna rubber	Cylinder	1.18 / 30	700	87 / 6	176 / 80
2	PVC		2.17 / 55	750	14 / 1	140 / 60
3			3.15 / 80	600		
4	PP		2.17 / 55			176 / 80
5			3.15 / 80	500		
6	PVDF		2.17 / 55	800		212 / 100
7			3.17 / 80	700		
8	Stainless steel 316 TI / 1.4571		1.73 / 44	800	360 / 25	392 / 200
9		Sphere	2.05 / 52	720	580 / 40	
10			3.27 / 83	450	360 / 25	
11			3.15 / 80	600		
12			3.15 / 80	750		



Model	Ø A (inch / mm)	Ø B (inch / mm)	Ø C (inch / mm)
1	1.18 / 30	1.77 / 45	0.52 / 13
2	2.17 / 55	2.13 / 54	0.87 / 22
3	3.15 / 80	3.11 / 79	0.94 / 25
4	2.17 / 55	2.13 / 54	0.87 / 22
5	3.15 / 80	3.11 / 79	0.94 / 25
6	2.17 / 55	2.72 / 69	0.87 / 22
7	3.17 / 80	3.11 / 79	0.94 / 25
8	1.73 / 44	2.05 / 52	0.59 / 15



Model	Ø A (inch / mm)	Ø B (inch / mm)	Ø C (inch / mm)
1	2.05 / 52	2.05 / 52	0.59 / 15
2	3.23 / 82	3.19 / 81	0.59 / 15
3	3.15 / 80	2.95 / 75	0.91 / 23
4	3.15 / 80	2.87 / 73	0.91 / 23

Special-order floats (titanium, ECTFE-coated) are available upon request.

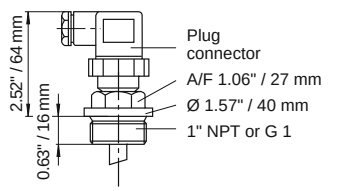
Process connection

These liquid level measuring sensors are usually attached to the inside of a container cover with a male threaded fitting (3/8",1/2", 1"). In such case, the sensor comes with a three-wire connection cable (PVC or silicone jacket) of up to 2,000 meters in length.
However, if the sensor is to be mounted from the outside of a container and inserted through the container cover, then the sensor must either come with a male threaded fitting that is compatible with the existing tank thread (1", 1-1/2", 2") or be mounted with flanges. The diameter of the tank mounting thread or the mounting flange should be sized so that the sensor float can pass through the opening in the container cover.

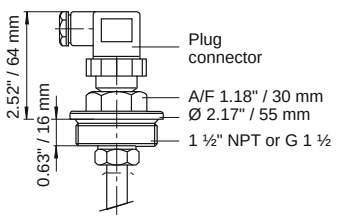
Float type	min. size of tank fitting	min. nominal size of flange
1	1"	1 1/4" / DN 32
2	2"	2 1/2" / DN 65
3	—-	3" / DN 80
4	2"	2 1/2" / DN 65
5	—-	3" / DN 80
6	2"	2 1/2" / DN 65
7	—-	3" / DN 80
8	1 1/2"	2" / DN 50
9	2"	2 1/2" / DN 65
10	—-	4" / DN 100
11	—-	3" / DN 80
12	—-	3" / DN 80

In addition, the material used for the process connection should be compatible with the materials used for the float and the guide tube.

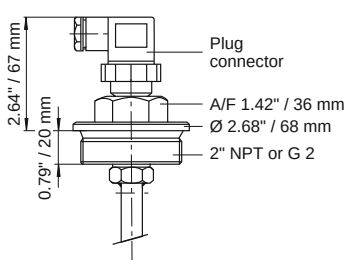
Dimensions of tank fittings and flange connections



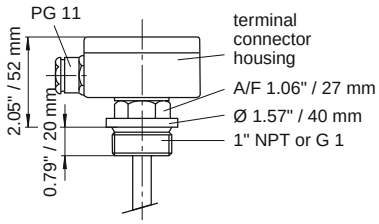
1" thread
stainless steel with ABS plug connection as per DIN 43650



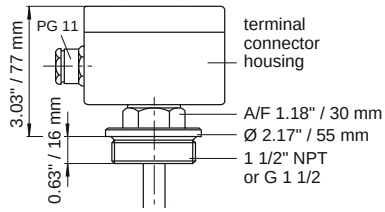
1 1/2" thread
PP, brass, steel, or stainless steel with ABS plug connection as per DIN 43650



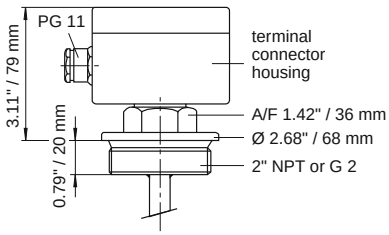
2" thread
PP, brass, steel, or stainless steel with ABS plug connection as per DIN 43650



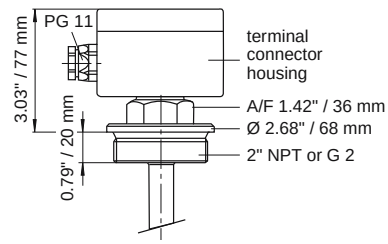
1" thread
stainless steel with aluminum terminal connector housing
2.52" x 2.28" x 1.34"
64 x 58 x 34 mm



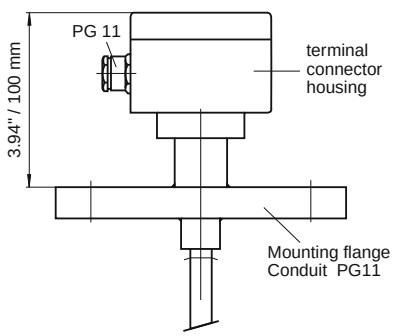
1 1/2" thread
PP, brass, steel, or stainless steel with aluminum terminal connector housing
3.15" x 2.95" x 2.24"
80 x 75 x 57 mm



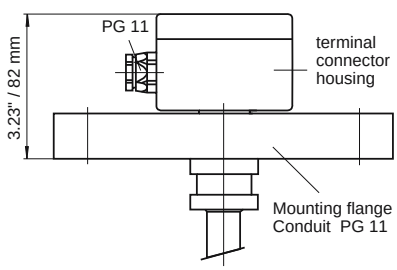
2" thread
PP, brass, steel, or stainless steel with aluminum terminal connector housing
3.15" x 2.95" x 2.24"
80 x 75 x 57 mm



2" thread
PVC, PP, PVDF with polyester terminal connector housing
3.15" x 2.95" x 2.24"
80 x 75 x 57 mm



Flange connection
ANSI 2" to ANSI 6", 150 lbs. to 600 lbs. RF / DN 50 to DN 150, PN 6 to PN 64
Steel or stainless steel with aluminum terminal connector housing
3.15" x 2.95" x 2.24"
80 x 75 x 57 mm



Flange connection
ANSI 3" to ANSI 4", 150 lbs., RF / DN 80 to DN 100, PN 10
PVC, PP, or stainless steel with PTFE plating, polyester terminal connector housing
3.15" x 2.95" x 2.24"
80 x 75 x 57 mm

Connection sizes for 3A-compliant sensors:

ANSI: 1", 1 1/2", 2"
DIN: DN 25, DN 40, DN 50

Ordering Code (general)

Order number **FN04. | 1. | 1. | 1. | 01. | 1001. | 1. | 0**

Liquid level measuring sensor

Guide tube material:

1 = Brass
2 = Stainless steel 316 Ti / 1.4571
3 = PVC
4 = PP
5= PP, semi-flexible
6 = PVDF
9 = Special order

Guide tube diameter:

1 = 0.47" / 12mm
2 = 0.55" / 14 mm
3 = 0.63" / 16 mm
4 = 0.71" / 18 mm
5 = 0.79" / 20 mm
9 = Special order

Resolution (Chip spacing) of resistance measuring chain:

1 = 0.20" / 5 mm
3 = 0.39" / 10 mm
4 = 0.50" / 12.7 mm
5 = 0.59" / 15 mm
9 = Special order

Float type:

01…12 = see table in "Floats" section

Process connection:

1001…9999 = see "Process Connections" table on this page

Electrical connection.

1 = 40" / 1 m PVC cable
2 = 40" / 1 m silicone cable
3 = Plug connection as per DIN 43650
5 = Polyester connection socket, 3.15" x 2.95" x 2.24" / 80 x 75 x 57 mm
6 = Aluminum connection socket, 2.52" x 2.28" x 1.34" / 64 x 58 x 34 mm
7 = Aluminum connection socket, 3.15" x 2.95" x 2.24" / 80 x 75 x 57 mm

Options:

Type of resistance measuring chain:

0 = Standard
1 = High-temperature design for up to 300 °F / 150°C

Ordering Code (process connections)

Order number **x | y y y**

Process connection

1 = Male thread
2 = Tank connector
3 = Flange connection

x = 1: Male thread **1 | 0 0 1**

001N = 3/8" NPT male, brass	001 = G 3/8 male, brass
002N = 3/8" NPT male, stainless steel 316 Ti / 1.4571	002 = G 3/8 male, stainless steel 316 Ti / 1.4571
003N = 1/2" NPT male, stainless steel 316 Ti / 1.4571	003 = G 1/2 male, stainless steel 316 Ti / 1.4571
004N = 1" NPT male, PVC	004 = G 1 male, PVC
005N = 1" NPT male, PP	005 = G 1 male, PP
006N = 1" NPT male, PVDF	006 = G 1 male, PVDF
999 = Special order	999 = Special order

x = 2: Tank connector **2 | 0 1 1**

002N = 1" NPT, stainless steel 316 Ti / 1.4571	002 = G 1, stainless steel 316 Ti / 1.4571
003N = 1 1/2" NPT, brass	003 = 1 1/2" NPT, brass
004N = 1 1/2" NPT, steel	004 = 1 1/2" NPT, steel
005N = 1 1/2" NPT, stainless steel 316 Ti / 1.4571	005 = 1 1/2" NPT, stainless steel 316 Ti / 1.4571
007N = 1 1/2" NPT, PP	007 = 1 1/2" NPT, PP
009N = 2" NPT, brass	009 = 2" NPT, brass
010N = 2" NPT, steel	010 = 2" NPT, steel
011N = 2" NPT, stainless steel 316 Ti / 1,4571	011 = 2" NPT, stainless steel 316 Ti / 1,4571
012N = 2" NPT, PVC	012 = 2" NPT, PVC
013N = 2" NPT, PP	013 = 2" NPT, PP
014N = 2" NPT, PVDF	014 = 2" NPT, PVDF
999 = Special order	

x = 3: Flange connection **3 | 2 | 4 | 3**

Material:

1 = Steel
2 = Stainless steel 316 Ti / 1.4571
3 = PVC
4 = PP
5 = Stainless steel with PTFE liner
999 = Special order

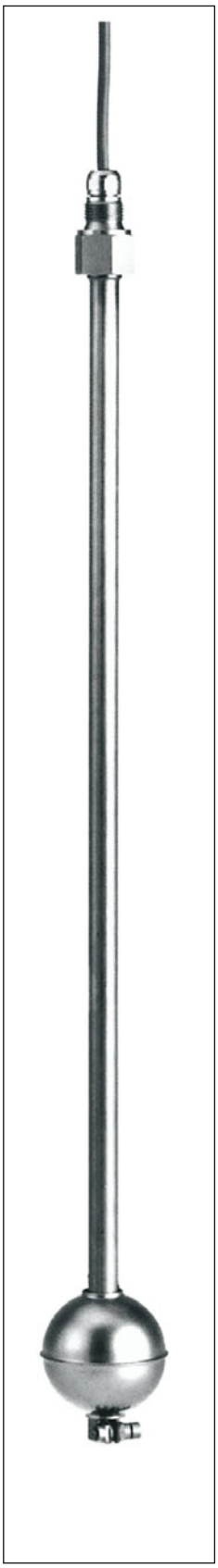
Nominal size:

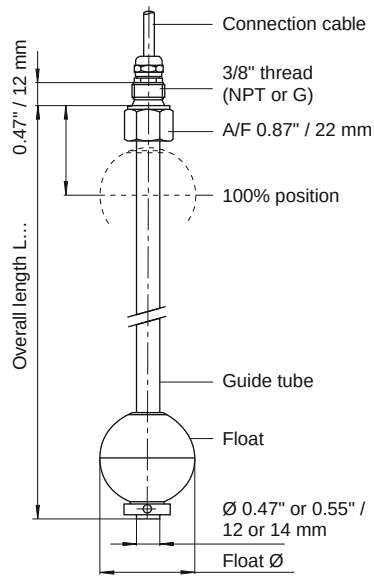
1A = ANSI 2", RF	1 = DN50
2A = ANSI 2 ?", RF	2 = DN65
3A = ANSI 3", RF	3 = DN80
4A = ANSI 4", RF	4 = DN100
5A = ANSI 5", RF	5 = DN125
6 = ANSI 6", RF	6 = DN150
9 = Special order	

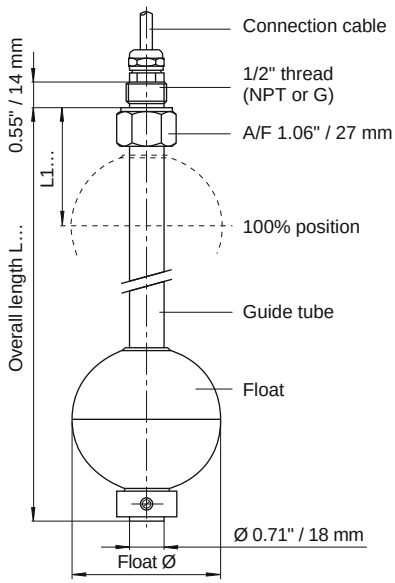
Pressure rating

	1 = PN6
	2 = PN10
3A =150 lbs.	3 = PN16
5A = 300 lbs.	5 = PN40
6A = 600 lbs.	6 = PN64
9 = Special order	

Standard level sensor of brass or stainless steel



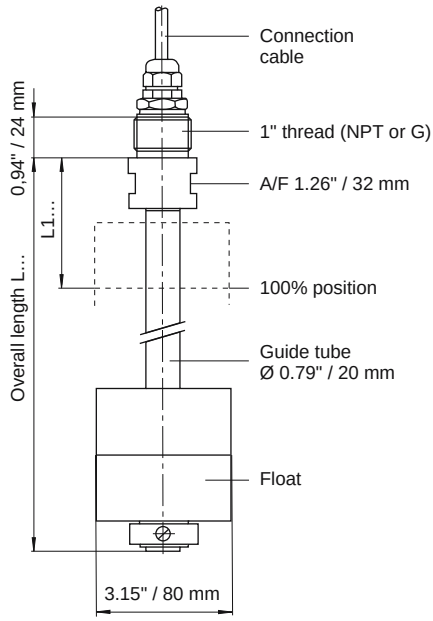


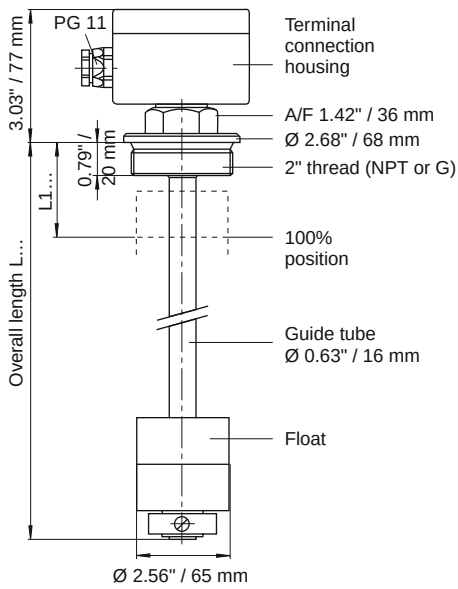


Versions and Technical Data

Guide tube material	**Brass**	**Stainless steel**
Guide tube diameter	0.47" / 12 mm	0.47", 0.55", 0.71" / 12 mm, 14 mm, 18 mm
Guide tube length	max 120" max. 3 m	ø0.47", 0.55" / ø12, ø14 mm: max. 120" / 3 m ø 0.71" / ø18 mm: max. 240" / 6 m
Max. pressure	Depends on float used (see table in "Floats" section)	
Max. temperature	**Float and process connection of metal:** 250°F / 120°C (194°F / 90°C with PVC cable), high-temperature design 480°F / 250°C (with resolution of 0.2", 0.39", 0.59" / 5, 10, 15 mm only) **Float and/or process connection of plastic:** As per specification for float or process connection	
Resolution	0.2" / 5 mm 0.39" / 10 mm 0.5" / 12.7 mm 0.59" / 15 mm	0.2" / 5 mm (ø 0.55"and ø 0.71" / ø14 and ø18 mm only) 0.39" / 10 mm 0.5" / 12.7 mm 0.59" / 15 mm
Float	No. 1, 8, 9,	1, 8, 9, 10, 11
Total resistance of measuring chain	**Standard:** Depends on length and chip spacing **When connected to safety barrier:** approx. 40 kOhm	
Cable length (for sensors with male thread only)	PVC or silicone cable, max. 6,500 ft. / 2,000 m, 3-wire	
Process connection	**Male thread**	
	3/8"	3/8", 1/2"
	Tank connectors with terminal connection housing Polypropylene, 1 1/2", 2" with ABS plug connection or polyester terminal connection housing	
		Stainless steel, 1" with ABS plug connection or aluminum connection housing
	Brass, 1 1/2", 2", with aluminum connection housing	Steel or stainless steel, 1 1/2", 2", with aluminum connection housing
	Flange connection	
	Steel or Stainless steel ANSI 2"-6" / DN 50-DN 150, 150 lbs.-600 lbs. / PN 6-PN 64 with aluminum connection housing	Steel or stainless steel ANSI 2"-6" / DN 50-DN 150, 150 lbs.-600 lbs. / PN 6-PN 64 with aluminum connection housing
Model designation:	As per ordering code	
Other specifications	Overall length L media, density, max. pressure max. temperature, special features	

Standard level sensor of PVC, PP or PVDF

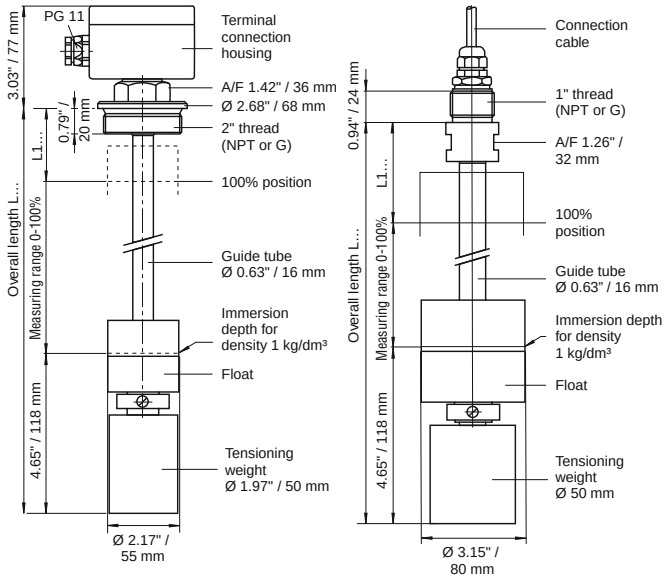




Versions and Technical Data

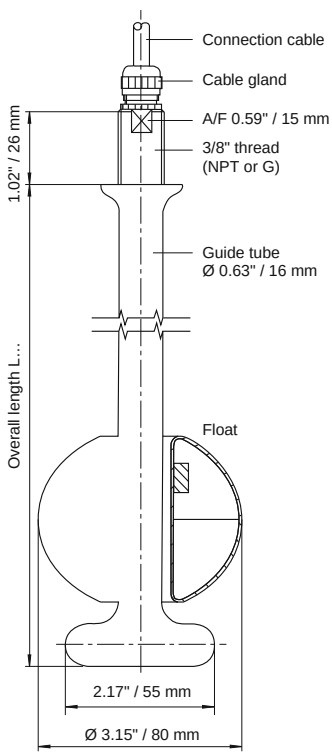
Guide tube material	**PVC**	**PP**	**PVDF**
Guide tube diameter	0.63" or 0.79" / 16 mm or 20 mm		
Guide tube length	max. 160" / 4 m		
Max. pressure	45 psi / 3 bar		
Max. temperature	140 °F / 60 °C	176°F / 80°C	212°F / 100°C
Resolution	0.2" / 5 mm 0.39" / 10 mm 0.5" / 12.7 mm 0.59" / 15 mm		
Float:	ø16: No. 2 ø18: No. 3	ø16: No. 4 ø18: No. 5	ø16: No. 6 ø18: No. 7
Total resistance of measuring chain	Depends on length and resolution		
Cable length (for sensors with male thread only):	PVC or silicon cable, max. 6500 ft. / 2000 m, 3-wire		
Process connection:	**Male thread**		
	1"		
	Tank threads and connection housing		
	2", PVC	2", PP	2", PVDF
	With polyester connection housing		
	Flange connection		
	PVC	PP	Stainless steel with PTFE spacer
	With polyester connection housing		
Model designation:	As per ordering code		
Other specifications	Overall length L… media, density, max. pressure max. temperature, special features		

Semi-flexible sensors of PP



Semi-flexible sensors are used in cases when the available installation space will not permit use of a rigid unit, such as in tight, cramped spaces where the top edge of the container is close to the ceiling. The sensors have a minimum bending radius of 40" / 1,000, allowing them to be inserted into the container even in close quarters.

3A-compliant sensors for sanitary applications in the food and beverage industry



Our 3A-compliant level sensors meet all of the requirements set forth in the 3-A-Sanitary Standards for Liquid Pressure and Level Sensing Devices from the International Association of Milk, Food and Environmental Sanitarians, US Public Health Service and from The Dairy Industry Committee.
These sensors can be sterilized with saturated steam or water.

Versions and Technical Data

Guide tube material	**PP**
Guide tube diameter	0.63" / 16 mm
Guide tube length	max. 160" / 4 m
Max. pressure	45 psi / 3 bar
Max. temperature	176 °F / 80 °C
Resolution	0.5" / 12.7 mm
Float	With 2" tank connector: no. 4, with 1" male thread or flange: no. 5
Total resistance of measuring chain	Depends on length
Cable length (for sensors with male thread only)	PVC or silicon cable, max. 6500 ft. / 2000 m, 3-wire
Process connection	**Male thread**
	1", PP
	Tank connectors with connection housing
	2", PP, with polyester connection housing
	Flange connection (other flange types available upon request)
	PVC or PP ANSI 3" or ANSI 4", 150 lbs., RF / DN 80 or DN 100, PN10 with polyester connection housing
Tensioning weight	ø 1.97" x 3.15" / 50 x 80 mm
Model designation	As per ordering code
Other specifications	Overall length L… media, density, max. pressure max. temperature, special features

Guide tube material	**Stainless steel 316 Ti / 1.4435**
Guide tube diameter	Ø 0.63" / 16 mm
Guide tube length	max. 200" / 5 m
Max. pressure	650 psi / 45 bar
Max. temperature	194 °F / 90 °C with standard measuring chain, 356°F / 180°C with high-temp. measuring chain
Resolution	0.5" / 12. 7 mm (up to 194 °F / 90 °C) 0.2", 0.39", 0.59" / 5, 10, 15 mm (up to 356 °F / 180 °C, high-temp measuring chain)
Float	No. 12
Total resistance of measuring chain	Depends on length and resolution
Cable length (for sensors with male thread only)	PVC or silicon cable, max. 6500 ft. / 2,000 m, 3-wire
Process connection	**Male thread**
	ISO 228/1, 3/8" or 4" Tri-clamp
Model designation	As per ordering code
weitere Angaben:	Overall length L… media, density, max. pressure max. temperature, special features

Transmitter for Resistance Measuring Chains

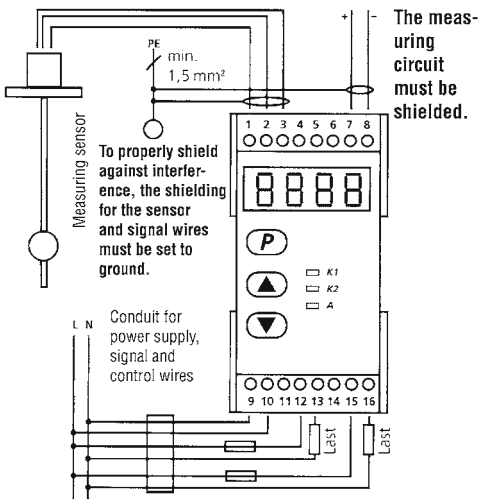
Description:

Model MULD transmitters can be connected to the resistance measuring chains in FN04 level sensors or FB01/FB04 bypass level sensors.

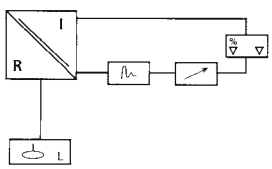
These transmitters convert the signal from the resistance-type sensor to a standard output signal (0 or 4 to 20 mA).

In addition, MULD transmitters have two programmable alarm contacts and a programmable, 4-digit LED display to represent the liquid level numerically.

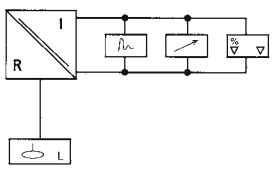
Elektrischer Anschluss



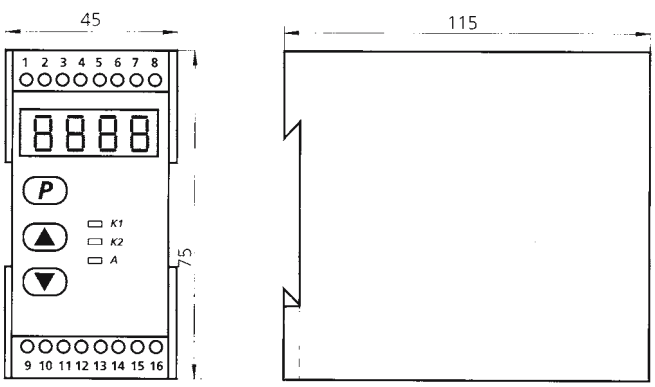
Current signal



Voltage signal



Dimensions



Ordering Code

Order number	MULD.	1.	4.

Transducer

Supply voltage

1 = 24 VDC, electrically isolated

2 = 24 VAC, 50/60 Hz

3 = 115 VAC, 50/60 Hz

4 = 230 VAC, 50/60 Hz

Output signal:

0 = 0-20 mA

4 = 4-20 mA

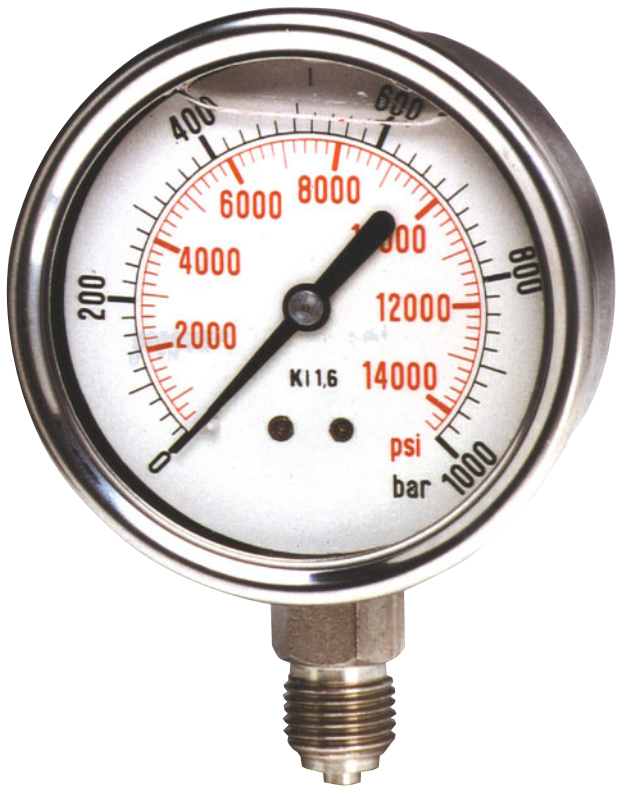
Technical Data

Power supply:	24 / 115 / 230 VAC, 48 to 62 Hz available or 24 VDC with electrical isolation of auxiliary power, measuring and output circuits
Power consumption:	4 VA
Input:	
Measuring circuit:	Resistance sensors, 3-wire
Meas. resistance:	1 to 100 kOhm
Output:	0/4 to 20 mA
Contact output:	2 limit-value relays, programmable as N/O or N/C, programmable hysteresis, switching capacity 500 VA, 230 VAC
Display:	Red, 4-digit LED display programmable from –999 to +9999, programmable decimal point
Housing:	Macrolone Snap-on rail mounting, as per DIN EN 50022
Protection type:	IP40, terminals IP20
Operating temperature:	32 to 122 °F / 0 to 50 °C

PMR02

Bourdon Tube Pressure Gauge

- Housing diameter 60 mm
- Accuracy class 1.6
- Steel or stainless steel housing
- Measuring mechanism and connection of brass or stainless steel
- Filled or unfilled
- Protection type IP 65



Description:

Model series PMR02 Bourdon tube pressure gauges can be supplied in brass or stainless steel versions, with filled or unfilled gauges. A coiled, drawn brass or stainless steel tube filled with the fluid or gas being monitored is deformed to an extent depending on the pressure exerted by the fluid or gas. The resulting movement of the coil is transmitted to an indicator mechanism with a graduated display. This movement can be dampened by means of an optionally available glycerin filling so that any vibrations have far less impact on the accuracy and stability of the reading. The natural lubricating properties of this glycerin filling also reduce wear to moving parts, entry of caustic/corrosive gases and accumulation of condensation. The stainless steel version allows pressure measurement of even the most caustic liquids and gases. These pressure gauges can be optionally fitted with a G1/4 A threaded connection at the bottom or on the back.

Applications:

Bourdon tube gauges are used throughout industry and are especially suitable for taking measurements at locations where there is no supply of electrical power available. Model series PMR02 Bourdon tube pressure gauges, of either steel or brass, are frequently used in industrial machinery and systems, on pumps, compressors, or block-type thermal power stations (BTTPs) since in these applications they only need to meet minimal requirements for withstanding the effects of the media being monitored. In contrast, chemical-service grade PMR02 Bourdon tube pressure gauges of stainless steel are designed to withstand contact with the very caustic/corrosive media often encountered in the chemical and petrochemical industries, the food and beverage industries, pharmaceutical production processes or in power plants, where they have provided the best service for decades.

Designs:

Nominal Sizes and Materials:

Housing diameter: 60 mm

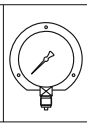
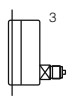
PMR02.K: housing of carbon steel, black, connection of brass

PMR02.M: Housing of stainless steel, connection of brass with glycerin filling availlabe only.

PMR02.E: Housing of stainless steel, connection of stainless steel

Process connection: G 1/4 at bottom or centered on back (carbon steel and brass version) or eccentric on back (stainless steel version)

Measuring Ranges: PMR02

Measuring range (bar)	Order code					
					 3	
	For all nominal sizes					
-1200...0 mbar**	A17	B17	C17[1]	D17[1]	E17	F17[2]
-1...0	A16	B16	C16	D16	E16	F16
-0.6...+1.0	A18	B18	C18	D18	E18	F18
-1...+0.6	A42	B42	C42	D42	E42	F42
-1...+1.5	A43	B43	C43	D43	E43	F43
-1...+3	A44	B44	C44	D44	E44	F44
-1...+5	A45	B45	C45	D45	E45	F45
-1...+9	A46	B46	C46	D46	E46	F46
-1...+15	A49	B49	C49	D49	E49	F49
0.2...1**	A50	B50	C50	D50	E50	F50
0...0.6**	A67	B67	C67	D67	E67	F67
0...1	A69	B69	C69	D69	E69	F69
0...1.6	A70	B70	C70	D70	E70	F70
0...2.5	A72	B72	C72	D72	E72	F72
0...4	A73	B73	C73	D73	E73	F73
0...6	A74	B74	C74	D74	E74	F74
0...10	A75	B75	C75	D75	E75	F75
0...16	A76	B76	C76	D76	E76	F76
0...25	A78	B78	C78	D78	E78	F78
0...40	A79	B79	C79	D79	E79	F79
0...60	A80	B80	C80	D80	E80	F80
0...100	A81	B81	C81	D81	E81	F81
0...160	A82	B82	C82	D82	E82	F82
0...250	A84	B84	C84	D84	E84	F84
0...400	A86	B86	C86	D86	E86	F86
0...600*	A87	B87	C87	D87	E87	F87
0...1000*	A88	B88	C88	D88	E88	F88

* measuring range not for PMR02.K

** measuring range not for PMR02.M

1 table section 65 mm

2 table section 63 mm

3 PMR02.M: frame coated black, optional chromed steel
PMR02.E: stainless steel frame

Model Coding:

Order number: **PMR02. | M. | 1. | 0. | A49. | 0**

Bourdon tube pressure gauge

Materials:
K* = Housing of carbon steel, connection of brass
M = Housing of stainless steel, connection of brass*)
E = Housing of stainless steel, connection of stainless steel
S = Special materials (please specify in writing)

Process connection:
1 = G 1/4 at bottom
2 = G 1/4 centered on back (PMR02.K and M only)
3 = G 1/4 eccentric on back (PMR02.E only)
9 = Custom connection

Vibration dampening:
0 = None
1 = With glycerin filling (for PMR02.M,E only)

Design and measuring ranges:
A17...F88 = see "Measuring Ranges" table

Options and accessories (more than one may be selected)
0 = None
xx = see "Options and Accessories" table

*) with glycerin filling only

Tecnical Details:

Housing: Round gauge housing of carbon steel, black, or stainless steel
d = 60 mm
Protection type IP45 (unfilled version)
Protection type IP65 (filled version)

Vibration dampening: Glycerin filling, with pressure-relief opening and inside pressure equalization

Pressure responsive element:

PMR02.K: Circular Bourdon tube up to 60 bar.
Coiled Bourdon tube as of 60 bar

PMR02.M: Circular Bourdon tube, copper alloy, soldered in the connection shank
As of 100 bar, coiled Bourdon tube, stainless steel 1.4571, brazed in the connection shank

PMR02E: Circular Bourdon tube
As of 100 bar, coiled Bourdon tube, stainless steel 1.4571

Indicator element:

PMR02.K,M: Brass, moving parts of nickel silver

PMR02.E: Stainless steel 1.4571/1.4301

Dial face: aluminum, white face, black characters, as per EN 837-1

Viewing window:

PMR02.K: Instrument plexiglas
PMR02.M: Polycarbonate
PMR02.E: Multilayer safety glass

Accuracy: Class 1.6

Maximum liquid temperature:

PMR02.K: 60°C
PMR02.M: - 25°C to 60°C
PMR02.E: 100°C

Overload protection:

PMR02.K: Short-term 1.0 times
PMR02.M,E: Short-term 1.3 times

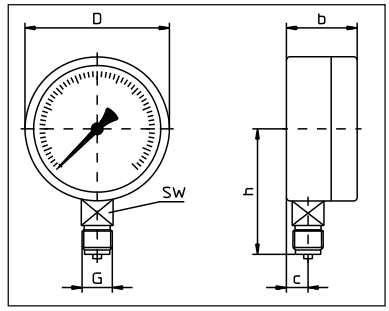
Options and Accessories:

Description	Code	for model PMR02…
Protective cap of red rubber	GR	K
Protective cap of blue rubber	GB	K,M
Double-scale dial (e.g. bar/psi)	SD	all models
Refrigerant double-scale dial for pressure / R717 (NH3)	SK7	E
Print plate for creating special scale	SS1	all models
Measuring system free of oil and grease for use with oxygen	MO	all models
Measuring system free of silicone	MS	M,E
Measuring system with excess pressure protection >1.3 times	U	M,E
Connection shank: 1/4" NPT	Px	E
Red graduations on dial face	MR	all models
Red gliding mark pointer in the viewing window	ZR	all models
Red gliding mark pointer on the dial face	ZR1	all models

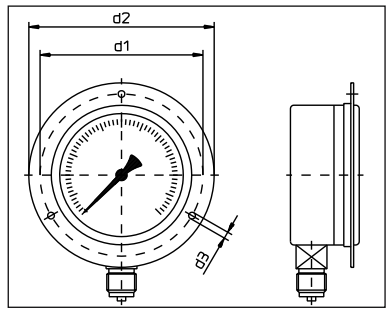
Dimensions:

Measurement:	Dimensions in mm
	PMR02
b	28.5
b1	46.5
b2	32.5
c	11
c1	18
D	63
d1	75
d2	85
d3	3.5
d4	67
h	84
SW	14
Weight (kg)	0.12

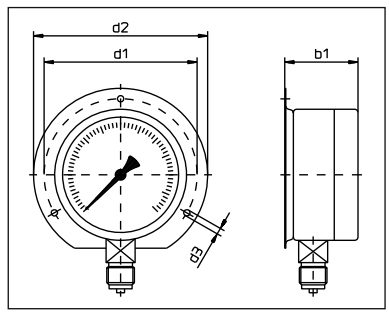
Designs:



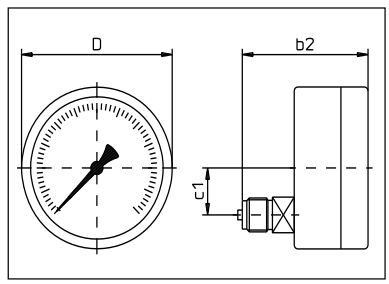
Design A:
Connection at bottom



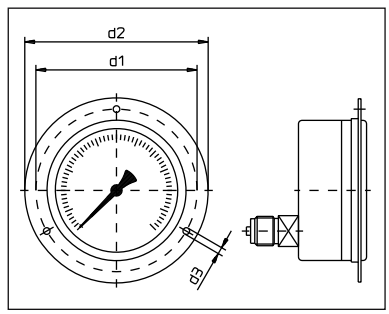
Design B:
Connection at bottom,
rim at front



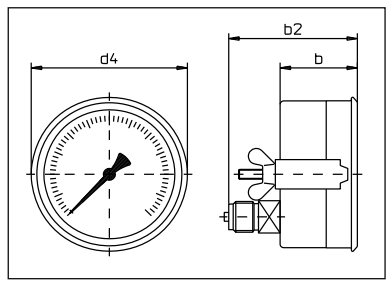
Design C:
Connection at bottom,
rim at back



Design D:
Connection on back



Design E:
Connection on back,
rim at front



Design F:
Triangular front ring
and retaining clip

PMR04

Bourdon Tube Pressure Gauge

- Nominal sizes: 100, 160 and 250 mm
- Designs with brass connection and stainless steel housing or completely in stainless steel
- Measuring ranges from –1200...0 mbar up to 0...1600 bar
- With or without liquid filling for vibration dampening
- Electrical supplementary devices such as limit contacts or analog output signals
- Fast delivery

Description:

Model series PMR04 Bourdon tube pressure gauges can be supplied in brass or stainless steel versions, with filled or unfilled gauges. A coiled, drawn brass or stainless steel tube filled with the fluid or gas being monitored is deformed to an extent depending on the pressure exerted by the fluid or gas. The resulting movement of the coil is transmitted to an indicator mechanism with a graduated display. This movement can be dampened by means of an optionally available liquid filling so that any vibrations have far less impact on the accuracy and stability of the reading. The natural lubricating properties of this liquid filling also reduce wear to moving parts, entry of caustic/corrosive gases and accumulation of condensation. The stainless steel version allows pressure measurement of even the most caustic liquids and gases. These pressure gauges are fitted with a threaded connection at the bottom or on the back. They may also be fitted with up to four limit contacts or with a transmitter for remote transmission of the measured value.

Applications:

Bourdon tube gauges are used throughout industry and are especially suitable for taking measurements at locations where there is no supply of electrical power available. Model series PMR04 Bourdon tube pressure gauges, with a brass responsive element, are frequently used in industrial machinery and systems, on pumps, compressors, or block-type thermal power stations (BTTPs) since in these applications they only need to meet minimal requirements for withstanding the effects of the media being monitored. In contrast, PMR04 Bourdon tube pressure gauges of stainless steel are designed to withstand contact with the very caustic/corrosive media often encountered in the chemical and petrochemical industries, the food and beverage industries, pharmaceutical production processes or in power plants, where they have provided the best service for decades. When fitted with the optionally available switching contacts or analog output, these gauges can also be used for electronic pressure monitoring.

Designs:

Nominal size: Housing diameter 100, 160 or 250 mm

Materials:

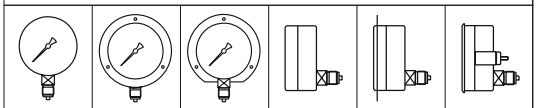
PMR04.x.M: Housing of stainless steel 1.4301, measuring element of copper alloy As of 100 bar, stainless steel, connection of brass

PMR04.x.E: Housing of stainless steel 1.4301, measuring element and connection of stainless steel 1.4571

Process connection: G1/2 or 1/2“ NPT at bottom or on back

Vibration dampening: Optional glycerin, oil or special filling

Measuring Ranges:

Measuring range (bar)	Order code					
						
	For all nominal sizes					Not for NG 250
-1200...0 mbar	A17	B17	C17	D17	E17	F17
-1...0	A16	B16	C16	D16	E16	F16
-0.6...+1.0	A18	B18	C18	D18	E18	F18
-1...+0.6	A42	B42	C42	D42	E42	F42
-1...+1.5	A43	B43	C43	D43	E43	F43
-1...+3	A44	B44	C44	D44	E44	F44
-1...+5	A45	B45	C45	D45	E45	F45
-1...+9	A46	B46	C46	D46	E46	F46
-1...+15	A49	B49	C49	D49	E49	F49
0.2...1	A50	B50	C50	D50	E50	F50
0...0.6	A67	B67	C67	D67	E67	F67
0...1	A69	B69	C69	D69	E69	F69
0...1.6	A70	B70	C70	D70	E70	F70
0...2.5	A72	B72	C72	D72	E72	F72
0...4	A73	B73	C73	D73	E73	F73
0...6	A74	B74	C74	D74	E74	F74
0...10	A75	B75	C75	D75	E75	F75
0...16	A76	B76	C76	D76	E76	F76
0...25	A78	B78	C78	D78	E78	F78
0...40	A79	B79	C79	D79	E79	F79
0...60	A80	B80	C80	D80	E80	F80
0...100	A81	B81	C81	D81	E81	F81
0...160	A82	B82	C82	D82	E82	F82
0...250	A84	B84	C84	D84	E84	F84
0...400	A86	B86	C86	D86	E86	F86
0...600	A87	B87	V87	D87	E87	F87
0...1000	A88	B88	C88	D88	E88	F88
0...1600	A89	B89	C89	D89	E89	F89

Model Coding:

Order number: **PMR04. 10. M. 1. 0. A75. 0. 0**

Bourdon tube pressure gauge

Design:
10 = 100 mm
16 = 160 mm
25 = 250 mm

Materials:
M = Housing of stainless steel, connection of brass
E = Housing of stainless steel, connection of stainless steel
S = Special materials (please specify in writing)

Process connection:
1 = G 1/2 at bottom
2 = G 1/2 eccentric on back
3 = 1/2“ NPT at bottom
4 = 1/2“ NPT eccentric on back
8 = Ready for connection to a pressure transmitter
9 = Custom connection

Vibration dampening:
0 = None
1 = With glycerin filling
2 = With oil filling (for devices with contact or analog output)

Design and measuring ranges:
A17...F89 = see “Measuring Ranges” table

Supplementary electrical devices
0 = None
xxx = see „Contacts and Analog Outputs“ table

Options and accessories (more than one may be selected)
0 = None
xx = see “Options and Accessories” table

Technical Details:

Housing: Round gauge housing of stainless steel, d = 100, 160 or 250 mm
Protection type IP45

Liquid-filled design: Glycerin filling (other filling optional), with pressure-relief opening and inside pressure equalization
Protection type IP65

Stainless steel version:
With pressure-relief opening (optional for increased safety with solid baffle wall and blow-out back)

Pressure responsive element:
PMR04.xx.M: Bourdon tube, up to 60 bar copper alloy, soldered As of 100 bar, stainless steel 1.4571, brazed
PMR04.xx.E: Bourdon tube of stainless steel 1.4571

Indicator element:
PMR04.xx.M: Brass, moving parts of nickel silver
PMR04.xx.E: Stainless steel 1.4571/1.4301

Dial face: Aluminum, white, black characters, As per EN 837-1

Viewing window:
PMR04.xx.M: Instrument glass, PMR04.25.M.x.1/2 Polycarbonate
PMR04.xx.E: Multilayer safety glass

Accuracy: Class 1.0

Maximum liquid temperature:
60°C, for PMR04.xx.M up to 60 bar, 100°C for all other devices

Overload protection: Short-term 1.3 times

Options and Accessories

Description	Code	for model PMR04...
Design for increased safety (solid baffle wall and blow-out back)	ES	x.E..., unfilled, not for NG 250, only designs A, B
Protective cap of blue rubber	GB	10.M... designs A, D
Bright metal bezel	FP	x.E... designs B, E, F
Housing suitable for tropical climates	GT	only unfilled devices
Indicator element of stainless steel	ZE	x.M... unfilled
Indicator element dampened	ZD	only unfilled devices
Scale with fine graduations and knife edge pointer	SFS	all models
Double-scale dial (e.g. bar/psi)	SD	all models
Multiple scale	SM	all models
Scale labeling	SA	all models
Refrigerant double-scale dial Pressure / R22, R134a, R507 Pressure / R22, R12, R502 Pressure / R12 Pressure / R22 Pressure / R507 Pressure / R134a	SK... ...1 ...2 ...3 ...4 ...5 ...6	x.M...
Refrigerant double-scale dial for pressure / R717 (NH3)	SK7	x.E...
Print plate for creating special scale (single color or multi-colored)	SS1 SSx	all models
Multilayer safety glass	WS	x.M..., unfilled
Measuring system free of oil and grease for use with oxygen	MO	all models
Measuring system free of silicone	MS	all models
Silicone oil filled	FS	x.E..., filled, and with option ES (increased safety)
Glycerin filled	FG	only with option ES (increased safety)
Measuring system with excess pressure protection >1.3 times	U	all models
Pressure throttling screw in the connection, d = 0.8 or 0.3 mm	D08 D03	all models
Process connection G 1/4 B, 1/4“ NPT, 7/16“-20 UNF	Px	all models, not for NG 250
Process connection G 1/4 female thread, G 3/8 B,3/8“, NPT, M20 x 1.5, small flange DN10, stainless steel	Px	all models
Process connection M16x1.5 female thread	Px	x.E...
Yellow graduations on dial face for N2 or Blue graduations on dial face for O2	MG MB	x.M..., unfilled, not for NG 250
Red graduations on dial face	MR	all models
Red gliding mark pointer in the viewing window	ZR	all models
Red gliding mark pointer on the dial face 1 or 2	ZR1 ZR2	only unfilled devices
Maximum pointer, can be reset, 1 or 2	ZS1 ZS2	all models
Adjustable pointer on bushing	ZZ	all models
Can be calibrated as per calibration regulations	E	all models
Test log all models	P	all models
Factory certificate as per EN-10204, 2.1, 2.2, 2.3, 3.1B	Wxxx	all models
Factory calibration	K	all models
Pressure sensor integrated in back of housing	PU	x.E..., unfilled,

Limit Contacts

Designs: **magnetic spring contact**

As NO contact, NC contact (maximum 4 units) or changeover contact (maximum 2 units)
Switching capacity: maximum 30W / 50 VA
Switching voltage: 24…250V

Inductive contact

As NO contact or NC contact (maximum 4 units)
Nominal voltage: 8 VDC
Power consumption: high: >3 mA, low: < 1 mA
Optional with Ex-certification as per ATEX
For use in zone 1 or 2

Other contact designs such as slow-action contacts or electronic contacts for direct connection to a PLC are available upon request.

Description (Contact operation with pointer movement in the clockwise direction)	Code 1 = NO contact 2 = NC contact 3 = Changeover contact
1 magnetic spring contact, NO contact	M1
1 magnetic spring contact, NC contact	M2
1 magnetic spring contact, changeover contact	M3
2 magnetic spring contacts, switching function x = NC contact, NO contact or changeover contact	Mxx
3 magnetic spring contacts, switching function x = NC contact or NO contact	Mxxx
4 magnetic spring contacts, switching function x = NC contact or NO contact	Mxxxx
1 inductive contact, NO contact	I1
1 inductive contact, NC contact	I2
2 inductive contacts, switching function x = NC contact or NO contact	Ixx
3 inductive contacts, switching function x = NC contact or NO contact	Ixxx
4 inductive contacts, switching function x = NC contact or NO contact	Ixxxx

Analog Outputs

Designs: **Angle-of-rotation transducer (potentiometric):**

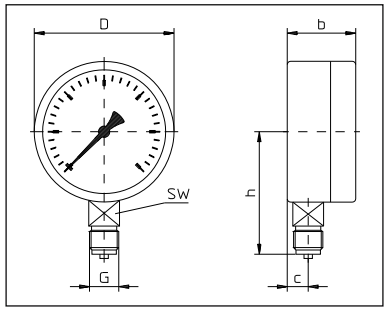
Power supply: 23…30 VDC
Output: 0 (4)...20 mA, 3-wire
Maximum load: 750 ohm at 24 V
Linearity error: ± 0.5%
Electrical connection: cable box
Operating temperature: -25…+80°C

Description	Code
Output signal 0...20 mA	AP0
Output signal 4...20 mA	AP4

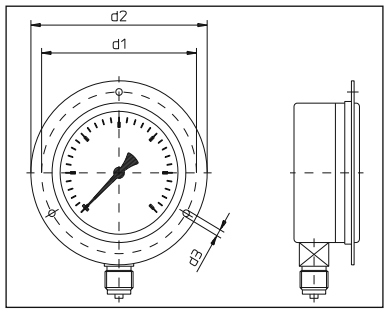
Capacitive angle-of-rotation transducer in 2-, 3-, or 4-wire circuitry available upon request.

Caution: When using supplementary electrical devices, liquid-filled devices must be filled with oil instead of glycerin.

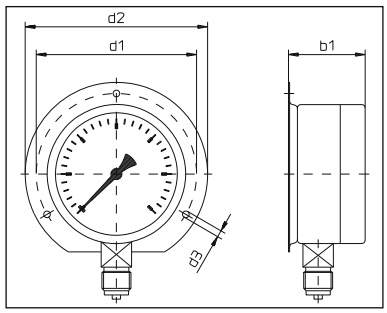
Dimensions:



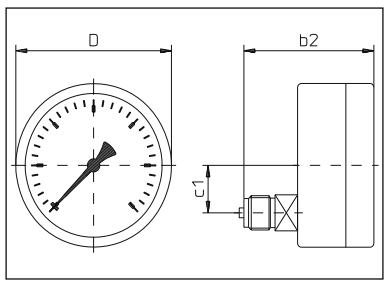
Design A:
Connection at bottom



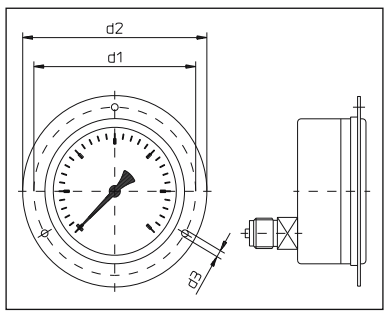
Design B:
Connection at bottom,
rim at front



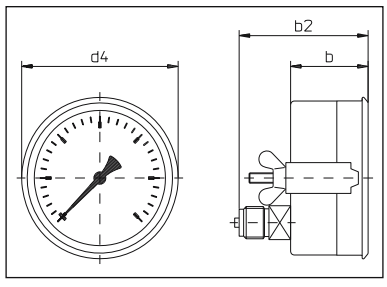
Design C:
Connection at bottom,
rim at back



Design D:
Connection on back



Design E:
Connection on back,
rim at front



Design F:
Connection on back,
Triangular front ring
and retaining clip

Standard version

Measurement:	Dimensions in mm		
	NG 100	NG 160	NG250
b	50	50	55
b1	56	56	61
b2	86.5	88	93
c	15	14.5	16
c1	29	50	50
D	100.8	161.3	251
d1	116	178	271
d2	132	196	285
d3	4.8	5.8	5.8
d4	107	166	---
h	87	118	165
size	22	22	22
weight (kg)	0.5	1.1	2.2

Design with angle-of-rotation transducer

Measurement:	Dimensions in mm		
	NG 100	NG 160	NG250
b	83.5	101	101
b1	90	107.5	124
b2	120	129	139
c	15	14.5	16
c1	29	50	50
D	100.8	161.3	251
d1	116	178	271
d2	132	196	285
d3	4.8	5.8	5.8
d4	105	166	---
h	87	118	165
size	22	22	22
weight (kg)	0.79	1.5	3

PMR06

Precision Pressure Gauge

- Accuracy class 0.6
- Nominal sizes: 160 and 250 mm
- Designs with brass connection and stainless steel housing or completely in stainless steel
- Measuring ranges from –1200...0 mbar up to 0...1600 bar
- With or without liquid filling for vibration dampening
- Fast delivery

Description:

Model series PMR06 precision pressure gauges operate according to the Bourdon tube principle. They can be supplied in brass or stainless steel versions, with filled or unfilled gauges. A coiled, drawn brass or stainless steel tube filled with the fluid or gas being monitored is deformed to an extent depending on the pressure exerted by the fluid or gas. The resulting movement of the coil is transmitted to an indicator mechanism with a graduated display. This movement can be dampened by means of an optionally available liquid filling so that any vibrations have far less impact on the accuracy and stability of the reading. The natural lubricating properties of this liquid filling also reduce wear to moving parts, entry of caustic/corrosive gases and accumulation of condensation. The stainless steel version allows pressure measurement of even the most caustic liquids and gases. These pressure gauges are fitted with a threaded connection at the bottom or on the back.

Applications:

Model series PMR06 precision pressure gauges are used wherever precise pressure measurements have to be performed. For mobile use, designs are available with gauge in a carrying case, including shut-off valve and connection fittings. Stainless steel versions are designed to withstand contact with the very caustic/corrosive media often encountered in the chemical and petrochemical industries, the food and beverage industries, pharmaceutical production processes or in power plants, where they have provided the best service for decades.

Designs:

Nominal size: Housing diameter 160 or 250 mm

Materials:

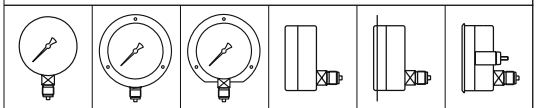
PMR06.x.M: Housing of stainless steel 1.4301, measuring element of copper alloy As of 100 bar, stainless steel, connection of brass

PMR06.x.E: Housing of stainless steel 1.4301, measuring element and connection of stainless steel 1.4571

Process connection: G1/2 or 1/2“ NPT at bottom or on back

Vibration dampening: Optional with glycerin filling

Measuring Ranges:

Measuring range (bar)	Bestellcode					
						
	For all nominal sizes					Not for NG 250
-1200...0 mbar	A17	B17	C17	D17	E17	F17
-1...0	A16	B16	C16	D16	E16	F16
-0.6...+1.0	A18	B18	C18	D18	E18	F18
-1...+0.6	A42	B42	C42	D42	E42	F42
-1...+1.5	A43	B43	C43	D43	E43	F43
-1...+3	A44	B44	C44	D44	E44	F44
-1...+5	A45	B45	C45	D45	E45	F45
-1...+9	A46	B46	C46	D46	E46	F46
-1...+15	A49	B49	C49	D49	E49	F49
0...0.6	A67	B67	C67	D67	E67	F67
0...1	A69	B69	C69	D69	E69	F69
0...1.6	A70	B70	C70	D70	E70	F70
0...2.5	A72	B72	C72	D72	E72	F72
0...4	A73	B73	C73	D73	E73	F73
0...6	A74	B74	C74	D74	E74	F74
0...10	A75	B75	C75	D75	E75	F75
0...16	A76	B76	C76	D76	E76	F76
0...25	A78	B78	C78	D78	E78	F78
0...40	A79	B79	C79	D79	E79	F79
0...60	A80	B80	C80	D80	E80	F80
0...100	A81	B81	C81	D81	E81	F81
0...160	A82	B82	C82	D82	E82	F82
0...250	A84	B84	C84	D84	E84	F84
0...400	A86	B86	C86	D86	E86	F86
0...600	A87	B87	V87	D87	E87	F87
0...1000	A88	B88	C88	D88	E88	F88
0...1600	A89	B89	C89	D89	E89	F89

Model Coding:

Order number: **PMR06. 16. M. 1. 0. A75. 0. 0**

Precision pressure gauge

Design:
16 = 160 mm
25 = 250 mm

Materials:
M = Housing of stainless steel, connection of brass
E = Housing of stainless steel, connection of stainless steel
S = Special materials (please specify in writing)

Process connection:
1 = G 1/2 at bottom
2 = G 1/2 eccentric on back
3 = 1/2“ NPT at bottom
4 = 1/2“ NPT eccentric on back
9 = Custom connection

Vibration dampening:
0 = None
1 = With glycerin filling

Design and measuring ranges:
A17...F89 = see “Measuring Ranges” table

Supplementary electrical devices
0 = None

Options and accessories (more than one may be selected)
0 = None
xx = see “Options and Accessories” table

Technical Details:

Housing: Round gauge housing of stainless steel, d = 160 or 250 mm
Protection type IP45

Liquid-filled design: Glycerin filling, with pressure-relief opening and inside pressure equalization
Protection type IP65

Stainless steel version: with pressure-relief opening (optional for increased safety with solid baffle wall and blow-out back)

Pressure responsive element:

PMR06.xx.M: Bourdon tube, up to 60 bar copper alloy, soft soldered As of 100 bar, stainless steel 1.4571, brazed

PMR06.xx.E: Bourdon tube of stainless steel 1.4571

Indicator element:

PMR06.xx.M: Brass, moving parts of nickel silver

PMR06.xx.E: Stainless steel 1.4571/1.4301

Dial face: Aluminum, white, black characters, as per EN 837-1

Viewing window:

PMR06.xx.M: Instrument glass

PMR06.xx.E: Multilayer safety glass

Accuracy: Class 1.0

Maximum liquid temperature: 60°C, for PMR06.xx.M up to 60 bar, 100°C for all other devices

Overload protection: Short-term 1.3 times

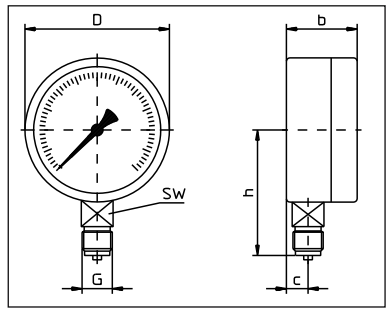
Options and Accessories

Description	Code	For model PMR06...
Design for increased safety (solid baffle wall and blow-out back)	ES	x.E..., unfilled, not for NG 250 only designs A,B
Bright metal bezel	FP	designs B,E,F
Housing suitable for tropical climates	GT	only unfilled devices
Indicator element of stainless steel	ZE	x.M... unfilled
Multiple-scale	SM	all models
Scale labeling	SA	all models
Print plate for creating special scale (single color or multi-colored)	SS1 SSx	all models
Measuring system free of oil and grease for use with oxygen	MO	all models
Measuring system free of silicone	MS	all models
Glycerin filled	FG	all models
Pressure throttling screw in the connection, d = 0.8 or 0.3 mm	D08 D03	all models
Process connection G 1/4 female thread, G 3/8 B,3/8“, Small flange DN10, stainless steel	Px	all models only x.E...
Red graduations on dial face	MR	all models
Red gliding mark pointer in the viewing window	ZR	all models
Maximum pointer, can be reset, 1 or 2	ZS1 ZS2	all models
Adjustable pointer on bushing	ZZ	all models
Can be calibrated as per calibration regulations	E	all models
Test log	P	all models
Factory certificate as per EN-10204, 2.1, 2.2, 2.3, 3.1B	Wxxx	all models
Carrying case with pressure gauge Shut-off angle valve and accessories	TK	only NG 160

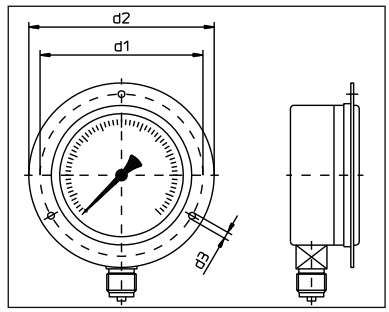
Dimensions:

Measuremet:	Dimensions in mm	
	NG 160	NG250
b	50	55
b1	56	61
b2	88	93
c	14.5	16
c1	50	50
D	161.3	251
d1	178	271
d2	196	285
d3	5.8	5.8
d4	166	---
h	118	165
Size A/F	22	22
Weight (kg)	1.1	2.2

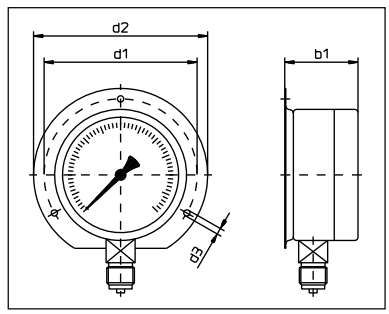
Designs



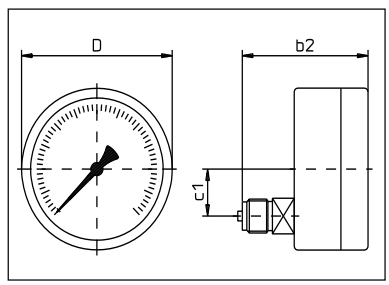
Design A:
Connection at bottom



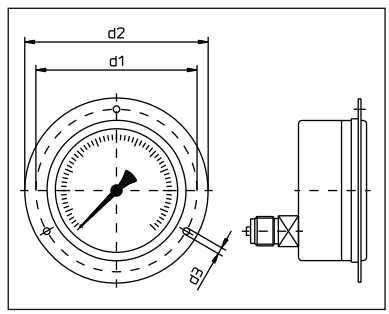
Design B:
Connection at bottom,
rim at front



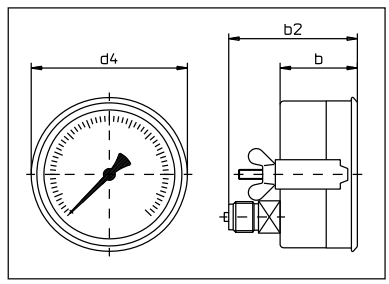
Design C:
Connection at bottom,
rim at back



Design D:
Connection on back



Design E:
Connection on back,
rim at front



Design F:
Connection on back,
Triangular front ring
and retaining clip

Precision Pressure Gauge in Test Case

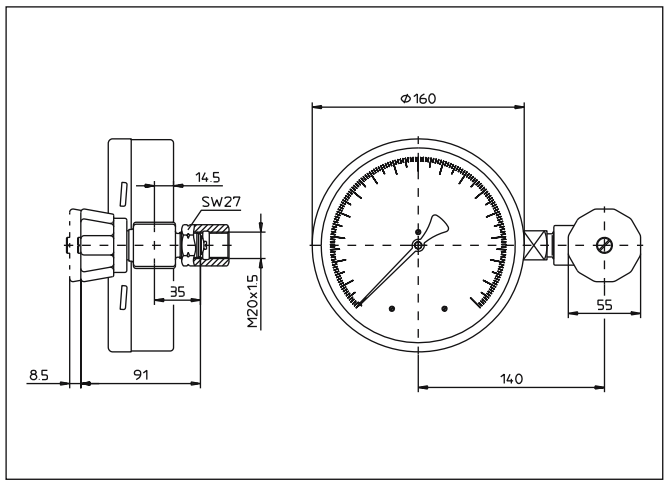
Design ...TK

For mobile use, models PMR06.16, etc.
can be supplied in a carrying case complete with assembly fittings

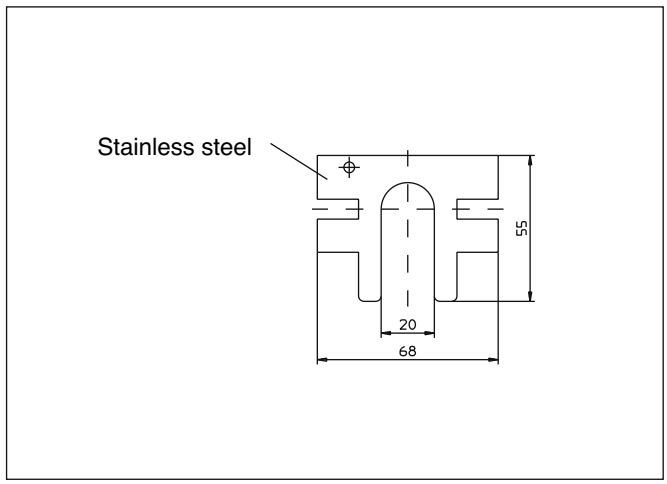
The mounting fittings include:

- Shut-off angle valve
- Socket clamp M20x1.5 - LH /RH as per DIN 16238
- Transition piece with test flange and accessories
- Branched connection for test flange
- Sturdy carrying case
- Test log

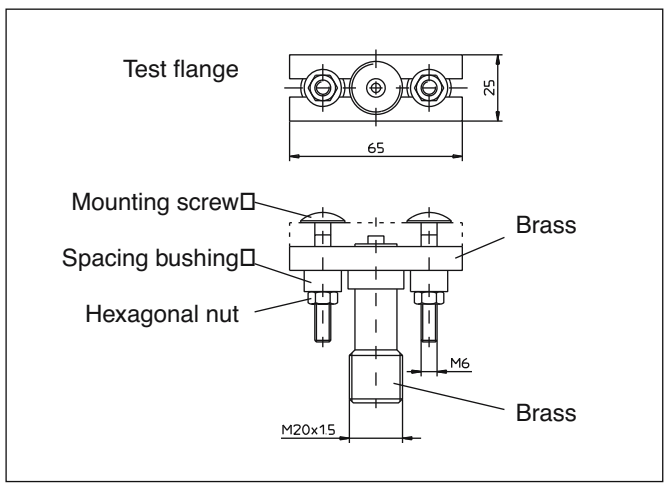
Dimensions



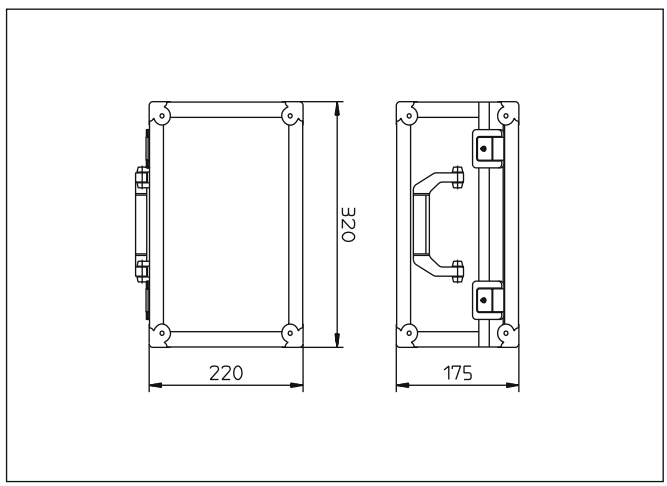
PMR06.16... with shut-off angle valve and socket clamp



Branched connection for test flange



Transition piece with test flange

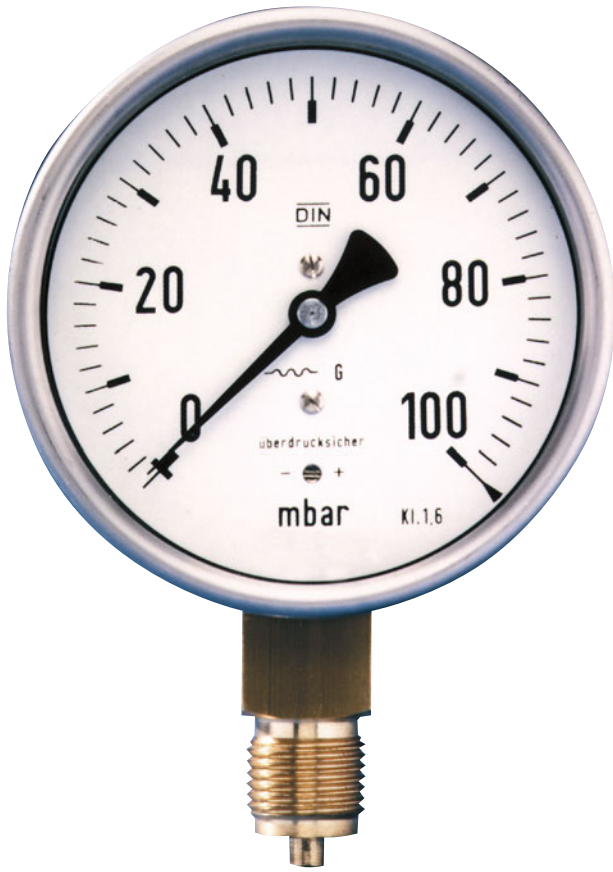


Carrying case

PMK04

Capsule-Element Pressure Gauge

- Accuracy class 1.6
- Millibar ranges
- Corrosion resistant
- Zero-point correction



Description:

PMK04 series capsule-element pressure gauges are intended to measure small negative and positive pressures of gases and fluids. The measuring element in this type of device consists of two welded diaphragm halves which, when pressurized from the inside, operate a pointer mechanism that indicates the pressure on an aluminum scale. These gauges are also available in brass and stainless steel versions. The overload protection of 25 mbar amounts to six times the value of the full scale reading. For larger measuring ranges, the overload protection amounts to ten times the full-scale value. The devices are available in steel housings of nominal sizes 63, 100 or 160 with connections at the bottom of the gauge or centered on the back of the housing. Other designs are available upon request.

Applications:

Capsule element pressure gauges are best suited for measuring very low pressures. All DIN categories are available, in ranges of from between 0 to 6 mbar up to 0 to 600 mbar positive pressure or from -25 to 15 mbar to -400 to 0 mbar negative pressure. Typical applications for these gauges are found in medical technology, air conditioning systems, gas generation or in laboratories. Such applications may include leak testing, filter condition monitoring, exhaust/combustion gas measurements or, with the stainless steel version, monitoring of caustic/corrosive fluids.

Designs with Round Gauge Housing:

Nominal Sizes: Housing diameter 60, 100 or 160 mm

Materials:

PMK04.x.M: Housing of stainless steel 1.4301, measuring element of copper alloy, connection of brass

PMK04.x.E: Housing of stainless steel 1.4301, measuring element and connection of stainless steel 1.4571

Process Connection: G1/4 A (NG63)
G1/2 A (NG100, NG160)

Measuring Ranges:

Mesuring range (mbar)	Order code					
						
	for all nominal sizes					
- 25...+15	A109	B109	C109	D109	E109	F109
- 20...+ 40	A110	B110	C110	D110	E110	F110
- 40...+20	A210	B210	C210	D210	E210	F210
- 6....0	A05	B05	C05	D05	E05	F05
- 10...0	A06	B06	C06	D06	E06	F06
- 16..0	A07	B07	C07	D07	E07	F07
- 25....0	A08	B08	C08	D08	E08	F08
- 40...0	A09	B09	C09	D09	E09	F09
- 60...0	A10	B10	C10	D10	E10	F10
-100..0	A11	B11	C11	D11	E11	F11
-160..0	A12	B12	C12	D12	E12	F12
- 250..0	A13	B13	C13	D13	E13	F13
- 400..0	A14	B14	C14	D14	E14	F14
0...6[1]	A57	B57	C57	D57	E57	F15
0...10[2]	A58	B58	C58	D58	E58	F58
0...16	A59	B59	C59	D59	E59	F59
0...25	A60	B60	C60	D60	E60	F60
0...40	A61	B61	C61	D61	E61	F61
0...60	A62	B62	C62	D62	E62	F62
0...100	A63	B63	C63	D63	E63	F63
0...160	A64	B64	C64	D64	E64	F64
0...250	A65	B65	C65	D65	E65	F65
0...400	A66	B66	C66	D66	E66	F66
0...600	A94	B94	C94	D94	E94	F94

1) in NG 160 only
2) in NG 100 and NG 160 only

Model Coding:

Order number: **PMK04. 10. M. 3. 1. A57. 0**

Capsule-element pressure gauge

Design:
06 = 60 mm
10 = 100 mm
16 = 160 mm
S = Special version

Materials:
M = Stainless steel housing, brass connection
E = Stainless steel housing, stainless steel connection
S = Special material (please specify in writing)

Prozess connection:
1 = G 1/4 A bottom (only for NG63)
2 = G 1/4 A centered on back (only for NG63)
3 = G 1/2 A bottom
4 = G1/2 A centered on back
9 = Custom connection

Vibration dampening:
1 = None
2 = Filled with glycerin (NG100, NG160 only)

Design and measuring ranges:
A109...F94 = see “Measuring Ranges” table

Options and accessories (more than one may be selected)
0 = None
xx = see “Options and Accessories” table

Technical Details:

Housing: Round gauge housing of stainless steel, d = 60, 100, 160 mm
Protection type: IP45

Vibration dampening:

Brass version: glycerin-filled gauge
NG100 and NG160
> 25 mbar, class 2.5

Stainless steel version: glycerin-filled gauge
NG100 and NG160
> 25 mbar, class 2.5 with pressure-relief opening

Measuring element:
PMK04.x.M: capsule-type element of copper alloy
PMK04.x.E: capsule-type element of stainless steel 1.4571, welded

Pointer element:
PMK04.x.M: moving parts of nickel silver
PMK04.x.E: stainless steel 1.4571 / 1.4301

Dial face: white aluminum, black characters, as per EN 837-1

Viewing window:
PMK04.x.M: NG63: plexiglas.
NG100, NG160: instrument glass

PMK04.x.E: NG63: plexiglas
NG100, NG160:
multilayer safety glass

Accuracy: Class 1.6

Maximum liquid temperature: 100°C

Overload capacity: < 25 mbar: 6x full scale value
>/ = 25 mbar: 10x full scale value

Designs with square and profile housing:

Nominal Sizes: Housing diameter
72x72, 96x96, 144x144,
144x172, 192x196

Materials:

PMK04.x.M: Housing of plastic, measuring element of copper alloy, connection of brass

Process connection: G1/2 A

Measuring Ranges:

Measuring range (mbar)	Order code				
					
	for all nominal sizes				
- 25...+15	G109	H109	K109	L109	M109
- 20...+ 40	G110	H110	K110	L110	M110
- 40...+20	G210	H210	K210	L210	M210
- 6....0	-	H05	K05	L05	M05
- 10...0	-	H06	K06	L06	M06
- 16..0	-	H07	K07	L07	M07
- 25....0	G08	H08	K08	L08	M08
- 40...0	G09	H09	K09	L09	M09
- 60...0	G10	H10	K10	L10	M10
-100..0	G11	H11	K11	L11	M11
-160..0	G12	H12	K12	L12	M12
- 250..0	G13	H13	K13	L13	M13
- 400..0	G14	H14	K14	L14	M14
0...6	-	H57	K57	L57	M57
0...10	-	H58	K58	L58	M58
0...16	-	H59	K59	L59	M59
0...25	G60	H60	K60	L60	M60
0...40	G61	H61	K61	L61	M61
0...60	G62	H62	K62	L62	M62
0...100	G63	H63	K63	L63	M63
0...160	G64	H64	K64	L64	M64
0...250	G65	H65	K65	L65	M65
0...400	G66	H66	K66	L66	M66
0...600	G94	H94	K94	L94	M94

Note: all profile housings are available with sideways or vertical scale.

Model Coding:

Order number: **PMK04. | Q07. | M. | 1. | 1. | G12. | 0**

Capsule-type element pressure gauge

Design:
Q07 = 72x72 mm
Q09 = 96x96 mm
Q14 = 144x144 mm
P14 = 144x72 mm
P19 = 192x96 mm

Materials:
M = Plastic housing, brass connection
S = Special material (please specify in writing)

Process connection:
1 = G1/2 A at back

Vibration dampening:
1 = none

Design and measuring ranges:
G109...M94 = see “Measuring Ranges” table

Options and accessories (more than one may be selected)
0 = None
xx = see “Options and Accessories” table

Technical Details:

Housing: Square gauge housing, profile housing of glass-fiber-reinforced plastic
Protection type IP45

Measuring element:
PMK04.x.M: capsule-type element of copper alloy

Pointer element:
PMK04.x.M: moving parts of nickel silver

Dial face: white aluminum, black characters, to EN 837-1

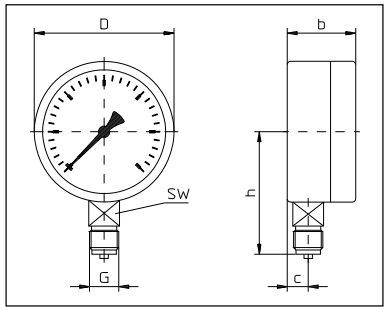
Viewing window:
PMK04.x.M: plastic (Lexan)

Accuracy: Class 1.6

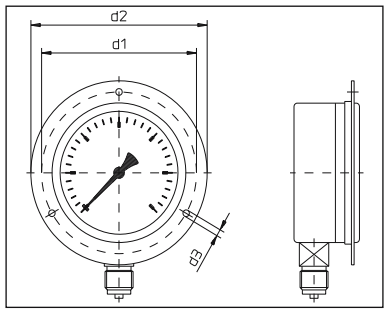
Maximum liquid temperature: 100 °C

Overload capacity: < 25 mbar: 6x full scale value
>/ = 25 mbar: 10x full scale value

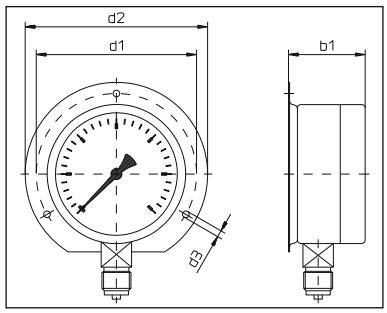
Designs:



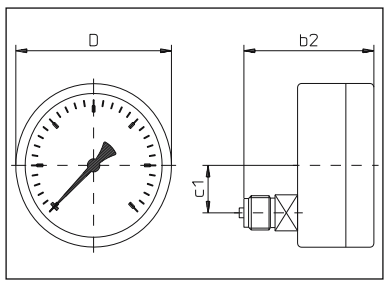
Design A:
Connection at bottom



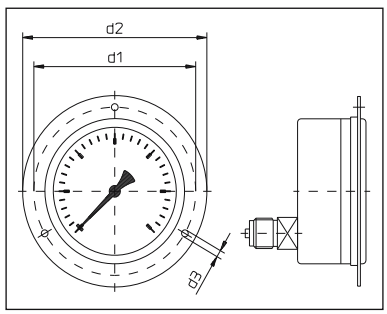
Design B:
Connection on bottom, rim at front



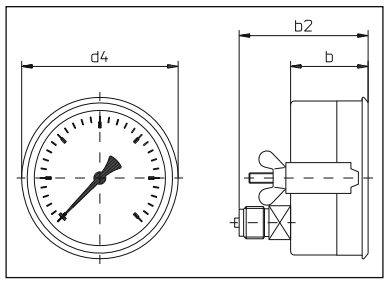
Design C:
Connection on bottom, rim at back



Design D:
Connection on back



Design E:
Connection on back, rim at front



Design F:
Connection on back, triangular front ring and retaining clip

Dimensions of Round Gauge Housing:

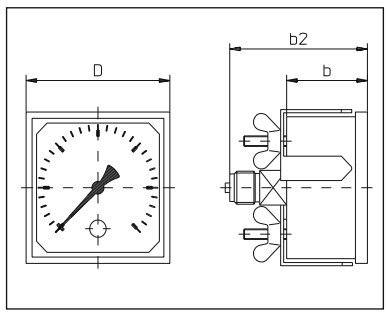
Measure-ment:	Dimensions in mm		
	NG 63 MS/VA	**NG100**	**NG160**
b	42/28.5	50	50
b1	46/46.5	56	56
b2	55/32.5	86.5	88
b5	57	86.5	88
b6	37	50	50
c	11/11	15	14.5
D	64/64	100.8	161.3
d1	75/75	116	178
d2	85/85	132	196
d3	3,5/3,5	4,8	5,8
d4	67/67	107	166
h	84/84	87	118
SW	14/14	22	22
Weight (kg)	0.12/0.12	0.5-0.8*	1.1-1.95*

*weight with glycerin filling

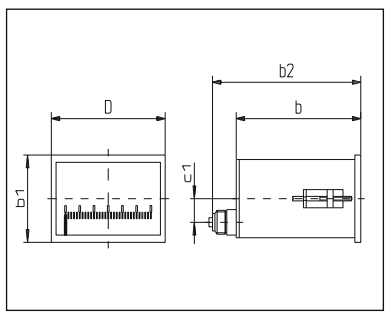
Dimensions of Square and Profile Housing:

Measure-ment:	Dimensions in mm				
	Design G	Design H	Design K	Design L	Design M
b	38	47	47	139.5	139.5
b1	-	-	-	72	96
b2	58	81	81	175	175
D	72	96	144	144	192
c1	-	-	-	7	7

Designs:



Design G-K:
Rectangular housing



Design L-M:
Profile housing

Options and Accessories:

Description	Code	for Type PMK04…
Protected against over/under pressure < / = 25 mbar, 3 times >25 mbar, 10 times	U	All models
Black painted bezel	FS	All MS models except NG 63
Bright metal bezel	FP	All stainless steel (VA) models
Red mark on dial face	MR	All models
Measuring system cleaned for oxygen	MO	All models
Pressure throttling screw in connection shank	D08	All models

PMP04

Diaphragm Pressure Gauge

- For caustic/corrosive, highly viscous, crystallizing fluids
- Unaffected by shocks and vibrations
- High protection against overpressure

Description:

Diaphragm pressure gauges have a thin, circular, dished diaphragm mounted between two flanges. One side of this diaphragm is exposed to the fluid. The deformation of the diaphragm caused by the fluid pressure is transmitted to a pointer element used to indicate pressure on a dial face. Diaphragm pressure gauges are unaffected by shock and vibration and can be optionally supplied with high protection against overpressure. With appropriate diaphragm coatings, these devices can be used under rough/extreme service conditions and with caustic/corrosive fluids.

Applications:

Due to their principle of design, and with the correct selection of materials, diaphragm pressure gauges can be used under the rough/extreme service conditions that occur in industrial production. Their open connecting flanges allow them to even be used with highly viscous, crystallizing and contaminated fluids since their design has no dead spaces (inaccessible areas such as nooks and crannies) that allow the build-up of deposits. Diaphragm pressure gauges are used in many applications in the food and beverage industry as well as in engineering applications, plants, machinery and other equipment.

Designs:

Nominal Sizes: Housing diameter 100, 160 or 250 mm

Materials:

PMP04.x.A: Housing of stainless steel 1.4301, top and bottom flange of aluminum, measuring element of stainless steel 1.4571, connection of brass

PMP04.x.M: Housing of stainless steel 1.4301, top flange of aluminum, bottom flange of stainless steel 1.4571, connection of stainless steel 1.4571

PMP04.x.E: Housing of stainless steel 1.4301 top and bottom flange of stainless steel 1.4571, measuring element, connection of stainless steel

Process connection: G 1/2 (standard) flange connection DN25, DN50, DN64, ANSI

Measuring Ranges:

Measuring range (mbar)	Order code			
				
	for all nominal sizes			
-1200...0	P17	S17	T17	V17
0...10	P58	-	-	-
0...16	P59	-	-	-
0...25	P60	-	-	-
0...40	P61	-	T61	V61
0....60	P62	-	T62	V62
0...100	P63	-	T63	V63
0...160	P64	-	T64	V64
0...250	P65	-	T65	V65
0...400	P66	-	T66	V66
bar				
-1...0	P16	S16	T18	V18
-0,6...+1,0	P18	S18	T19	V19
-1...+0,6	P42	S42	T42	V42
-1...+1,5	P43	S43	T43	V43
-1...+3	P44	S44	T44	V44
-1..+5	P45	S45	T45	V45
-1...+9	P46	S46	T46	V46
-1...+15	P49	S49	T49	V49
-1...+25	P52	S52	T52	V52
0...0,6	P67	S67	T67	V67
0...1	P69	S69	T69	V69
0...1,6	P70	S70	T70	V70
0...2,5	P72	S72	T72	V72
0...4	P73	S73	T73	V73
0...6	P74	S74	T74	V74
0...10	P75	S75	T75	V75
0...16	P76	S76	T76	V76
0...25	P78	S78	T78	V78
0....40	P79	S79	T79	V79

Model Coding:

Order number: **PMP04. 10. A. 1. P67. 0**

Diaphragm Pressure Gauge

Design:
10 = 100 mm
16 = 160 mm
25 = 250 mm

Materials:
A = Top and bottom flange of aluminum, brass connection
M = Top flange of aluminum, bottom flange of VA, connection of VA
E = Top and bottom flange of VA, connection of VA (VA = vanadium stainless steel)

Process connection:
1 = G 1/2, design P
2 = Connecting flange DN25, design V
3 = Connecting flange DN50, design T
4 = Connecting flange DN64, design S
S = ANSI B16.5 150 / 300 lb./sq. in. (upon request)

Measuring range:
P17 to V79 = see “Measuring Ranges” table

Options and accessories (more than one may be selected)
0 = None
xx = see “Options and Accessories” table

Technical Details:

Housing: Round gauge housing of stainless steel, d = 100, 160, 250 mm
Protection type: IP45

Vibration dampening: optional with glycerin-filled gauge

Measuring element: diaphragm of stainless steel 1.4571

Pointer element:
PMP04.x.A: base and cover plate of brass, moving parts of nickel silver
PMP04.x.M: base and cover plate of brass, moving parts of nickel silver
PMP04.x.E: stainless steel 1.4571 / 1.4301

Dial face: white aluminum, black characters to EN 837-3

Viewing window:
PMP04.x.A: Instrument glass
PMP04.x.M: Multilayer safety glass
PMP04.x.E: Multilayer safety glass

Accuracy: Class 1.6

Maximum liquid temperature: 100 °C

Overload protection: 5.0 times full scale value, maximum 40 bar

Dimensions:

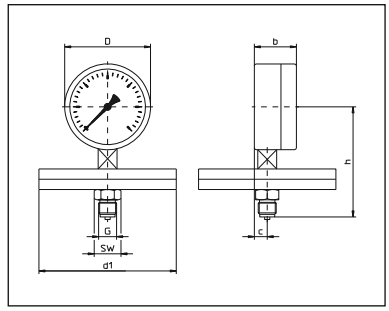
Measurement:	Dimensions in mm NG100, NG160, NG250 G 1/2 / 10 - 400 mbar/ 0.6 to 40 bar
b	50 / 50 / 55
c	15 / 14.5 / 16
D	100.8 / 161.3 / 251
G	G 1/2
h	129.5 / 168 / 209
d1	160 / 100
SW	27
Weight without glycerin filling Weight with glycerin filling	1.1 / 1.6 / 2.8 Kg 1.4 / 2.5 / 5.0 Kg

Measurement:	Dimensions in mm NG100, NG160, NG250 DN64 / 0.6 - 40 bar
D	100.8 / 161.3 / 251
d1	100
d2	82
d3	75
e	1
f	19
G	M8
h	103.5 / 142 / 183
Weight without glycerin filling Weight with glycerin filling	1.3 / 1.8 / 3.0 Kg 1.6 / 2.7 / 5.2 Kg

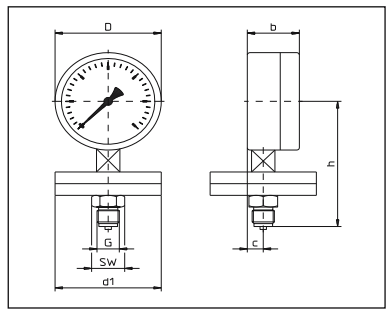
Options and Accessories:

Description	Code	for model PMP04
PTFE lined	PE	all models
Measuring system excess pressure protection 10 times, maximum 40 bar	U	all models
Measuring system vacuum protection , - 1 bar Measuring range > / = 0.6 bar Measuring range < 0.6 bar	A	all models
Indicator with fine graduations and knife edge pointer	ZF	all models
Double-scale dial (e.g. bar/psi)	SD	all models
Pointer element CrNi carbon steel	ZC	all models
Multiple-scale	SM	all models
Measuring system with venting/flushing valve	SH	all models
Print plate for creating specific, custom scale (single color or multicolored)	SS1 SSx	all models
Measuring system free of oil and grease for use for oxygen	MO	all models
Measuring system free of silicone	MS	all models
Glycerin-filled, measuring range < 0.6 bar > / = 0.6 bar	FG FK	all models
Throttling screw in connection, d = 0.8 or 0.3 mm	D08 D03	all models
Process connection 1/2 NPT	Px	all models
Connection shank bored out to 8 mm	AG8	all models
Connection shank bored out to 12 mm	AG12	all models
Maximum temperature of fluid: 200 °C	MB	all models
Red graduations on dial face	MR	all models
Red gliding mark pointer in the viewing window	ZR	all models
Maximum indicator, can be reset, 1 time or 2 time	ZS1 ZS2	all models
Red gliding mark pointer on the dial face	ZR1	all models
Can be calibrated as per calibration regulations	E	all models
Test log	P	all models

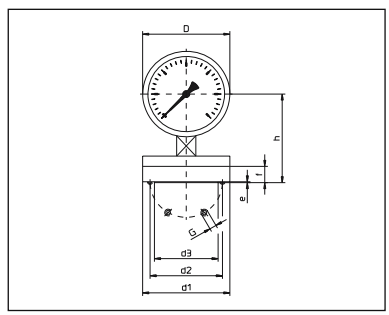
Designs:



Design P:
10 to 400 mbar



Design P:
0.6 to 40 bar

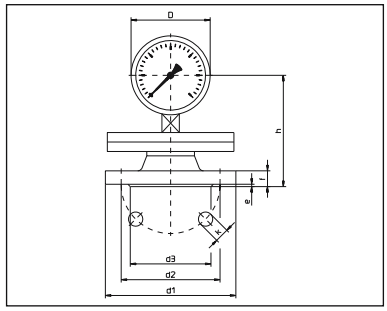


Design S:
0.6 to 40 bar

Dimensions:

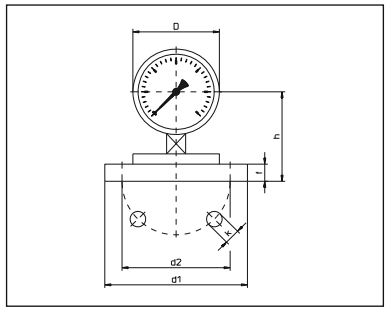
Measurement:	Dimensions in mm NG100 / NG160/ NG250 DN50 / 40 - 400 mbar
D	100.8 / 161.3 / 251
d1	165
d2	125
d3	102
e	3
f	20
h	141 / 179.5 / 220.5
k	18
Weight without glycerin filling Weight with glycerin filling	5.0 / 5.5 / 6.7 Kg 5.3 / 6.4 / 8.9 Kg

Designs:



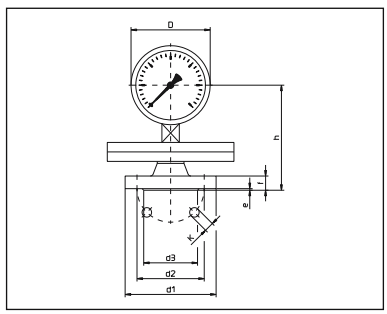
Design T:
40 to 400 mbar

Measurement:	Dimensions in mm NG100 / NG160/ NG250 DN 50/ 0.6 - 40 bar
D	100.8 / 161.3 / 251
d1	165
d2	125
d3	-
e	-
f	20
h	104.5 / 143 / 184
k	18
Weight without glycerin filling Weight with glycerin filling	2.7 / 3.2 / 4.4 Kg 3.0 / 4.2 / 5.6 Kg



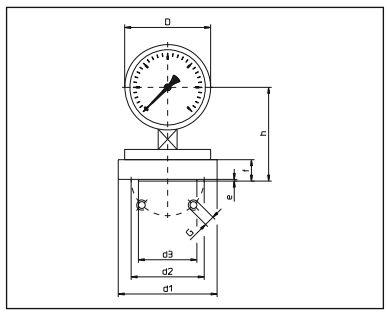
Design T:
0.6 to 40 bar

Measurement:	Dimensions in mm NG100 / NG160/ NG250 DN25 / 40 - 400 mbar
D	100.8 / 161.3 / 251
d1	115
d2	85
d3	68
e	2
f	18
h	133 / 171.5 / 212.5
k	18
Weight without glycerin filling Weight with glycerin filling	3.2 / 5.3 / 6.8 Kg 3.5 / 6.2 / 8.0 Kg



Design V:
40 to 400 mbar

Measurement:	Dimensions in mm NG100 / NG160/ NG250 DN 25/ 0.6 - 40 bar
D	100.8 / 161.3 / 251
d1	115
d2	85
d3	68
e	2
f	25
h	109.5 / 148 / 189
k	-
Weight without glycerin filling Weight with glycerin filling	2.9 / 3.4 / 4.6 Kg 3.1 / 4.3 / 5.7 Kg



Design V:
0.6 to 40 bar

PUM01

Pressure Transmitter for OEM Applications

- **Compact construction**
- **Integrated amplifier**
- **Economical operation**
- **Compatible with a wide range of media**

Description:

Model series PUM01 pressure transmitters are among the finest pressure sensors available. Their economical price makes them particularly suitable for OEM applications. Depending on the pressure range, the PUM01 measures the applied pressure by means of a piezo-resistive cell or a thin-film cell. The combination of these two technologies covers all DIN measuring ranges from 0…1000 bar. The pressure-dependent resistance signal transmitted by these cells is converted by an amplifier to a current signal or voltage signal. The transmitter can be configured to output either a current signal of 4 to 20 mA in two-wire circuitry or a voltage signal of 0 to 10 V in three-wire circuitry. Other output signals are available upon request.

Fields of Application:

PUM01 pressure transmitters are used to measure the pressure of liquid or gaseous media when the process does not need to meet especially high standards of accuracy but must be able to provide good reproducibility. All transmitter parts coming in contact with the pressurized media are made of stainless steel. This construction allows it to be used with a wide variety of media. For media that are particularly difficult to handle (caustic, corrosive), we recommend installing the PUM01 with a diaphragm seal (commercially available models available upon request). PUM01 devices can handle high overloads, are unaffected by corrosion, mechanical vibration, mechanical shock and temperature and have long-term stability. These combined characteristics allow them to be reliably used in numerous industrial applications.

Designs:

PUM01 pressure transmitter

Output signal: possible output signals are: Current signal of 4 to 20 mA in two-wire circuitry or voltage signal of 0 to 10 V in three-wire circuitry

Calibration: If desired, these devices can be calibrated up to a measuring range of from 0 to 10 bar at absolute pressure.

Electrical connection: standard DIN EN 175301-803 plug connector, model A with cable box. Permanently attached connection cable optional, standard length of 1m

Electrical Specifications:

Supply voltage:	10 to 30 VDC with current output 14 to 30 VDC with voltage output
Power consumption, max.:	20 mA
Output:	voltage output load ≥ 5 kOhm current output load ≤ (U-10V) / 0.02A
Interference emission:	as per EN 61326
Noise Immunity:	as per EN 61326
Protection type:	IP65 EN 60 529 / IEC 529
Electrical protection types:	incorrect polarity, overvoltage, and short-circuit protection

Technical Details:

Process connection:	G1/4 B male thread
Parts in contact with media:	stainless steel 1.4571 and 1.4542
Max. pressure:	3.5 times the upper range value with measuring range ≤ 10 bar 2 times the upper range value with measuring range ≤ 600 bar 1.5 times the upper range value with measuring range ≤ 1000 bar Vacuum-proof
Max. media temp.:	-40 to +100°C
Max. ambient temp.:	-30 to +80°C
Max. storage temp.:	-30 to +100°C
Compensated range:	0 to 80°C
Housing:	stainless steel, European standard no. 1.4301
Weight:	approx. 0.15 kg
Accuracy:	class 1.0
Reproducibility:	< +/- 0.2% f. s.
Response time:	≤ 1 ms (between 10% to 90% f.s.)

Ordering Code:

Order number: **PUM01. | 2. | 1. | 2. | R79**

Pressure transmitter for OEM applications

Output signal:
1 = 4 to 20 mA, 2-wire
2 = 0 to 10 V, 3-wire

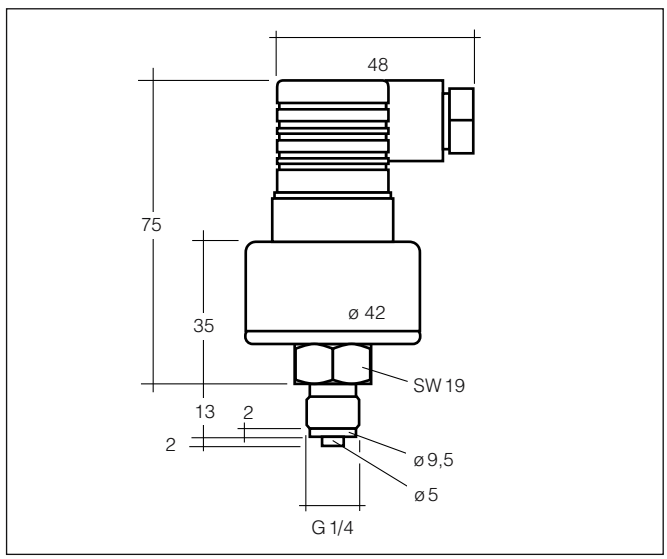
Calibration
1 = Relative pressure
2 = Absolute pressure

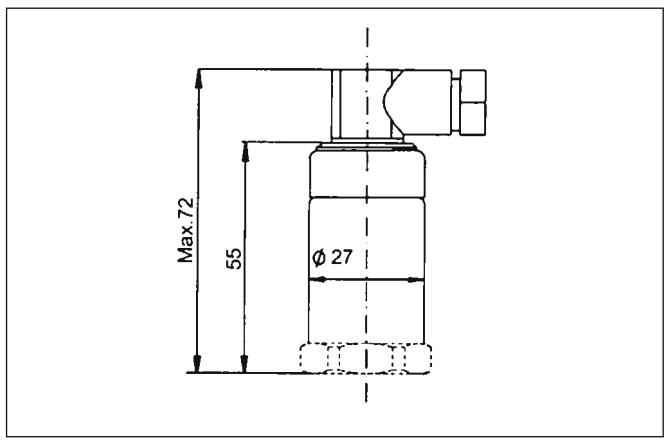
Electrical connection:
1 = Plug connector

Measuring range:

R = relative	A = absolute
R65 = 0 - 0,25 bar*	A69 = 0 - 1 bar
R66 = 0 - 0,4 bar*	A70 = 0 - 1,6 bar
R67 = 0 - 0,6 bar*	A72 = 0 - 2,5 bar
R69 = 0 - 1 bar	A73 = 0 - 4 bar
R70 = 0 - 1,6 bar	A74 = 0 - 6 bar
R72 = 0 - 2,5 bar	A75 = 0 - 10 bar
R73 = 0 - 4 bar	
R74 = 0 - 6 bar	
R75 = 0 - 10 bar	
R76 = 0 - 16 bar	
R78 = 0 - 25 bar	
R79 = 0 - 40 bar	
R80 = 0 - 60 bar	
R81 = 0 - 100 bar	
R82 = 0 - 160 bar	
R84 = 0 - 250 bar	
R86 = 0 - 400 bar	
R87 = 0 - 600 bar	
R88 = 0 - 1000 bar	

*with Hirschmann mini plug connector





PUM02

Pressure Transmitter for General Industrial Applications

- Accuracy class 0.5
- Stainless steel pressure port
- Sturdy, heavy-duty design
- High precision and linearity
- Compatible with a wide range of media
- Adjustable zero-point and measuring range

Description:

Model series PUM02 pressure sensors are high-quality, accurate and reliable transmitters. Depending on the pressure range, the PUM02 measures the applied pressure by means of a piezo-resistive cell or a thin-film cell. The combination of these two technologies covers all DIN measuring ranges from -1/0 bar to 0/2500 bar with consistent accuracy. The pressure-dependent resistance signal transmitted by these cells is converted by an amplifier to a current signal or voltage signal. The transmitter can be configured to output either a current signal of 4 to 20 mA in two-wire circuitry or a voltage signal of 0 to 10 V in three-wire circuitry. Other output signals are available upon request. PUM02 pressure sensors with flush-mounted stainless-steel diaphragms are especially suited for use with sticky or viscous fluids since such media cannot enter the device and damage or clog it. For difficult measuring tasks, such as level measurements with hydrostatic columns, two potentiometers allow the zero-point and the measuring range to be set as required.

Fields of Application:

PUM02 pressure transmitters are used to measure the pressure of liquid or gaseous media. All transmitter parts coming in contact with the pressurized media are made of stainless steel. This construction allows it to be used with a wide variety of media. For media that are particularly difficult to handle (caustic, corrosive, viscous, high-temperature), we recommend fitting the PUM02 with a diaphragm seal (commercially available models available upon request), so that flange connections, milk-pipe threaded fittings or Tri-Clamp connections can be used. The compact design, accuracy and material combination of PUM02 devices allow them to be used in numerous applications such as in the chemical or food industries.

Designs:

PUM02 Pressure Transmitters, Class 0.5

Output signal: possible output signals are: Current signal 4 to 20 mA in two-wire circuitry or voltage signal 0 to 10 V in three-wire circuitry (other outputs available upon request)

Calibration: If desired, these devices can be calibrated from a measuring range of 0 to 0.25 bar up to a measuring range of 0 to 16 bar at absolute pressure.

Electrical connection: standard DIN EN 175301-803 plug connector, model A with cable box. Permanently attached connection cable optional, standard length of 1m

Process connection: If desired, these devices can be supplied with a flush-mounted stainless-steel diaphragm for a measuring range of 0 to 0.1 bar up to a measuring range of 0 to 600 bar. This will be necessary for use with viscous or sticky fluids.

Technical details:

Process connection:	G1/2 B male thread, with flush-mounted G1 B diaphragm for measuring range of 0 to 1.6 bar M16x1.5 female thread for measuring range > 1600 bar
Optional connections:	G1/4,1/4" NPT and 1/2" NPT
Parts in contact with media:	stainless steel 1.4571 and 1.4542 (with flush-mounted diaphragm, 1.4571 only)
Max. pressure:	3.5 times the upper range value for measuring range up to 16 bar 2 times the upper range value for measuring range to 600 bar 1.5 times the upper range value for measuring range > 600 bar 1.2 times the upper range value for measuring range = 1600 bar 1.2 times the upper range value for measuring range = 2500 bar
Max. media temp.:	-30…+100°C
Max. ambient temp.:	-20…+80°C
Max. storage temp.:	-40…+100°C
Compensated range:	0…80°C
Housing:	stainless steel, European standard no. 1.4301
Weight:	approx. 0.2 kg
Accuracy:	class 0.5
Reproducibility:	< ± 0.05% f. s.
Response time:	1 ms (between 10%…90% f. s.)
Adjustability:	zero-point and measuring range up to 10%

Ordering Code:

order number: **PUM02. 2. 1. 2. 1. 1. R78**

Pressure transmitter, class 0.5

Output signal:
1 = 4 to 20 mA, 2-wire
2 = 0 to 10 V, 3-wire

Calibration:
1 = Relative pressure
2 = Absolute pressure

Electrical connection:
1 = Plug connector
2 = Permanently attached connection cable

Process connection:
1 = G1/2 B
2 = G1 B (with flush-mounted diaphragm for measuring range of 0 to 1.6 bar)
3 = M16 x 1.5 female thread (for measuring range > 1600 bar)
4 = Special thread (G1/4, 1/4" NPT, 1/2" NPT)

Design:
1 = Internal diaphragm
2 = Flush-mounted diaphragm

Measuring range:

R = relative	A = absolute
R11 = -0.1 - 0 bar (without flush-mounted diaphragm)	
R12 = -0.16 - 0 bar (without flush-mounted diaphragm)	
R13 = -0.25 - 0 bar	
R14 = -0.4 - 0 bar	
R15 = -0.6 - 0 bar	
R16 = -1 - 0 bar	
R43 = -1 - 1.5 bar	
R45 = -1 - 5 bar	
R63 = 0 - 0.1 bar	
R64 = 0 - 0.16 bar	
R65 = 0 - 0.25 bar	A65 = 0 - 0.25 bar
R66 = 0 - 0.4 bar	A66 = 0 - 0.4 bar
R67 = 0 - 0.6 bar	A67 = 0 - 0.6 bar
R69 = 0 - 1 bar	A69 = 0 - 1 bar
R70 = 0 - 1.6 bar	A70 = 0 - 1.6 bar
R72 = 0 - 2.5 bar	A72 = 0 - 2.5 bar
R73 = 0 - 4 bar	A73 = 0 - 4 bar
R74 = 0 - 6 bar	A74 = 0 - 6 bar
R75 = 0 - 10 bar	A75 = 0 - 10 bar
R76 = 0 - 16 bar	A76 = 0 - 16 bar
R78 = 0 - 25 bar	
R79 = 0 - 40 bar	
R80 = 0 - 60 bar	
R81 = 0 - 100 bar	
R82 = 0 - 160 bar	
R84 = 0 - 250 bar	
R85 = 0 - 315 bar	
R86 = 0 - 400 bar	
R87 = 0 - 600 bar	
R88 = 0 - 1000 bar (without flush-mounted diaphragm)	
R89 = 0 - 1600 bar (without flush-mounted diaphragm)	
R90 = 0 - 2500 bar (without flush-mounted diaphragm)	

Electrical specifications:

Supply voltage:	10 to 30 VDC for current output 14 to 30 VDC for voltage output
Power consumption max.:	20 mA
Output:	voltage output Load >= 5 kOhm Current output Load <= (U-10 V) / 0.02 A
Interference emission:	as per EN 61326
Noise immunity:	as per EN 61326
Protection type:	IP65 EN 60 529/IEC 529
Electrical protection types:	incorrect polarity, overvoltage, and short-circuit protection

PUM03

High-Precision Pressure Transmitter in Stainless Steel

- Accuracy class 0.25
- Measures relative or absolute pressure
- Optional flush-mounted stainless steel diaphragm
- Sturdy, heavy-duty design
- Current or voltage output

Description:

Model series PUM03 pressure sensors have a piezo-resistive sensor element for pressure ranges up to 16 bar. This element very accurately registers changes in pressure through the change in the electrical resistance of the piezo crystal caused by variation in the mechanical force exerted upon it. For higher measuring ranges, thin-film technology is used due to its fast reaction times. This method translates the changes in resistance in an extremely thin strip of expanding film into an output signal that is proportional to the mechanical force exerted upon the film. The combination of these two technologies allows this device to meet all DIN measuring ranges from -1/0 bar to 0/2500 bar with consistent accuracy.

Fields of Application:

The sturdy design of PUM03 pressure transmitters allows accurate measurement of gases and liquids in a process, even under rough service conditions. A stainless-steel diaphragm protects the transmitter measuring system from damage, allowing a great variety of media to be measured as long as they are not highly viscous or crystallizing. If necessary, the pressure transmitter can be fitted with a flush-mounted diaphragm which prevents these kinds of materials from entering the housing and hardening there. The electrical signal at the output can be remotely transmitted or used for direct display. For direct display of readings, we recommend the PKP AZ01 digital display, which can be easily installed between the transmitter and the plug connector. This display does not require a separate power supply.

Designs:

PUM02 Pressure Transmitters, Class 0.25

Output signal: possible output signals are: Current signal 4 to 20 mA in two-wire circuitry or voltage signal 0 to 10 V in three-wire circuitry (other outputs available upon request)

Calibration: If desired, these devices can be calibrated up to a measuring range of 0 to 16 bar at absolute pressure.

Electrical connection: standard DIN EN 175301-803 plug connector, model A with cable box. Permanently attached connection cable optional, standard length of 1m

Process connection: If desired, these devices can be supplied with a flush-mounted stainless-steel diaphragm for a measuring range up to 0 to 600 bar. This will be necessary for use with viscous or sticky fluids.

Electrical specifications:

Supply voltage:	10 to 30 VDC with current output 14 to 30 VDC with voltage output
Power consumption Max.:	20 mA
Output:	voltage output load ≥ 5 kOhm current output load ≤ (U-10V) / 0.02 A
Interference emission:	as per EN 61326
Noise immunity:	as per EN 61326
Protection type:	IP65 EN 60 529 / IEC 529
Electrical protection types:	incorrect polarity, overvoltage, and short-circuit protection

Technical details:

Process connection:	G1/2 B male thread, with flush-mounted G1 B diaphragm for measuring range of 0 to 1.6 bar M16x1.5 female thread for measuring range > 1600 bar
Optional connections:	G1/4,1/4" NPT and 1/2" NPT
Parts in contact with media:	stainless steel 1.4571 and 1.4542 (with flush-mounted diaphragm, 1.4571 only)
Max. pressure:	3.5 times the upper range value for measuring range up to 16 bar 2 times the upper range value for measuring range to 600 bar 1.5 times the upper range value for measuring range > 600 bar 1.2 times the upper range value for measuring range = 1600 bar 1.2 times the upper range value for measuring range = 2500 bar

Ordering Code:

order number: PUM03. 2. 1. 2. 1. 1. R76

Pressure transmitter, class 0.25

Output signal:
1 = 4 to 20 mA, 2-wire
2 = 0 to 10 V, 3-wire

Calibration:
1 = Relative pressure
2 = Absolute pressure

Electrical connection:
1 = Plug connector
2 = Permanently attached connection cable

Process connection:
1 = G1/2 B
2 = G 1 B (with flush-mounted diaphragm for measuring range of 0 to 1.6 bar)
3 = M16 X 1.5 female thread (for measuring range > 1600 bar)
4 = Special thread (G1/4, 1/4" NPT, 1/2" NPT)

Design:
1 = Internal diaphragm
2 = Flush-mounted diaphragm

Measuring range:

R = relative	A = absolute
R13 = -0.25 - 0 bar	
R14 = -0.4 - 0 bar	
R15 = -0.6 - 0 bar	
R16 = -1 - 0 bar	
R43 = -1 - 1.5 bar	
R45 = -1 - 5 bar	
R65 = 0 - 0.25 bar	A65 = 0 - 0.25 bar
R66 = 0 - 0.4 bar	A66 = 0 - 0.4 bar
R67 = 0 - 0.6 bar	A67 = 0 - 0.6 bar
R69 = 0 - 1 bar	A69 = 0 - 1 bar
R70 = 0 - 1.6 bar	A70 = 0 - 1.6 bar
R72 = 0 - 2.5 bar	A72 = 0 - 2.5 bar
R73 = 0 - 4 bar	A73 = 0 - 4 bar
R74 = 0 - 6 bar	A74 = 0 - 6 bar
R75 = 0 - 10 bar	A75 = 0 - 10 bar
R76 = 0 - 16 bar	A76 = 0 - 16 bar
R78 = 0 - 25 bar	
R79 = 0 - 40 bar	
R80 = 0 - 60 bar	
R81 = 0 - 100 bar	
R82 = 0 - 160 bar	
R84 = 0 - 250 bar	
R85 = 0 - 315 bar	
R86 = 0 - 400 bar	
R87 = 0 - 600 bar	
R88 = 0 - 1000 bar (without flush-mounted diaphragm)	
R89 = 0 - 1600 bar (without flush-mounted diaphragm)	
R90 = 0 - 2500 bar (without flush-mounted diaphragm)	

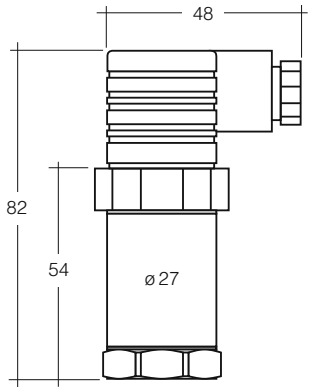
Max. media temp.:	-30…+100°C
Max. ambient temp.:	-20…+80°C
Max. storage temp.:	-40…+100°C
Compensated range:	0 to 80°C
Housing:	stainless steel, European standard no. 1.4301
Weight:	approx. 0.2 kg
Accuracy:	class 0.25
Reproducibility:	< +/- 0.05% f. s.
Response time:	1 ms (between 10%…90% f. s.)
Adjustability:	zero-point and measuring range up to 10%

PUM02/PUM03 – Pressure Transmitters

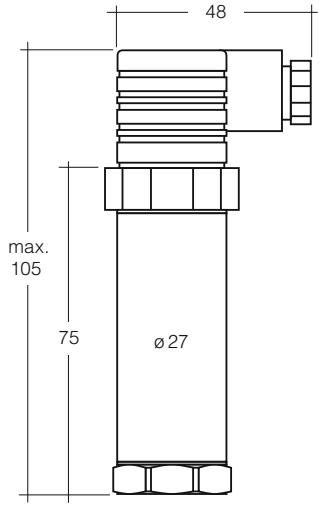
Dimensions

Housing – design with plug connector as per DIN43650

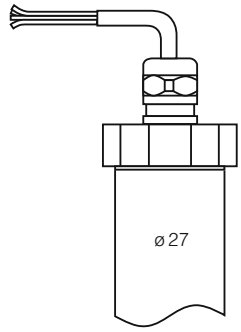
Short design



Long design

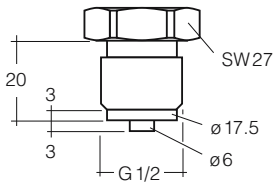


cable outlet

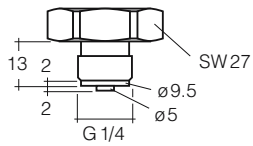


Pressure ports

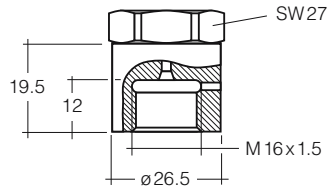
G 1/2B



G 1/4B

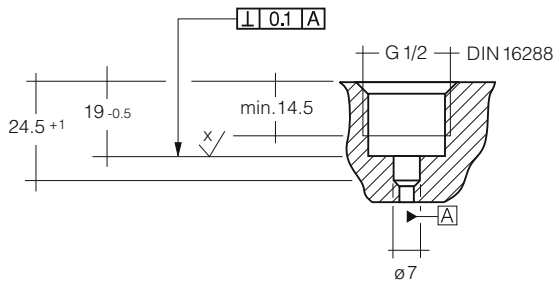


high-pressure threaded connection
M 16x1.5 female

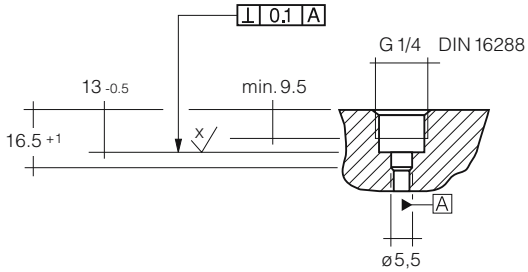


Tapped hole and/or thread adapter as per DIN16288

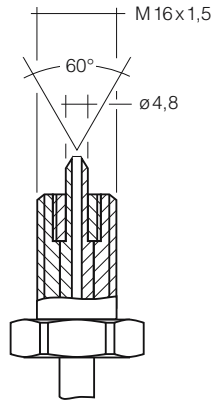
G 1/2



G 1/4



high-pressure threaded connection
M 16x1.5 female



PUM50

OEM
Miniature Pressure Transmitter

- **Compact design**
- **Parts in contact with gas or liquid are made of stainless steel**
- **Measuring ranges: 0...1 / 0...600 bar**
- **Output signals: 4...20 mA / 0...10 V**
- **Accuracy: ± 1% of end value**

Description:

The PU50 miniature pressure transmitter is suitable for use in most general industrial applications, providing long-term, reliable service life. Due to the well-proven technologies and materials used in their construction, these sensors are unaffected by caustic/corrosive vapors and liquids as well as mechanical stress and loads. The pressure port and the measuring cell are welded together, making gaskets or sealants between them unnecessary. The compact design permits their use in confined spaces and in light-weight installations Their technical specifications and economical price also make these sensors ideal for use in OEM applications. Furthermore, these pressure sensors comply with the electromagnetic compatibility (EMC) requirements as per EN 61326

Applications:

PUM50 pressure sensors are suitable for measuring and monitoring almost any liquids or gases.

Typical applications:
– Pneumatics
– Hydraulics
– Pumps and compressors
– Building automation
– Test stands and benches
– General applications in industrial machinery and systems

Models:

Measuring ranges: 0…1 / 0…600 bar

Output signals: 4…20 mA / 0…10 V

Electrical connection: Plug as per DIN EN 175301-803 Form A, Round plug connector, M12x1, 4-pin

Process connection:

Standard: 1/4” BSP parallel fitting

Optional: 1/2” BSP parallel fitting
1/4” NPT, male thread
1/2” NPT, male thread

Technical Specifications:

Sensor element:

0…1 / 0…6 bar: Piezo-resistive

0…10 / 0…600 bar: Thin film

Max. pressure: 2x upper range end value

Temperature range:

Monitored media (liquid, gas): 0…80 °C

Compensated: 0…80 °C

Ambient: 0…80 °C

Storage: -20…80 °C

Materials:

Parts in contact with monitored media (liquid, gas): Stainless steel 1.4534 and 316L

Housing: Stainless steel 316L, PA

Weight: approx. 80 g

Accuracy: ± 1 % of end value (full scale)

Reproducibility: ± 0.1 % of end value (full scale)

Long-term stability: ± 0.2 % of end value (full scale) (under reference conditions)

Electrical Specifications:

Supply voltage: 8…30 VDC (current output)
14…30 VDC (voltage output)

CE conformity:

Noise immunity: EMC Directive 89/336/EEC interference and noise immunity as per EN 61 326 Limit-value class A and B

PED: Pressure Equipment Directive 97/23/EC (module H)

Protection types: protected against reverse polarity, overvoltage and short circuits

with device plug: IP65

with round plug connector: IP67

Response time: = 4 ms (within 10%…90% of measuring range)

Model Coding:

Order Number:	**PUM50.**	**1.**	**1.**	**08G.**	**R75.**	**0**

Miniature Pressure Transmitter OEM design

Output signals:

1 = 4…20 mA, 2-wire
2 = 0…10 V, 3-wire

Electrical connection:

1 = Device plug
2 = Round plug connector, M12x1*

Process connection:

08G = 1/4” BSP parallel fitting (standard)
08N = 1/4” NPT, male thread
15G = 1/2” BSP parallel fitting
15N = 1/2” NPT, male thread

Measuring ranges:

R69 = 0…1 bar
R70 = 0…1.6 bar
R72 = 0…2.5 bar
R73 = 0…4 bar
R74 = 0…6 bar
R75 = 0…10 bar
R76 = 0…16 bar
R78 = 0…25 bar
R79 = 0…40 bar
R80 = 0…60 bar
R81 = 0…100 bar
R82 = 0…160 bar
R84 = 0…250 bar
R86 = 0…400 bar
R87 = 0…600 bar

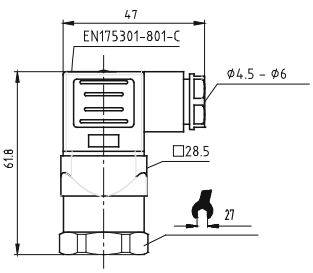
Options:

0 = None
9 = Please specify in writing.

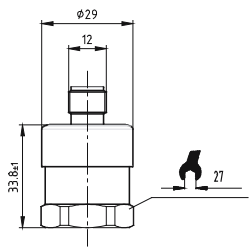
*) matching socket connector not included

Dimensions:

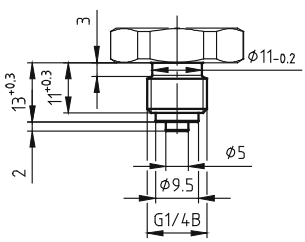
PUM50.x.1…



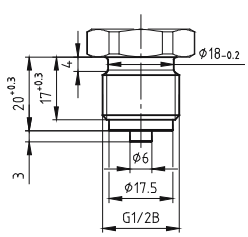
PUM50.x.2…



G1/4



G1/2



TZ04

Dial Thermometer (nitrogen-filled gauge)

- Housing sizes from 63 to 250 mm
- Stainless steel housing
- Available with directly attached sensor or with capillary line
- Temperature sensor and process connection individually configurable
- Measuring ranges: from -200 - +50°C to 0 - 800°C
- Optional alarm contacts or analog output
- Measuring accuracy: accuracy classes 1.6, 1.0 and 0.6

Description:

Model series TZ04 dial thermometers feature a housing with integral gauge mechanism and a sensor system that is either attached directly or by means of a capillary tube. The sensors are filled with neutral nitrogen, which transmits the temperature information. The gauge mechanism reacts to the pressure exerted by the nitrogen in the sensor system, causing corresponding movement of the gauge indicator needle.

Typical Applications:

Because they are available in a variety of designs, TZ04 dial thermometers can be used in almost any kind of application where it is necessary to measure process temperatures by means of a local or remote gauge.
In addition, limit contacts, analog output signals or an optionally available temperature recorder (thermograph) allow the temperature information to be evaluated and upstream or downstream processes to be controlled.

Technical Specifications:

Ausführungen und Werkstoffe: See pages 3-5

Limit contacts and analog outputs: See page 6

Options: See page 6

Max. process pressure:

Without protective sleeve: min. 16 bar
(Depends on temperature, sensor diameter and length)

With protective sleeve: 25 bar
(Special models for higher pressures available upon request)

Min. sensor length: See Table 5, page 5

Different minimum sensor lengths are recommended, depending on the substance being monitored and the sensor diameter. Example:

Sensor diameter: 10 mm

Monitored media (liquid, gas):

Water: L_{min} = 60 mm
Oil: L_{min} = 100 mm
Air: L_{min} = 160 mm

Max. sensor length: 3 m
(Longer lengths available upon request)

Max. length of capillary tube: 40 m

Accuracy:

NG 63, 80: Class 1.6
NG 100, 160, 250: Class 1.0
Optional:
NG 160, 250: Class 0.6

Overload protection: 30% of measured range end value, up to max. 800°C (optional 100%)

Model Coding:

Order no. TZ04. R X. 100 L A 37. 0 0. 9x90 BX1. 0. 0

Dial thermometer

Model (page 3):
R = with directly attached sensor
C = with capillary tube
S = special order

Housing materials: (page 3):
X = stainless steel

Housing diameter (page 3):
63 = 63 mm
80 = 80 mm
100 = 100 mm
160 = 160 mm
250 = 250 mm
xxx = special order; please specify in writing.

Damping (page 3):
X = unfilled (standard)
L = glycerin-filled
S = silicon-oil-filled
K = oil-filled, for devices with integral limit contacts

Version (page 3):
A to H = see Table 1

Measuring range (page 4):
1 to 47 = see Table 2

Capillary tube (page 4):
0 = none
X = see Table 3

Capillary tube jacket (page 4):
0 = ohne
S = see Table 4

Sensor (page 5):
DxL = sensor diameter x sensor length see Table 5

Process connection (page 5):
BX1 to CS3X6 = see Table 6

Electrical output signals (page 6):
0 = ohne
M to TT2 = see Table 7

Options (page 6):
More than one may be selected
0 = none
A to L = see Table 8

Models:

R = Thermometer with directly attached sensor

C = Thermometer with capillary tube

Materials:

X = Housing of stainless steel 1.4301, with bayonet ring, IP-65
Sight glass of mineral glass, 4 mm
Aluminum scale, white with black markings
Aluminum indicator needle, black
Gauge mechanism, brass

Housing diameter

Nominal size: Diameter: 63, 80, 100, 160, 250 mm

Sonderbauformen: (auf Anfrage) square housing
72 x 72, 96 x 96,
144 x 144, 192 x 192,
72 x 144 vertical or horizontal,
96 x 192 vertikal or horizontal
Temperature recorder (thermograph), square:
192 x 192, 288 x 288 mm,
round: d = 260 mm

Damping

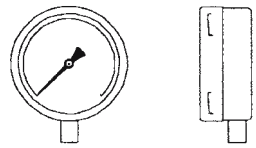
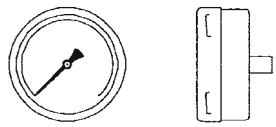
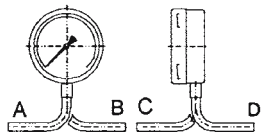
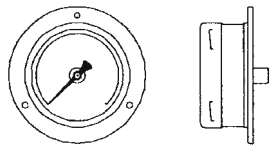
X = unfilled

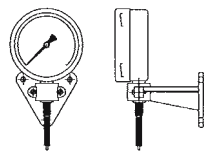
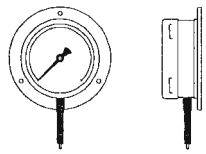
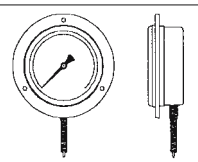
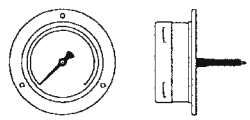
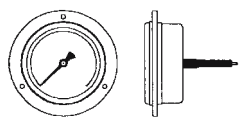
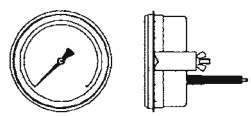
L = filled with glycerin to dampen indicator needle vibrations

S = filled with silicon oil (increased vibration damping)

K = filled with oil (for devices with integral limit contacts)

Version (Table 1):

With directly attached sensor		
	Connection on bottom	**A**
	Connection on back in center	**E**
	Connection on bottom with 90° angle (A to D: direction of 90° angle)	**T**
	Connection on back in center with rim flange	**F**

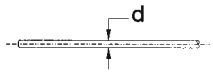
With capillary tube		
	Connection on bottom with wall mounting bracket	**A**
	Connection on bottom with rim flange on back for wall mounting	**B**
	Connection on bottom with rim flange at front for installation in control panel	**D**
	Connection on back in center with rim flange on back	**F**
	Connection on back in center with rim flange at front	**G**
	Connection on back, not centered with three-angle front ring and retainer for installation in control panel	**H**

Measuring ranges (Table 2):

No.	Range in °C	Scale in °C		Comments
		Class 1,0 and 1,6	Class 0,6 (Option)	
1	-200...+50	5	2	Option
2	-120...+40	2	1	Option
3	-110...+50	5	1	Option
4	-100...+100	5	1	Option
5	-100...+50	5	1	Option
6	-80...+40	2	1	Option
7	-60...+40	2	0,5	Option
8	-60...+60	2	1	Option
9	-50...+50	2	0,5	Option
10	-40...+20	1	0,5	Option
11	**-40...+40**	**1**	**0,5**	**Standard**
12	-40...+60	2	0,5	Option
13	-40...+80	2	1	Option
14	40...+110	5	1	Option
15	-40...+120	2	0,5	Option
16	-40...+160	5	1	Option
17	**-30...+30**	**1**	**0,5**	**Standard**
18	-30...+50	1	0,5	Option
19	-30...+70	2	0,5	Option
20	-30...+170	5	1	Option
21	-20...+40	1	0,5	Option
22	-20...+60	1	0,5	Option
23	-20...+80	2	0,5	Option
24	-20...+100	2	1	Option
25	-20...+120	2	1	Option
26	-20...+180	5	1	Option
27	-15...+45	1	0,5	Option
28	-10...+15	0,5	0,2	for sizes 72 x 144 and 96 x 192 only
29	-10...+30	1	0,2	
30	-10...+50	1	0,5	Option
31	-10...+110	2	1	Option
32	-10...+150	5	1	Option
33	0...+25	0,5	0,2	for sizes 72 x 144 and 96 x 192 only
34	0...+40	1	0,2	
35	**0...+60**	**1**	**0,5**	**Standard**
36	0...+80	1	0,5	Option
37	**0...+100**	**2**	**0,5**	**Standard**
38	**0...+120**	**2**	**1**	**Standard**
39	**0...+160**	**5**	**1**	**Standard**
40	0...+200	5	1	Option
41	0...+250	5	2	Option
42	0...+300	5	2	Option
43	0...+400	10	2	Option
44	0...+500	10	5	Option
45	0...+600	10	5	Option
46	0...+700	10	5	Option
47	0...+800	10	5	Option

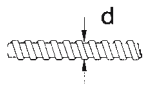
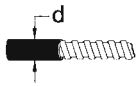
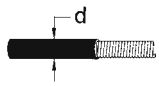
Capillary Tube (Table 3):

only for TZ04.C...

	Material	d (mm)	$T_{min.}$ (°C)	$T_{max.}$ (°C)	Code
	Stainless steel 1.4541	2,5	-260	800	**X**
	Stainless steel with PVC-Coating	4	-60	120	**XP**

Capillary Tube Jacket (Table 4):

only for TZ04.C...

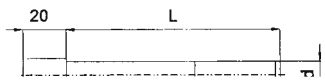
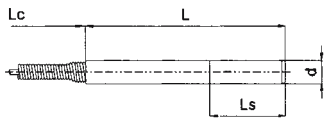
	Material	d (mm)	$T_{min.}$ (°C)	$T_{max.}$ (°C)	Code
	flexible, stainless steel 1.4301	6	-260	800	**S**
	flexible, st. steel 1.4301 with PVC-coating	7,5	-60	120	**SP**
	flexible, stainless steel 1.4401	6	-260	800	**X**
	flexible, st. steel 1.4401 with PVC-coating	7,5	-60	120	**XP**
	Lead jacket	16	-20	200	**PB**

Sensors:

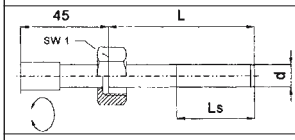
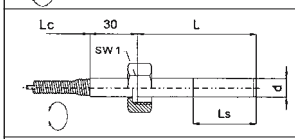
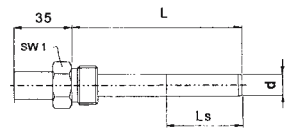
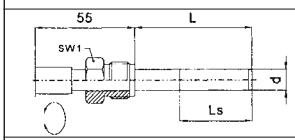
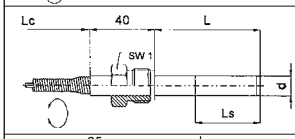
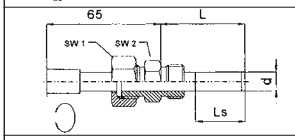
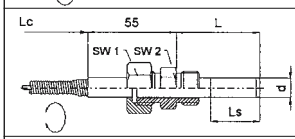
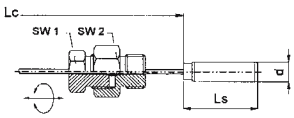
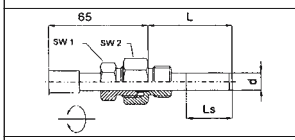
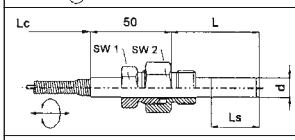
The temperature sensors are all made of stainless steel 1.4541. The minimum sensor length is limited by dimension Ls (see Table 5). This length is the sensitive section of the sensor, which has to be immersed in the gas or liquid being monitored.

When ordering a thermometer, please use the following format to describe it:
Sensor diameter x sensor length (in mm)
Example: 10 x 200

Sensor Dimensions (Table 5):

Possible sensor diameters and minimum sensor lengths L_S (in mm)					
				TZ04.R Sensor directly attached, minimum sensor length: L = Ls	
				TZ04.C With capillary tube, minimum sensor length: L = Ls	
Sensor Diameter (in mm)	**Standard-Thermometer**			**Thermometer with Alarm Contact**	
	TZ04.R Sensor directly attached	**TZ04.C with capillary tube up to 5 m**	**TZ04.C with capillary tube over 5 m**	**TZ04.R Measuring-range >100° C**	**TZ04.C Capillary tube over 5 m**
6	190	190	---	---	---
6.35	155	155	---	---	---
7	125	125	---	---	---
8	90	90	170	170	170
9	68	68	130	130	130
10	55	55	100	100	100
11	45	45	80	80	80
12	35	35	65	65	65
12.5	35	35	60	60	60
13	35	35	65	65	65
14	30	30	50	50	50
15	25	25	45	45	45
16	25	25	40	40	40
18	20	20	35	35	35
20	20	20	31	31	31

Process Connection (Table 6):

	Design	Connection	Material
			Stainless steel 1.4301
	With union nut for TZ04.R and TZ04.C	1/2“ BSP 3/4“ BSP 1“ BSP	BX1 BX2 BX3
			
	With fixed nipple for TZ04.R	1/2“ BSP 3/4“ BSP 1“ BSP 1/2“ NPT 3/4“ NPT 1“ NPT	CX1 CX2 CX3 CX4 CX5 CX6
	With rotating nipple for TZ04.R and TZ04.C	1/2“ BSP 3/4“ BSP 1“ BSP	A04X1 A04X2 A04X3
			
	With double nipple and union nut for TZ04.R and TZ04.C	1/2“ BSP 3/4“ BSP 1“ BSP 1/2“ NPT 3/4“ NPT 1“ NPT	B01X1 B01X2 B01X3 B01X4 B01X5 B01X6
			
	With double nipple and union nut, can be slid on capillary tube for TZ04.C	1/2“ BSP 3/4“ BSP 1“ BSP 1/2“ NPT 3/4“ NPT 1“ NPT	CS2X1 CS2X2 CS2X3 CS2X4 CS2X5 CS2X6
	With double nipple and union nut, can be slid on sensor for TZ04.C	1/2“ BSP 3/4“ BSP 1“ BSP 1/2“ NPT 3/4“ NPT 1“ NPT	CS3X1 CS3X2 CS3X3 CS3X4 CS3X5 CS3X6
			
Additional process connections: Metric thread, hygienic dairy coupling, Tri-Clamp, surface sensor, spiral sensor for air, etc. (available upon request)			

Limit Contacts and Analog Outputs:

Limit contacts are used to signal the overshooting or undershooting of certain temperature thresholds. Model TZ04 thermometers with round housing sizes of 100 and 160 mm or square housings can have up to four integral magnet-spring or inductive contacts fitted in their housings. These contacts will be either of the normally open (N/O) or normally closed (N/C) type (in each case, based on increasing temperature). In addition, microswitches with higher switching ratings, contacts mounted on the housing or pneumatic contacts are also available upon request.

Analog outputs are used to transmit measurement information to higher-level display, evaluation or control systems. In this case, there is a choice between having an integral angle-of-rotation measuring transducer or a PT-100 measuring transducer with a PT-100 sensor integrated in the device sensor.

Models (Table 7)

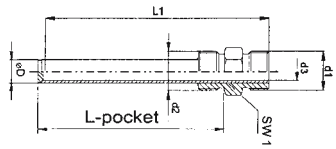
Magnetic-spring contacts (30 W / 50 VA)		
x = 1: Normally open (N/O) x = 2: Normally closed (N/C) x = 3: Changeover switch	For round housing diameters of 100, 160 mm and square housing dimensions of 96x96, 144x144, 72x144 mm	
1 contact	N/C or N/O	**Mx**
2 contacts	N/C, N/O or 2 changeover switches	**Mxx**
3 contacts	N/C or N/O Not for 72x144 housing	**Mxxx**
4 contacts	N/C or N/O Not for 72x144 housing	**Mxxxx**
Inductive contacts as per NAMUR (requires intrinsically safe contact protection relay)		
1 contact	N/C or N/O	**Ix**
2 contacts	N/C, N/O or 2 changeover switches	**Ixx**
3 contacts	N/C or N/O Not for 72x144 housing	**Ixxx**
Analog outputs:		
Angle-of-rotation measuring transducer with 4 to 20 mA, 3-wire output	Diameter 100, 160 mm Dimensions 96x96, 144x144 mm	**RT43**
Angle-of-rotation measuring transducer with 0 to 20 mA, 3-wire output	Diameter 100, 160 mm Dimensions 96x96, 144x144 mm	**RT03**
Angle-of-rotation measuring transducer with 0…100 Ohm, 3-wire output	Diameter 100, 160 mm Dimensions 96x96, 144x144 mm	**R**
PT-100 measuring transducer with 4…20 mA, 2-wire output, including PT-100 element in sensor and cable	Diameter 100, 160 mm Dimensions 96x96, 144x144 mm	**TT2**

Options (Table 8):

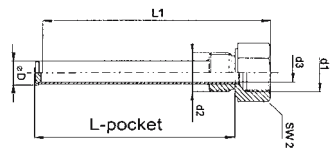
Housing of stainless steel 1.4401 instead of 1.4301	for TZ04…X…	**A**
Sight glass made of safety glass	as of NG 100	**B**
Non-return indicator needle, key reset	for devices without contact	**C**
Non-return indicator needle, key reset	for devices with contact	**D**
Micrometer indicator		**E**
Gauge mechanism and indicator needle made of stainl. steel 1.4301		**F**
Double scale: °C + °F		**G**
Precision measurement model, Class 0.6	only for diametersNG 160, 250, and dimensions 144x144, 192x192, 72x144 mm	**H**
Mirror scale	Only with precision measurement model, only for diameters NG 160, 250	**I**
Polished sensor		**K**
HALAR-coated sensor,	max. 1000 mm, max. 200°C	**L**

Stainless Steel Sensor Protection Sleeves

For sensors with A04, B, C and CS3 connections
Models (Table 9)



TS02...
With male thread on sensor side



TS03...
With female thread on sensor side

Type	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**
max. sensor length	10	10	10	12.5	12.5	12.5
L (mm) (min. length)	100	100	100	63	63	63
Sensor connection d1 (mm)	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
Process connection d2 (mm)	**G 1/2**	**G 3/4**	**G 1**	**G 1/2**	**G 3/4**	**G 1**
Inside diameter d3 (mm)	10.5	10.5	10.5	13	13	13
Outside diameter D (mm)	12.5	12.5	12.5	15	15	15
Wrench size 1 (mm)	22	27	41	22	27	41
Wrench size 2 (mm)	27	32	41	27	32	41

Dimension L1: for sensor connections B, C, CS3: L1 = sensor length
for sensor connection A04: L1 = sensor length + 15

Example: TS02.2.120 Protective sleeve with size 1/2, male thread on sensor side; size 3/4 male thread on process side
length 120 mm,
for sensor diameter of 10 mm

TFK01

Compact Resistance Thermometer

- With angle connector as per DIN EN 175301-803
- Compact design
- Replaceable measuring insert
- Integral transmitter
- Resistance-current and voltage output
- Parts in contact with liquids/gases are made of stainless steel
- -200°C...600°C
- Short response times
- Very easy to service

Description:

The TFK01 features a temperature-dependent electrical resistor integrated in a protective stainless steel tube. The resistance value changes as a function of the liquid temperature. In the model with an integral transmitter, this resistance value is transformed into a current signal (4…20 mA) or a voltage signal (0…10 V). The respective signal is then output at the 5-pin plug connection. In the model with no transmitter, the unconverted resistance value can be picked up directly at the plug connection. For short response times, there is also a version available with a tapered immersion shank. However, the best performance will be obtained when using an angle connector (DIN EN 175301-803).

Typical Applications:

The resistance thermometer and thermocouples (DIN 43650) are very well suited for general use in industrial machinery and systems, plants, tanks and piping as well as in applications in the chemical industry, process engineering and food processing, where they are preferred for measuring the temperatures of liquids and gases. Their compact design make them especially suitable for installation in restricted locations and confined spaces.

Models:

TFK01.xPx: Pt100 output, 2-, 3 or 4-wire
Single or dual element

TFK01.A04: 4…20 mA output, 2-wire

TFK01.V10: 0…10 V output, 3-wire

Technical Specifications:

Sensor: Pt100 as per DIN IEC 75, Class B

Electrical connection: Angle connector (DIN EN 175301-803 Form A), IP65

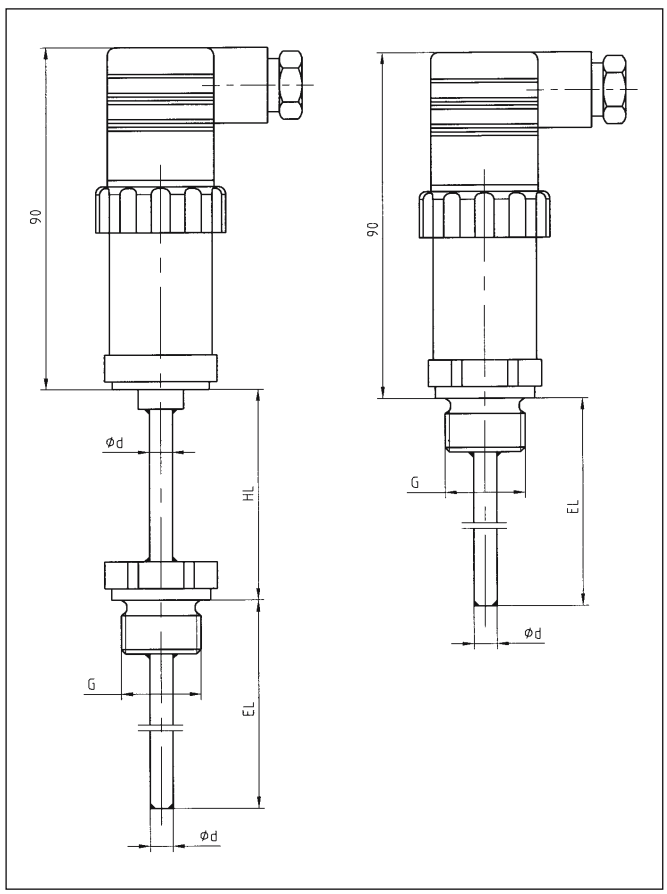
Protective tube:
Diameter: 6 or 8 mm
Materials: Stainless steel 1.4571

Process Connections: Fixed or sliding compression fitting

Max. pressure at 20°C: Diameter of protective tube: 6 mm: 40 bar
Diameter of protective tube: 8 mm: 100 bar

Transmitter: Supply voltage: 12…30 VDC
Output: 4…20 mA, 2-wire
0…10 V, 3-wire
Min. measuring range: 50 Kelvin
Max. measuring range: 800 Kelvin

Dimensions:



Model Coding:

Order Number: TFK01. | 1P2. | 6. | 08F. | 0050. | 200. | 0

Compact Resistance Thermometer

Sensor:
1P2 = 1 x Pt100, 2-wire
1P3 = 1 x Pt100, 3 wire
1P4 = 1 x Pt100, 4 wire
2P2 = 2 x Pt100, 2-wire
A04 = 4-20 mA (please specify measuring range desired)*
V10 = 0-10 V (please specify measuring range desired)*
* preferably 0…50°C, 0…100°C, 0…120°C

Diameter of immersion shank:
6 = 6 mm
8 = 8 mm (not for compression fitting)

Process Connections:
08F = G 1/4 A, fixed
10F = G 3/8 A fixed
15F = G 1/2 A, fixed
2NF = 1/2 NPT fixed
08V = G 1/4, sliding
10V = G 3/8, sliding
15V = G 1/2, sliding
1NV = 1/4" NPT sliding
2NV = 1/2" NPT sliding

Installation length: (from edge of seat)
0050 = 50 mm
0075 = 75 mm
0100 = 100 mm
0160 = 160 mm
0200 = 200 mm
0300 = 300 mm
0400 = 400 mm
0500 = 500 mm
xxxx = as specified by the customer

Temperature range:
200 = - 50…200°C, without protective tube
400 = -200…400°C, with protective tube: 50 mm
600 = -200…600°C, with protective tube
a) without transmitter: 50 mm
b) with transmitter: 100 mm, as well as fixed measuring insert

Options:
0 = None
VR = Tapered protective tube (for description, see “Options” section)

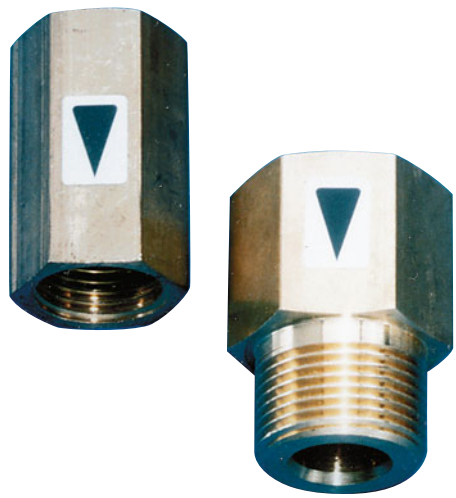
Options:

For faster response times, a protective tube tapered down to 3 mm diameter may be used. This arrangement is only intended for models with fixed threaded connection and a protective tube with a diameter of 6 mm. With installation lengths greater than 100 mm, the device is fitted with a reinforced tube with a diameter of 8 mm.

SB02

Flow Limiter

- **without additional power requirement**
- **saves energy by limiting the flow rate to the actually needed flow**
- **compact design**
- **easy to install**
- **all metal version without plastic internals**
- **materials: brass or stainless steel**



Description

The model SB02 flow limiters are used to limit the flow of water or waterlike media to a fixed value. They make sure that this fixed flow rate stays constant despite varying upstream or downstream pressures. Contrary to the commonly used products of this kind the SB02 limiter do not utilize a plastic membrane as limiting device. Instead the SB02 work with a spring loaded stainless steel variable orifice. Due to the differential pressure across the limiter this variable orifice changes its aperture continously. Through increasing the orifice size with falling pressure or decreasing it with rising pressure the flow rate will always remain constant.

Applications

For water and waterlike media.
Usable in water distribution systems in the industry, in car wash installations, for sanitary applications and in water treatment systems.

Versions:

Process connection:

- 1/2" NPT or G 1/2 female on both sides
- 3/4" NPT or G 3/4 female on both sides
- Input 1/2" NPT or G 1/2 female, output 1/2" NPT or G 1/2 male
- Input 3/4" NPT or G 3/4 female, output 3/4" NPT or G 3/4 male

Materials:

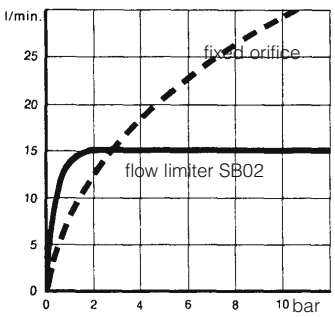
- Housing brass, internals stainless steel
- Housing and internals stainless steel

Flow rates:

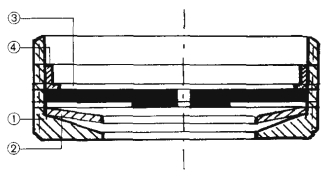
from 0.264-7.925 GPM / 1-30 l/min water in steps of 0.264 GPM / 1 l/min, and 10.5 GPM / 40 l/min

The flow rates are defined by the design of the units and cannot be changed by the user.
By installing several single SB02 in parallel almost all required flow rates may be achieved (see data sheet SB03).

Principle of operation:



The orifice size decreases proportional to the upstream pressure , therefore the flow rate remains constant.



1) housing
2) ring
3) variable orifice
4) fixing ring

Ordering code:

Order number	**SB02.**	**1.**	**1.**	**10.**	**0**

Flow limiter

Process connection:

1 = G 1/2 female on both sides
1N = 1/2" NPT female on both sides
2 = G 3/4 female on both sides
2N = 3/4" NPT female on both sides
3 = Input G 1/2 female, output G 1/2 male
3N = Input 1/2" NPT female, output 1/2" NPT male
4 = Input G 3/4 female, output G 3/4 male
4N = Input 3/4" NPT female, output 3/4" NPT male

Materials:

1 = brass
2 = stainless steel

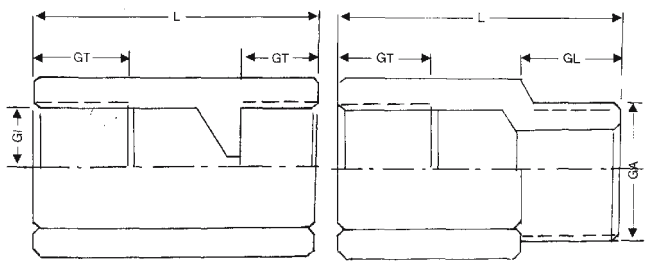
Flow rate:

xx = flow rate in GPM or l/min

Options:

0 = without
1 = please describe

Dimensions:



Model	L	GT	GL	GI	GA	SW
SB02.1	43	14		1/2"		24
SB02.2	45	15		3/4"		30
SB02.3	43	14	14	1/2"	G 1/2	24
SB02.4	45	15	15	3/4"	G 3/4	30

Technical specifications:

min. control pressure: 29 psi / 2 bar
max. differential pressure: 145 psi / 10 bar
max. static pressure: 928 psi / 64 bar
max. temperature: 392 °F / 200 °C
accuracy:
up to 2 l/min ± 15 % from actual flow value
from 3 l/min ± 10 % from actual flow value

SB03

Flow Limiter For Large Flow Rates

- without additional powerrequirements
- saves energy by limiting the flowrate to the actually needed flow
- for pipe diameters (DN 20...DN80)
- with male thread for mouting into existing pipes or complete with flowhousing
- all metal version without plastic internals
- materials: brass or st. steel

Description:

The model SB03 flow limiters are used to limit the flow of water or waterlike media to a fixed value. They make surethat this fixed flow rate stays constant despite varying upstream or downstream pressures. Contrary to the commonly used products of this kind the SB03 limiter do notutilize a plastic membrane as limiting device. Instead the SB03 work with a spring loaded stainless steel variableorifice. Due to the differential pressure across the limiter this variable orifice changes its aperture continously. Through increasing the orifice size with falling pressure or decreasing it with rising pressure the flow rate will always remain constant.

Applications:

For water and waterlike media. Usable in water distribution systems in the industry, in carwash installations, for sanitary applications and in water treatment systems.

Principle of operation

see data sheet SB02

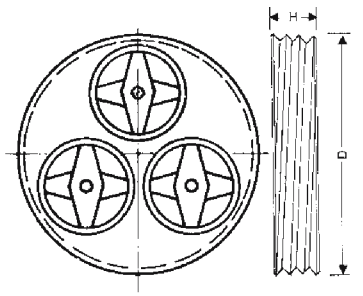
Flow rates

Single limiting elements may be supplied for the following flow rates: 1…30 l/min water. By adding several flow elements onto a common disc nearly all flow rates may be realized.

Versions and dimensions

The SB03 flow limiters are available either as disc with male thread (G) or mounted into a st. steel flow housing

D Disc size (male thread G)	max. no. of limiting elements	flow rate (l/min.)
3/4“	1	1-30
1 1/2“	3	3-90
2“	5	5-150
2 1/2“	9	9-270
3“	13	13-390



H = 12 mm

Ordering code

Order no.	SB03.	1.	50.	100

Flow limiter

Disc material:
1 = Scheibe Messing, Einsätze Edelstahl
2 = Scheibe Edelstahl, Einsätze Edelstahl

Disc outer diameter:
20 = G 3/4
40 = G 1 1/2
50 = G 2
65 = G 2 1/2
80 = G 3

Flow rate:
xxx = in l/min. water

Technische Daten

min. regulating pressure: 2 bar
max. differential pressure: 10 bar
max. static pressure: 16 bar
max. temperature: 100 °C

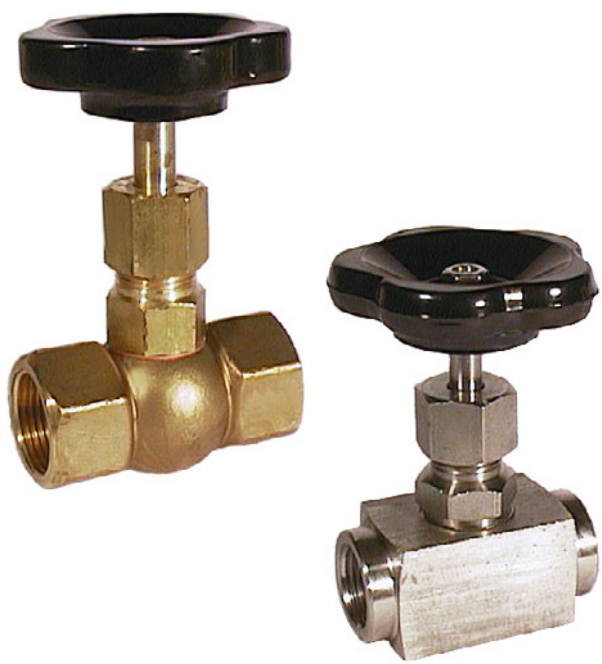
materials:

disc: brass or st. steel 1.4571
insert: st. steel 1.4310
ring: st. steel 1.4310

SNV01

Needle valves made of brass or carbon steel

- **Nominal pressures PN100 and PN 200**
- **Liquid temperatures to 350 °C**
- **Process connection from G 1/8 to G 2**
- **Wetted parts made of brass or carbon steel, plastic or graphite packing**



Description:

PKP needle valves in model series SNV01 accurately regulate the flow of liquids in piping systems.
The devices are designed in two parts, the upper part is screwed into the base and is sealed with plastic or graphite packing.

Applications:

PKP needle valves are designed to shut off, reduce and regulate flowing liquids in industrial plant.
The devices are ideally suited for use as shut-off valves in flow and level measurement applications.

Designs:

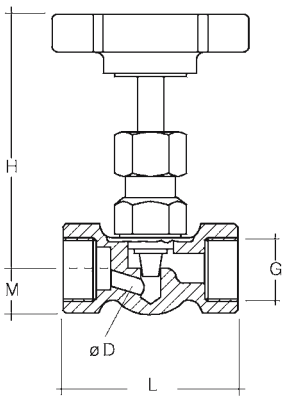
SNV01.G: thread connection G,
to DIN / ISO 228

Nominal pressures:

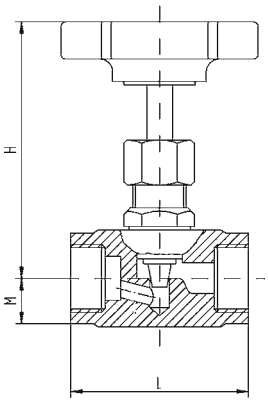
SNV01.x.x.1: PN100 (brass design only)
SNV01.x.x.2: PN200 (carbon steel design only)

Dimension:

PN100, brass



PN200, carbon steel



Process connection	Dimension (mm)		
G	L	H	M
brass, PN100			
1/8“	50	70	12,5
1/4“	50	78	12,5
3/8“	50	78	12,5
1/2“	55	78	14
3/4“	67	90	18
1“	75	95	22,5
11/4“	110	105	30
11/2“	110	110	32,5
2“	110	110	32,5
carbon steel, PN200			
1/8“	50	72	12
1/4“	50	72	12
3/8“	55	72	12
1/2“	60	77	14
3/4“	75	97	17
1“	100	110	22
1 1/4“	110	145	28
1 1/2“	130	145	33
2“	130	145	33

Model Coding:

Order number: **SNV01. | G. | 1. | 1. | 15. | 0**
SNV01 needle valve

Design:
G = G screw thread

Process connection:
1 = female thread on both sides

Material:
1 = brass, PN100
2 = carbon steel, PN200

Nominal pipe size:
06 = 1/8“
08 = 1/4“
10 = 3/8“
15 = 1/2“
20 = 3/4“
25 = 1“
32 = 1 1/4"
40 = 1 1/2"
50 = 2“

Options:
0 = none
9 = custom version, please specify in writing

Technical details:

Materials:

SNV01.G.1.1: brass body
buna N packing
(G 1/8 to G1/2), or
PTFE (G 3/4 to G2)

SNV01.G.1.2: carbon steel body 9 S 20 K
stainless steel stem
1.4104
graphite packing

Max. pressure:

SNV01.G.1.1: 100 bar
SNV01.G.1.2: 200 bar

Max. temperature:

SNV01.G.1.1: 100 °C
SNV01.G.1.2: 350 °C

SNV02

Needle valves made of stainless steel, high-pressure version

- Nominal pressures PN 250 and PN 400
- Liquid temperatures to 250 °C
- For nominal pipe sizes from 1/8“ to 2“
- Process connection G or NPT
- Wetted parts made of stainless steel 1.4571, packing made of PTFE or graphite

Description:

PKP needle valves in model series SNV02 accurately regulate the flow of liquids in piping systems.
The devices are designed in two parts, the upper part is screwed into the base and is sealed with PTFE or graphite packing.

Applications:

A variety of versions are available in stainless steel 1.4571 for nominal sizes 1/8” to 2” G or NPT screw threads, and for two nominal pressures (PN250 or PN400). These device versions can be deployed in a wide range of applications.

Designs:

SNV02.G: thread connection G, to DIN / ISO 228

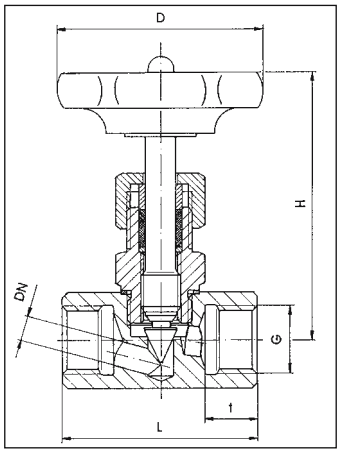
SNV02.N: thread connection NPT, to ANSI / ASME B1.20.1-1983

Nominal pressures:

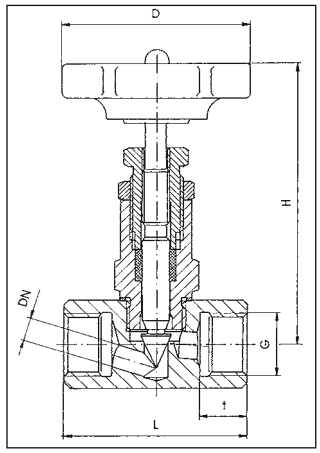
SNV02.x.x.1: PN100 (brass design only)
SNV02.x.x.2: PN200 (carbon steel design only)

Dimension:

PN250



PN400



Process connection	Dimension (mm)			
	L screw thread G	L screw thread NPT	H	D
PN250				
1/8"	45	50	74	50
1/4"	50	55	73	50
3/8"	55	60	72	50
1/2"	60	65	83	63
3/4"	75	80	100	63
1"	100	105	110	80
1 1/4"	120	125	135	100
1 1/2"	130	135	140	100
2"	160	165	150	100
PN400				
1/8"	45	50	94	50
1/4"	50	55	93	50
3/8"	55	60	92	50
1/2"	60	65	96	63
3/4"	75	80	108	63
1"	100	105	123	80

Special versions

- Compression fitting (coupling) to DIN 2353, series S and L
- Clamping tapered ring screw joints
- Non-standard sizes up to 4“
- Maximum pressure version up to 630 bar

upon request

Model Coding:

Order number: **SNV02. | G. | 1. | 1. | 15. | 0**

SNV02 needle valve made of stainless steel

Design:
G = G screw thread
N = NPT screw thread
S = custom connection

Process connection:
1 = female thread at both sides
2 = female/male thread
3 = male thread at both sides

Nominal pressure:
1 = PN250
2 = PN400
9 = custom version

Nominal pipe size:
06 = 1/8“
08 = 1/4“
10 = 3/8“
15 = 1/2“
20 = 3/4“
25 = 1“
32 = 1 1/4“
40 = 1 1/2“
50 = 2“

Options:
0 = none
2 = high-temperature design up to 250 °C
9 = custom version, please specify in writing

Technical details:

Materials:

body: stainless steel 1.4571
packing: standard up to 100°C: PTFE
high-temperature up to 250°C: graphite

Max. pressure: PN 250 / PN 400
as per „Model Coding“

max. temperature: standard: 100 °C
high-temperature: 250 °C

AZ10

Digital Display and Control Unit

- **Dimensions: 96x48 mm**
- **Models for pulse input, standardized signals and temperature sensors**
- **5/6-place, 14 mm high LED display; up to 4 limit switches**
- **Optional analog output**
- **RS-232 or RS-485 interface and Windows-compatible programming software**
- **Power supply: 230 VAC or 24 VDC**
- **Integral sensor power supply**

Description:

The Model AZ10 digital display and control until was developed for use in tough, demanding industrial applications. It is available in three basic models designed for pulse, analog or temperature input signals. It can be easily programmed with the five buttons on the front keypad or by means of optional Windows software. The AZ10 accepts up to three interface cards for limit contacts, analog output or serial interfaces. If necessary, these cards can be added later.

Typical Applications:

Its great variety of input and output configurations, easy programmability and heavy-duty design make the AZ10 suitable for a vast range of industrial or laboratory applications.

Models:

AZ10.I: **Counter and Tachometer**
LED display: 6-place, 14 mm high

Inputs:
2 independent counter inputs; 1 tachometer, programmable for input A or B
1 internal counter, programmable A+B, A-B or along with serial interface for alphanumeric display of short texts
1, 2 or 4 phase discriminator(s)

Input signals:
NPN, PNP, TTL, floating contacts, setting by means of DIP switch Maximum input frequency dependent on counting mode: up to 34 kHz
3 programmable control inputs, NPN or PNP switching

Output signals:
Pulse output, NPN open collector, freely scala ble Sensor supply, 12 VDC, 100 mA max., short-circuit proof

Power supply:
85…250 VAC, 50/60 Hz, 18 VA or
11…36 VDC, 18 W / 24 VAC, 15 VA

AZ10.P: **Display for standard signals**
LED display: 5-place, 14 mm high
Freely programmable
Counter, freely programmable
16-point linearization

Inputs:
1 input for analog signals 0 (4)…20 mA or 0…10 V
3 programmable control inputs, NPN or PNP switching

Output signals:
Sensor supply, 24 VDC, 50 mA max.

Power supply:
85…250 VAC, 50/60 Hz, 15 VA or
11…36 VDC, 11 W / 24 VAC, 15 VA

AZ10.T: **Display for temperature sensors**
LED display: 5-place, 14 mm high
Freely programmable for thermocouples PT-100, resistance thermometer
16-point linearization

Inputs:
1 input for a thermocouple or PT-100
3 programmable control inputs, NPN or PNP switching

Output signals:
Sensor supply, 24 VDC, 50 mA max.

Power supply:
85…250 VAC, 50/60 Hz, 15 VA or
11…36 VDC, 11 W / 24 VAC, 15 VA

Options

Model series AZ10 devices can be fitted with up three different output cards.
The cards can be simply inserted into the available slots and programmed by means of the front keypad or the optional Windows software. If necessary, these cards can be added later by the customer.

Limit switches:
4 different output cards are available for programming limit switches:

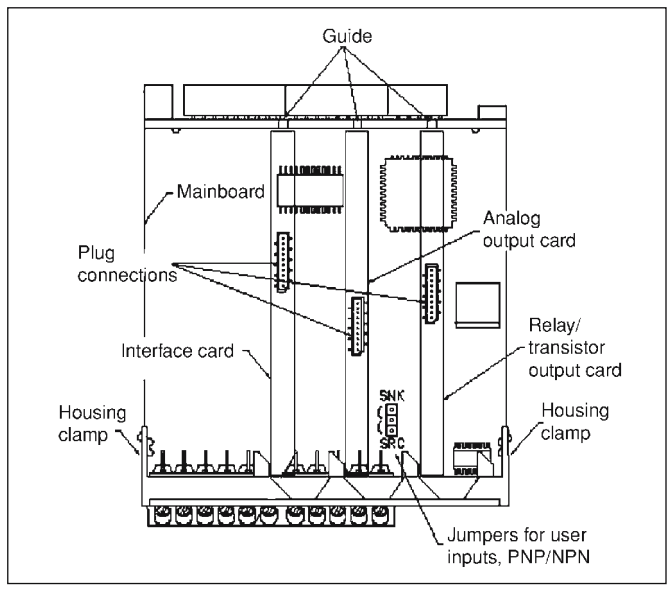
K2R:	2 relay outputs, changeover contact, max. 5 A at 230 VAC
K4R:	4 relay outputs, NO contact, max. 3 A at 250 VAC
K4TN:	4 transistor switching outputs, NPN open collector, max. 100 mA
K4TP:	4 transistor switching outputs, PNP open collector, max. 100 mA with external power supply

Analog output:

A:	Analog output, freely programmable, 0(4)…20 mA, 0…10 V, scalable, max. load 500 ohm

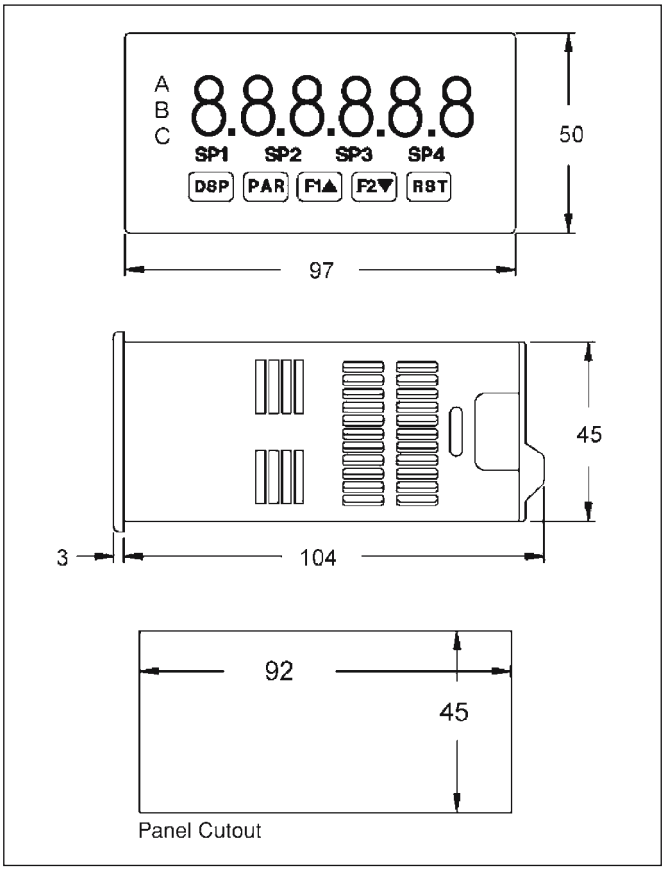
Interfaces:

RS2:	RS-232 interface, half duplex, programmable, max. 32 devices per loop
RS4:	RS-485 interface, multipoint, programmable, max. 32 devices per loop
RPB:	Profibus DP interface

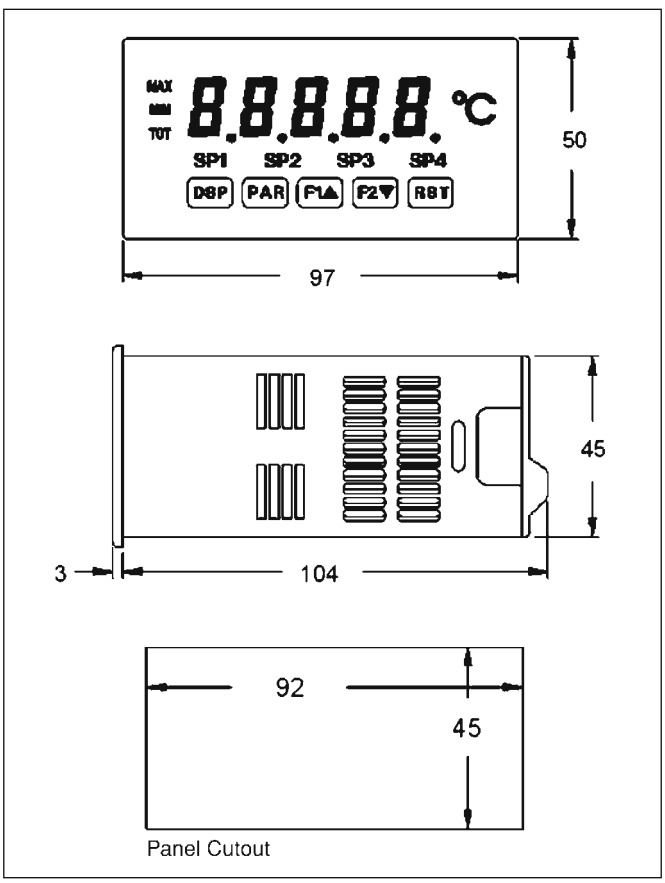


Dimensions:

AZ10.I: Front View, Dimensions and Panel Cutout



AZ10.P / T: Front View, Dimensions and Panel Cutout



Model Coding:

Order Number **AZ10. | P. | 1. | K2R. | RLC**

Digital Display and Control Unit

Model:
I = for pulse inputs
P = for analog outputs
T = for temperature sensors

Power supply:
1 = 85 to 250 VAC
2 = 11 to 36 VDC / 24 VAC

Interface cards:
(up to three different cards may be selected)
K2R = 2 relay outputs, changeover contact
K4R = 4 relay outputs, NO contact
K4TN = 4 transistor switching outputs, NPN OC
K4TP = 4 transistor switching outputs, PNP OC
A = Analog output
RS2 = RS-232 interface
RS4 = RS-485 interface
RPB = Profibus DP interface

Options:
(more than one may be selected)

IP =	IP-65 housing
E =	Reference sheets for AZ10.P/T
RLC =	RLCPro programming software
KIT =	Starter kit consisting of RLCPro software, RS-232 interface card and connection cable

Options

IP-65 housing:
A rugged sheet metal housing is available for model series AZ10. This housing provides protection against intrusion of water and dust (protection type IP 65). The housing can be used on a table top or be installed alongside other equipment. The mounting bracket required is supplied with the housing.
The rear panel of the housing can be removed to gain access to electrical connections. To ensure that the stated protection type is maintained, any leads installed must be routed through appropriate cable fittings (not included).
Dimensions (WxHxD): 140 x 83 120 mm

Reference sheets for AZ10.P/T:
Printed reference sheets listing common units used in process technology, intended to be stored behind the front cover, are available for the AZ10.P or AZ10.T.