FISCHER MESS- UND REGELTECHNIK

Data Sheet

DA03 | Differential pressure - Measuring device
Pressure levels PN40/PN100

The differential pressure - measuring device DA03 serves the direct display of differential pressures and can be equipped with the following additional equipment:

- Contacts in sliding and magnetic spring switches
- Inductive contacts acc. to NAMUR
- electrical angular position transducer

Important features

- highly corrosion resistant
- sturdy, wear-free measuring unit
- resistant to dirt
- rinsable pressure chambers

Application scopes

- Chemical, petrochemical industry
- Process engineering
- Marine and offshore technology
- Power plant technology

Design and mode of operation

The pressures that are to be compared are each exerted onto a measuring membrane that can be rigidly connected to each other using a connection rod.

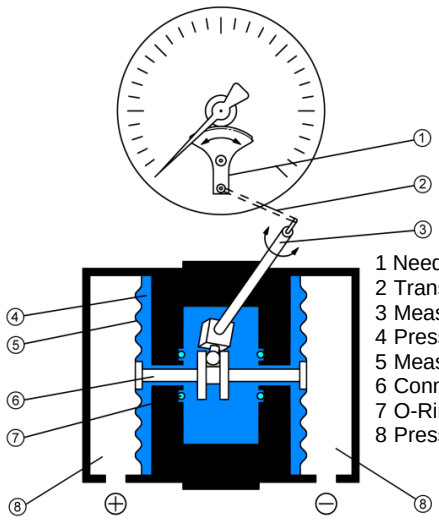
To compensate the static pressure, the space between the measuring membranes is filled with a pressure transfer fluid.

If the pressure equalised, both measuring membranes are in their idle positions. In case of pressure difference, the force acting on the measuring membrane causes it to be moved towards the side of the lower pressure.

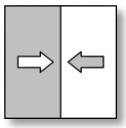
The movement of the measuring membranes is transferred via a connecting rod to a transfer lever mounted to the measuring shaft. Proportional to the current differential pressure, the measuring shaft rotates and this is transferred to a rotational angle of between 0 and 270° via the needle mechanism.

In the case of one-sided pressure by the measuring system above and beyond the measuring range, the over-pressure guard will be activated. The over-pressure causes the overloaded membrane and its band to be pressed against the inner O-ring. This creates two separate pressure spaces between the measuring membranes that need to be filled with fluid. In the adjacent pressure space, a corresponding over-pressure is created. The measuring membrane is supported by the contained transfer fluid. In this way the measuring membranes compensate the forces acting upon them.

Functional Schematic



1 Needle mechanism
2 Transfer lever
3 Measuring shaft
4 Pressure transfer fluid
5 Measuring membranes
6 Connection rod
7 O-Ring; over-pressure guard
8 Pressure chamber



09005393 DB_EN_DA03_GK_HL Rev.A 05/12

Technical data

Technical design	Nominal pressure[1]	Measuring cell	Application information
DA03 G…	PN40	Ø75 (small)	Measuring ranges: 0…0.6 mbar to 0…25 bar Allowed ambient temperature -20 °C … +80 °C Remote seals: It is possible to attach remote seals for measuring ranges ≥ 0.6 mbar. The remote seals need to be designed for the displacement volume, the length of the cable and the application temperature.
DA03 K…	PN100	Ø75 (small)	Measuring ranges: 0…0.6 mbar to 0…25 bar Allowed ambient temperature -20 °C … +80 °C Remote seals: It is possible to attach remote seals for measuring ranges ≥ 0.6 bar. The remote seals need to be designed for the displacement volume, the length of the cable and the application temperature.
DA03 H…	PN40	Ø130 (large)	Measuring ranges: 0…40 mbar to 0…400 mbar Allowed ambient temperature -20 °C … +80 °C Limitations: Trailing needle measuring ranges ≥ 60 mbar Contacts / transmitter measuring ranges ≥ 100 mbar Remote seals: It is possible to attach remote seals for measuring ranges ≥ 160 mbar. The remote seals need to be designed for the displacement volume, the length of the cable and the application temperature.
DA03 L…	PN100	Ø130 (large)	Measuring ranges: 0…40 mbar to 0…400 mbar Allowed ambient temperature -20 °C … +80 °C Limitations: Trailing needle measuring ranges ≥ 60 mbar Contacts / transmitter measuring ranges ≥ 100 mbar Remote seals: It is possible to attach remote seals for measuring ranges ≥ 160 mbar. The remote seals need to be designed for the displacement volume, the length of the cable and the application temperature.

	General points
Rated pressure of the measuring system	Max. static operating pressure
Measuring accuracy	±1.6 % of the measuring range
Overload capability	on-sided over-pressure-proof up to the rated pressure of the measuring system resistance to under-pressure on the (+) and (-) side
Zero-point adjustment	±25 % of the measuring range (can be access through the upper opening in the display housing)
Admissible ambient temperature	-20 °C … +80 °C
Admissible media temperature	max. 100 °C
Admissible storage temperature	
Temperature sensor	approx. 0.3% / 10 °C
Measured Value Display	Round housing NG100 or NG160
Pressure chambers	smooth walls without undercuts; flat measuring membranes
Enclosure protection class	IP65 as per DIN EN 60529
	Connections
Process connection	Flange connection based on DIN EN 61518 with internal thread G½ various connection ports; cutting ring screw connections (see order code)
Purge and venting connection	Inner thread G⅛ per pressure cap; closed with a sealing plug

[1] Rated pressure of the measuring system

	Materials
Design of the measuring system	**Code R**
Pressure caps (contact with the medium)	CrNi-steel 1.4404 (AISI 316L)
Measuring membranes (contact with the medium)	Measuring ranges ≤ 400 mbar : CrNi-steel 1.4571 (AISI 316Ti) Measuring ranges ≥ 0.6 bar : NiCrCo alloy. DURATHERM®
Design of the measuring system	**Code H**
Pressure caps (contact with the medium)	Hastelloy® C276
Measuring membranes (contact with the medium)	Measuring ranges ≤ 2.5 bar : Hastelloy® C276 Measuring ranges ≥ 4 bar : Standard membrane with separator film Hastelloy® C276 The model with the separator foil is not suitable for underpressure.
Design of the measuring system	**Code G**
Pressure caps (contact with the medium)	CrNi-steel 1.4404 (AISI 316L)
Measuring membranes (contact with the medium)	Measuring ranges ≤ 2.5 bar : Hastelloy® C276 Measuring ranges ≥ 4 bar : Standard membrane with separator film Hastelloy® C276 The model with the separator foil is not suitable for underpressure.
Intermediate plate	AlMgSiPb HART-COAT®
Needle mechanism and housing	CrNi-steel 1.4301 (AISI 304)
Window	Safety laminated glass
Dial face and needle	aluminium
Gaskets	Viton® O-rings
	Additional Attachments
Additional electrical attachments	Limit signal transmitters (mechanical sliding, snap action or inductive contacts) and capacitive angular position transducers with output signal can be built into a housing augmented by a corresponding bayonet ring connector.[2] The measuring deviation increases by ±0.5% per contact due to the operation and switching of the contacts.
Fluid charging	If there are built-in contacts with silicone oil, the housing can be filled with glycerine if the meter is to operate under aggravated operating conditions such as vibrations and extreme pressure fluctuations, or in order to avoid condensate formation if used out of doors.
Marker needle	Adjustable needle in the window for noting the limit values
Trailing needle	The trailing needle is "dragged" by the measuring value needle. As there is no fixed connection between the two needles, one-off maximum values are stored. The trailing needle can be reset using an adjusting dial in the window. Trailing needles cannot be used in connection with contacts.
Shut-off fitting	3-spindle valve block made of 1.4571, PN 100, DN 5, can be directly flanged Functions: Shut-off, pressure compensation (Type DZ35)
on request	PTFE-coated seals (medium-compatibility) Special scales; housing made of 1.4571
	Assembly
Wall mounting	**Code W**
	by means of a wall assembly plate attached to the reverse
Pipe mounting	**Code R**
	by means of a pipe assembly test for attachment to vertical or horizontal 2"-pipes
Direct panel mounting	**Code T**
	Owing to the relatively heavy weight, only small measuring cells are suitable for directly mounting to the panel: Measuring ranges ≥ 0.6 bar, measuring value display NG100 and NG160, without contact or transmitter fittings.
Panel mounting with front ring	**Code G**
	All variants can be mounted to the panel using a supporting construction provided by the customer and a front ring set.

[2] See data sheet KE

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Small measuring cell Ø75

Measuring ranges	Measured Value Display	Magnetic spring contacts			Inductive contacts		Capacitive angular position transducers	Trailing needle	Marker needle	Remote seal displacement volume 7.5 cm^2	Pressure levels
		1	2	3	1	2				Fischer	
0…40 mbar											
0…60 mbar											
0…100 mbar											
0…160 mbar											
0…250 mbar											
0…400 mbar											
-40…60 mbar											
-60…100 mbar											
-100…250 mbar											
0…0.6 bar	•	•	•	•	•	•	•	•	•	•	PN100 / PN40
0…1.0 bar	•	•	•	•	•	•	•	•	•	•	
0…1.6 bar	•	•	•	•	•	•	•	•	•	•	
0…2.5 bar	•	•	•	•	•	•	•	•	•	•	
0…4.0 bar	•	•	•	•	•	•	•	•	•	•	
0…6.0 bar	•	•	•	•	•	•	•	•	•	•	
0…10 bar	•	•	•	•	•	•	•	•	•	•	
0…16 bar	•	•	•	•	•	•	•	•	•	•	
0…25 bar	•	•	•	•	•	•	•	•	•	•	
-1…0.6 bar	•	•	•	•	•	•	•	•	•	•	
-1…1.5 bar	•	•	•	•	•	•	•	•	•	•	
-1…3 bar	•	•	•	•	•	•	•	•	•	•	
-1…5 bar	•	•	•	•	•	•	•	•	•	•	

Size of the measuring cell Ø130

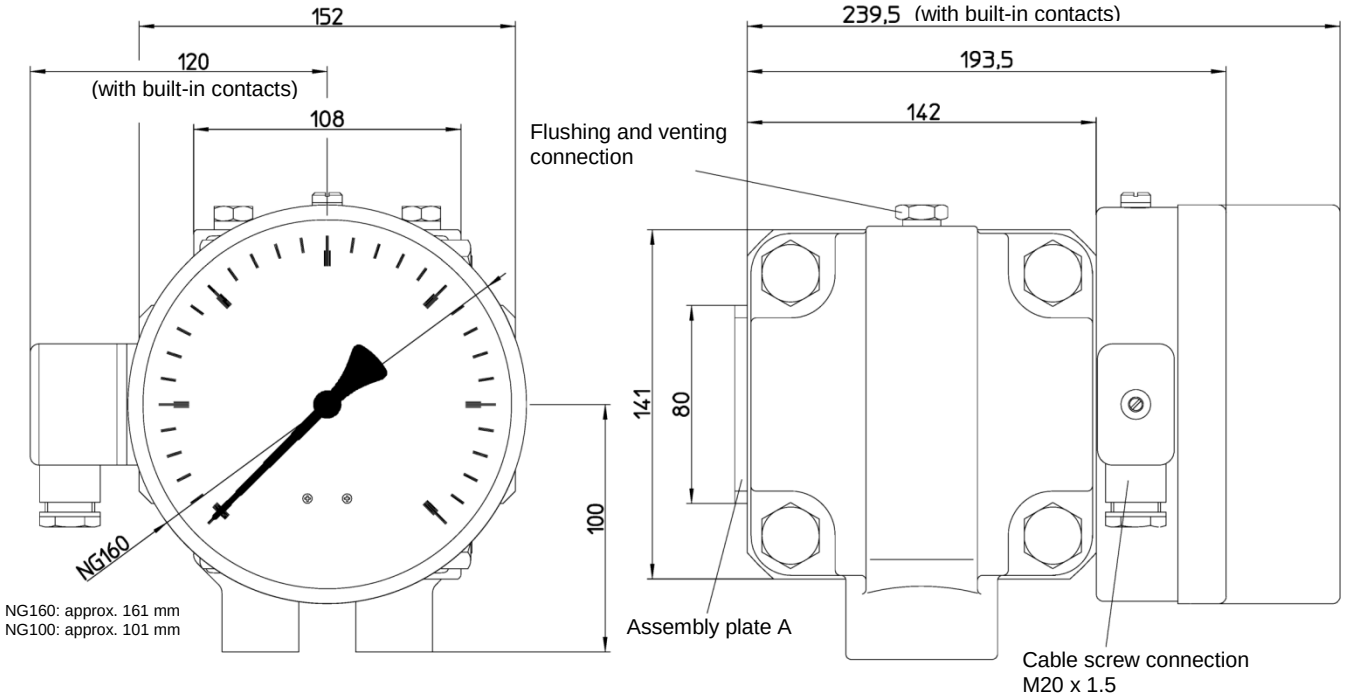
Measuring ranges	Measured Value Display	Magnetic spring contacts			Inductive contacts		Capacitive angular position transducers	Trailing needle	Marker needle	Remote seal displacement volume 14 cm²		Pressure levels
		1	2	3	1	2				Fischer		
0…40 mbar	●	□	□		□	□	●		●			PN100 / PN40
0…60 mbar	●	●	●		●	●	●	●	●			
0…100 mbar	●	●	●		●	●	●	●	●	●		
0…160 mbar	●	●	●	●	●	●	●	●	●	●		
0…250 mbar	●	●	●	●	●	●	●	●	●	●		
0…400 mbar	●	●	●	●	●	●	●	●	●	●		
-40…60 mbar	●	●	●	●	●	●	●	●	●	●		
-60…100 mbar	●	●	●	●	●	●	●	●	●	●		
-100…250 mbar	●	●	●	●	●	●	●	●	●	●		
0…0.6 bar												
0…1.0 bar												
0…1.6 bar												
0…2.5 bar												
0…4.0 bar												
0…6.0 bar												
0…10 bar												
0…16 bar												
0…25 bar												
-1…0.6 bar												
-1…1.5 bar												
-1…3 bar												
-1…5 bar												

□ on request

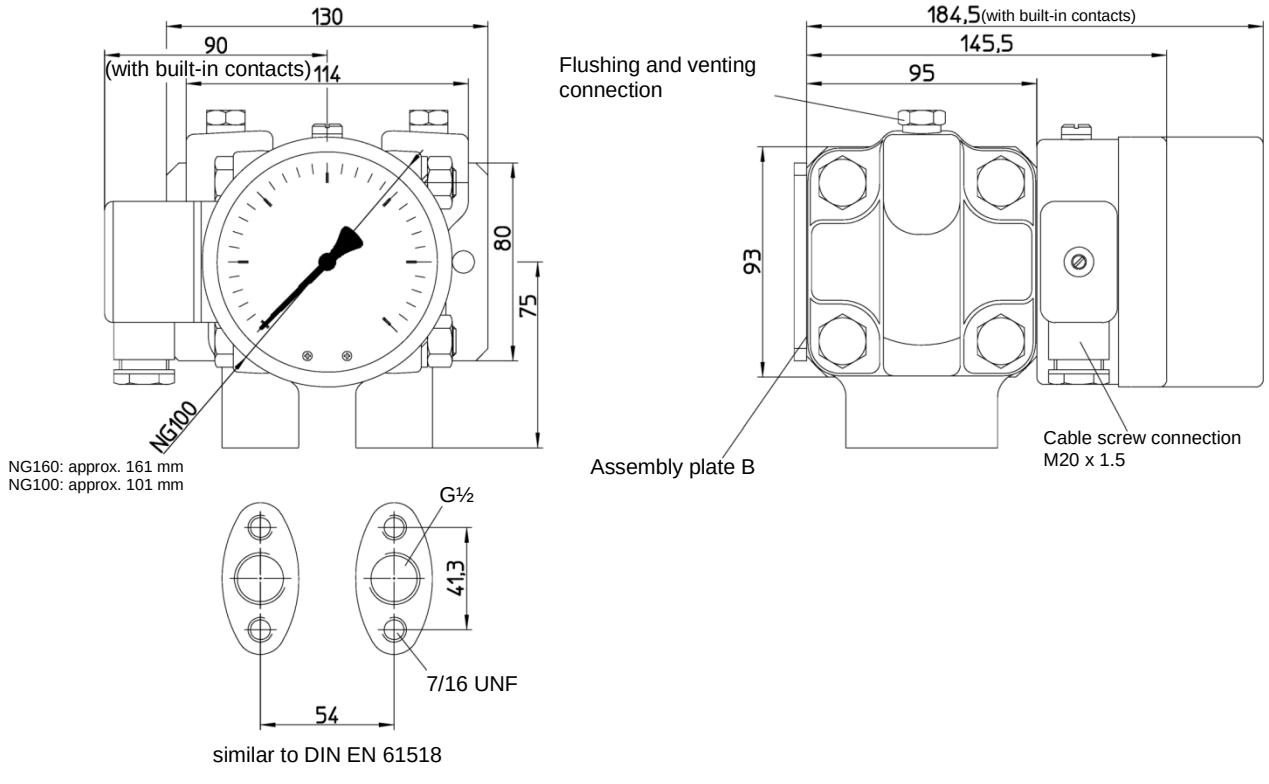
Dimensional drawings (unless otherwise stated, all dimensions in mm)

Models

(A) For measuring ranges 40 … 400 mbar

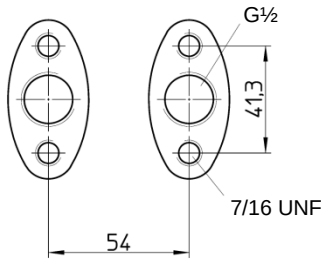


(B) For measuring ranges 0.6 … 25 bar



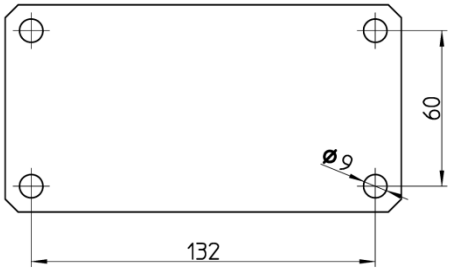
Assembly

Flange connection

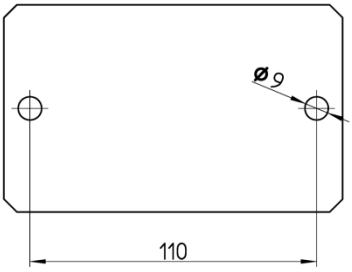


similar to
DIN EN 61518

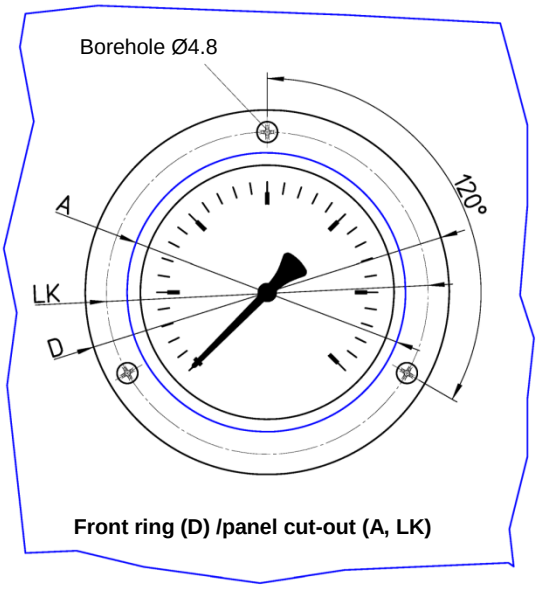
Wall mounting (code W)



Assembly plate A

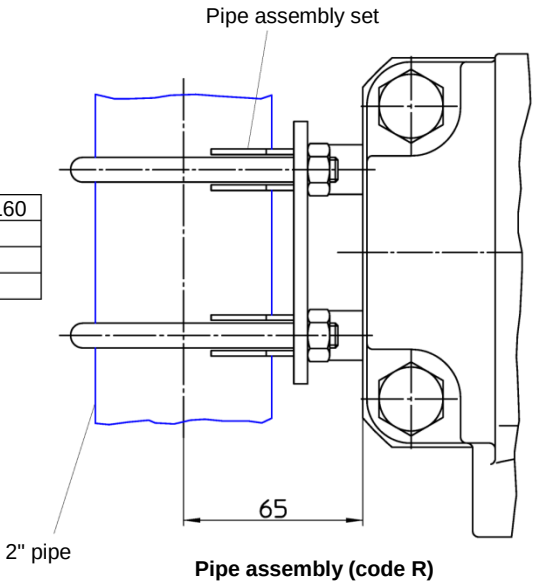


Assembly plate B

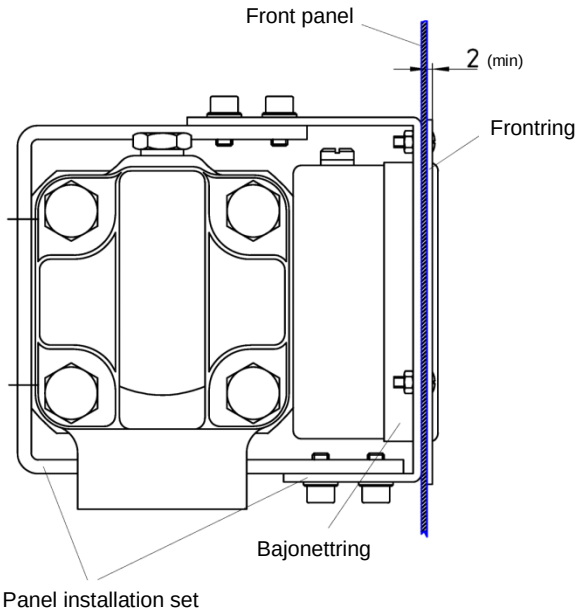


Front ring (D) /panel cut-out (A, LK)

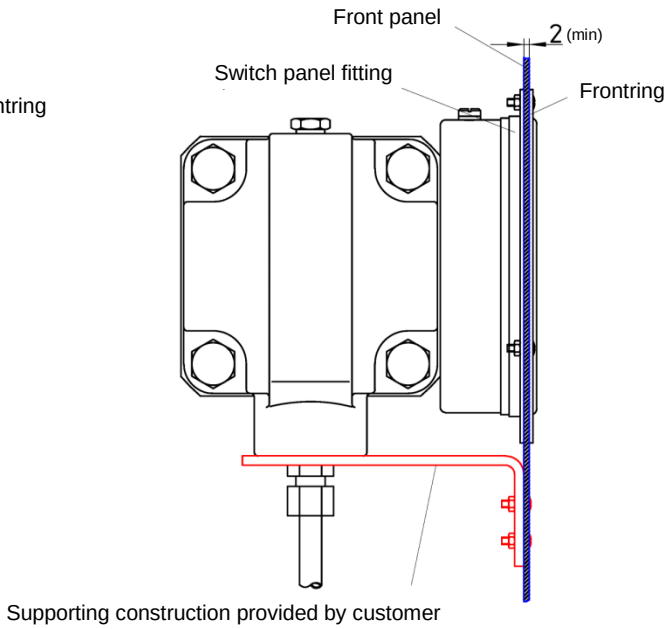
	NG100	NG160
A	104	164
LK	116	178
D	132	192



Pipe assembly (code R)

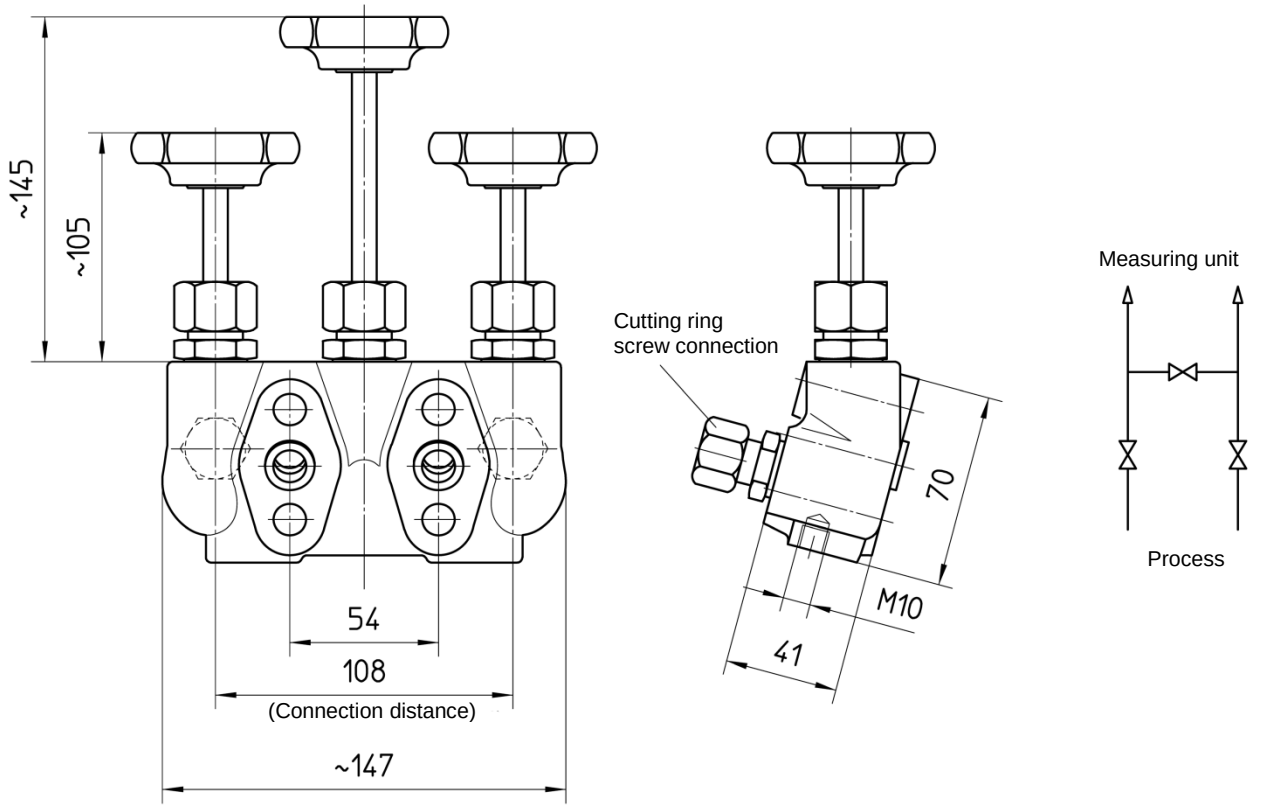


Installation of the panel using the panel installation set (code T)



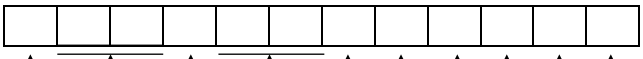
Direct panel mounting (code G)

Accessories



Order Codes

Differential pressure measuring unit
Small measuring cell Ø75 **Type DA03**



Device model

DA03 PN40 measuring system 75	G
DA03 PN100 measuring system 75	K

Measuring range

PN100	PN40	7	6
0 … 0.6 bar	0 … 0.6 bar	0	1
0 … 1.0 bar	0 … 1.0 bar	0	2
0 … 1.6 bar	0 … 1.6 bar	0	3
0 … 2.5 bar	0 … 2.5 bar	0	4
0 … 4.0 bar	0 … 4.0 bar	0	5
0 … 6.0 bar	0 … 6.0 bar	0	6
0 … 10.0 bar	0 … 10.0 bar	0	7
0 … 16.0 bar	0 … 16.0 bar	0	8
0 … 25.0 bar	0 … 25.0 bar	0	9
-1 … 0.6 bar	-1 … 0.6 bar	3	2
-1 … 1.5 bar	-1 … 1.5 bar	3	3
-1 … 3.0 bar	-1 … 3.0 bar	3	4
-1 … 5.0 bar	-1 … 5.0 bar	3	5

Design of the measuring system

Pressure chamber chrome-nickel steel 1.4404 / AISI 316L Measuring membrane standard	R
Pressure chamber Hastelloy C4 Measuring membrane Hastelloy C276	H
Pressure chamber chrome-nickel steel 1.4404 / AISI 316L Measuring membrane Hastelloy C276	G

Pressure connection

Flange connection similar to EN 61518 with internal thread G1/2	0	3
Connecting piece with inside thread 1/4 18 NPT	0	4
Connecting piece with inside thread 1/2 14 NPT	0	5
Connecting pin with outer thread G1/2 B Niro	1	3
Connecting pin with outer thread 1/4-18 NPT EXT Niro	1	4
Connecting pin with outer thread 1/2-14 NPT EXT Niro	1	5
Cutting ring screw connection made of 1.4571 for 12 mm pipe	2	7

Measured Value Display

Bayonet ring connector housing Ø 100mm 1.4301	L
Bayonet ring connector housing Ø 160mm 1.4301	M

Assembly option

Wall mounting	W
Pipe mounting	R
Panel mounting set (only for bar ranges / without additional add-ons)	T
Front ring for panel mounting	G

Fluid charging

No fluid filling		0
Measuring value display with damping fluid glycerine	(only for devices without contacts)	1
Measuring value display with damping fluid paraffin oil	(for fitted inductive contacts)	4
Measuring value display with damping fluid silicone oil	(for devices with and without contacts)	5

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Differential pressure measuring unit

Small measuring cell Ø75 Type DA03

Special functions

No special functions	>	0
Adjustable marker needle	>	1
Resettable trailing needle	>	2

Contacts/transmitters

No contacts/transmitters	>	0
Built-in contacts as per data sheet KE ..	>	1
Built-in capacitive angular position transducers as per data sheet KE09	>	2
Built-in contacts with plug connector (power plant model)		5

Explosion protection / contacts

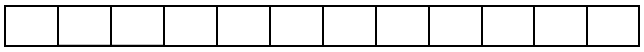
Standard model		>	0
Non-electronic device (without switch contacts)	II2 GD c95°C IP65	>	A
Device with switch contacts (simple electr. operating equipment acc. to DIN EN60079-11 Par.5.7) Built-in contacts as per data sheet KE...	II2 G c95°C IP65	>	B(1)
Device with switch contacts (inductive proximity switches) Built-in contacts as per data sheet KE...	II2 GD c95°C IP65	>	C(1)
device with fitted capacitive angular position transducer KINAX 3W2 708-226D0 or KINAX 3W2 708-226E0…	II2 GD c95°C IP65	>	D(1)

(1) Variant restriction

B: KE##M##0D4H2
C: KE##I##0C0H2
D: KE0905#90000

Differential pressure measuring unit

Size of the measuring cell Ø130 Type DA03



Device model

DA03 PN40 measuring system 130	H
DA03 PN100 measuring system 130	L

Measuring ranges

0 … 40 mbar	5	7
0 … 60 mbar	5	8
0 … 100 mbar	5	9
0 … 160 mbar	6	0
0 … 250 mbar	8	2
0 … 400 mbar	8	3
-40 … 60 mbar	7	0
-60 … 100 mbar	7	2
-100 … 150 mbar	7	4
-150 … 250 mbar	7	6

Design of the measuring system

Pressure chamber chrome-nickel steel 1.4404 / AISI 316L Measuring membrane standard	R
Pressure chamber Hastelloy C276 Measuring membrane Hastelloy C276	H
Pressure chamber chrome-nickel steel 1.4404 / AISI 316L Measuring membrane Hastelloy C276	G

Pressure connection

Flange connection similar to EN 61518 with internal thread G1/2	0	3
Connecting piece with inside thread 1/4 18 NPT	0	4
Connecting piece with inside thread 1/2 14 NPT	0	5
Connecting pin with outer thread G1/2 B Niro	1	3
Connecting pin with outer thread 1/4-18 NPT EXT Niro	1	4
Connecting pin with outer thread 1/2-14 NPT EXT Niro	1	5
Cutting ring screw connection made of 1.4571 for 12 mm pipe	2	7

Measured Value Display

Bayonet ring connector housing Ø 160mm 1.4301	M

Assembly option

Wall mounting	W
Pipe mounting	R
Front ring for panel mounting	G

Fluid charging

No fluid filling		0
Measuring value display with damping fluid glycerine	(only for devices without contacts)	1
Measuring value display with damping fluid paraffin oil	(for fitted inductive contacts)	4
Measuring value display with damping fluid silicone oil	(for devices with and without contacts)	5

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Differential pressure measuring unit

Size of the measuring cell Ø130 Type DA03

									↑	↑	↑

Special functions

No special functions	>	0
Adjustable marker needle	>	1
Resettable trailing needle (measuring ranges upwards of 60 mbar)	>	2

Contacts/transmitters

No contacts/transmitters	>	0
Built-in contacts as per data sheet KE ... for measuring ranges ≥ 60 mbar)	>	1
Built-in capacitive angular position transducers as per data sheet KE09, for measuring ranges ≥ 60 mbar	>	2
Built-in contacts with plug connector (power plant model)		5

Explosion protection / contacts

Standard model		>	0
Non-electronic device (without switch contacts)	II2 GD c95°C IP65	>	A
Device with switch contacts (simple electr. operating equipment acc. to DIN EN60079-11 Par.5.7) Built-in contacts as per data sheet KE ... for measuring ranges ≥ 60 mbar	II2 G c95°C IP65	>	B(1)
Device with switch contacts (inductive proximity switches) Built-in contacts as per data sheet KE ... for measuring ranges ≥ 60 mbar	II2 GD c95°C IP65	>	C(1)
device with fitted capacitive angular position transducer KINAX 3W2 708-226D0 or KINAX 3W2 708-226E0… for measuring ranges ≥ 100 mbar.	II2 GD c95°C IP65	>	D(1)

(1) Variant restriction
B: KE##M##0D4H2
C: KE##I##0C0H2
D: KE0905#90000

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