FISCHER
MESS- UND REGELTECHNIK

Type DA 01

Application

The differential pressure gauge is used for direct indication of differential pressure.

Application Fields

- Chemical- and gas industry
- On- and offshore field

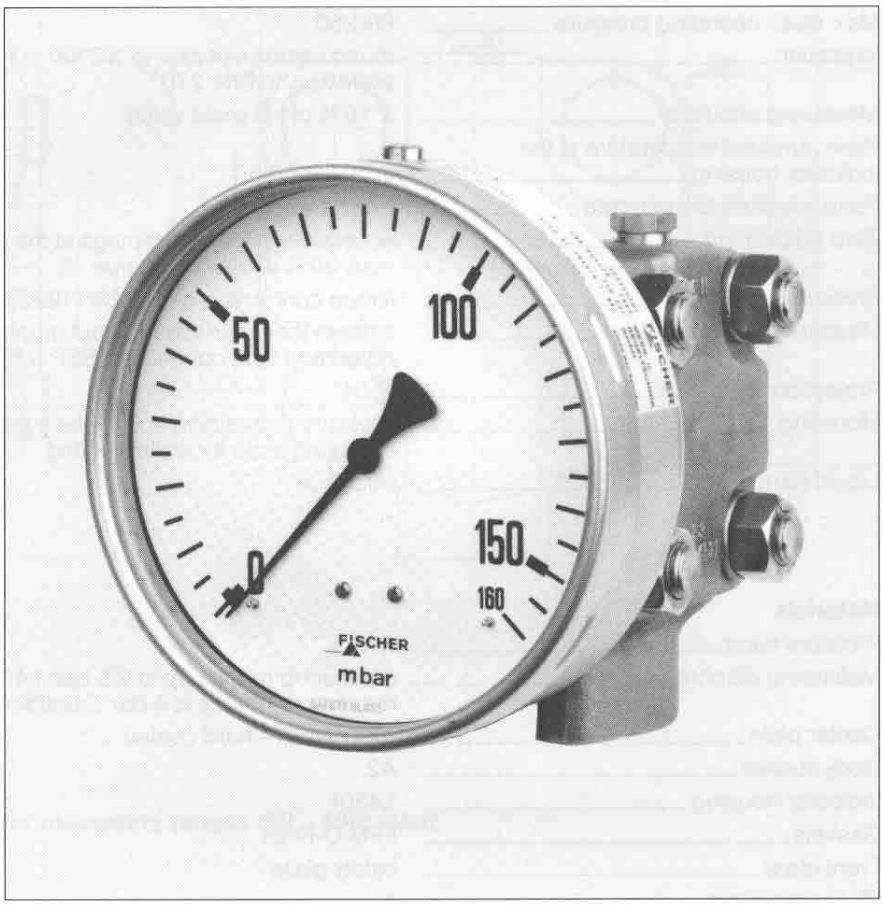
Main Features

- high corrosion resistant
- maintenance-free measuring system
- measuring chambers are purgeable, insensitive to the accumulation of solid particles
- overpressure protected up to 250 bar

Construction and Operation

The pressures to be compared act on one of two measuring diaphragms which are connected via a connecting rod. The cavity between the two diaphragms is liquid-filled to compensate the static pressure. In case of balanced pressure, both measuring diaphragms are in their position of equilibrium. In case of differential pressure, a force is created on the diaphragm which causes a deflection in direction of the lower pressure. Via the connecting rod, this deflection of the measuring diaphragms now will be transferred to the transfer-lever mounted on the measuring shaft. Proportional to the differential pressure, the measuring shaft causes a rotation which is transmitted by the movement to an angle deflection between 0 and 270 degrees.

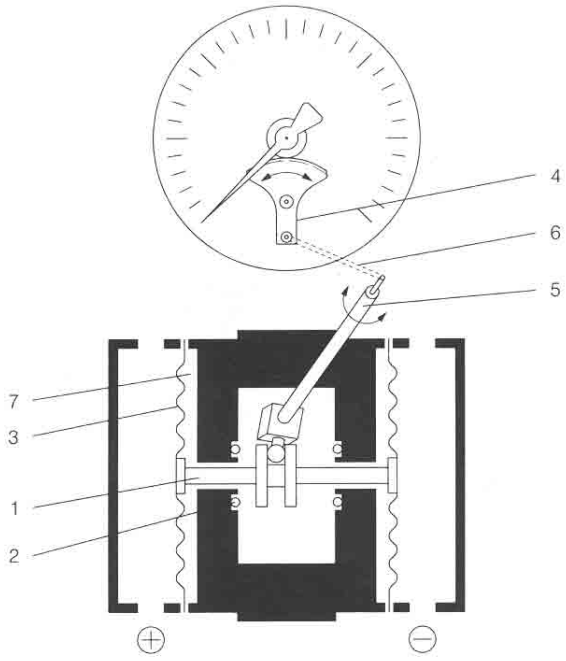
When the system is exposed to a one-sided pressure exceeding the measuring range, the overpressure protection becomes active. Due to the overpressure, the diaphragm will be pressed with the collar against the internal O-ring. Between the measuring diaphragms two different pressure chambers are built; both are liquid-filled. In the pressure chamber adjoining the overloaded diaphragm, a pressure equivalent to the overpressure builds up, e.g. the measuring diaphragm will be supported by means of the enclosed liquid. The forces acting on the diaphragm will be compensated.



Functional Diagram

Differential pressure instrument Type DA 01

1. Connecting rod
2. O-ring, overpressure protection
3. Measuring diaphragm
4. Movement
5. Measuring shaft
6. Transfer lever
7. Liquid for pressure transfer



112D/2/598E

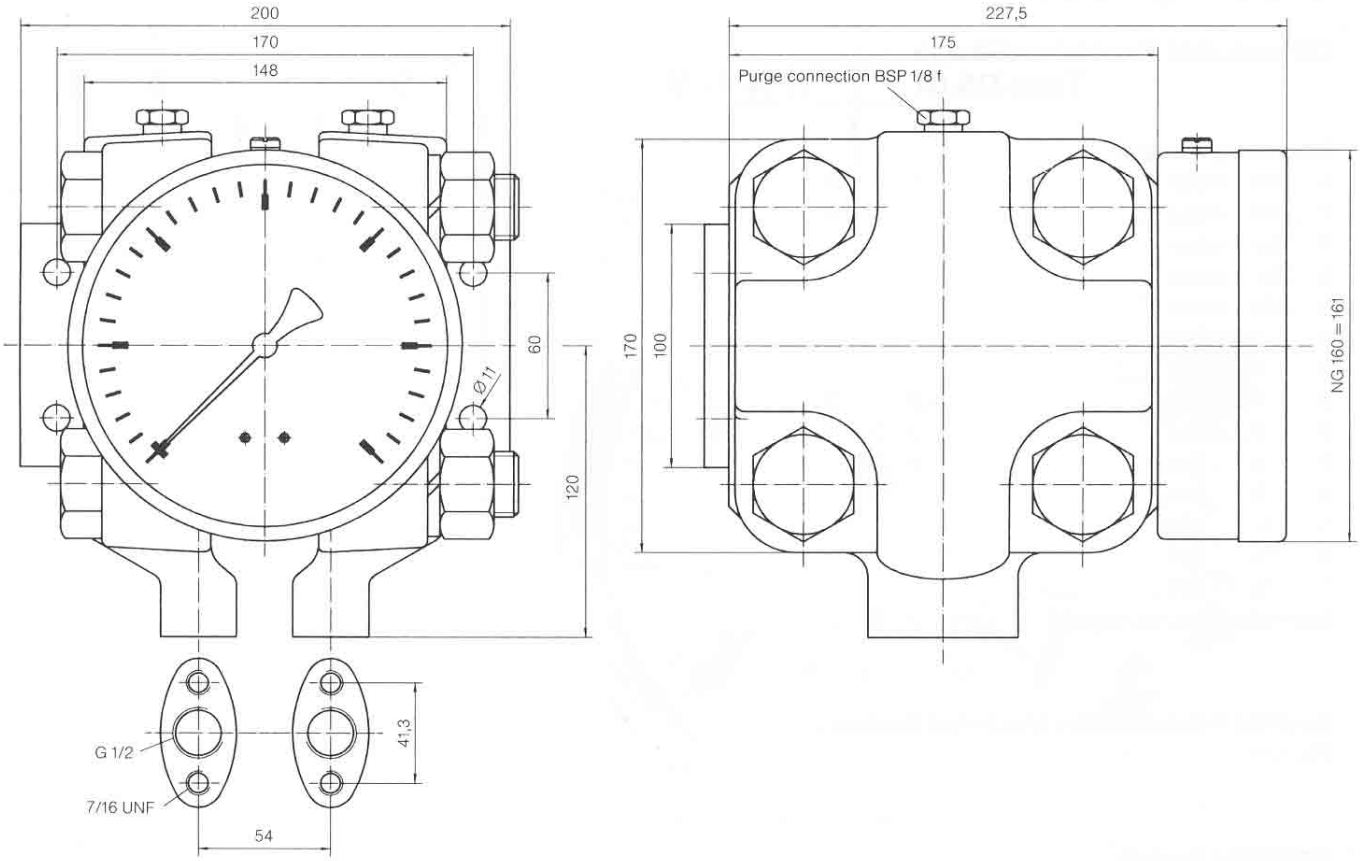
Technical Data

Measuring ranges	see ordering instructions
Max. pressure rating	overpressure protected up to the max. perm. operating pressure
Max. static operating pressure	PN 250
Indication	round instrument casing NG100 or NG160 scale acc. to DIN, 270°
Measuring accuracy	± 1.6 % of full scale value
Perm. ambient temperature at the indicator housing	(– 20 ... + 80) °C
Perm. medium temperature	(– 20 ... + 80) °C
Zero adjustment	accessible through openings at the side of the casing, max. 30 % of full scale value
Pressure connections	flange connection acc. to DIN 19209, threaded BSP 1/2″ female
Measuring chamber	smooth inner surfaces without undercutting, flat measuring diaphragm; purge and vent connection BSP 1/8″ female
Protection class	IP 54
Mounting	pressure connection acc. to the symbols shown mounting plate for wallmounting
Liquid filling	silicon oil

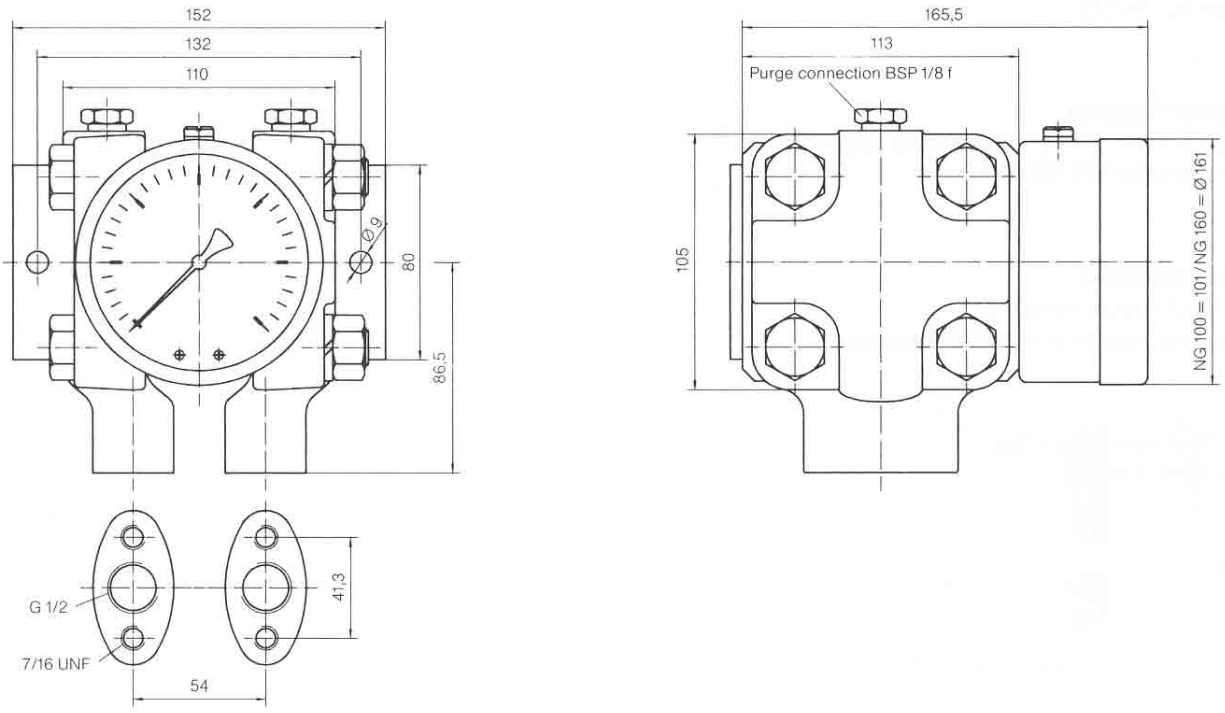
Materials

Pressure caps	1.4571
Measuring diaphragms	measuring ranges up to 2.5 bar: 1.4571 measuring ranges ≧ 4 bar: Duratherm
Center plate	AlCuMgPb – hard coated
Body screws	A2
Indicator housing	1.4301
Gaskets	FPM O-rings
Front glass	safety glass
Dial and pointer	Al

Dimensioned Drawings



Differential pressure gauge type DA 01 for measuring ranges (60 ... 400) mbar



Differential pressure gauge type DA 01 for measuring ranges (0.6 ... 25) mbar

Ordering Code

Differential Pressure Gauge Type DA 01

		N	V	0	3		0			0	0

Measuring Ranges

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
0... 0.6 bar	▷ 0 1
0... 1 bar	▷ 0 2
0... 1.6 bar	▷ 0 3
0... 2.5 bar	▷ 0 4
0... 4 bar	▷ 0 5
0... 6 bar	▷ 0 6
0... 10 bar	▷ 0 7
0... 16 bar	▷ 0 8
0... 25 bar	▷ 0 9
Special ranges on request	▷ 9 9

Nominal Pressure of the Measuring System
250 bar

Measuring System
Stainless steel SS 316 ti, Duratherm

Pressure Connections
Flange acc. to DIN 19209, BSP 1/2" female

Indicator Housing

Case diameter 100 mm (measuring ranges ≧ 0.6 bar) SS 304	▷ L
Case diameter 160, SS 304	▷ M

Special Facilities

1. Without special facilities	▷ 0
Measuring indication filled with glycerine	▷ 1

2. Without special facilities	▷ 0
Adjustable marking pointer	▷ 1

Standard Bourdon Tube Pressure Gauge

FISCHER
MESS- UND REGELTECHNIK

Type MA 11

Application

The standard pressure gauge MA11 for overpressure and vacuum can be used for liquid and gaseous media, except those having a high viscosity or are liable to crystallize.



Application Fields

- Machinery and terotechnology
- Hydraulic systems
- Pneumatic systems
- Heating installations and air conditioning
- Environmental technology

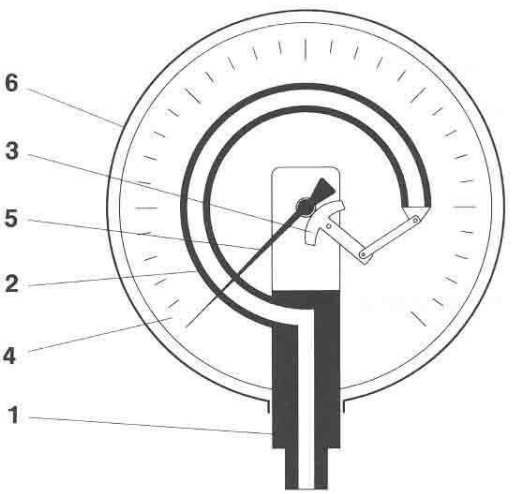
Construction and Operation

The measured pressure is transferred into the measuring element via the connection thread. Due to the pressure admission an elastic deformation occurs, leading to a movement of the measuring element.

This movement is converted into a pressure-proportional pointer deflection via the motion work. The measuring element and the connection thread is one construction, together with the motion work and the scale. Therefore the measuring system is autonomical against forces acting on the case.

Internal spring stops limit the pointer deflection up to 270 angular degrees.

Functional Diagram



1 Connection thread
2 Measuring element
3 Movement
4 Dial
5 Pointer
6 Case

Subject to technical changes

Technical Data

Measuring ranges	0 to 0.6 bar ... 0 to 600 bar acc. to DIN 16064 ref. to order code
Max. pressure load	1.3 x the measuring end value (for short time)
Accuracy	class 1.0 acc. to DIN 16005
Temperature fault / 20 °C	increasing per 10 °C + 0.3% falling per 10 °C – 0.3%
Ambient temperature	–25 °C to 60 °C
Media temperature	max. 60 °C (measuring ranges ≦ 40 bar) max. 100 °C (measuring ranges ≧ 60 bar)
Protection class	IP 54 acc. to DIN 40050
Perm. range of application	in case of permanent load: end value of scale in case of alternating load: 0.9fold end value of scale
Pressure connections	lower connection BSP ½" acc. to DIN 16288 back connection BSP ½" excentrical acc. to DIN 16288

Materials

Measuring system	brass / bronce (ranges ≦ 40 bar) brass / stainless steel CrNi 1.4571 (ranges ≧ 60 bar)
Case	steel, black lacquered
Movement	brass
Dial	aluminium
Pointer	aluminium

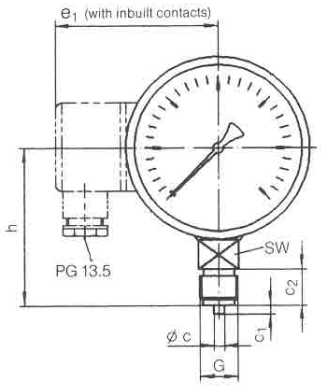
Optional Equipments

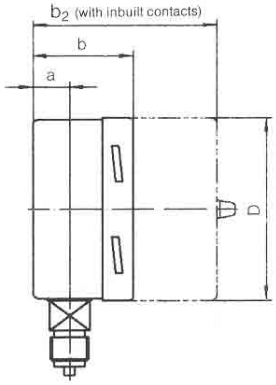
Electrical equipment	Contact modules / transducers (mechanical creep-, magnetic- or inductive contacts) as well as capacitive swing angle transformers with angle-proportional output signals can be integrated within the case which has been enlarged by means of an adequate high bayonet-type face ring. Electrical accessories acc. to datasheet KE ...
Liquid filling	In case of aggravated operating conditions like vibrations and pressure oscillations, or against condensation in case of outdoor-installation, the case can be filled with damping liquid.
Marking pointer	Adjustable pointer for signal marking behind the window.
Drag pointer	The drag pointer is carried by the measuring indicator. Between the two pointers does not exist a fixed connection, e.g. once reached maximum values are accumulated. Via an adjusting knob in the window the drag pointer can be readjusted.

Installation / Mounting	Screwed tube connection via cutting- or clamping ring connection or direct screwing to the tube by means of appropriate connecting parts and sealing materials. Wallmounting with back flange or gauge support MZ 31 ... Panelmounting via frontring.
Accessories	Couplings to further thread diameters, tube connecting screwing, solder- and welding fittings, shut-off valves, siphons, manifolds etc. acc. to datasheet MZ ...

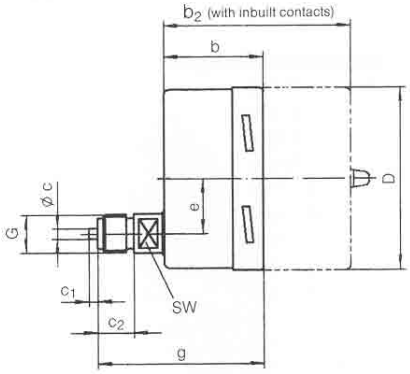
Dimensioned Drawings

Standard variant connection below

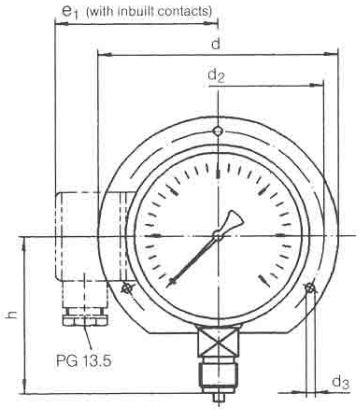


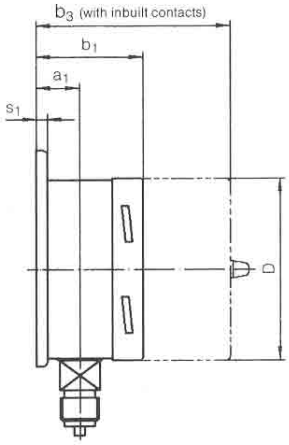


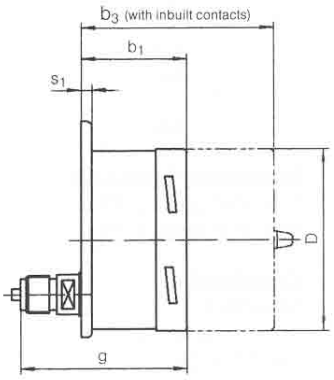
Back connection



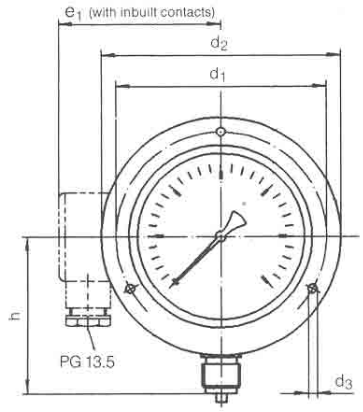
Variant with back flange

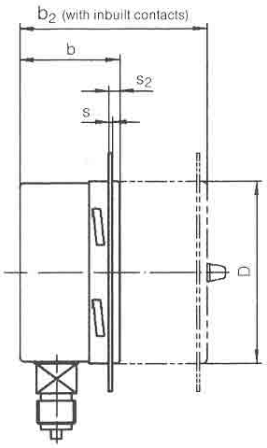


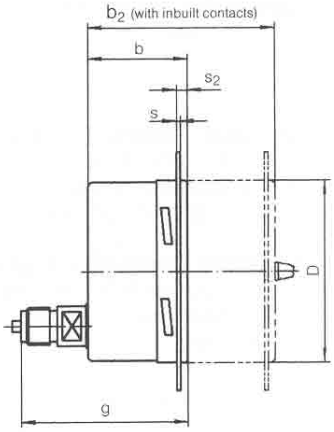




Variant with front ring







NG	D	a	a_1	b	b_1	b_2	b_3	c	c_1	c_2	d_1	d_2	d_3	e	e_1	g	G	h±1	s	s_1	s_2	SW	SW_1
100	101	20	23,5	55	58,5	103	106,5	6	5	20	116	132	4,8	30	89	97	G1/2A	87	2	6	6	22	17
160	161	15,5	19	50,5	54	98,5	102	6	5	20	178	196	5,8	52	119	92,5	G1/2A	118	2	6	6	22	17

Ordering Code

Standard Bourdon Tube Gauge Type MA11

					0	0				0

Measuring Ranges

0 – 0.6 bar	▷ 0 1
0 – 1.0 bar	▷ 0 2
0 – 1.6 bar	▷ 0 3
0 – 2.5 bar	▷ 0 4
0 – 4 bar	▷ 0 5
0 – 6 bar	▷ 0 6
0 – 10 bar	▷ 0 7
0 – 16 bar	▷ 0 8
0 – 25 bar	▷ 0 9
0 – 40 bar	▷ 1 0
0 – 60 bar	▷ 1 1
0 – 100 bar	▷ 1 2
0 – 160 bar	▷ 1 3
0 – 250 bar	▷ 1 4
0 – 400 bar	▷ 1 5
0 – 600 bar	▷ 1 6
– 1 ... 0 bar	▷ 3 1
– 1 ... 0.6 bar	▷ 3 2
– 1 ... 1.5 bar	▷ 3 3
– 1 ... 3 bar	▷ 3 4
– 1 ... 5 bar	▷ 3 5
– 1 ... 9 bar	▷ 3 6
– 1 ... 15 bar	▷ 3 7

Measuring Indication

Bayonet case ø 100	▷ D
Bayonet case ø 160	▷ E

Construction

Standard	▷ O
Front ring for panel mounting	▷ G
Back flange	▷ B

Pressure Connection

Thread BSP 1/2 below	▷ 8 2
Thread BSP 1/2 back	▷ 9 2

Optional: Liquid Filling

Without liquid filling	▷ 0
Damping liquid glycerine	▷ 1
Damping liquid in case of inbuilt contacts	▷ 2

Optional: Special Functions

Without special functions	▷ 0
Adjustable marking pointer	▷ 1
Readjustable drag pointer (measuring ranges ≧ 1 bar)	▷ 2

Optional: Contacts – Transducers

Without contacts / transducers	▷ 0
Inbuilt contacts acc. to datasheet KE ... (for measuring ranges ≧ 1 bar)	▷ 1
Inbuilt capacitive electrical position transducer acc. to datasheet KE ... (for measuring ranges ≧ 1 bar)	▷ 2

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Type MA 12

General Description

The MA 12 pressure gauge can be used for monitoring under- and over-pressure under difficult operating conditions such as pressure surges and vibrations.
The instrument uses a spring-loaded diaphragm as the sensing element, and is inherently protected against overpressure conditions.
A choice of materials of construction for the pressure chamber and diaphragm allows the instrument to be configured to meet a wide variety of applicationns requirements.



Applications

- process instrumentation
- machine instrumentation
- water hydraulic systems
- pneumatic conveying systems

Important Features

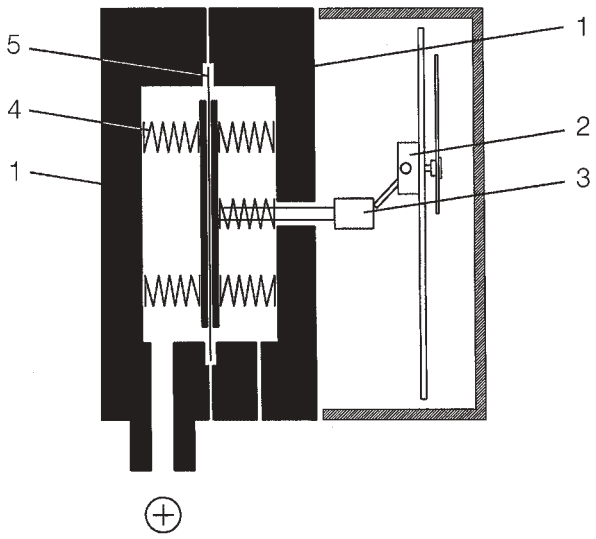
- vibration resistant
- long life expectancy
- rugged sensing diaphragm and springs
- overpressure rating 25 bar, for all ranges

Principles of Operation

The gauge uses a tough, flexible sensing diaphragm sandwiched between stiffening plates and balanced by springs on either side. For higher pressure ranges, a special stainless steel (Duratherm) diaphragm is used, which also acts a plate spring. The gauge can be used for monitoring under- or over-pressure. The diaphragm is at zero position when the forces exerted by the springs (or the plate spring) and the pressures on either side of the diaphragm are equal. When pressure is applied on the pressure chamber side of the diaphragm, it moves to a new equilibrium position, determined by a balance of forces of the springs and pressures on both sides. At overload limit, the diaphragm ist stopped by the end metal face on the side opposite the pressure chamber. The linear displacement of the diaphragm is translated to angular movement of the dial pointer, through a precision mechanism consisting of a push-rod, lever, linkages, and gears.

Schematic Diagram

1. Pressure chamber
2. Pointer mechanism
3. Push-rod
4. Sensing springs
5. Sensing diaphragm



Specifications

Measuring ranges	0…400 mbar to 0…25 bar (see Ordering Code)
Nominal pressure rating	25 bar
Max. overpressure	Safe up to nominal pressure rating (all ranges).
Operating temperature ambient	-10 ° to +70 °C (max. 5°C for SEV Approval)
Operating temperature media	max. 70 °C
Protection class	IP 54 per DIN 40 050
Mounting position	arbitrary
Accuracy	± 1.6 % of range full-scale
Zero adjustment	by screw, through dial window (front)
Pressure connections	threaded plug connector G 1/2 (M), per DIN 16 288

Sensing Elements

Range 10 bar	Sensing spring plus fabric-reinforced elastomer diaphragm
Range 16 bar	DURATHERM® (stainless steel) diaphragm, acting as a plate spring

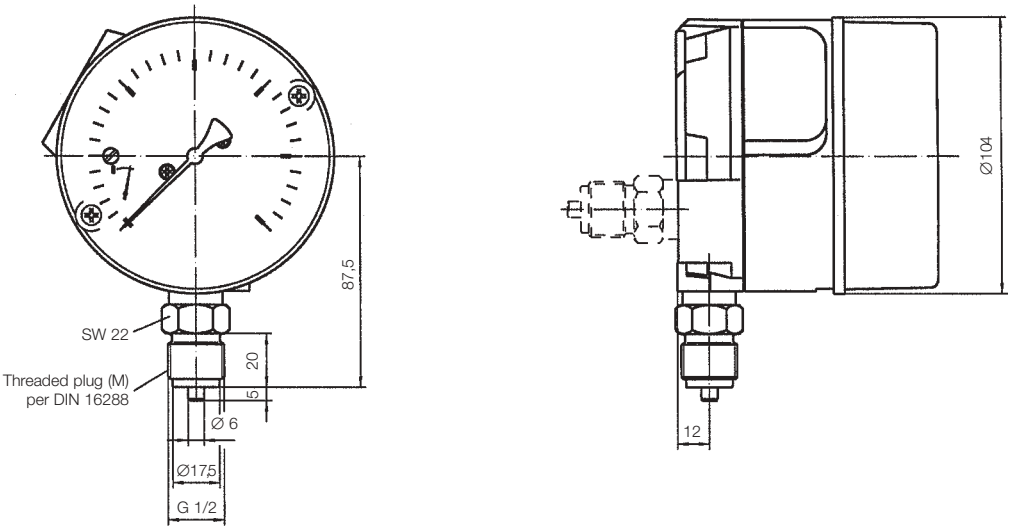
Materials

Pressure chamber	Aluminium Gk Al Si 12 (Cu) painted black Aluminium Gk Al Si 12 (Cu) with hard coat surface protection Stainless steel 1.4305
Diaphragm and seals Elastomer	Diaphragm and seals: NBR (nitrile) or Viton (fluorocarbon) Plate spring diaphragm: DURATHERM® (stainless steel)
Other parts in contact with media	Stainless steel 1.4310, 1.4305
Housing	Makrolon
Weight	With aluminium pressure chamber: 1.2 kg With stainless steel pressure chamber: 3.5 kg

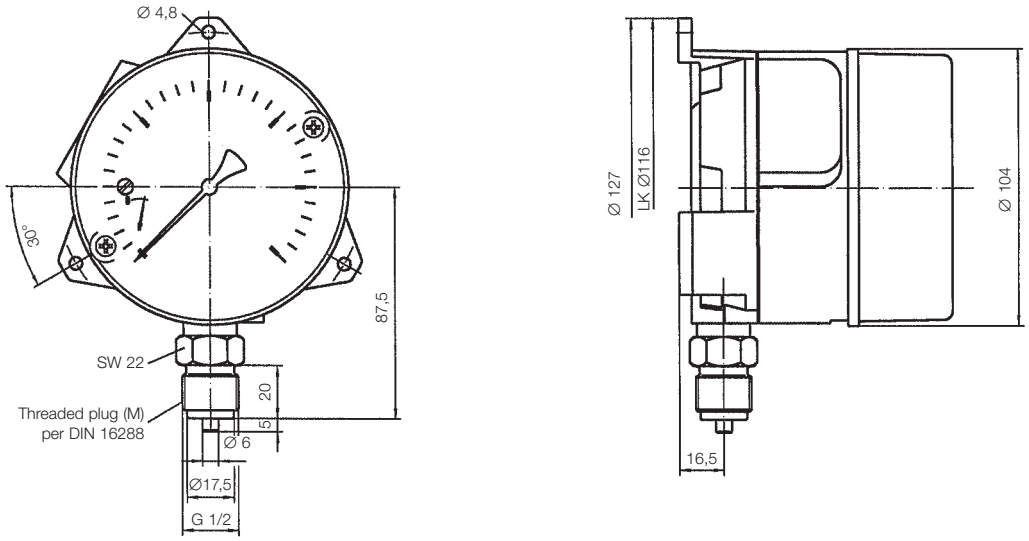
Mounting/Installation	Tube mounting:	Threaded connectors per DIN 16 288; (bottom or rear entry pressure connection)
	Wall mounting:	three integral mounting tabs (bottom entry pressure connection only)
	Front panel mounting:	front panel adaptor ring, 132 mm dia. (Adaptor kit DZ 11) (bottom or rear entry pressure connection)

Accessories	Pressure gauge acessories per Data Sheet MZ… e.g. gauge isolating valve, etc. Wall holder per DIN 16 281

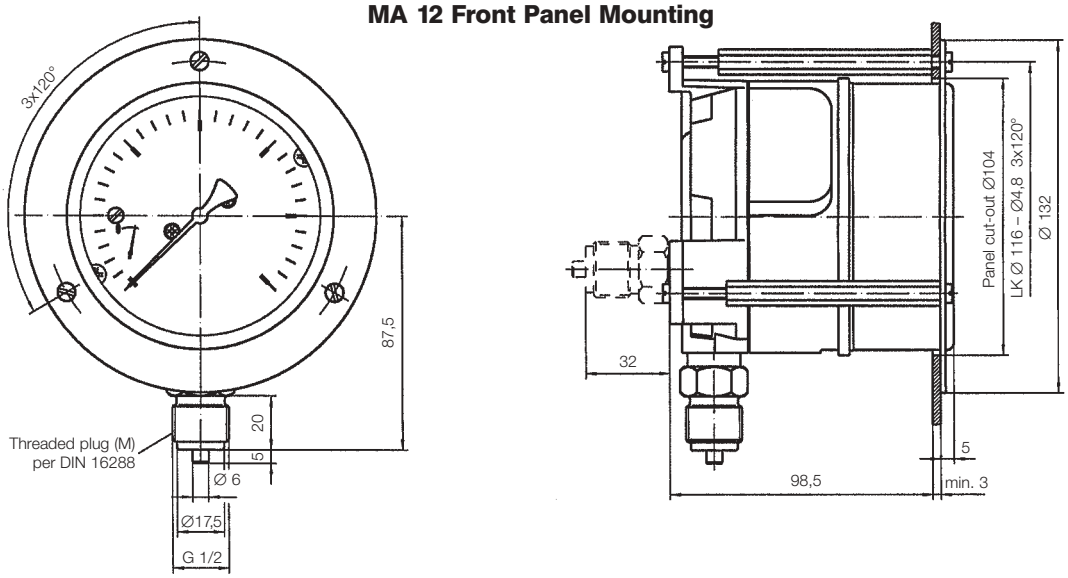
MA 12 Standard Configuration



MA 12 Wall Mounting



MA 12 Front Panel Mounting



Ordering Code

Pressure Gauge **Type MA 12** [ ][ ] [ ] [ ] **0** [ ] **0** **0**

Range

0 ... 400 mbar	▷ 8 3
0 ... 0.6 bar	▷ 0 1
0 ... 1 bar	▷ 0 2
0 ... 1.6 bar	▷ 0 3
0 ... 2.5 bar	▷ 0 4
0 ... 4 bar	▷ 0 5
0 ... 6 bar	▷ 0 6
0 ... 10 bar	▷ 0 7
0 ... 16 bar	▷ 0 8
0 ... 25 bar	▷ 0 9
-0,6 ... 0 bar	▷ 3 0
-1 ... 0 bar	▷ 3 1
-1 ... 0.6 bar	▷ 3 2
-1 ... 1.5 bar	▷ 3 3
-1 ... 3 bar	▷ 3 4
-1 ... 5 bar	▷ 3 5

Diaphragm / Seals

Diaphragm	Seals	
NBR	NBR (Range < 16 bar)	▷ N
Viton	Viton (Range < 16 bar)	▷ V
DURATHERM®	NBR (Range ≧ 16 bar)	▷ D
DURATHERM®	Viton (Range ≧ 16 bar)	▷ E

Pressure Chamber

Aluminium	▷ A
Aluminium, hard coated	▷ D
Stainless steel 1.4305	▷ W

Pressure Connections & Mounting

Bottom entry pressure connection, G 1/2 (M)	▷ O
Rear entry pressure connection, G 1/2 (M)	▷ H
Wall mounting, bottom entry pressure connection, G 1/2 (M)	▷ B
Front panel mounting, bottom entry pressure connection, G 1/2 (M)	▷ G
Front panel mounting, rear entry pressure connection, G 1/2 (M)	▷ L

FISCHER MESS- UND REGELTECHNIK

MA 13 || Bourdon Tube Pressure Gauge (for chemical use)

Application

The pressure gauge MA13 for overpressure and vacuum meets the high technical requirements of corrosion-resistance and interference immunity. It is used for liquid and gaseous media, except those having a high viscosity or are liable to crystalize.

Application Fields

- Chemical industries
- Materials processing
- Pneumatic systems
- Machinery and terotechnology
- Environmental technology

Construction and Operation

The measure pressure is transferred into the measuring element via the connection thread. By means of the pressure admission an elastic deformation occurs, leading to a movement of the measuring element.

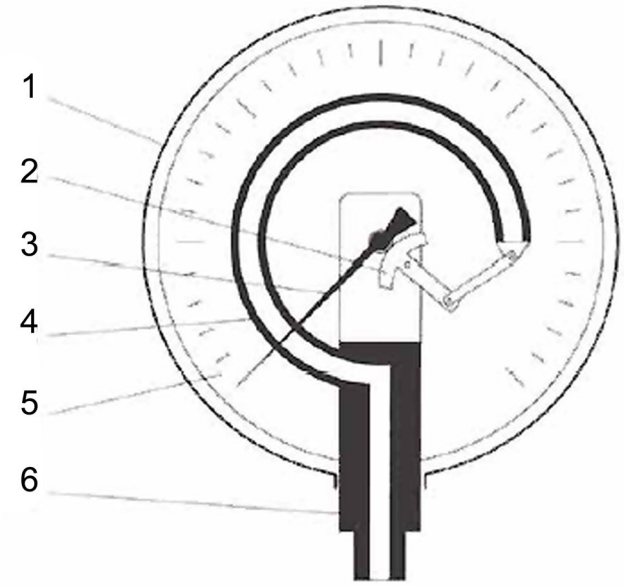
This movement is converted into a pressure-proportional pointer deflection via the motion work. The measuring element and the connection thread is one construction, together with the motion work and the scale. Therefore the measuring system is autonomical against forces acting on the case.

Internal spring stops limit the pointer deflection up to 270 angular degrees.

Regulations for prevention of accidents and div. laws require measuring instruments for special processes acc. to manifold safeguards. The type ''bayonet-case acc. to DIN 16006“ meets these requirements disposing of following features: blow-out of case back wall, front-window of security laminated glass, security against fracture via separating wall between measuring element and dial.



Functional Diagram



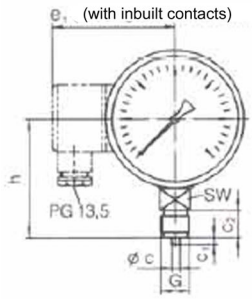
1 Connection thread
2 Measuring element
3 Movement
4 Dial
5 Pointer
6 Case

Technical Data

Measuring ranges	0 to 0.6 bar ...0 to 600 bar acc to DIN 16064 ref. to order code
Max. pressure load	1.3 x the measuring end value (for short time)
Accuracy	class. 1.0 acc. to DIN 16005
Temperature fault/20°C	increasing per 10°C + 0.3% falling per 10°C -0.3%
Ambient temperature	-25°C to 60°C
Media temperature	max. 100°C
Measuring scale	round case diameter 100/160 mm security case diameter 100/160 mm acc. to DIN 16006
Protection class	IP54 acc. to DIN 40050
Perm. range of application	in case of permanent load: end value of scale in case of alternating load: 0.9fold end value of scale
Pressure connections	lower connection BSP ½“ acc. to DIN 16288 back connection BSP ½“ excentrical acc. to DIN 16288 for casing acc. to DIN 16006 only lower connection possible
Materials	
Measuring system	stainless steel Cr-Ni 1.4571
Case	stainless steel Cr-Ni 1.4301
Movement	stainless steel Cr-Ni 1.4301
Dial	aluminium
Pointer	aluminium
Optional Equipments	
Electrical equipment	Contact modules/transducers (mechanical creep-, magnetic- or inductive contacts) as well as capacitive swing angle transformers with angle-proportional output signals can be integrated within the case which has been enlarged by means of an adequate high bayonet-type face ring. Electrical accessories acc. to datasheet KE...
Liquid filling	In case of aggravated operating conditions like vibrations and pressure oscillations, or against condensation in case of outdoor-installation, the case can be filled with damping liquid.
Marking pointer	Adjustable pointer for signal marking behind the window.
Drag pointer	The drag pointer is carried by the measuring indicator. Between the two pointers does not exist a fixed connection, e.g. once reached maximum values are accumulated. Via an adjusting knob in the window the drag pointer can be readjusted.
Installation/Mounting	Screwed tube connection via cutting- or clamping ring connection or direct screwing into the tube by means of appropiate connecting parts and sealing materials. Wallmounting with back flange or gauge support MZ31... Panelmounting via frontring.
Accessories	Couplings to further thread diameters, tube connecting screwings, solder- and welding fittings, shut-off valves, manifolds etc. acc. to datasheet MZ...

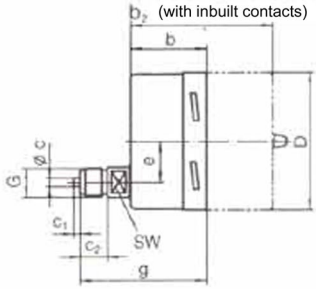
Dimensioned drawings

Standard variant connection below

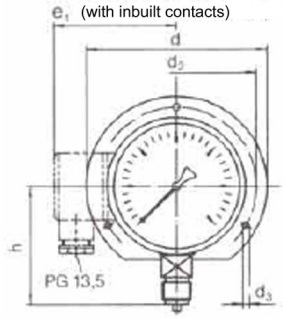


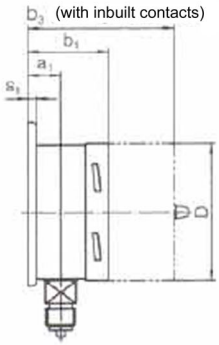


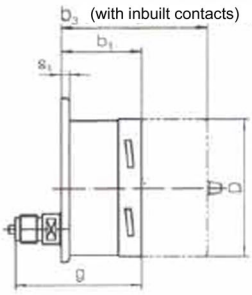
Back connection



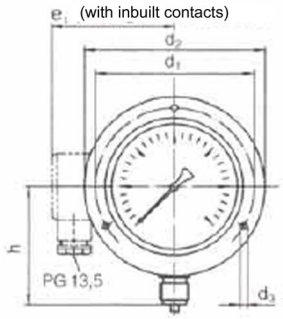
Variant with back flange

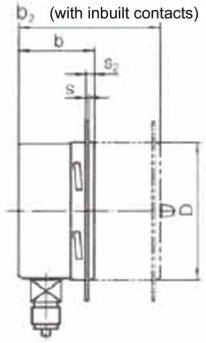


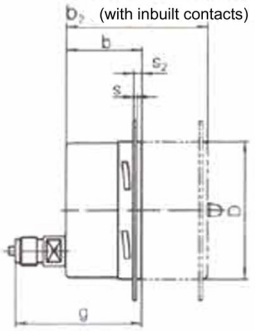




Variant with front ring

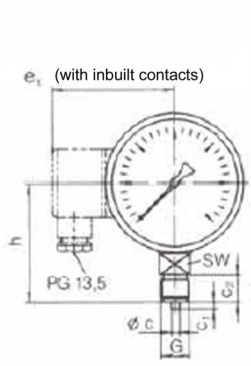


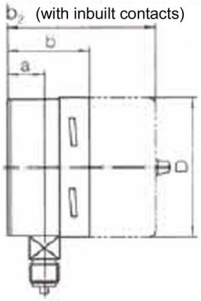


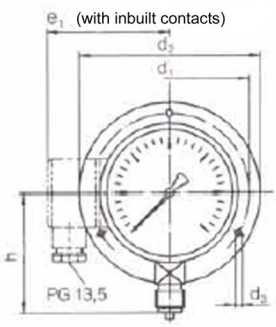


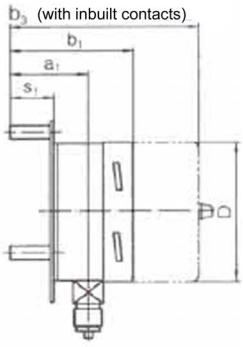
NG	D	a	a_1	b	b_1	b_2	b_3	c	c_1	c_2	d_1	d_2	d_3	e	e_1	g	G	h±1	s	s_1	s_2	SW	SW_1
100	101	20	23.5	55	58.5	103	106.5	6	5	20	116	132	4.8	30	89	97	G½A	87	2	6	6	22	17
160	161	15.5	19	50.5	54	98.5	102	6	5	20	178	196	5.8	52	119	92.5	G½A	118	2	6	6	22	17

Safety case acc. to DIN 16006









NG	D	a	a_1	b	b_1	b_2	b_3	c	c_1	c_2	d_1	d_2	d_3	e_1	G	h±1	s_1	SW
100	101	27	57	60	90	108	138	6	5	20	116	132	4.8	89	G½A	87	32	22
160	161	40	70	78	108	126	156	6	5	20	178	196	5.8	119	G½A	118	32	22

Ordering Code

Bourdon Tube Pressure Gauge (for chemical use) Type MA13

						0	0				0

Measuring Ranges

0 . . . 0.6 bar	0	1
0 . . . 1.0 bar	0	2
0 . . . 1.6 bar	0	3
0 . . . 2.5 bar	0	4
0 . . . 4 bar	0	5
0 . . . 6 bar	0	6
0 . . . 10 bar	0	7
0 . . . 16 bar	0	8
0 . . . 25 bar	0	9
0 . . . 40 bar	1	0
0 . . . 60 bar	1	1
0 . . . 100 bar	1	2
0 . . . 160 bar	1	3
0 . . . 250 bar	1	4
0 . . . 400 bar	1	5
0 . . . 600 bar	1	6
-1 . . . 0 bar	3	1
-1 . . . 0.6 bar	3	2
-1 . . . 1.5 bar	3	3
-1 . . . 3 bar	3	4
-1 . . . 5 bar	3	5
-1 . . . 9 bar	3	6
-1 . . . 15 bar	3	7

Measuring Indication

Bayonet case ø 100	L
Bayonet case ø 160	M
Safety case ø 100 acc. to DIN 16006	O
Safety case ø 160 acc. to DIN 16006	P

Construction

Standard	O
Front ring for panel mounting	G
Back flange	B

Pressure Connection

Thread BSP ½ below	8	7
Thread BSP ½ back	9	7

Optional: Liquid Filling

Without liquid filling	0
Damping liquid glycerine	1
Damping liquid in case of inbuilt contacts	2

Optional: Special Functions

Without special functions	0
Adjustable marking pointer	1
Readjustable drag pointer (measuring ranges ≥ 1 bar)	2

Optional: Contacts - Transducers

Without contacts / transducers	0
Inbuilt contacts acc. to datasheet KE... (for measuring ranges ≥ 1 bar)	1
Inbuilt capacitive position transducer electrical acc. to datasheet KE... (for measuring ranges ≥ 1 bar)	2

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Diaphragm Pressure Gauge (for chemical use)

FISCHER
MESS- UND REGELTECHNIK

Type MA 15

Application

Diaphragm pressure gauges are used for measuring pressure in difficult conditions. They are used to measure pressure whilst being uneffected by the media.

All parts of the instrument are made of special materials to handle corrosive process fluids and to withstand aggressive ambient and permanent weathering.

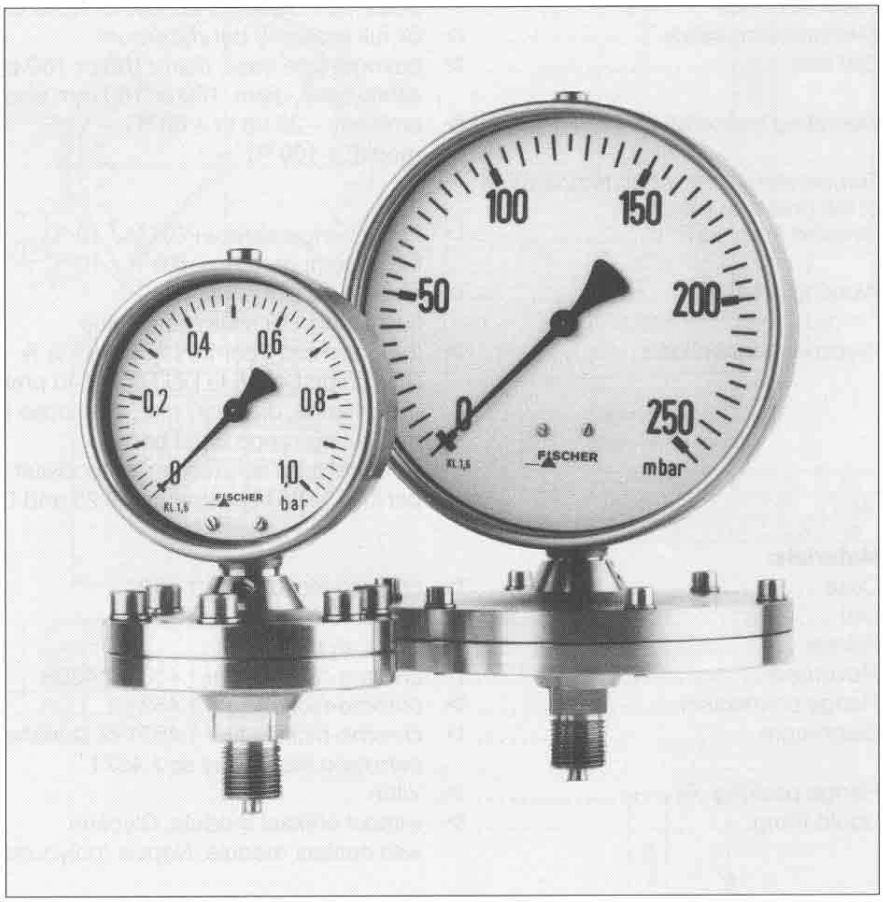
Process connection may be a large size flange which enable the measurement of highly viscous media. For the foodstuff and beverage industries we offer screwed tubes acc. DIN 11851.

To make the travel of the pointer less sensitive to shocks and vibration the item can be filled with liquid dampening. This also increases life of the gauge and protects it against icing.

The requirements of DIN 16006 are met by a safety casing with break-proof dividing wall between the measuring system and scale as well as a blow-out disc.

The diaphragm pressure gauge can easily be equipped with FISCHER contact modules and transducers with output signal 0-20/4-20 mA.

All these electrical supplements are available intrinsically safe for application in hazardous areas.



Special Features

- high corrosion resistance
- manufactured acc. DIN
- high overpressure safe
- suitable for open-air installation

Construction and functioning

The diaphragm element consists of a thin convoluted membrane which is held between two flanged halves, where the bottom half incorporates the pressure entry. The diaphragm deflects when a pressure is applied.

By means of push rod and geared movement this deflection is converted into rotation of a concentric pointer to be indicated on a dial scale. The value indicated is proportional to the pressure applied.

Indication of measuring value is shown on a dial of 270°.

031 M/2/0900 E

Technical Data

Scale ranges	▷	as per ordering charge flange size 160 mm, 0-25 mbar up to 0-400 mbar flange size 100 mm, 0-6 bar up to 0-25 bar
Accuracy class	▷	class 1.6 / class 2.5 in case of items coated with PTFE foil
Overpressure safety	▷	5x full scale, 40 bar maximum
Dial size	▷	bayonet type case, diam. 100 or 160 mm, standard case acc. DIN 16026 safety case, diam. 100 or 160 mm acc. DIN 16006
Operating temperature	▷	ambient: – 20 up to + 60 °C media: + 100 °C
Temperature error when temperature of the pressure element deviates from + 20 °C	▷	rising temperature: + 0,6 % / 10 °C falling temperature: – 0,6 % / 10 °C
Working pressure	▷	steady: full scale value fluctuating: 0.9 x full scale value
Pressure connection	▷	threaded entry per DIN 16288 G ½ A DIN flange DN 15 to DN 50, PN 40 preferably DN 25 and DN 50 open flange, diam. 50 mm, with loose male fitting flange per DN 50, PN 40, measuring range ≧0,6 bar screwed tube connection for foodstuff and beverage industries per DIN 11851 preferably DN 25 and DN 50

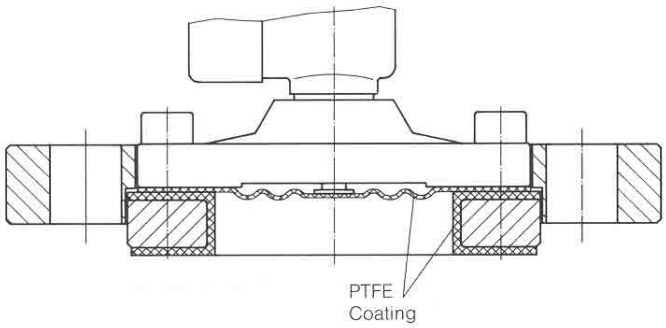
Materials:

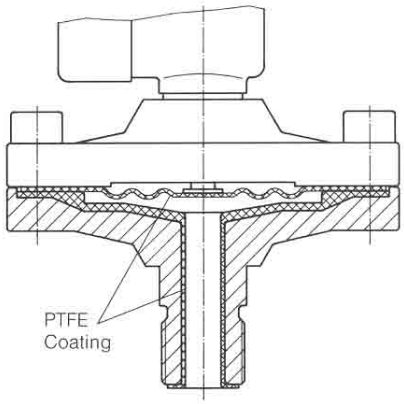
Case	▷	chrome-nickel-steel 1.4301
Dial	▷	aluminium
Pointer	▷	black aluminium
Movement	▷	chrome-nickel-steel 1.4301/1.4305
Flange connection	▷	chrome-nickel-steel 1.4571
Diaphragm	▷	chrome-nickel-steel 1.4571 or Duratherm® corrosion resistance as 1.4571
Flange packing	▷	Viton
Liquid filling	▷	without contact module: Glycerin with contact module: Napvis (polybutene)

Wetted parts

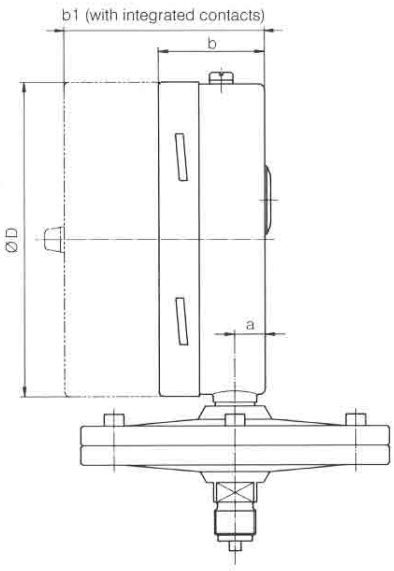
Coat	▷	(only for measuring range = ≧160 mbar) in case of high aggressive process fluid inner parts are coated as follows: wetted parts: PTFE foil, 2 mm thick diaphragm: PTFE foil, 0,5 mm thick diaphragm sealing: ring of Viton coated with PTFE
Sealing	▷	to seal these coated parts at the gauge side please use special sealing of PTFE

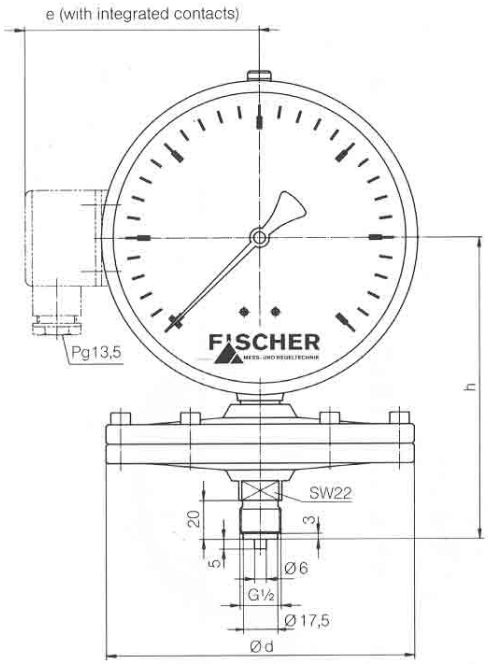
PTFE Coated Parts

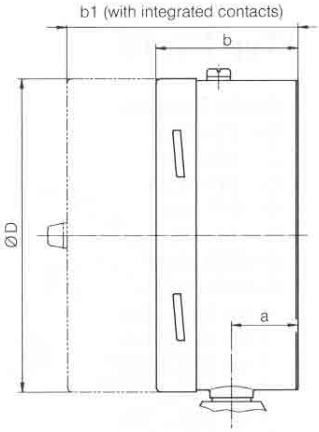




Measurements





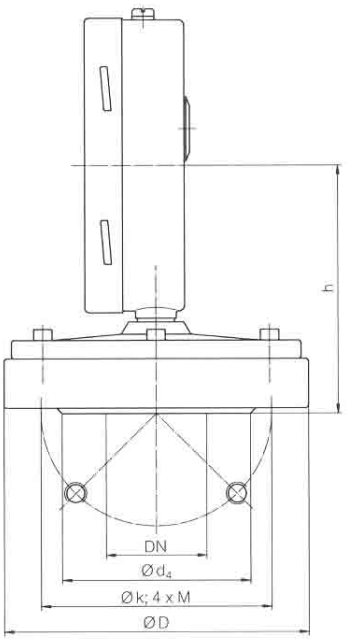


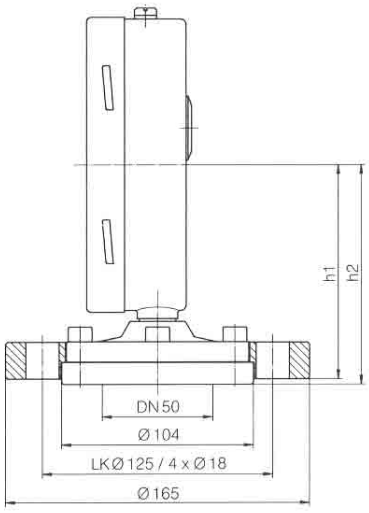
Safety Case acc. DIN 16006

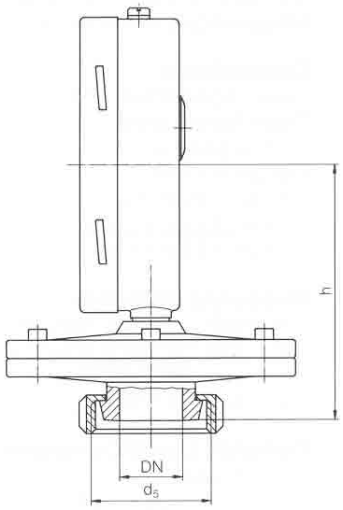
case Ø	ØD	a	b	b1
100	101	31	67	115,5
160	161	34	72,5	118

Connection acc. DIN 16288 Standard Design

scale range	case Ø	ØD	Ød	a	h	b	b1	e
≧ 0,6 bar	100	101	99	16	128	52	100	89
	160	161	99	15,5	158	54	102	119
≦ 400 mbar	100	101	157	16	125	52	100	89
	160	161	157	15,5	155	54	102	119







Flange Connection acc. DIN PN 40

DN	ØD scale range: ≧0,6 bar	ØD scale range: ≦400 mbar	Ød4	Øk	M	h case diam. 100	h case diam. 160
15	105	157	45	65	M12	109	139
20	105	157	58	75	M12	106	136
25	115	157	68	85	M12	106	136
40	150	157	88	110	M16	106	136
50	165	165	102	125	M16	106	136

Male Fitting Flange

case Ø	h1	h2
100	117	120
160	147	150

Screwed Tube Connection acc. DIN 11851

DN	d5 acc. DIN 405 T1	h case diam. 100	h case diam. 160
25	RD 52 x 1/6	107	137
50	RD 78 x 1/6	113	143

Order Nos

Typ MA 15

							0				

Scale Ranges

0– 25 mbar	▷	56
0– 40 mbar	▷	57
0– 60 mbar	▷	58
0–100 mbar	▷	59
0–160 mbar	▷	60
0–400 mbar	▷	82
0–600 mbar	▷	83
-1 up to 0 bar	▷	31
-1 up to 0,6 bar	▷	32
-1 up to 1,5 bar	▷	33
-1 up to 3 bar	▷	34
-1 up to 5 bar	▷	35
0–0,6 bar	▷	01
0–1 bar	▷	02
0–1,6 bar	▷	03
0–2,5 bar	▷	04
0–4 bar	▷	05
0–6 bar	▷	06
0–10 bar	▷	07
0–16 bar	▷	08
0–25 bar	▷	09
Special range	▷	99

Nominal Pressure

10 bar (scale range ≦ 400 mbar)	▷	E
40 bar (scale range ≧ 0,6 bar)	▷	H

Measuring System

Measuring system of stainless steel 1.4571-Duratherm	▷	V
Measuring system coated with PTFE foil	▷	U

Connections

Lower connection BSP ½"	▷	87
Open flange with male fixing flange DN 50 (orifice plate ≧ 0,6 bar)	▷	FL
Flange connection DN 25, PN 40	▷	F2
Flange connection DN 50, PN 40	▷	F5
Screwed tube connection DIN 11851, DN 25	▷	M2
Screwed tube connection DIN 11851, DN 50	▷	M5

Measuring indication

Case with cam ring (bayonet type) bezel 100 mm	▷	L
Case with cam ring (bayonet type) bezel 160 mm	▷	M
Case acc. DIN 16006, diam. 100 mm	▷	O
Case acc. DIN 16006, diam. 160 mm	▷	P

Optional: Liquid Dampening

without liquid filling	▷	0
liquid filling (glyzerin)	▷	1
liquid filling with integrated contact module (Napris)	▷	2

Optional: Pointer

without special pointer	▷	0
adjustable set hand	▷	1
readjusting maximal pointer (scale range from 0–60 mbar)	▷	2

Optional: Contact Modules / Transducers

without alarm signal	▷	0
integrated contact module per datasheet KG 01 (scale range ≧100 mbar)	▷	1
integrated remote transmitter per datasheet	▷	2

Optional: Special Dial / Range etc.

without extras	▷	0
If any other extras are required please state in the ordering text	▷	S

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Diaphragm Pressure Gauge

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Typ MA 16

Application

Diaphragm pressure gauges are used for measuring pressure in difficult conditions. They are used to measure pressure whilst being uneffected by the media.

The diaphragm pressure gauge can easily be equipped with FISCHER contact modules and transducers.

All these electrical supplements are available intrinsically safe for application in hazardous areas.

Process connection may be a large size flange which enables the measurement of highly viscous media.

Special Features

- high overpressure safe
- contact modules or transducers as accessories
- moderate price
- manufactured acc. to DIN

Construction and Functioning

The diaphragm element consists of a thin convoluted membrane which is held between two flanged halves, where the bottom half incorporates the pressure entry.

The diaphragm deflects when a pressure is applied. By means of push rod and geared movement this deflection is converted into rotation of a concentric pointer to be indicated on a dial scale.

The value indicated is proportional to the pressure applied. Indication of measuring value is shown on a dial of 270°.



Technical Data

Measuring ranges	flange size 160 mm: 0...25 mbar up to 0...400 mbar flange size 100 mm: 0...6 mbar up to 0...25 bar (as per ordering code)
Accuracy class	class 1.6
Dial size	bayonet type case, diam. 100 or 160 mm, standard case acc. to DIN 16026
Operating temperature	ambient: -20° up to +60°C/media: +100°C
Temperature error when temperature of the pressure element deviates from +20°C	rising temperature: +0.6%/10 K falling temperature: –0.6%/10 K
Working pressure	steady: full scale value fluctuating: 0.9 x full scale value
Pressure connection	threaded entry per DIN 16288 G1/2 A open flange 1.4571, diam. 50 mm, with loose male fitting flange

Materials

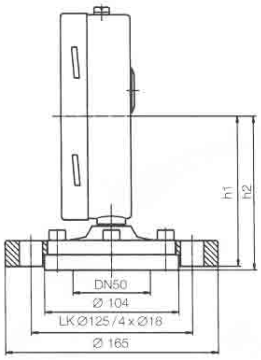
Case	steel, black painted
Dial	aluminium
Pointer	aluminium, black painted
Movement	brass
Flange connection	steel, black painted
Diaphragm	chrome-nickel-steel 1.4571 or Duratherm, corrosion resistance as 1.4571
Flange packing	FPM

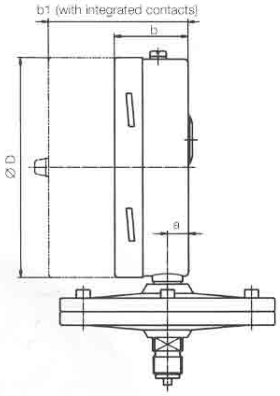
114 M / 2 / 698 F

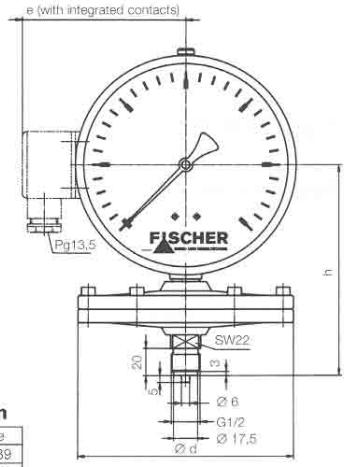
Dimensioned Drawings

Version with male fixing flange

Case Ø	h1	h2
100	117	120
160	147	150







Connection acc. to DIN 16288 Standard design

Range	Case Ø	Ø D	Ø d	a	h	b	b1	e
>= 0.6 bar	100	101	99	16	128	52	100	89
	160	161	99	15.5	158	54	102	119
<= 400 mbar	100	101	157	16	125	52	100	89
	160	161	157	15.5	155	54	102	119

Ordering Code

Diaphragm Pressure Gauge Type MA 16 [ ][ ] [ ] S [ ][ ] [ ] 0 0 [ ] [ ] [ ]

Measuring Ranges

0– 25 mbar	5	6
0– 40 mbar	5	7
0– 60 mbar	5	8
0– 100 mbar	5	9
0– 160 mbar	6	0
0– 400 mbar	8	2
-1– 0 bar	3	1
-1– 0.6 bar	3	2
-1– 1.5 bar	3	3
-1– 3 bar	3	4
-1– 5 bar	3	5
0– 0.6 bar	0	1
0– 1 bar	0	2
0– 1.6 bar	0	3
0– 2.5 bar	0	4
0– 4 bar	0	5
0– 6 bar	0	6
0– 10 bar	0	7
0– 16 bar	0	8
0– 25 bar	0	9
Special range	9	9

Nominal Pressure

10 bar (range ≦ 400 mbar)	E
40 bar (range ≦ 0.6 bar)	H

Measuring System: steel

Connection

Lower connection BSP 1/2"	7 7
Open flange with male fixing flange DN 50 (range ≦ 400 mbar)	F L

Measuring Indication

Case with cam ring (bayonet type) bezel 100 mm	L
Case with cam ring (bayonet type) bezel 160 mm	M

Optional: Pointer

Without special pointer	0
Adjustable set hand	1
Readjusting maximal pointer (range 0–60 mbar)	2

Optional: Contact Modules / Transducers

Without alarm signal	0
Integrated contact module per data sheet KE (range 100 mbar)	1
Integrated remote transmitter per data sheet KE	2
Integrated contact device per data sheet KB	4

Optional: Special Dial / Range etc.

Without extras	O
If any other extras are required please state in the ordering text	S

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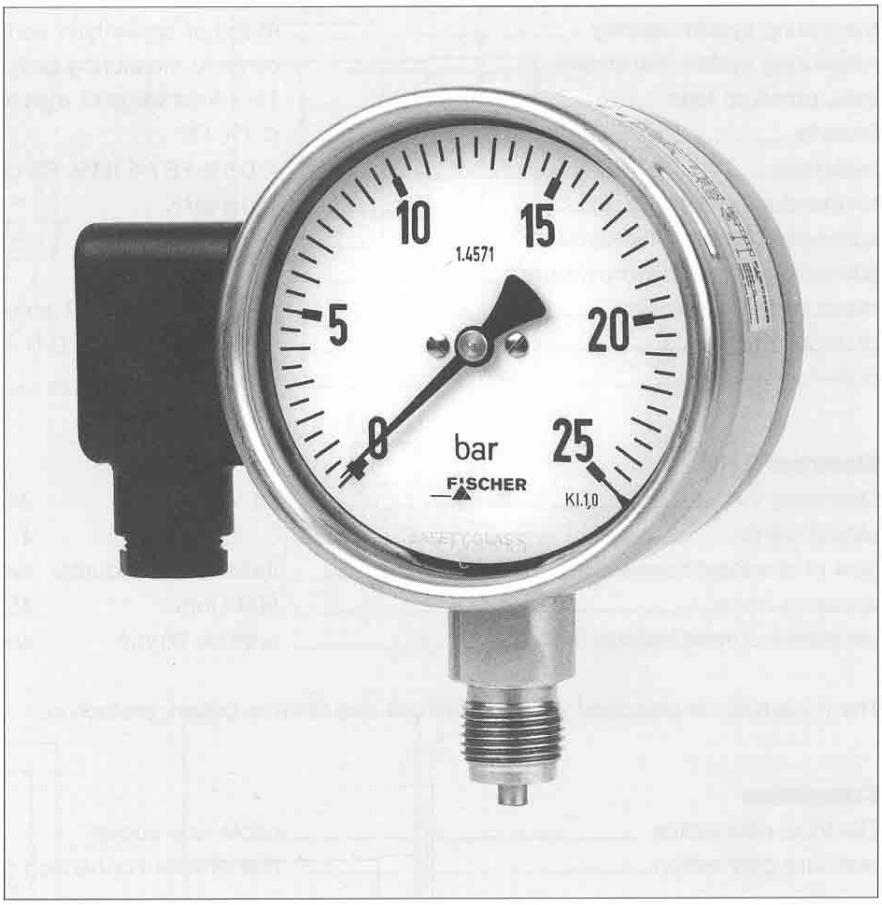
Type MA 32

Application

A transmitter manometer converts pressure values into standard electric signals.

These standard signals are suitable for being transmitted to displaying, recording or controlling receiver units. Large distances between the measuring point and the receiver unit can be bypassed whereby the signals are not tampered.

At the same time the transmitter manometer offers an analogous local display.



Main features

- Casing and measuring system of stainless steel
- Safety casing according to DIN EN 837-1
- Direct local pressure display
- Teletransmission of measured values

Construction and Functioning

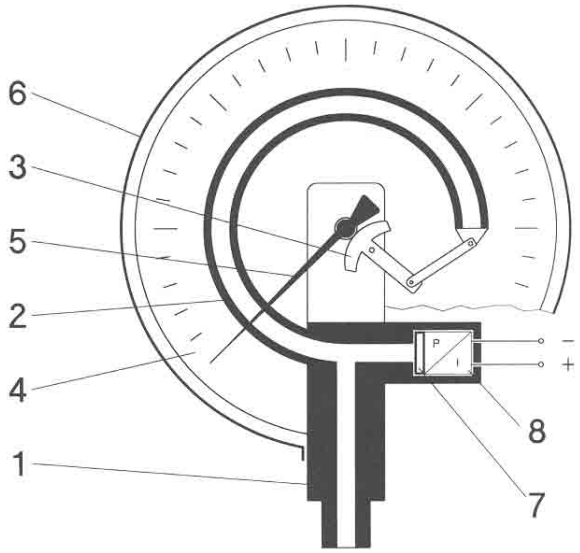
The transmitter-manometer consists of two measuring systems which are independent from each other.

A Bourdon-tube gauge is used for local display. An elastic deformation and a motion of the measuring system is caused by the pressure increase. This motion is transferred by the motion work which shifts the pointer in proportion to the pressure.

The standard electric signal is emitted by a ceramic measuring cell. The increasing pressure deforms the ceramic diaphragm, and consequently the DMS bridge fitted at the rear changes. An integrated electronic system converts the DMS bridge signals into standard electric signals.

Functional Diagram

1. connection shank
2. measuring element
3. motion work
4. dial face
5. pointer
6. casing
7. measuring cell
8. electronic conversion system



We reserve the right to technical changes

Technical Data

General

Measuring ranges	from 0...0,6 to 0...400 bar according to DIN EN 837-1 (see order code)
measuring system display	round or screw-type spring-tube manometer
measuring system transmitter	ceramic measuring cell
max. pressure load	1.3 x final value of measuring range
linearity	< 1% FS
hysteresis	< 0.5% FS / < 0.1% FS of electric output signal
temperature drift	< 0.4% / K
admissible ambient temperature	0...+ 60 °C
admissible medium temperature	0...+ 85 °C
measured value display	safety casing Ø 100 according to DIN EN 837-1
protection type	IP 54 according to DIN 40050
built-in position	vertical

Electrical Data

Operating voltage	24 V DC	24 V DC	24 V DC
output signal	0...20 mA	4...20 mA	0...10 V DC
type of electrical connection	three-wire conductor	two-wire conductor	three-wire conductor
apparent ohmic	500 Ohm	450 Ohm	> 2 kOhm
resistance current/voltage limitation	approx. 26 mA	approx. 26 mA	approx. 13 V DC

The transmitter is equipped with short circuit and reverse battery protection.

Connection

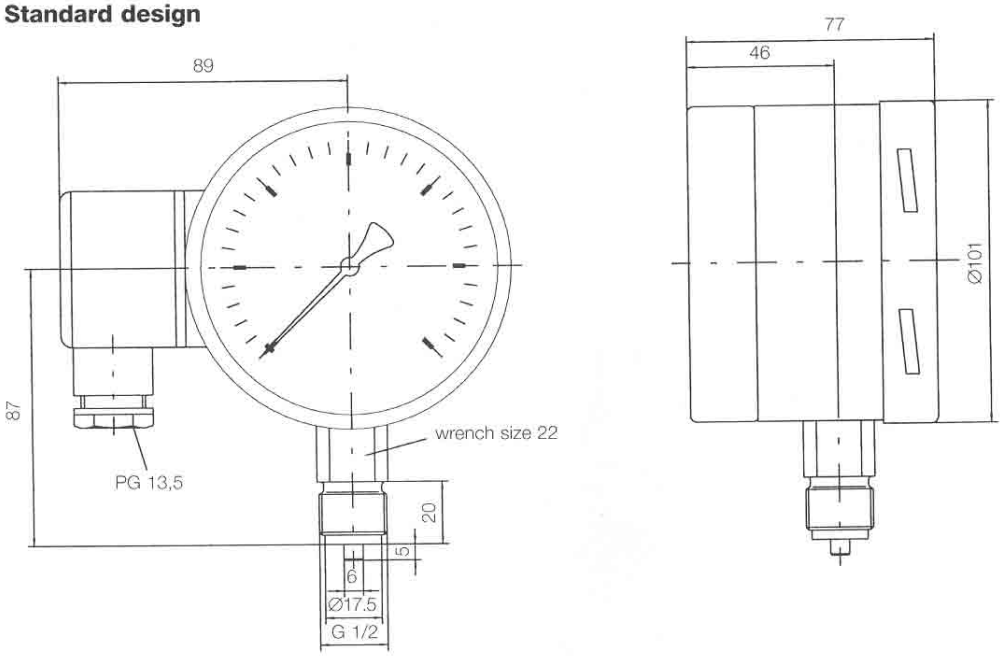
Electrical connection	cable wall socket
pressure connection	manometer connection peg according to DIN EN 837-1, below

Materials

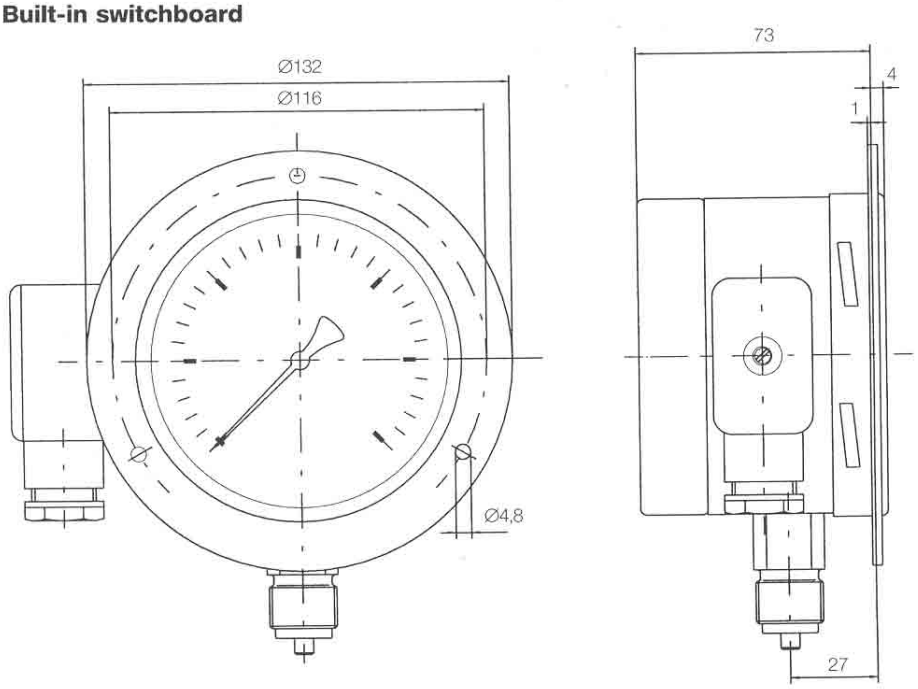
Measuring system	nickel chromium steel 1.4571, 1.4305 / ceramics
manometer casing	nickel chromium steel 1.4301
motion work	nickel chromium steel 1.4301
sealings that come in contact with medium	FPM
dial face and pointer	aluminium
inspection glass	multilayer compound glass

Dimensioned Drawings

Standard design

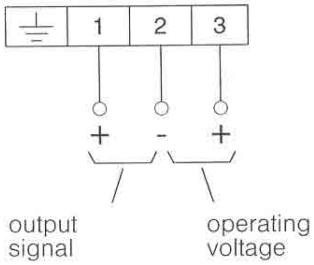


Built-in switchboard

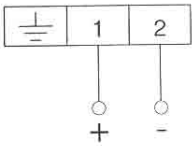


Electric wiring diagrams

Three-wire conductor



two-wire conductor



Ordering Code

Transmitter-Manometer **Type MA 32**

		0		8	7		K		0	0	0

Measuring Ranges

0– 0.6 bar	01
0– 1.0 bar	02
0– 1.6 bar	03
0– 2.5 bar	04
0– 4.0 bar	05
0– 6.0 bar	06
0– 10 bar	07
0– 16 bar	08
0– 25 bar	09
0– 40 bar	10
0– 60 bar	11
0– 100 bar	12
0– 160 bar	13
0– 250 bar	14
0– 400 bar	15
-1– +0 bar	31
-1–+0.6 bar	32
-1–+1.5 bar	33
-1– +3 bar	34
-1– +5 bar	35
-1– +9 bar	36
-1– +15 bar	37

Measured Value Display

Safety casing Ø100 according to DIN EN 837-1

Construction

Standard	O
front ring for panal mounting	G

Pressure Connections

Connection thread 1/2 below BSP

Output Signal

0...20 mA, three-wire conductor	A
4...20 mA, two-wire conductor	B
0...10 V, DC, three-wire conductor	C

Electrical Connection

Cable wall socket

1. Additional Block – Liquid filling

without liquid filling	0
damping liquid Parafin	1

FISCHER
MESS- UND REGELTECHNIK

Type MD 03

General Description

Diaphragm seals of the MD 03 series are designed for used in food and beverages industries, and conform to DIN 11851 standard specifications.



Applications

Diaphragm seals are used to isolate pressure / differential pressure measuring instruments such as gauges, transmitters, or sensors, from the media to be measured.

In the food and drinks industry, diaphragm seals must conform to standards of hygiene. Materials and manufacturing proceesses used ensure that they have the necessary corrosion resistance and functional safety.

All surfaces coming into contact with the product are processed extremely carefully to a fine degree of surface finish, and all media contact parts are free of undercuts and recesses, so that there are no places for micro-organisms or bacteria to accumulate.

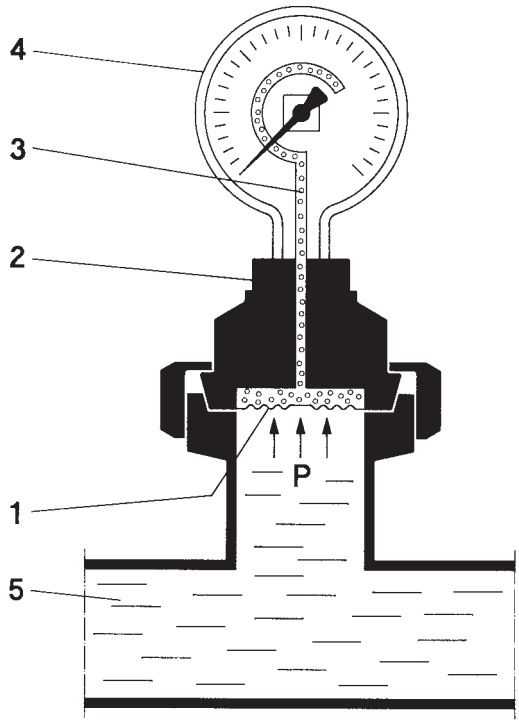
Conformity to DIN 11851 standards ensures quick installation and removal of diaphragm seals and measuring instruments, and therefore makes cleaning or sterilisation very simple.

Important Features

- can be sterilised
- easy installation and removal
- corrosion resistant materials
- conforms to DIN 11851 specifications

Principles of Operation

A diaphragm seal provides a fluid-filled isolation stage between the pressure medium (5) and sensitive parts of the measuring device (4). A flexible diaphragm (1) of suitable material (generally stainless steel) is the primary barrier between the pressure media and the measuring device. The space between the isolating diaphragm and the sensing surface of the measuring device is filled with special liquid (3), in this case vegetable oil. Media pressure (P) is transferred to the measuring device through the flexible diaphragm and filling liquid.



1. Diaphragm
2. Diaphragm seal housing
3. Filling liquid
4. Pressure measuring device
5. Pressure medium

032 M/2/0601 E

Specifications

Selection Criteria

To select a suitable diaphragm seal for a particular application, serval factors need to be considered:

- application details
- required displacement volume
- temperature of the pressure media

The manufacturer's recommendations should be followed.

Nominal size:	DN	25	32	40	50
Nominal pressure:	PN	40	40	40	25
Displacement volume:	cc	0.3	0.3	0.35	0.35

Instrument connection: Threaded socket: G½ or G¼

Process connection: DIN standard hygenic female threaded coupling

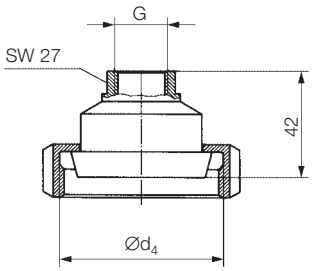
Liquid filling: Vegetable oil

Operating temperature: –10°C to +120°C

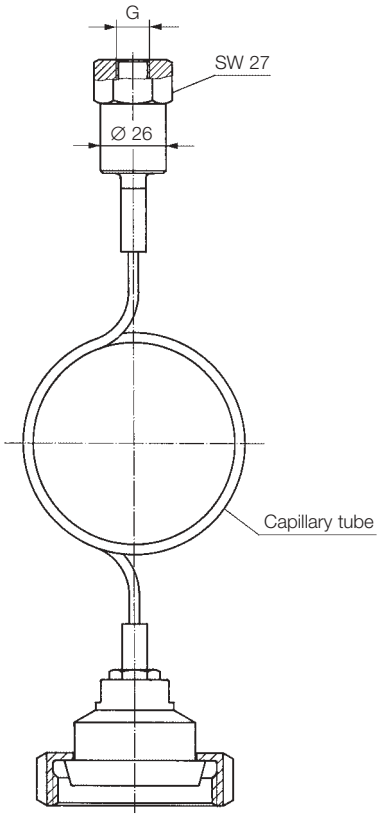
Instrument assembly: MD 03 diaphragm seals are available without or with capillary tube separation (1, 2.5, 5, 10 m). Without capillary tubing the diaphragm seal is directly coupled to the measuring device.

Materials

Diaphragm seal casing	Stainless steel 1.4571
Diaphragm	Stainless steel 1.4571
Process coupling	Stainless steel 1.4305
Capillary tubes and instrument socket	Stainless steel 1.4571



DIN	d_5 to DIN 405 T1	G
25	RD 52 x 1/6	G½
32	RD 58 x 1/6	G½
40	RD 65 x 1/6	G½
50	RD 78 x 1/6	G½



Odering Code

Diaphragm seals for food and beverage industries (per DIN 11851)

Type MD 03 — V

Nominal size

DN 25 (nominal pressure 40 bar) ▷	2	5
DN 32 (nominal pressure 40 bar) ▷	3	2
DN 40 (nominal pressure 40 bar) ▷	4	0
DN 50 (nominal pressure 25 bar) ▷	5	0

Nominal pressure rating

25 bar ▷	G
40 bar ▷	H

Material of measuring system

Instrument connection

Threaded socket G ½" (F) ▷	O	3	0	
1 m capillary tube with threaded coupling G ¼" (F) ▷	K	1	1	
2,5 m capillary tube with threaded coupling G ¼" (F) ▷	K	1	2	
5 m capillary tube with threaded coupling G ¼" (F) ▷	K	1	3	
10 m capillary tube with threaded coupling G ¼" (F) ▷	K	1	4	
1 m capillary tube with threaded coupling G ½" (F) ▷	K	3	1	
2,5 m capillary tube with threaded coupling G ½" (F) ▷	K	3	2	
5 m capillary tube with threaded coupling G ½" (F) ▷	K	3	3	
10 m capillary tube with threaded coupling G ½" (F) ▷	K	3	4	

Assembly

Diaphragm seal only ▷	0
Diaphragm seal assembled with pressure gauge/transmitter ▷	1

FISCHER
MESS- UND REGELTECHNIK

Type MD 26 / MD 36

General Description

Diaphragm seals are used to isolate pressure / differential pressure measuring instruments such as gauges, transmitters, or sensors, from the media to be measured. This becomes necessary in unfavourable operating conditions such as

- high media temperature
- corrosive media
- difficult measuring locations

Important Features

- corrosion resistant materials
- easy installation
- maintenance free

Principles of Operation

Diaphragm seals are added to pressure / differential pressure measuring devices to protect these from corrosive media, high media temperatures, and other difficult measuring conditions. A diaphragm seal provides a fluid-filled isolation stage between the pressure medium (5) and sensitive parts of the measuring device (4). A flexible diaphragm (1) of suitable material (generally stainless steel) is the primary barrier between the pressure media and the measuring device. The space between the isolating diaphragm and the sensing surface of the measuring device is filled with special liquid (3), e.g., silicone oil. Media pressure (P) is transferred to the measuring device through the flexible diaphragm and filling liquid.

As a rule, pressure seals and pressure gauge are assembled together, precharged with filling fluid, and supplied as one unit. The pressure measuring device is directly fastened to the diaphragm seal assembly, or connected to a remote diaphragm seal assembly by means of a capillary tube. The capillary tube versions are used to isolate high media temperatures from pressure measuring devices.

Selection criteria

To select a suitable diaphragm seal for a particular application, several factors need to be considered:

- chemical and physical properties of the pressure medium
- pressure displacement volume
- media temperature
- pressure measuring range

The manufacturer's recommendations on this subject should be considered. Regarding diaphragm seal size, the following guideline should be generally followed. Small displacement volume seals (Model MD 36) should be used for higher pressure and differential pressure ranges, particularly with electronic sensors / transmitters. Large displacement volume seals (Model MD 26) should be used for low pressure and differential pressure applications, particularly when mechanical gauges are used.



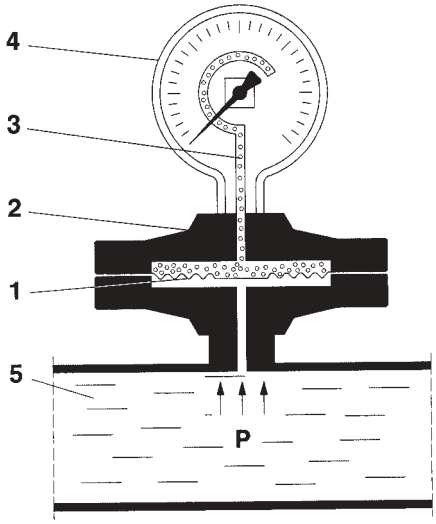
Lined system

For particularly aggressive media, all components coming into contact with the medium can be given a protective lining of pure PTFE. The lining is about 0.5 mm thick for the diaphragm, and about 2 mm thick for other media contact parts of the seal. O-rings used in such applications are FEP coated.

An economical alternative to PTFE is ECTFE lining, which has the same chemical resistance properties. The chemical resistance however, must be tested for each application before use.

A note regarding connections:

For diaphragm seals with PTFE / ECTFE lining, suitable sealing material (PTFE) must also be used for the process connections.



1. Diaphragm
2. Diaphragm seal casing
3. Filling liquid
4. Pressure measuring device
5. Pressure medium

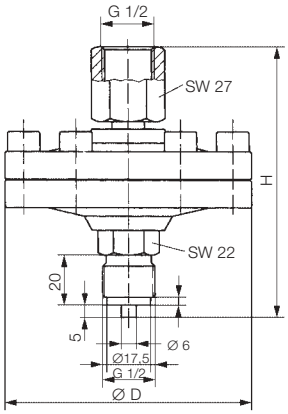
101 M/2/0601 E

Specifications

Type	MD 26	MD 36
Pressure rating	PN 40	PN 40
Effective diaphragm diameter	115 mm	60 mm
Displacement volume	6.2 cm^3	1.2 cm^3
Pressure connection: process side	Threaded plug: DIN 16288-B-G½ (M)	Threaded plug: DIN 16288-B-G½ (M)
Pressure connection: instrument side	DIN 16288-Z-G½	DIN 16288-Z-G½
Liquid filling	Silicone oil	Silicone oil
Operating temperature	– 20 °C to + 200 °C	– 20 °C to + 200 °C

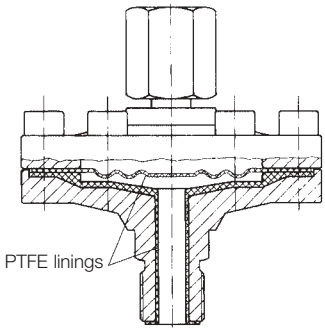
Materials

Diaphragm seal housing	Stainless steel 1.4571
Diaphragm	Stainless steel 1.4571
Screws	A 2
O-rings	FPM
Capillary tube	Stainless steel 1.4571

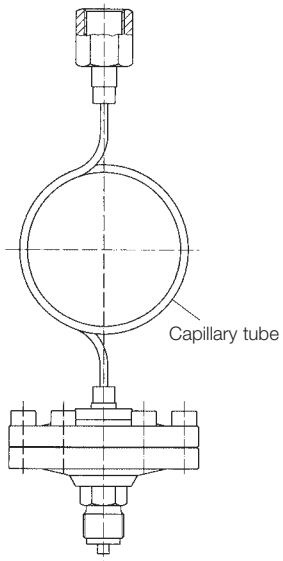


Standard configuration

Typ	øD	H
MD 26	157	106
MD 36	99	108



With PTFE linings



With capillary separation

Ordering Code

Diaphragm Seal Type MD

		8	7	H				

Diaphragm diameter
130 mm ▷ 2 6
75 mm ▷ 3 6

Process connection
Threaded socket: G½ (F)

Pressure rating
40 bar

Materials
Stainless steel ▷ V
Stainless steel with ECTFE coating ▷ T
Stainless steel with PTFE coating ▷ U

Instrument connection
Threaded socket G½ (F) ▷ O 30
1 m capillary tube with coupling G½ (F) ▷ K 31
2,5 m capillary tube with coupling G½ (F) ▷ K 32
5 m capillary tube with coupling G½ (F) ▷ K 33
10 m capillary tube with coupling G½ (F) ▷ K 34
1 m capillary tube with protective hose and coupling G½ (F) ▷ S 31
2,5 m capillary tube with protective hose and coupling G½ (F) ▷ S 32
5 m capillary tube with protective hose and coupling G½ (F) ▷ S 33
10 m capillary tube with protective hose and coupling G½ (F) ▷ S 34

Assembly
Diaphragm seal only ▷ 0
Diaphragm seal assembled with pressure gauge/transmitter ▷ 1

The following pressure instruments are compatible with diaphragm seal Models **MD 26/MD 36**:

MD 26
DA 03 (bar)
DS 11 (bar/mbar)
DA 12 (bar/mbar)
DS 13 (bar/mbar)
DE 16 (bar/mbar)
DA 09 (bar)
DA 04 (bar/mbar)

MD 36
DE 03 (bar/mbar)
MA 03 (bar/mbar)
MA 01 (bar/mbar)
ME 40 (bar/mbar)

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eMail: info@klaus-fischer.de · Internet: www.fischer.ag

FISCHER
MESS- UND REGELTECHNIK

Type MD 28 / MD 38

General Description

Diaphragm seals are used to isolate pressure / differential pressure measuring instruments such as gauges, transmitters, or sensors, from the media to be measured. This becomes necessary in unfavourable operating conditions such as

- high media temperature
- corrosive media
- difficult measuring locations

Important Features

- corrosion resistant materials
- easy installation
- maintenance free

Principles of Operation

Diaphragm seals are added to pressure / differential pressure measuring devices to protect these from corrosive media, high media temperatures, and other difficult measuring conditions. A diaphragm seal provides a fluid-filled isolation stage between the pressure medium (5) and sensitive parts of the measuring device (4). A flexible diaphragm (1) of suitable material (generally stainless steel) is the primary barrier between the pressure media and the measuring device. The space between the isolating diaphragm and the sensing surface of the measuring device is filled with special liquid (3), e.g., silicone oil. Media pressure (P) is transferred to the measuring device through the flexible diaphragm and filling liquid.

As a rule, pressure seals and pressure gauge are assembled together, precharged with filling fluid, and supplied as one unit. The pressure measuring device is directly fastened to the diaphragm seal assembly, or connected to a remote diaphragm seal assembly by means of a capillary tube. The capillary tube versions are used to isolate high media temperatures from pressure measuring devices.

Selection criteria

To select a suitable diaphragm seal for a particular application, several factors need to be considered:

- chemical and physical properties of the pressure medium
- pressure displacement volume
- media temperature
- pressure measuring range

The manufacturer's recommendations on this subject should be considered. Regarding diaphragm seal size, the following guideline should be generally followed. Small displacement volume seals (Model MD 38) should be used for higher pressure and differential pressure ranges, particularly with electronic sensors / transmitters. Large displacement volume seals (Model MD 28) should be used for low pressure and differential pressure applications, particularly when mechanical gauges are used.



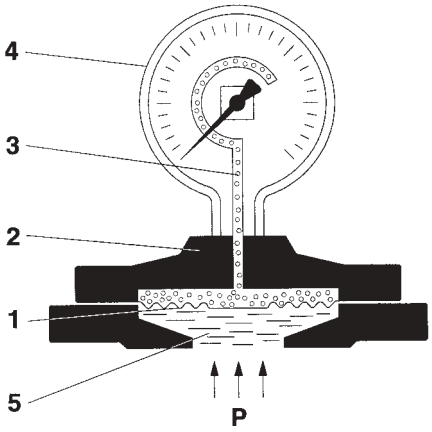
Lined system

For particularly aggressive media, all components coming into contact with the medium can be given a protective lining of pure PTFE. The lining is about 0.5 mm thick for the diaphragm, and about 2 mm thick for other media contact parts of the seal. O-rings used in such applications are FEP coated.

An economical alternative to PTFE is ECTFE lining, which has the same chemical resistance properties. The chemical resistance however, must be tested for each application before use.

A note regarding connections:

For diaphragm seals with PTFE / ECTFE lining, suitable sealing material (PTFE) must also be used for the process connections.



1. Diaphragm
2. Diaphragm seal casing
3. Filling liquid
4. Pressure measuring device
5. Pressure medium

102 M/2/0601 E

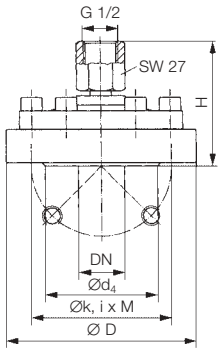
Specifications

Type	MD 28	MD 38
Pressure rating	PN 40	PN 40
Effective diaphragm diameter	115 mm	60 mm
Displacement volume	6.2 cm^3	1.2 cm^3
Pressure connection: process side	DIN flange DN 50, DN 65, DN 80	DIN flange DN 25, open connecting flange with clamping flange DN 50
Pressure connection: instrument side	DIN 16288-Z-G½	DIN 16288-Z-G½
Liquid filling	Silicone oil	Silicone oil
Operating temperature	– 20 °C to + 200 °C	– 20 °C to + 200 °C

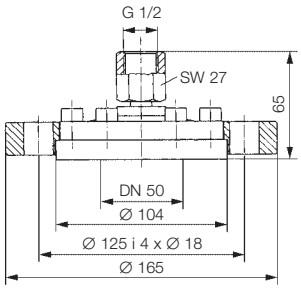
Materials

Diaphragm seal housing	Stainless steel 1.4571
Diaphragm	Stainless steel 1.4571
Screws	A 2
O-rings	FPM
Capillary tube	Stainless steel 1.4571

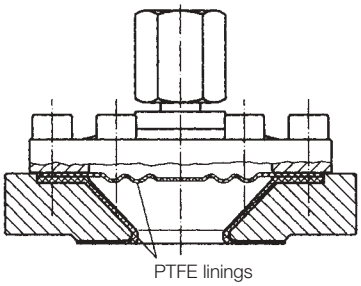
Typ	MD 38	MD 28	MD 28	MD 28
DN	25	50	65	80
øD	115	165	185	200
H	75	84	84	84
øk	85	125	145	160
i	4	4	8	8
M	M12	M16	M16	M16
$ød_4$	58	102	122	138



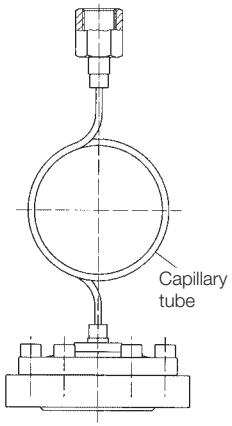
Standard configuration



With clamping flange Model MD 38



With PTFE linings



With capillary separation

Ordering Code

Diaphragm seals Type MD

[ ][ ] [ ][ ] **H** [ ] [ ][ ][ ] [ ]

Diaphragm diameter
130 mm ▷ 2 8
75 mm ▷ 3 8

Process connection
Connecting flange DN 25, PN 40, 75 mm ▷ F 2
Connecting flange DN 50, PN 40, 130 mm ▷ F 5
Open flange with clamping attachment
DN 50, PN 40, 75 mm ▷ F L
Connecting flange DN 65, PN 40, 130 mm ▷ F 6
Connecting flange DN 80, PN 40, 130 mm ▷ F 8

Pressure rating
40 bar

Materials
Stainless steel ▷ V
Stainless steel with ECTFE coating ▷ T
Stainless steel with PTFE coating ▷ U

Instrument connection
Threaded socket G½ (F) ▷ O 30
1 m capillary tube with coupling G½ (F) ▷ K 31
2,5 m capillary tube with coupling G½ (F) ▷ K 32
5 m capillary tube with coupling G½ (F) ▷ K 33
10 m capillary tube with coupling G½ (F) ▷ K 34
1 m capillary tube with protective hose and coupling G½ (F) ▷ S 31
2,5 m capillary tube with protective hose and coupling G½ (F) ▷ S 32
5 m capillary tube with protective hose and coupling G½ (F) ▷ S 33
10 m capillary tube with protective hose and coupling G½ (F) ▷ S 34

Assembly
Diaphragm seal only ▷ 0
Diaphragm seal assembled with pressure gauge/transmitter ▷ 1

The following pressure instruments are compatible with diaphragm seal Models **MD 28/MD 38**:

MD 28
DA 03 (bar)
DS 11 (bar/mbar)
DA 12 (bar/mbar)
DS 13 (bar/mbar)
DE 16 (bar/mbar)
DA 09 (bar)
DA 04 (bar/mbar)

MD 38
DE 03 (bar/mbar)
MA 03 (bar/mbar)
MA 01 (bar/mbar)
ME 40 (bar/mbar)

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FISCHER
MESS- UND REGELTECHNIK

Type ME 01

Applications

Electronic manometer with ceramic measuring cell for pressure or vacuum measurements.
For on-site read-out and remote transfer of measurements.
Measuring ranges from 0…1.0 bar to 0…400 bar.

For many applications in the following fields:

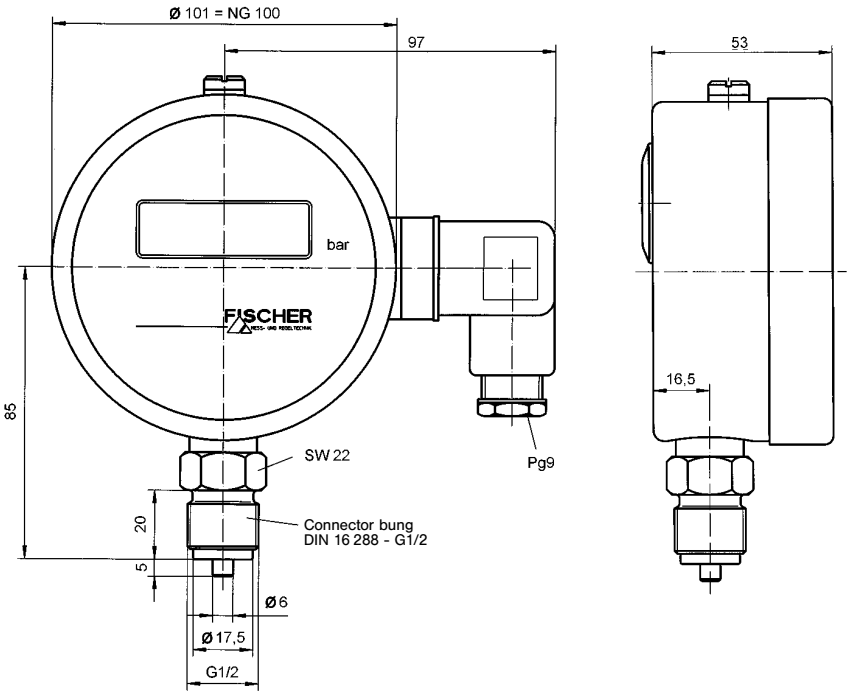
- Control engineering
- Process control
- Environmental engineering
- Machine and system construction



Main features

- Direct measuring sensor without transfer fluid
- High degree of protection against vibration
- High accuracy
- Over-pressure safety
- Low hysteresis

Dimensioned Drawing



Construction and functioning

A ceramic measuring cell is used as a pressure sensor. The highly robust ceramic materials used allows the system to be used in conjunction with aggressive media.

A resistive bridge is located on the side of the system which comes into contact with the medium. When pressure is applied, the diaphragm changes form within its elastic range. Simultaneously, the resistive values of the bridge change in proportion with and to the pressure to be measured. These values are converted by the internal electronics and displayed.

A standard 0…20 mA electric signal is available to transfer values to a remote position via three-wire system.

ME 01 Technical Data

Measuring range	0…1 bar to 0…400 bar (ref. ordering code)
Over-pressure safety	2x measuring range to 60 bar, 1.5x measuring range over 60 bar
Linearity	± 1% of measuring range
Hysteresis	smaller 0.5 % of measuring range
Permissable ambient temp.	0 to 60°C
Permissable medium temp.	0 to 85°C
Pressure connection	G½ bung in accordance to DIN 16 288
Electrical connection	90 degree connector DIN 43 650
Protection class	IP 54 in accordance with DIN 40 050

Materials

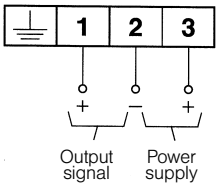
Wetted parts	Chrome-Nickel-Steel 1.4305, Ceramic, Viton
Housing	Chrome-Nickel-Steel 1.4301
Front glass	Safety glass

Electrical data

Power supply	24 V DC ± 20 %
Output signal	0…20 mA, independent from digital read-out
Electrical connection	3-wire
Load at nominal voltage	500 Ohm
Current limitation	approximately 30 mA
Temp. drift at zero point	0.4 % FS / 10°K
Temp. drift over meas. range	0.1 % FS / 10°K

Electrical connections

Three-wire-connection



Ordering Code

Digital Manometer **Type ME 01** | | | 0 | 8 | 7 | A | H | 9 |

Measuring ranges

0… 1 bar	T 0 2
0… 1.6 bar	T 0 3
0… 2.5 bar	T 0 4
0… 4 bar	T 0 5
0… 6 bar	T 0 6
0… 10 bar	T 0 7
0… 16 bar	T 0 8
0… 25 bar	T 0 9
0… 40 bar	T 1 0
0… 60 bar	T 1 1
0…100 bar	T 1 2
0…160 bar	T 1 3
0…250 bar	T 1 4
0…400 bar	T 1 5
-1… 0 bar	T 3 1
-1… 0.6 bar	T 3 2
-1… 1.5 bar	T 3 3
-1… 3 bar	T 3 4
-1… 5 bar	T 3 5
-1… 9 bar	T 3 6
-1… 15 bar	T 3 7

Construction
Standard

Pressure connection
Connector bung G ½ A (acc. to DIN 16 288)

Electrical output signal
0…20 mA, three-wire-connection
4…20 mA, three-wire-connection (on request)

Electrical connection
Plug connector acc. to DIN 43 650

Power supply
24 V DC ± 20 %

Pressure Transmitter

Water- and Waste Water Treatment
Electro Plating

FISCHER
MESS- UND REGELTECHNIK

ME69

Applications

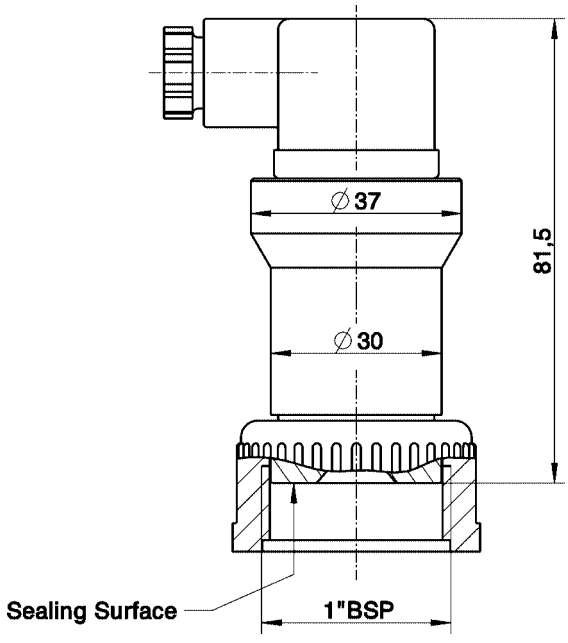
The ME 69 type pressure transducer is designed to detect the process pressure in water treatment plants and electroplating plants.
Because of its “all plastics”design and its corrosion free characteristic feature derived therefrom, the ME 69 is best suitable in applications where transducers with metallic housings or process connections will be destroyed within a few days. Typical applications can be found in sys-tems and plants for treatment of

- potable water
- service water
- process water
- waste water
- electroplating vats

The transmitter consists of a ceramic sensor with connected electronics. Under process pressure the diaphragm of the ceramic sensor is deflected in relation to the pressure supplied. Depending thereof the output signal of the bridge circuit on the back of the ceramic sensor is varying. The value change of the signal is proportional to the change in process pressure. The downstream electronic is amplifying the signal to the standard range of 4 ... 20 mA.The pressure transmitter ME 69 is available in standard ranges from 0... 0,6 bar up to 0...10 bar. The process connection is done as 1 inch nut which fits directly onto standard plastic pipe fittings. All wetted parts are made from ceramic or plastics (PVC). The housing is made from POM and the transmitter is suitable for agressive environments. Gaskets are from PEEK and can withstand even extreme conditions.



Dimensional Drawing



Subject to change without notice!

Fischer - Meß- und Regeltechnik GmbH - Bielefelder Str. 37a - D-32107 Bad Salzuflen - Tel.: (0 5222) 974-0 - Fax: (0 5222) 7170
eMail: info@klaus-fischer.de - Internet: www.fischer.ag

Technical Data

Measuring ranges in bar	0-0,6	0-1	0-1,6	0-2,5	0-4	0-6	0-10
Max. pressure in bar	1,5	2	3	5	8	12	20

Linearrity	< 1 % FS
Hysteresis	< 0,5 % FS
Nominal temperature range	0 .. 60 °C
Max. temperature range	0 .. 85 °C
Storage ambient temperature	0 .. 85 °C
Pressure connection	G 1"
Electrical connection	plug connector
Protection class	IP 65 acc. to DIN 40 050
Material wetted parts	plastics: PEEK, gasket: Viton
Material housing	POM, PVC

Electrical data

Power supply	24 V DC (12 - 30 V DC)
Electrical connection	2 - wire connection
Output signal	0 ..20 mA,
Load	600 Ohms
Current limit	ca. 26 mA
Temperature drift of zero	0,4 % / 10 K
Temperature drift of measuring range	0,05 % / 10 K

The transmitter is protected against reverse connection and short circuit

Ordering Code

Pressure Transmitter Typ ME 69 [ ][ ] D 2 [ ] 0 H 9

Ranges

0.....0,6 bar	0 1
0.....1 bar	0 2
0.....1,6 bar	0 3
0.....2,5 bar	0 4
0.....4 bar	0 5
0.... 6 bar	0 6
0....10 bar	0 7

Pressure connection
DN 20 - G 1"

Output

0 - 20 mA, 3 - wire	A
4 - 20 mA, 2 - wire	B
0 - 10 V DC, 3 - wire	C

Electrical connection
Plug connector acc. to DIN 43 650

Power supply
24 V DC +/- 10 %

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Type ME 71

General Description

The type ME 71 pressure transmitter uses a capacitance type sensor and modern microprocessor technology. It is ideally suited for measuring positive and negative gage pressure in applications where a high degree of accuracy is required. It is optionally available in versions certified for use in hazardous locations.



Features

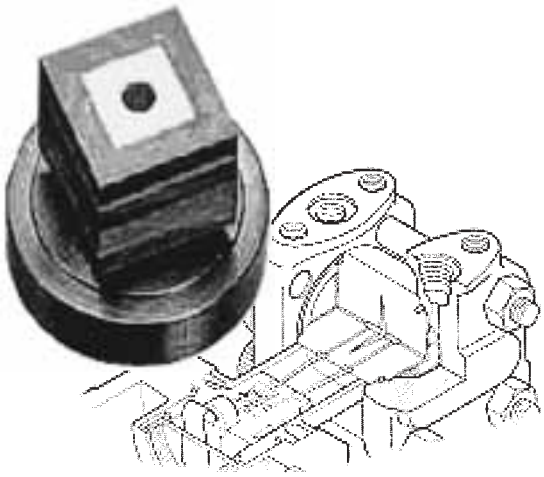
- robust, wear resistant sensor
- high resistance to corrosion
- high degree of functionality
- excellent long term stability
- low hysteresis
- not affected by fouling of pressure chambers
- capacitance type silicon sensor
- microprocessor technology

Principles of Operation

The type ME 71 pressure transmitter uses a silicon capacitance sensor with a bridge measuring circuit, the output of which changes when the pressure changes.

Modern microprocessor technology is used to convert the bridge output to a standard 4-20 mA signal, which permits the measured value to be transmitted over long distances. A HART® interface is also available, using an optional communication module installed in the transmitter. With the HART® interface, digitally transmitted pressure measurements, as well as the transmitter's set-up data can be read very accurately by simply connecting a compatible terminal device at any point along the length of the signal output loop. Also, the terminal device can also be used to re-configure the transmitter's set-up parameters: locally, or from a remote location.

The Measuring System



The ME 70 transmitter uses a precision silicon capacitance type pressure sensing element, which is manufactured under stringently controlled condition. This sensor is rugged, resistant to effects of fatigue and overloading, and unaffected by pressure fluctuations. The sensor and microprocessor based signal processing ensure the highest possible accuracy and stability.

148 M/2/0601 E

Specifications

General

Measuring ranges	0 – 130 mbar to 0 – 1.3 bar. Max. static pressure: 5 bar 0 – 500 mbar to 0 – 5 bar. Max. static pressure: 15 bar 0 – 3 bar to 0 – 30 bar. Max. static pressure: 90 bar 0 – 10 bar to 0 – 100 bar. Max. static pressure: 150 bar
Linearity	< 0.1%
Hysteresis	< 0.1%
Temperature coefficient	< 0.5% / 10°K
Operating temperature ambient	-10° to +70°C.
Operating temperature media	0° to +80 °C
Protection Class	IP 67

Electrical

Supply voltage	24 V DC (15 – 30 V DC)
Power consumption	Approx. 2 W
Dielectric strength	500 V AC
Output signal	4 – 20 mA. Optional: HART® interface, using communication module (option -K: see ordering code)
Output load	Max. 600 Ohm (minimum 250 Ohms with communication module installed)
Output current limit	25 mA
Built-in display (optional)	Analog display with 0-100% scale Digital display (only with communication Module option -K installed)

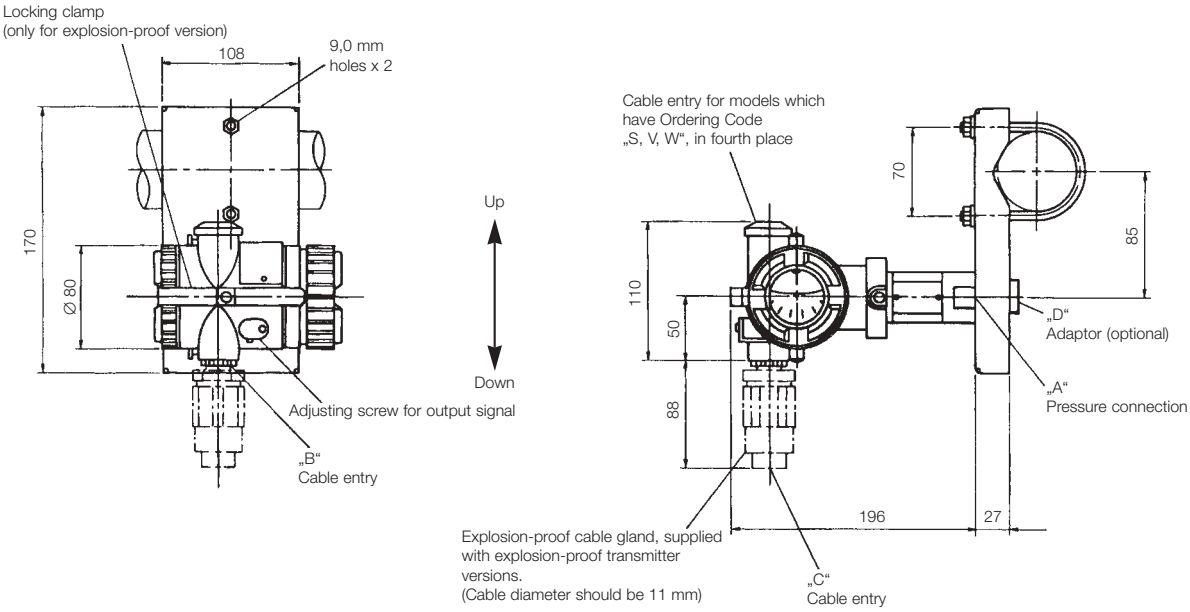
Connections

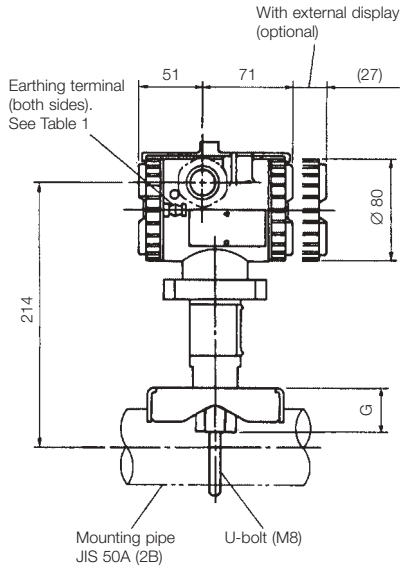
Electrical connections	Internal terminal block
Pressure connection	1/2" NPT(F) threaded socket

Materials

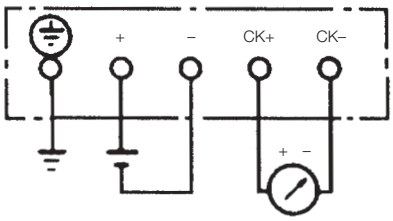
Parts in contact with media	Stainless steel 316 L (1.4404)
Seals	Viton. optional: teflon
Electronics housing	Aluminium (surface coated)
CE marking	The ME 71 transmitter carries the CE mark, and complies with EMV specifications EN 50082–1 and EN 50082–2

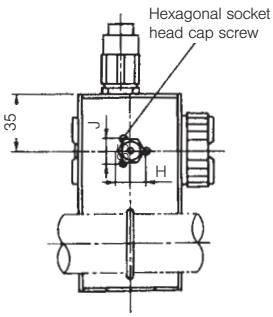
Dimensional Drawings





Electrical connections





Ordering Code

Absolute Pressure Transmitter Type ME 71

	V							O	Y	O

Communication Module

Without communications module ..... ▷ H
With communications module ..... ▷ K

Electrical connection: PG 13.5

Range

0– 130 mbar to ... 1.3 bar ..... ▷ 1 V
0– 0.5 bar to ... 5 bar ..... ▷ 2 V
0– 3 bar to ... 30 bar ..... ▷ 3 V
0– 10 bar to ... 100 bar ..... ▷ 4 V

Display

Without display ..... ▷ A
With analog display scale 0 – 100% ..... ▷ B
With digital display (only with option -K installed) ..... ▷ L

Hazardous location approval

Not approved for hazardous locations ..... ▷ A
Intrinsically safe per E Ex i a II C T4/T5 ..... ▷ K
Explosion-proof per Ex d II C T5/T6 ..... ▷ X

Mounting bracket kit

Without mounting bracket kit ..... ▷ A
With mounting bracket kit (stainless steel) ..... ▷ C

Instrument tag plate

Without tag plate ..... ▷ Y
Stainless tag plate with customer application data ..... ▷ B

Sensor filling liquid

Silicone oil ..... ▷ Y
Fluorinated oil for oxygen service ..... ▷ A

Pressure connection: 1/4 NPT inside 7/16.UNF

Contact Pressure Gauge
(for heavy measuring conditions)

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Type MS 11

Application

Contact pressure gauge, especially suited for heavy measuring conditions, e.g. in case of pressure shocks, vibration, numerous or exacting breaking capacity. The separated drive of the indication- and switching function guarantees a high operation safety.

The pressure chamber and the measuring diaphragm are available in different materials to meet the various requirements.



Application Fields

- winning of drinking water
- process technology
- terotechnology
- water economy
- pneumatic transporter

Main Features

- 2 change-over microswitches
- high repeatability
- switching function independent of the indication
- vibration resistant
- long service life
- rugged diaphragm system
- all measuring ranges overpressure safe up to 25 bar

Construction and Operation

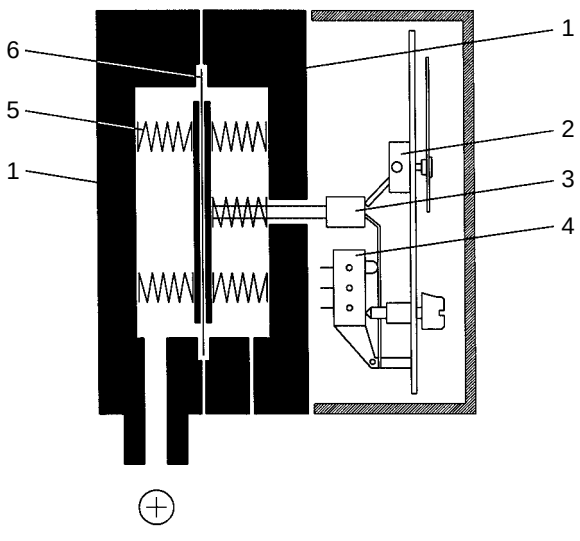
The measuring system is based on a rugged and uncomplicated diaphragm movement, suitable for overpressure and partial vacuum pressure measurements.

In a state of equilibrium, the forces of the springs on both sides of the diaphragm are balanced. The pressure to be measured creates an unbalanced force at the diaphragm. This force moves the diaphragm system against the force of the springs for the measuring range until a new equilibrium is reached. When subjected to excessive pressure, the diaphragm rests on metal supporting plates.

A centre-mounted tappet transfers the motion of the diaphragm system to the indicator movement and to the initiating elements of the microswitches.

Functional Diagram

1. Pressure chamber
2. Movement
3. Tappet
4. Initiating elements for microswitches
5. Measuring springs
6. Measuring diaphragm



300 M/2/0900 E

Technical Data

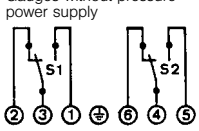
General

Measuring ranges	0…400 mbar to 0…25 bar (acc. to ordering code)
Nominal pressure	25 bar
Max. pressure load	overpressure protected up to nominal pressure of the measuring system (all measuring ranges), vacuum protected
Permissible ambient temperature	-10…+ 70 °C
Permissible medium temperature	70 °C
Protection class	IP 54 acc. to DIN 40 050
Mounting position	as desired
Measuring accuracy	± 1,6 % of full scale range
Zero-adjustment	located in the dial

Switching Elements

Contact output	1 or 2 microswitches, 1-channel change-over contact
Adjustment of switching points	external adjustment by standard value scales smallest adjustable value: approx. 5 % of full scale range
Switching hysteresis	approx. 2,5 %
Load data/contacts	U ~ max. = 250 VAC, I max. = 5 A, P max. = 250 VA U = max. = 30 VDC, I max. = 0,4 A, P max. = 10 W

Gauges without pressure power supply



Connection

Electrical connection	numbered cable, prewired cable terminal box, 7-channel plug
Pressure connection	connection shank BSP 1/2 male, DIN 16 288

Measuring System

Measuring range ≦ 10 bar	measuring spring-diaphragm system
Measuring range ≧ 16 bar	diaphragm measuring system

Material

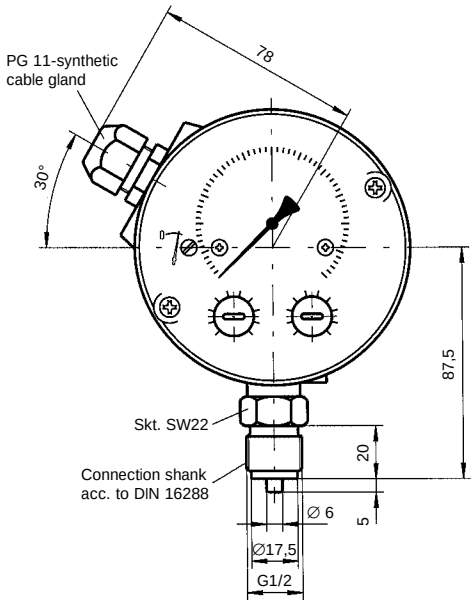
Pressure chamber	aluminium Gk Al Si 12 (Cu), varnished black; aluminium Gk Al Si 12 (Cu) HART COAT; chrome nickel steel 1.4305
Measuring diaphragm	diaphragm and gaskets of NBR or VITON diaphragm element of DURATHERM NiCrCo-alloy
Medium-contacted internal parts	noncorrosive steel 1.4310, 1.4305
Dial cover	macrolon
Weight	pressure chamber Al = 1,2 kg; pressure chamber 1.4305 = 3,5 kg

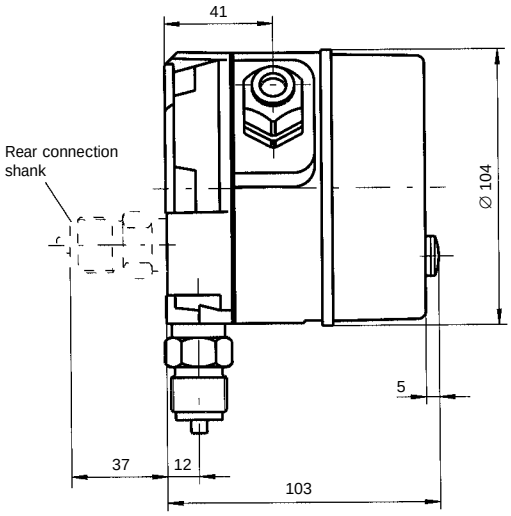
Approval — prototype test acc. to German Lloyd is possible
CE-certification — acc. to valid instructions

Mounting
pipe mounting: connection shank acc. to DIN 16 288
wall mounting: 3 fastening elements, bottom pressure connection
panel mounting: with front-ring, 132 mm diam., bottom or rear pressure connection

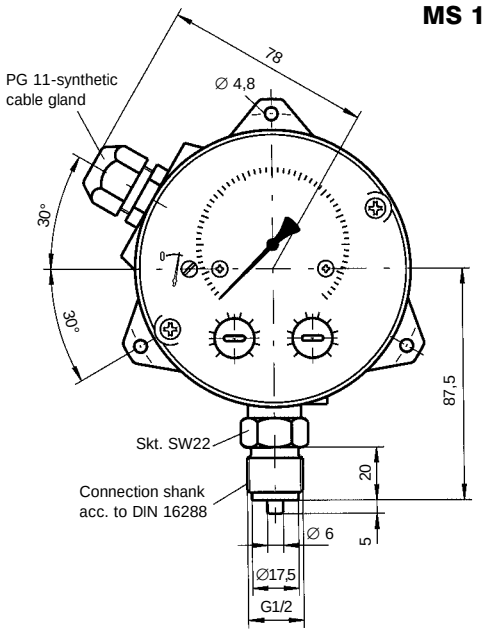
Accessories — manometer accessories acc. to datasheet MZ…
e.g. manometer valves,
wall mounting device acc. to DIN 16 281
several connecting pieces

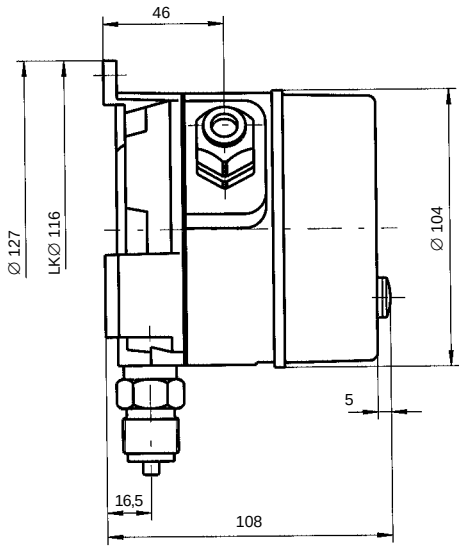
MS 11 Standard Version



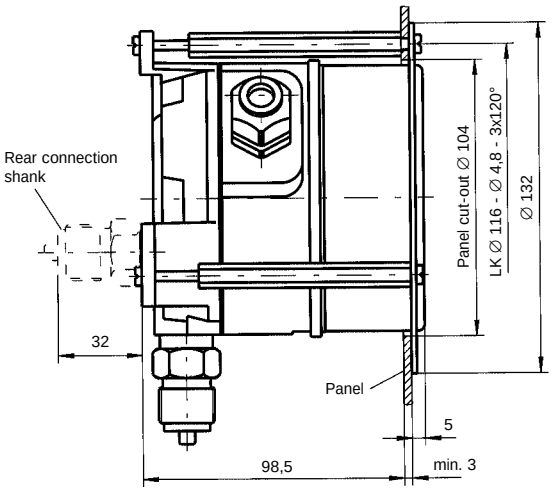


MS 11 Wall Mounting

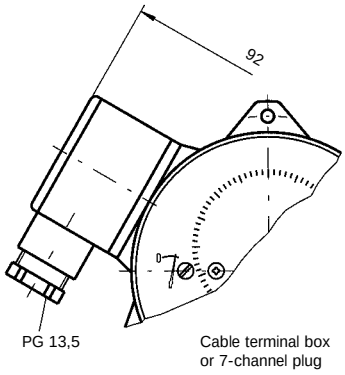




MS 11 Panel Mounting



Variants of Electrical Connections



Ordering Code

Contact Pressure Gauge **Type MS 11** [ ][ ] [ ] [ ] [0] [ ] [ ] [ ]

Measuring Ranges

0 – 400 mbar	83
0 – 0,6 bar	01
0 – 1 bar	02
0 – 1,6 bar	03
0 – 2,5 bar	04
0 – 4 bar	05
0 – 6 bar	06
0 – 10 bar	07
0 – 16 bar	08
0 – 25 bar	09
-0,6 – 0 bar	30
-1 – 0 bar	31
-1 – 0,6 bar	32
-1 – 1,5 bar	33
-1 – 3 bar	34
-1 – 5 bar	35

Measuring Diaphragm/Gaskets

NBR	NBR	N
VITON	VITON	V
DURATHERM®	NBR for measuring range ≧ 16 bar	D
DURATHERM®	VITON for measuring range ≧ 16 bar	E

Pressure Chamber

Aluminium	A
Aluminium HART COAT	D
Chrome nickel steel 1.4305	W

Pressure Connections

Bottom connection shank, BSP 1/2 male	O
Rear connection shank, BSP 1/2 male	H
Wall mounting, pressure connection, BSP 1/2 male	B
Front ring for panel mounting, bottom pressure connection, BSP 1/2 male	G
Front ring for panel mounting, rear pressure connection, BSP 1/2 male	L

Switches

1 adjustable microswitch	A
2 adjustable microswitches	B

Electrical Connection

Numbered cable, 1 m long, prewired	1
Numbered cable, 2,5 m long, prewired	2
Numbered cable, 5 m long, prewired	5
Cable terminal box	K
7-channel plug	W