Diaphragm Seals for Pressure Gauges

DRM

- Measuring ranges: 0...1 bar to 0...1600 bar
- Cavity free measuring points for special hygienic conditions
- t_{max}: 350 °C
- Protection of the measuring device against aggressive, highly viscous, solidifying or crystallising measured medium
- Transmission lines enable high temperatures of the medium to be measured
- Protection of the measuring device against vibrations by use of capillary tube
- Damping of pressure changes and pressure peaks

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Description

Diaphragm seals are partitions for pressure gauges that prevent the material being measured penetrating the measuring system. For measuring pressure in the food industry the use of diaphragm seals are mostly indispensable. With the right choice of diaphragm seal systems it is possible to solve measuring problems that can often not be overcome with the pressure gauge alone.

Application

KOBOLD membrane diaphragm seals are used when the pressure gauge cannot stand up to the requirements of the measuring position. Diaphragm seals transmit the pressure to be measured over that of the transmission fluid that is separated from the medium to be measured by means of the membrane. The transmitted pressure affects the pressure gauge, pressure switch or pressure sensor. The diaphragm seals can be connected to the pressure gauge either directly, or indirectly using a transmission line. Diaphragm seal and pressure gauge are joined together at the works to create one unit. Assembly and adjustment are carried out with extreme precision and years of experience.

Areas of Application

- Hygienic requirements for the food and pharmaceutical sector
- Media enriched with solids
- Crystallising measured medium
- Polymerising measured medium
- High viscosity measured medium
- Corrosive measured medium
- Toxic and environmentally hazardous measured medium
- Very low measured medium temperature
- Very high measured medium temperature
- Batch changing without product residues in the measuring system

Characteristics

A diaphragm seal barely influences the characteristics of a pressure gauge. The following items do influence them:

Fill and work volumes

The diaphragm seals only contain the minimum amount of pressure transmission fluid required for temperature and pressure. This volume covers what is needed for the pressure gauge, the compressibility and the thermal expansion.

Membrane

The membranes used are optimally coordinated with the corresponding diaphragm seals.

Transmission line

Reduced volume transmission lines are used to keep the influence on the measuring system as small as possible. Transmission lines are however indispensable for high measured media temperatures, pressure or system pulsation or for unfavourably positioned measuring points.

Pressure Transmission Fluid

The pressure transmission fluid transmits the pressure from diaphragm seal to pressure gauge. There are various fluids that can be used, depending on the operational conditions. All these fluids fulfil the requirement for minimum compressibility and lowest thermal expansion. Glycerine (up to +80 °C) and liquid paraffin (from -10…+120 °C) are used as siliconfree fluids.

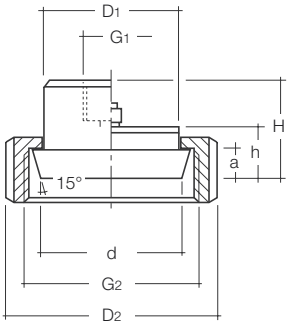
Operating Conditions

Since the proper pressure indication depends on the tempe rature of the fill fluid the pressure gauge with diaphragm seals can be adjusted for the operating conditions. To keep these errors to a minimum, the measuring systems are configured to suit the ambient and measured medium temperatures of the application. Without readings the gauges are as standard calibrated to a temperature of +20 °C (±2 °C). Gauges with a transmission line are set without a height differential between gauge and diaphragm seal. Other height differentials must be stated when ordering because this greatly influences the accuracy of measurement, especially within small measuring ranges.

Materials

All diaphragm seals are made of 1.4571 or 1.4404 stainless steel, as a matter of principle. Other materials can however be used for the membranes or the whole diaphragm seal. It is also possible to coat the diaphragm or the whole diaphragm seal – for example with PFA.

Accessories are listed as of page 40.



Diaphragm Seal DRM-602/603 with union nut according to DIN 11851 (sanitary connection)

Measuring range:	0…1 bar to 0…40 bar (depending on nominal size)
Temperature range:	-10…+200°C (not with electr. transmitter)
Material:	st. steel 1.4301, st. steel 1.4571, others on request
Diaphragm:	flush mounted, st. steel 1.4571
Max. length of capillary tube:	up to 10 m, if required with if required with protection hose
Filling fluid:	compatible with foodstuffs

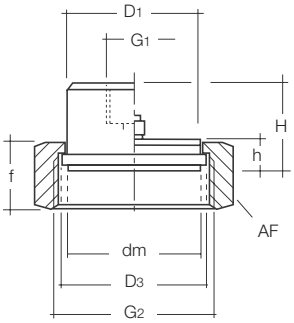
Model for direct mounting	Model for capillary tube	G2	D1	D2	G1	DN	d	a	h	H
DRM-602 R20	-	Rd44 x 1/6"	30	54	G ½	20	32	8	16	31
DRM-602 R25	DRM-603 R25	Rd52 x 1/6"	35	63	G ½	25	40	8	16	31
DRM-602 R32	DRM-603 R32	Rd58 x 1/6"	70	70	G ½	32	46	11	16	32
DRM-602 R40	DRM-603 R40	Rd65 x 1/6"	48	78	G ½	40	52	11	16	32
DRM-602 R50	DRM-603 R50	Rd78 x 1/6"	61	92	G ½	50	64	11	16	32
DRM-602 R65	DRM-603 R65	Rd95 x 1/6"	79	112	G ½	65	84	13	16	32
DRM-602 R80	DRM-603 R80	Rd110 x 1/4"	93	127	G ½	80	96	13	16	32
DRM-602 R1H	DRM-603 R1H	Rd130 x 1/4"	114	148	G ½	100	117	13	16	32

100 °C	200 °C	max. medium temperature

Diaphragm Seal DRM-602G with round thread according to DIN11851 (for counterpiece with union nut)

Model for direct mounting	Model for capillary tube	G2	D1	D2*	G1	DN	d**	a	h	H
DRM-602 G25	-	Rd52 x 1/6"	30	(63)	G ½	25	43	11	16	32
DRM-602 G32	-	Rd58 x 1/6"	32	(70)	G ½	32	49	11	16	32
DRM-602 G40	-	Rd65 x 1/6"	38	(78)	G ½	40	55	11	16	32
DRM-602 G50	-	Rd78 x 1/6"	50	(92)	G ½	50	64	11	16	32

max. medium temperature 100°C *D2= existing on customer side only **d = start of cone of thread connection

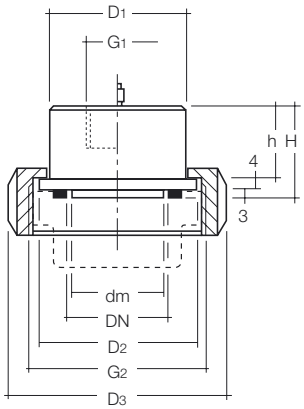


Diapgragm Seal DRM-604/605 with union nut according to IDF standard

Measuring range:	0…1 bar to 0…100 bar (depending on nominal size)
Temperature range:	-10…+200°C (not with electr. transmitter)
Material:	st. steel 1.4301, st. steel 1.4571, others on request
Diaphragm:	front flush, st. steel 1.4571
Max. length of capillary tube:	up to 10 m, if required with protection hose
Filling fluid:	compatible with foodstuffs

Model for direct mounting	Model for capillary tube	G2IDF	D1, dm	D3	G1	AF	f	h	H
DRM-604 R25	DRM-605 R25	1"	29.5	33.5	G ½	47	30	13	31
DRM-604 R40	DRM-605 R40	1 ½"	42.5	47	G ½	62	30	13	30.5
DRM-604 R50	DRM-605 R50	2"	56	60	G ½	77	30	13	30.5

100 °C	200 °C	max. medium temperature

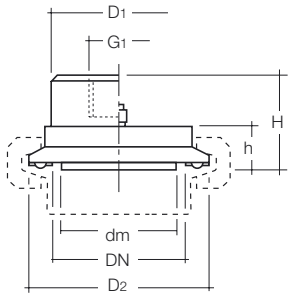


Diaphragm Seal DRM-610 / 611 with union nut according to SMS standard

Measuring range:	0…1 bar to 0…10 bar (depending on nominal size)
Temperature range:	-10…+200 °C (not with electr. transmitter)
Material of housing:	st. steel 1.4571, others on request
Diaphragm:	front flush, st. steel 1.4571
Max. length of capillary tube:	up to 10 m, if required with protection hose
Filling fluid:	compatible with foodstuffs

Model for direct mounting	Model for capillary tube	G2 SMS-standard	D1	D2	dm	G1	DN	D3	h	H
DRM-610 R40	**DRM-611 R40**	1½"	47.5	55	34.5	G ½	1½"	74	20	27
DRM-610 R50	**DRM-611 R50**	2"	60	65	45.5	G ½	2"	84	20	27

100 °C	200 °C	max. medium temperature

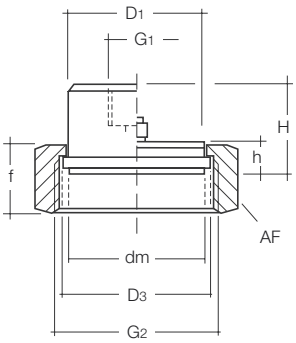


Diaphragm Seal DRM-612 / 613 with clamp connection

Measuring range:	0…2.5 bar to 0…10 bar
Temperature range:	-10…+200 °C (not with electr. transmitter)
Material of housing:	st. steel 1.4571, others on request
Diaphragm:	front flush, st. steel 1.4571
Max. length of capillary tube:	up to 10 m, if required with protection hose
Filling fluid:	compatible with foodstuffs

Model for direct mounting	Model for capillary tube	DN	D1	D2	dm	G1	h	H
DRM-612 R25	**DRM-613 R25**	1"	42.5	50.5	18	G ½	10.5	25
DRM-612 F40	**DRM-613 F40**	1½"	42.5	50.4	34.5	G ½	10.5	25
DRM-612 F50	**DRM-613 F50**	2"	51	64	45.5	G ½	10.5	25
DRM-612 R65	**DRM-613 R65**	2½"	63.5	77.5	52	G ½	10.5	25
DRM-612 R80	**DRM-613 R80**	3"	76	91	64	G ½	10.5	25

100 °C	200 °C	max. medium temperature

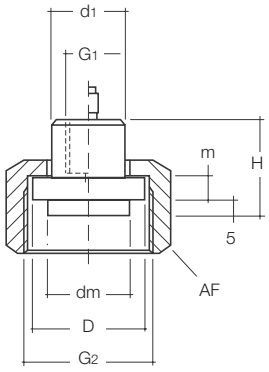


Diaphragm seal DRM-614 / 615 with union nut according to APV-RJT standard

Measuring range:	0…1 bar to 0…100 bar (depending on nominal size)
Temperature range:	-10…+200 °C (not with electr. transmitter)
Material of housing:	st. steel 1.4571, others on request
Diaphragm:	front flush, st. steel 1.4571
Max. length of capillary tube:	up to 10 m, if required with protection hose
Filling fluid:	compatible with foodstuffs

Model for direct mounting	Model for capillary tube	G_2 APV-RJT	D_1, dm	D_3	G_1	AF	f	h	H
DRM-614 R25	**DRM-615 R25**	1"	29.5	33.5	G ½	47	30	13	31
DRM-614 R40	**DRM-615 R40**	1 ½"	42.5	47	G ½	62	30	13	30.5
DRM-614 R50	**DRM-615 R50**	2"	56	60	G ½	77	30	13	30.5

100 °C	200 °C	max. medium temperature

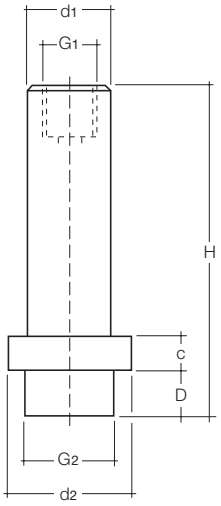


Diaphragm seal DRM-616 / 617 with union nut

Measuring range:	0…100 bar to 0…1600 bar
Temperature range:	0 °C…+120 °C (not with electr. transmitter)
Material of housing:	st. steel 1.4571
Diaphragm:	front flush, st. steel 1.4571
Max. length of capillary tube:	up to 10 m, if required with protection hose
Filling fluid:	MF8 (foodstuff-compatible) recommended

Model for direct mounting	Model for capillary tube	G_2	G_1	AF	dm	D	d_1	m	H
DRM-616 R45	**DRM-617 R45**	M45x2	G ⅜	55	23.8	33.3	22	6	27

100 °C	120 °C	max. medium temperature



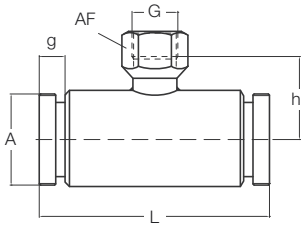
Diaphragm Seals DRM-189 for homogenizing machines, for direct mounting to pressure gauges

Measuring range:	0 …100 bar to 0 …1000 bar
Temperature range:	0 …+120 °C (calibration temperature +85 °C)
Material housing:	st. steel 1.4571
Diaphragm:	front flush, st. steel 1.4571
Max. length of capillary tube:	not available
Filling fluid:	MF 8 (foodstuff-compatible) recommended

Model for direct mounting	D	dm	d1	a	h	H	G1
DRM-189 F23	34.5	23.8	22	10	12.5	90.5	G ⅜

Accessories for pressure gauges

	Material	Code
Protection hose (capillary tube)	W. 1.4301	**A**
Protection against buckling (capillary tube)	steel	**C**
Elbow joint	passivated steel	**D**
Intermediate piece	passivated steel	**E**
Temperature calibration up to +100 °C		**G**
Temperature calibration from +100°C		**H**
Special calibration (e.g. height adjustment, 2 temperatures)		**I**
PTFE-coating		**K**
Halar-coating		**L**
Special materials		**S**
Welded contra flange for measuring adapter 48 mm (DRM-622)		**DRM-622 G**
Mounting set (screw and sealings)		**DRM-ZM1**
Mounting set PTFE (VA-screws and PTFE-sealings)		**DRM-ZM2**



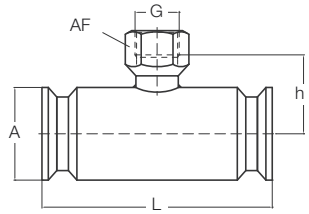
Inline diaphragm seal DRM-500/501, sterile connection ISO, for direct mounting and with capillary tube

Measuring range:	1.6…40 bar to 2.5…40 bar (depending on the pipe dia.)
Temperature range:	up to 80 °C (>30 min. to 140 °C)
Housing:	st. steel 1.4571
Diaphragm tube:	st. steel 1.4571 (DN 15/20/25/40), st. steel 1.4404 resp. 1.4435 (DN 50)
Socket connection:	st. steel 1.4301 (DN 15/20), st. steel 1.4435 (DN 25/40/50)
Filling fluid:	depending on operating conditions

Model for direct mounting	Model for capillary tube	DN	A	L	h	G	g	AF
DRM-500 D15	**DRM-501 D15**	15	M30x2	130	26	G ¼	12	17
DRM-500 D20	**DRM-501 D20**	20	M36x2	120	30	G ¼	12	17
DRM-500 D25	**DRM-501 D25**	25	M42x2	120	33	G ½	12	27
DRM-500 D40	**DRM-501 D40**	40	M56x2	110	39	G ½	14	27
DRM-500 D50	**DRM-501 D50**	50	M68x2	100	45	G ½	14	27

Model for direct mounting	Model for capillary tube	DN	für Rohr	O-Ring	Weight [kg]	Inner form
DRM-500 D15	**DRM-501 D15**	15	26.9x2.0	18.5x3.0	0.6	square
DRM-500 D20	**DRM-501 D20**	20	33.7x2.0	25.0x3.0	0.8	square
DRM-500 D25	**DRM-501 D25**	25	48.3x2.0	30.0x3.0	0.9	hexagonal
DRM-500 D40	**DRM-501 D40**	40	60.3x2.0	45.0x3.0	1.3	hexagonal
DRM-500 D50	**DRM-501 D50**	50	88.9x2.0	55.0x3.0	1.6	hexagonal

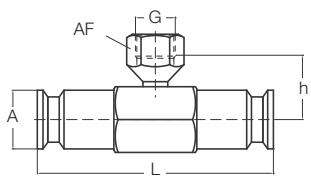
DN ½"- 1"



Inline diaphragm seal DRM-502 with clamp connection ISO 2852 for direct mounting

Measuring range:	1.6…40 bar to 2.5…40 bar (depending on the pipe dia.)
Temperature range:	up to 80°C (>30 min. to 140°C)
Housing:	stainless steel 1.4435
Diaphragm tube:	stainless steel 1.4435 (DN 15/20/25), stainless steel 1.4404 (DN 40/50)
Socket connection:	stainless steel 1.4301 (DN 15/20/25), stainless steel 1.4435 (DN 40/50)
Filling fluid:	depending on operating conditions

DN 1 ½"- 2"



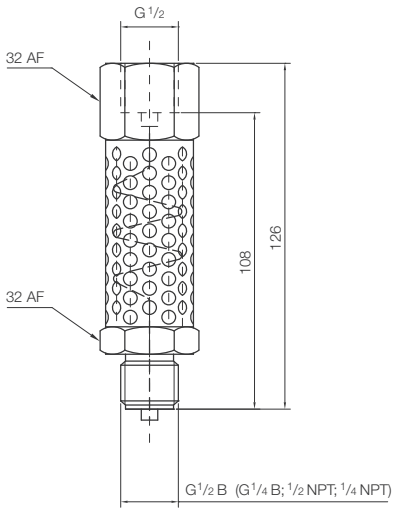
Model for direct mounting	DN	A	L	h	G	AF	Weight [kg]	Inner form
DRM-502 D15	½"	25	140	24	G ½	17	0.5	square
DRM-502 D20	¾"	25	120	27	G ½	27	0.5	square
DRM-502 D25	1"	50.5	120	36	G ½	27	1.6	square
DRM-502 D40	1 ½"	50.5	120	36	G ½	27	1.2	hexagonal
DRM-502 D50	2"	64	100	45	G ½	27	1.3	hexagonal

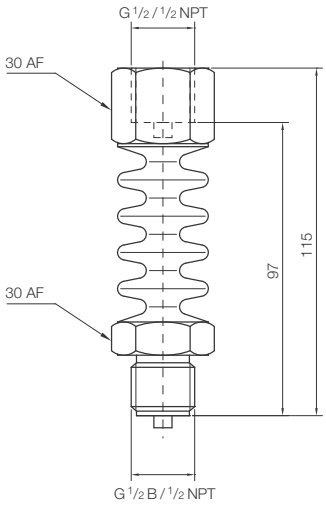
Multipart Design

- Very good cooling effect
- Perforated sheet body transmits little heat
- t_{max} = 450 °C
- PN 600 (temperature-dependent)
- All parts are made of 1.4571 stainless steel
- Pressure transmission with a capillary line (inner Ø 1.0 mm), that in addition balances
- Also for direct mounting of diaphragm seals (t_{max} = 350 °C)

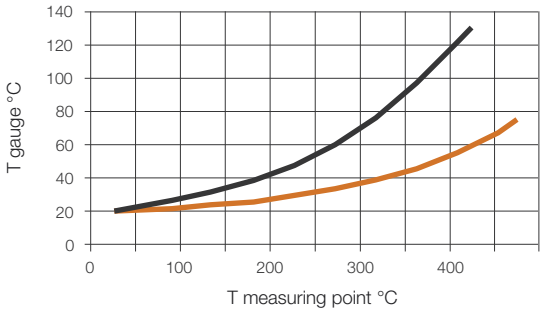
One-part Design

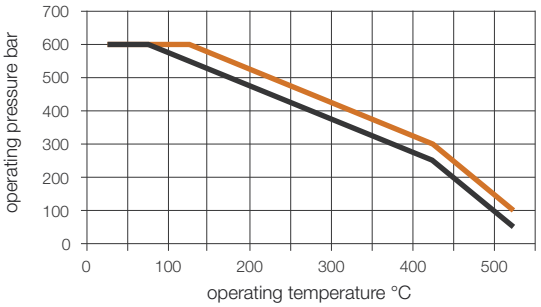
- Good cooling effect
- Optimum ratio of surface to geometry
- t_{max} = 300 °C
- PN 600 (temperature-dependent)
- Body made of 1.4571 stainless steel
- Pressure transmission with tube diameter (inner Ø 3.5 mm), thus no change in reaction time
- Cheaper version
- For use with high viscosity media





Temperature Drift (guide value for cooling effect) and Range of Use (rated pressure)





MZB-711.7221 to MZB-711.7224 = multipart design
MZB-711.7225 and MZB-711.7226 = one-part design

Order Details

Model	Connection meas. device	Process connection
MZB-711.7221	G ½ female	G ¼ male
MZB-711.7222	G ½ female	G ½ male
MZB-711.7223	G ½ female	¼ NPT male
MZB-711.7224	G ½ female	½ NPT male

Model	Connection meas. device	Process connection
MZB-711.7225	G ½ female	G ½ male
MZB-711.7226	½ NPT female	½ NPT male

Other connections on request.