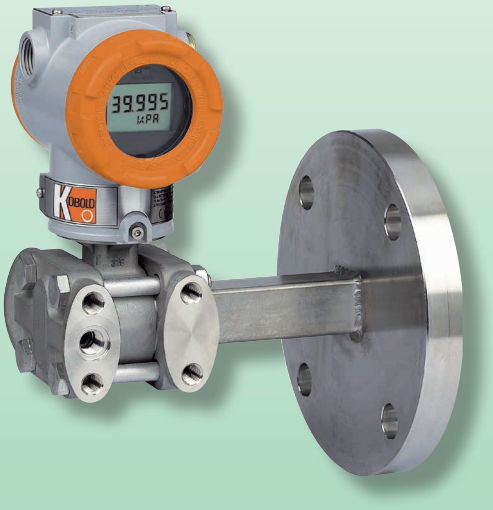
Heavy Duty Differential Pressure Transmitter

measuring • monitoring • analyzing

PAD



- Span: 0.3" W.C. … 6" W.C. to 60 … 6000 PSIG
- Static Pressure: Max. 4500 PSIG
- t_{max}: 248 °F
- Process Connection: ½" NPT, ¼" NPT, or Various Diaphragm Seals Available upon Request
- Material: Stainless Steel, HAST-C®, Tantalum, or Monel®
- Various Outputs: 4 ... 20 mA or Frequency Output
- Sensor Inputs: Differential, Gauge, or Absolute Pressure
- Digital Communication with HART® Protocol

KOBOLD companies worldwide:

ARGENTINA, AUSTRIA, BELGIUM, BULGARIA, CANADA, CHILE, CHINA, COLUMBIA, CZECH REPUBLIC, EGYPT, FRANCE, GERMANY, GREAT BRITAIN, HUNGARY, INDIA, INDONESIA, ITALY, MALAYSIA, MEXICO, NETHERLANDS, PERU, POLAND, ROMANIA, SINGAPORE, SOUTH KOREA, SPAIN, SWITZERLAND, TAIWAN, THAILAND, TUNISIA, TURKEY, USA, VIETNAM

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Description

The KOBOLD Differential Pressure Transmitter model PAD is a microprocessor based high performance transmitter. It has flexible pressure calibration and output, automatic compensation of ambient temperature and process variables, configuration of various parameters, and communication with HART® protocol. It measures pressure, flow and level by an application method. All data is input, modified and stored in EEPROM.

The KOBOLD Pressure Transmitter is also available as a flow meter. The flowmeter model PAD-F has an added totalizing function. It is able to check the flow rate and the totalizing flow. It measures the flow rate by using differential pressure without compensation for the temperature and static pressure. The shape of the PAD-F is the same as the standard device. Only the terminal block is different, since there are two more terminals for the display of the pulse output.

Features

Superior Performance

- High reference accuracy:
  ±0.075 % of calibrated span
  (optional: ±0.04 % of calibrated span)
- Long-term stability (0.125 % URL for 3 years)
- High rangeability (100:1) for range 4-0

Flexibility

- Data configuration with HART® configurator
- Zero point adjustment

Reliability

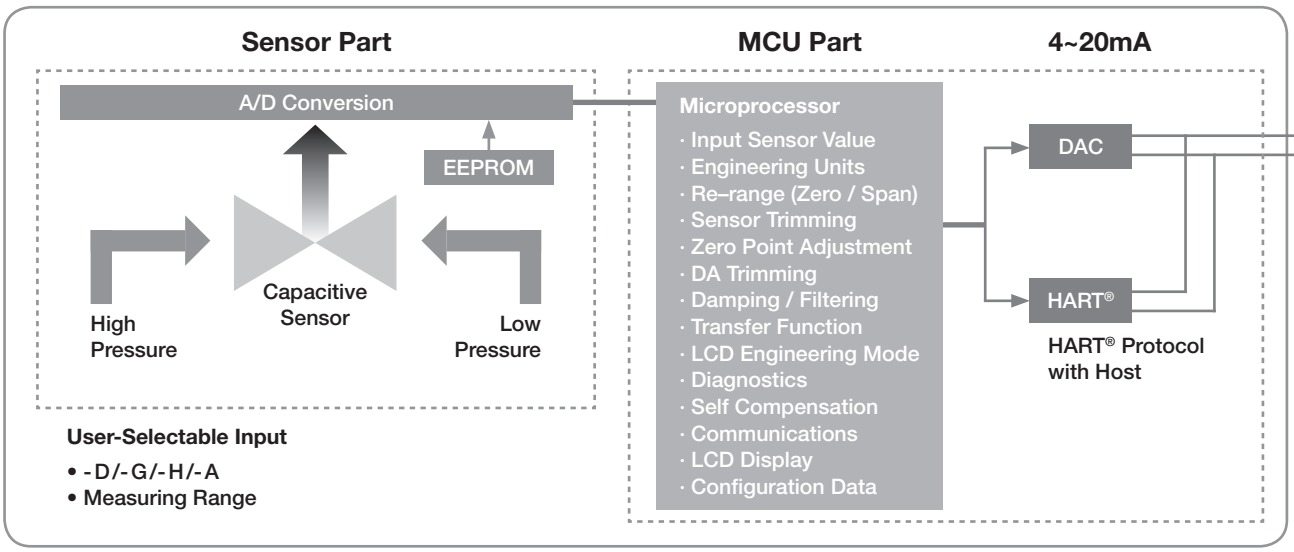
- Continuous self-diagnostic function
- Automatic ambient temperature compensation
- EEPROM write protection
- Fail-mode process function
- CE EMC conformity standards (EN 50081-2, EN 50082-2)

Transmitter Description

Electronics module

The Electronics module consists of a circuit board sealed in an enclosure. There is an MCU module. an analog module, an LCD module and a terminal module within the transmitter. The MCU module acquires the digital value from the analog module and applies correction coefficients selected from EEPROM. The output section of the MCU module converts the digital signal to a 4…20 mA output. The MCU module communicates with the HART®-based configurator or control system such as DCS. The power section of the MCU module has a DC-to-DC power conversion circuit and an input/output isolation circuit. The LCD module plugs into the MCU module and displays the digital output in a user-configured unit.

Functional Block Diagram



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Sensor Inputs

The models PAD-D, PAD-G, and PAD-H are available in a capacitance type differential pressure sensor. It measures differential and gauge pressure and is commonly used in flow and level applications. Both sides in the capacitance sensor transmit process pressure from the process isolators to the sensor. The model PAD-A is also available in a piezoresistive type absolute pressure sensor. The sensor module converts the capacitance or the resistance to the digital value. The MCU module calculates the process pressure based on the digital value.

The sensor modules include the following features

- 0.075 % accuracy
- The software of the transmitter compensates thermal effects, improving performance.
- Precise Input Compensation during operation is achieved with temperature and pressure correction coefficients that are characterized over the range of the transmitter and stored in the sensor module EEPROM memory.
- EEPROM stores sensor information and correction coeficients separately from MCU module, allowing for easy repair, reconfiguration and replacement.

Basic Setups

The following settings can be easily configured from any host that supports the HART® protocol:

- Operational parameters
- 4-20 mA points (zero/span)
- Engineering units
- Damping time: 0.25...60 sec
- Tag: 8 alphanumeric characters
- Descriptor: 16 characters
- Message: 32 characters
- Date: day/month/year

Calibration and Adjustment

- Lower/Upper range (zero/span)
- Sensor zero trimming
- Zero point adjustment
- DAC output trimming
- Transfer function
- Self-compensation

Self-Diagnosis and others

- CPU & Analog Module Fault Detection
- Communication error
- Fail-mode handling
- LCD indication
- Temperature measurement of sensor module

Multi Planar Process Connection

When the pressure transmitter should be vertically installed irrespective of the orientation of the process connection lines, modified flanges (as shown above) are required in addition to the basic flanges. Multi-planar pressure transmitters have been made in an effort to solve the problems occurring in these types of installation. The object of this is to provide a pressure transmitter, capable of being vertically installed, without separate adaptors or various types of brackets. This is regardless of the position of the process connection lines.

Process Connection Via Diaphragm Seals

When connecting the differential pressure transmitter model PAD to all different process connections, diverse diaphragm seal versions are necessary. They can be connected to the differential pressure transmitter by direct mounting or via a capillary tube. Depending on the application, different combinations of diaphragm seals, capillary tubes and fill fluids are available. To clarify those options, the special connections via diaphragm seals should be specified separately for the differential pressure transmitter.

Technical Details

Measuring Principle:	Capacitance sensor (PAD-D, -F, -G, -H) Piezo-resistive (PAD-A)
Measuring Span:	0.3" W.C..6" W.C. to 60…6,000 PSIG bar (depending on instrument version) Zero and span values can be set anywhere within the range limits. Span must be greater than or equal to the minimum span.
Accuracy:	• For Range 2 ±0.25 % of span for 0.1 URL ≤ span ≤ URL ±[0.24 + (0.008 x (URL/span)) % of span for 0.05 URL ≤ span ≤0.1 URL • For Range 3 ±0.075 % of span for 0.1 URL ≤ span ≤ URL ±[0.25 + (0.005 x (URL/span))] % of span for 0.02 URL ≤ span ≤0.1 URL • For Range 4 to 0 ±0.075 % of span for 0.1 URL ≤ span ≤ URL ±[0.025+(0.005x(URL/span))] % of span for 0.01 URL ≤ span ≤0.1 URL
Turndown Ratio:	Ranges 4 ~ 0 = 100 : 1 Range 3 = 50 : 1 Range 2 = 20 : 1
Process Temperature:	-40 °F…248 °F (Approval codes may effect limits. Max. ambient temperature at LCD = 176°F.)
Ambient Temperature:	-22 °F…176 °F
Storage Temperature:	-40 °F…185 °F (non-condensing)
Humidity Limit:	5 %...100 % RH

Pressure Limits (with silicone oil)

(Valid for stand-alone intruments only without assembled diaphragm seals.)

Model D and G	0…1999.6 PSIG (for range 2...8)
Model G	0…5800 PSIG (for range 9) 0...10875 PSIG (for range 0)
Model H	0…4495 PSIG (for range 4...7)
Model A	0…72.5 PSIG (for range 4) 0…435 PSIG (for range 5) 0…754 PSIG (for range 6)

Burst Pressure

Model D, G and H	9990.5 PSIG 11600 PSIG (for model G, range 0)
Model A	145 PSIG (for range 4) 580 PSIG (for range 5) 1015 PSIG (for range 6)

Wetted Materials

Isolating Diaphragms:	1.4404 (316L st. st), Monel, Tantalum, HAST-C®
Drain/Vent Valves:	1.4401 (316 st.st), HAST-C®
Flanges and Adapters:	1.4401 (316 st.st), HAST-C®
O-ring:	FKM, PTFE as an option

Non-Wetted Materials

Fill Fluid:	Silicone oil or inert fill
Bolts:	Stainless steel
Electronics Housing:	Aluminum, or 316L st.st. (option) flameproof (Ex d) and waterproof (IP67)
Cover O-ring:	NBR
Paint:	Epoxy-polyester or polyurethane
Mounting Bracket:	For 2-inch pipe, 1.4301 (304 sst), with 1.4301(304 sst) U-bolt
Nameplate:	1.4301 (304 sst)
Process Connections:	¼" NPT with 54.0 mm center distance for standard flanges ½" NPT with process adapter (option)
Mounting Position:	Upright (process connection more flexible by using multi-planar flange)
Display:	5 Digit LCD
Power Supply:	12…45 V_{DC} 17.5…45 V_{DC} -HART® communication
Maximum Load:	250 Ω at 17.5 V_{DC} 550 Ω at 24 V_{DC} Max. loop resistance = $\frac{(U - 12\ V_{DC})}{0.022\ A}$
Loop Load:	0...1500 Ω - operation 250...550 Ω - HART® communication
Failure Mode:	Fail high: current ≥ 21.1 mA Fail low: current ≤ 3.78 mA
Electrical Connection:	½" NPT conduit with M4 screw terminals (G½ option)
Output:	• Two wire 4…20 mA, configurable for linear or square root output, digital process value superimposed on 4…20 mA signal, available to any host that conforms to the HART® protocol • Frequency output for flowmeter model PAD-F with pulse width of 10, 50 or 100 ms (selectable, negative going pulse) Output type: open collector, 30 V, 500 mA max. Pulse rate: 49 pulses/sec max.
Update Time:	0.12 seconds
Turn-On Time:	3 seconds
Protection:	IP 67 for Standard (code S)
Weight:	8.6 lb (excluding options) standard 11.8 lb (st. st. housing - excl. options)
ATEX Approval (Option):	II 2G Exd IIC T6…T5 (see PAS datasheet)

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Order Details (Example: **PAD-D EE 2 S 2 N S 0 0**)

Model	Version	Material Body/Vent Plug/ Diaphragm	Calibrated Span (Measuring range limits for PAD-D, -F, -G and -H in separate table)
PAD-	**..D..** = differential pressure transmitter (static pressure 2000 PSI) **..F..**[1] = differential pressure transmitter with pulse output and totalizer especially for flow measurement **..H..** = differential pressure transmitter for high line pressure (static pressure 4495 PSI) **..G..** = gauge pressure transmitter **..A..** = absolute pressure transmitter	**..EE..** = 316 st. steel/316 st. steel/ 316L st. steel **..EH..** = 316 st. steel /316 st. steel/ HAST-C® **..EM..** = 316 st. steel/316 st. steel/ Monel **..ET..** = 316 st. steel /316 st. steel/ Tantalum **..HH..** = HAST-C®/HAST-C®/HAST-C® **..HM..** = HAST-C®/HAST-C®/Monel **..HT..** = HAST-C®/HAST-C®/Tantalum	**Calibrated Span for PAD-D, -F, -G, -H** **..2..**[3] = 0.3"...6" W.C. **..3..** = 0.6"...30" W.C. **..4..** = 1.5"...150" W.C. **..5..** = 7.5"...750" W.C. **..6..** = 1...100 PSIG **..7..** = 3...300 PSIG **..8..**[3] = 10 ...1000 PSIG **..9..**[3][4] = 30...3000 PSIG **..0..**[3][4] = 60...6000 PSIG **..X..**[2] = custom **Calibrated Span for PAD-A** **..4..** = 10"...1000" W.C. **..5..** = 1.5...217 PSIA **..6..** = 3...362 PSIA **..X..**[2] = custom

Order Details continued

Fill Liquid	Process Connection	Electrical Connection	Approvals	Manifold Valve[6]	Options
..S.. = silicone **..I..** = inert filling liquid **..X..**[2] = special	**..2..** = ¼" NPT female (standard) **..4..** = ½" NPT female (adapter) **..X..**[2] = special	**..N..** = ½" NPT epoxy-polyester painted aluminium **..G..** =G ½ epoxy-polyester painted aluminium **..X..**[2] = special	**..S..** = standard (waterproof IP67) **..F..** = ATEX, flameproof, Ex d **..E..*** = ATEX, intrinsically safe, Ex i **..1..*** = FM explosion proof **..2..*** = FM intrinsically safe *consult factory for availability	**..0..** = without	**..0** = without **..C** = engineering unit (must be chosen when using the differential transmitter as a flowmeter) **..D** = PTFE o-ring (wetted part) **..E** = oil free finish **..F** = side vent / drain bottom **..G** = side vent / drain top **..H** = multi-planar process connection **..M** = housing in stainless steel **..N**[5] = mounting of PAD onto diaphragm seal

[1] specify flow rate engineering unit, Δ p and flow rate at URV (Upper Range Value), Δ p and flow rate (generally '0') at LRV (Lower Range Value)
pulse scale (choose only one value from 0.001, 0.01, 0.1, 1, 10, 100, 1 000, 10 000 m³/pulse) and pulse width (choose only one value from 10 ms, 50 ms, 100 ms), while ordering so that max. duty cycle is 49 pulses/sec

[2] Order code X must be specified in writing
[3] not for PAD-H
[4] not for PAD-D and PAD-F
[5] Diaphragm seal model and application data to be specified in clear text. Application Index on pages 15, 16 to be filled out. For summary of diaphragm seal models and possible ranges, see page 11 onwards. For dimensional details see DRM data sheet.
[6] without mounted manifold valve. For order details of manifold valve, see seperate ordering codes

Order Details: Mounting Brackets

Description	Order Number
Angle type bracket for PAD/PAS vertical pipe mounting for PAS vertical pipe mounting for PAD incl. U-Clamp for 2“ pipe mounting bracket and 2 x mounting nuts/ washers incl. 4 x mounting screws for PAS incl. 4 x mounting screws for PAD	**ZUB-PAD/PAS-K**
Flat type bracket for PAD/PAS horizontal pipe mounting for PAS vertical pipe mounting for PAD incl. U-Clamp for 2“ pipe mounting bracket and mounting nuts/ washers incl. 4 x mounting bolts and washers for PAS incl. 4 x mounting bolts for PAD	**ZUB-PAD/PAS-L**

Order Details: Manifold Valves

Description	Order Number
2-way manifold valve, remote mount	**ZUB-PAD-2WMR**
3-way manifold valve, remote mount	**ZUB-PAD-3WMR**
5-way manifold valve, remote mount	**ZUB-PAD-5WMR**
2-way manifold valve, direct mount	**ZUB-PAD-2WMD**
3-way manifold valve, direct mount	**ZUB-PAD-3WMD**
5-way manifold valve, direct mount	**ZUB-PAD-5WMD**

Measuring Range Limits for PAD-D, -F, -G and -H

Range Code	Calibrated Span	Lower Range Limit (LRL)			Upper Range Limit (URL)
		PAD-D, -F	PAD-G	PAD-H	
2	0.3...6" W.C.	-6" W.C.	-6" W.C.	-	6" W.C.
3	0.6...30" W.C.	-30" W.C.	-30" W.C.	-	30" W.C.
4	1.5...150" W.C.	-150" W.C.	-150" W.C.	-150" W.C.	150" W.C.
5	7.5...750" W.C.	-750" W.C.	-14.5 PSIG	-750" W.C.	750" W.C.
6	1...100 PSIG	-100 PSIG	-14.5 PSIG	-100 PSIG	100 PSIG
7	3...300 PSIG	-300 PSIG	-14.5 PSIG	-300 PSIG	300 PSIG
8	10...1000 PSIG	-1000 PSIG	-14.5 PSIG	-	1000 PSIG
9	30...3000 PSIG	-	-14.5 PSIG	-	3000 PSIG
0	60...6000 PSIG	-	-14.5 PSIG	-	6000 PSIG

* Special measuring span, with adequate lower and upper range limits, on request.

Range Code Unit Conversion

Range Code	bar	kg/cm²	KPa	psi	in H_2O at 39 °F	mm H_2O at 39 °F	in Hg at 32 °F
2	0.015	0.015	1.5	0.217	6	152	0.422
3	0.075	0.076	7.5	1.087	30	765	2.215
4	0.373	0.38	37.3	5.410	149	3804	11.014
5	1.865	1.902	186.5	27	749	19018	55.072
6	6.900	7.036	690	100	2773	70361	203.750
7	20.681	21.088	2068	300	8310	210878	610.660
8	68.950	70.309	6895	1000	27708	703097	2036.025
9	206.800	210.876	20680	3000	83105	2108781	6106.597
0	413.700	421.856	41370	6000	166085	4218566	12216.550

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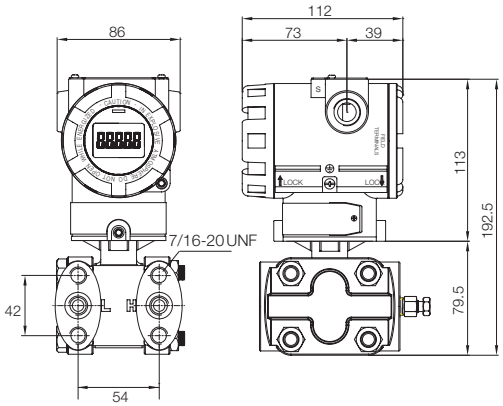
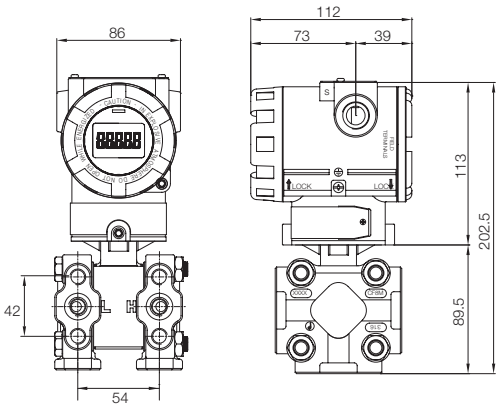
Dimensions (in mm)

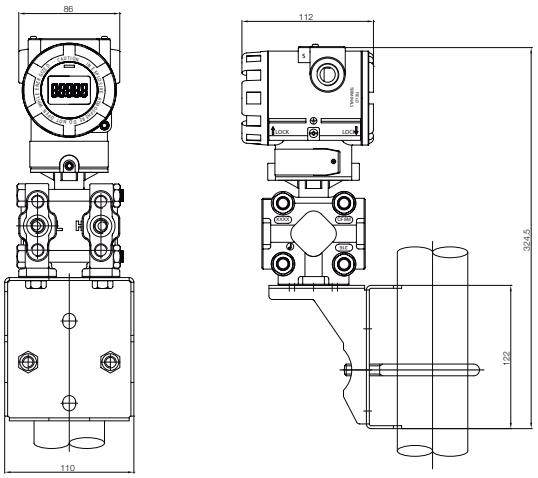
PAD standard*



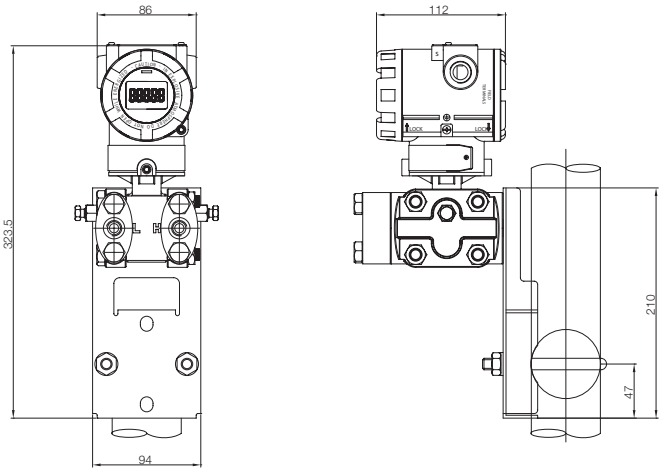
PAD multi planar process connection*



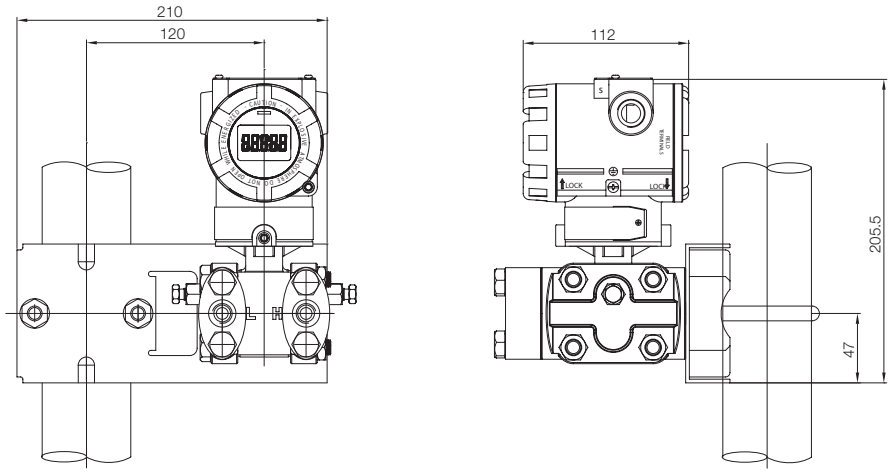
PAD with multi planar flange and angle type bracket*



PAD standard with flat type bracket (vertically mounted)*



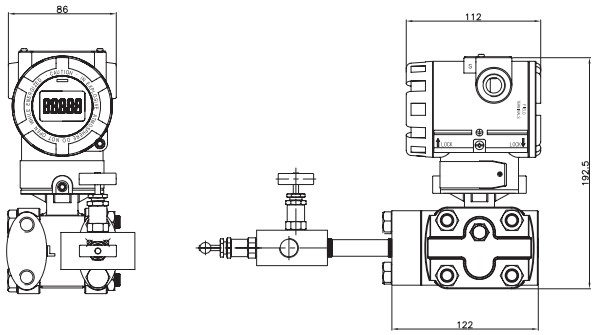
PAD standard with flat type bracket (horizontally mounted)*



* For PAD-G/A, the low pressure port 'L' is always closed.

(Dimensions in mm)

PAD-G/A mounted with 2-way manifold valve*



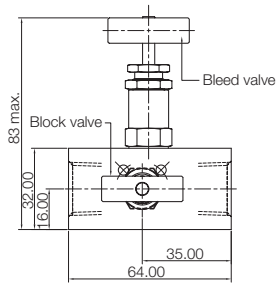
* For PAD-G/A, the low pressure port 'L' is always closed.

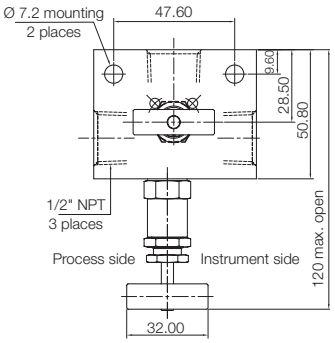
Manifold Valves (Remotely Mounted)

Technical Specifications:

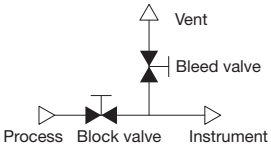
Material: 316 SS body with PTFE packing
Connection and size: ½" NPT (F)
Pressure rating: 6000 PSIG at 100 °F (≈410 bar)
Temperature range: -65 °F ... 449 °F

2-way Manifold Valve

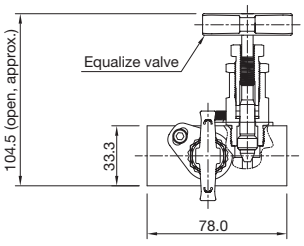


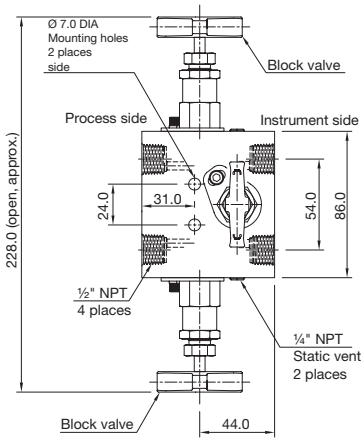


Weight: 0.8 kg

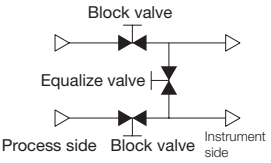


3-way Manifold Valve

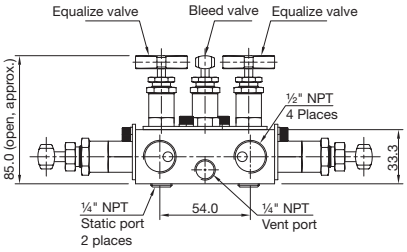


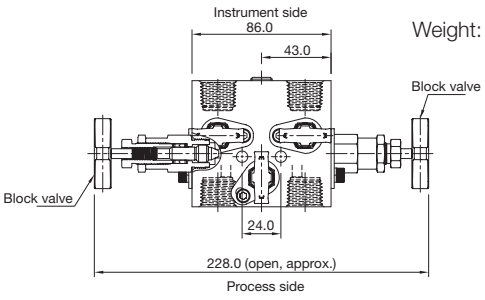


Weight: 2 kg

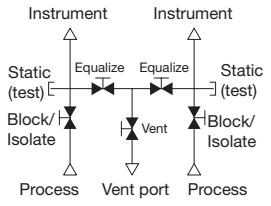


5-way Manifold Valve





Weight: 2.2 kg



(Dimensions in mm)

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Manifold Valves (Direct Mount)

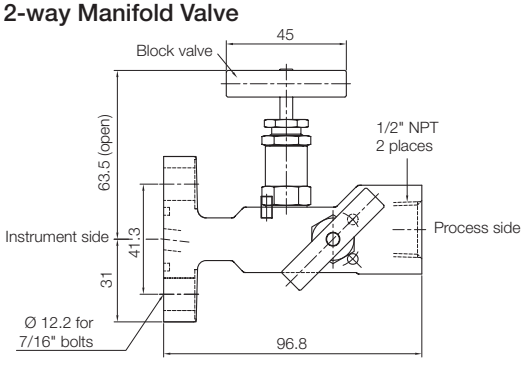
Technical Data:

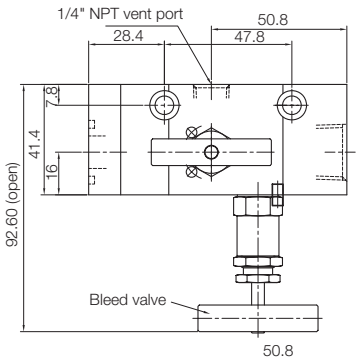
Material: 316 SS body with PTFE packing
Connection and size: ½" NPT (F) to flange

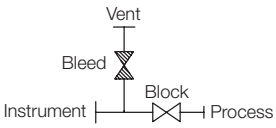
Pressure rating: 3000 PSIG at 449 °F (≈210 bar)
Temperature range: -65 °F ... 449 °F

2-way Manifold Valve

Weight: 1.6 kg

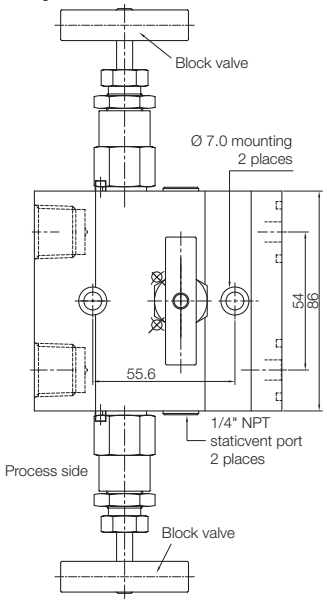


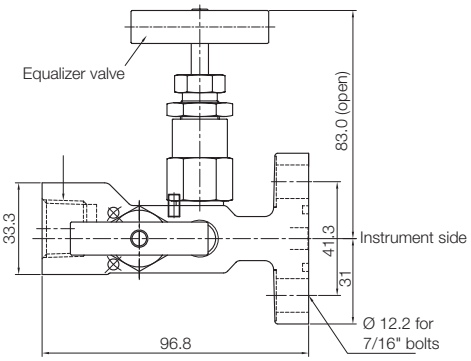


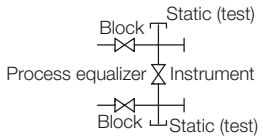


3-way Manifold Valve

Weight: 1.64 kg

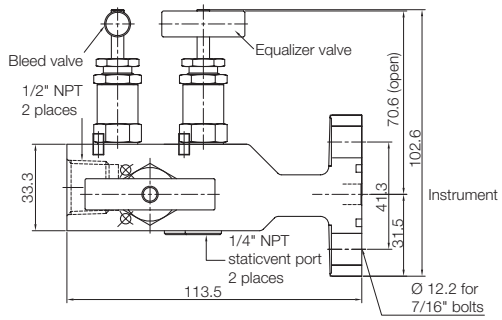


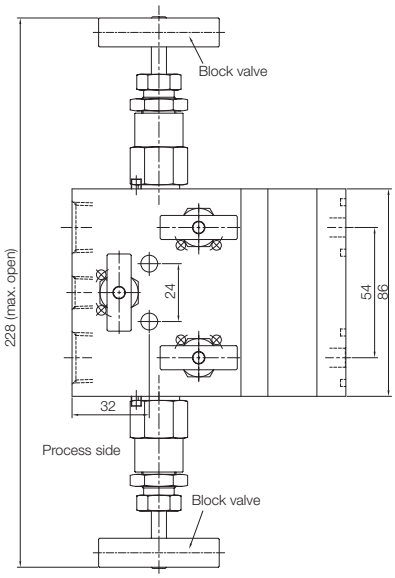


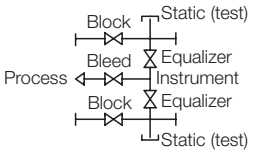


5-way Manifold Valve

Weight: 3.1 kg



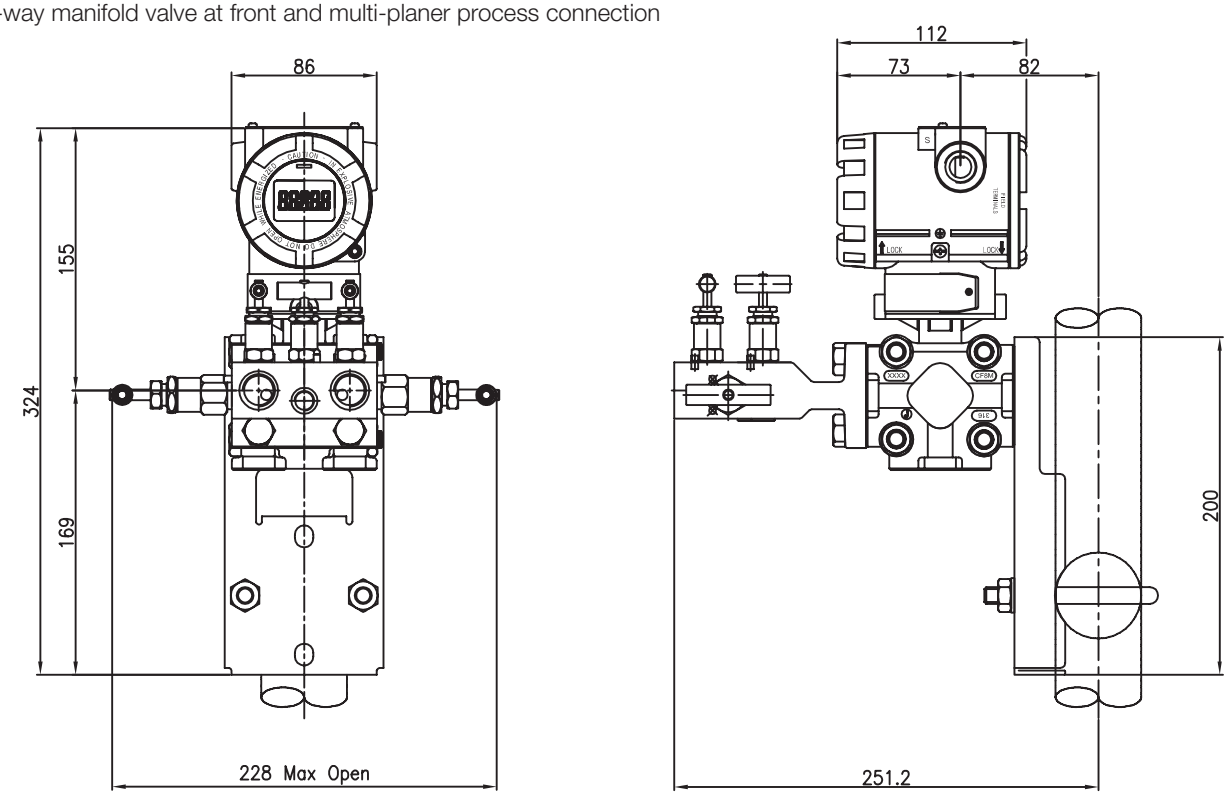




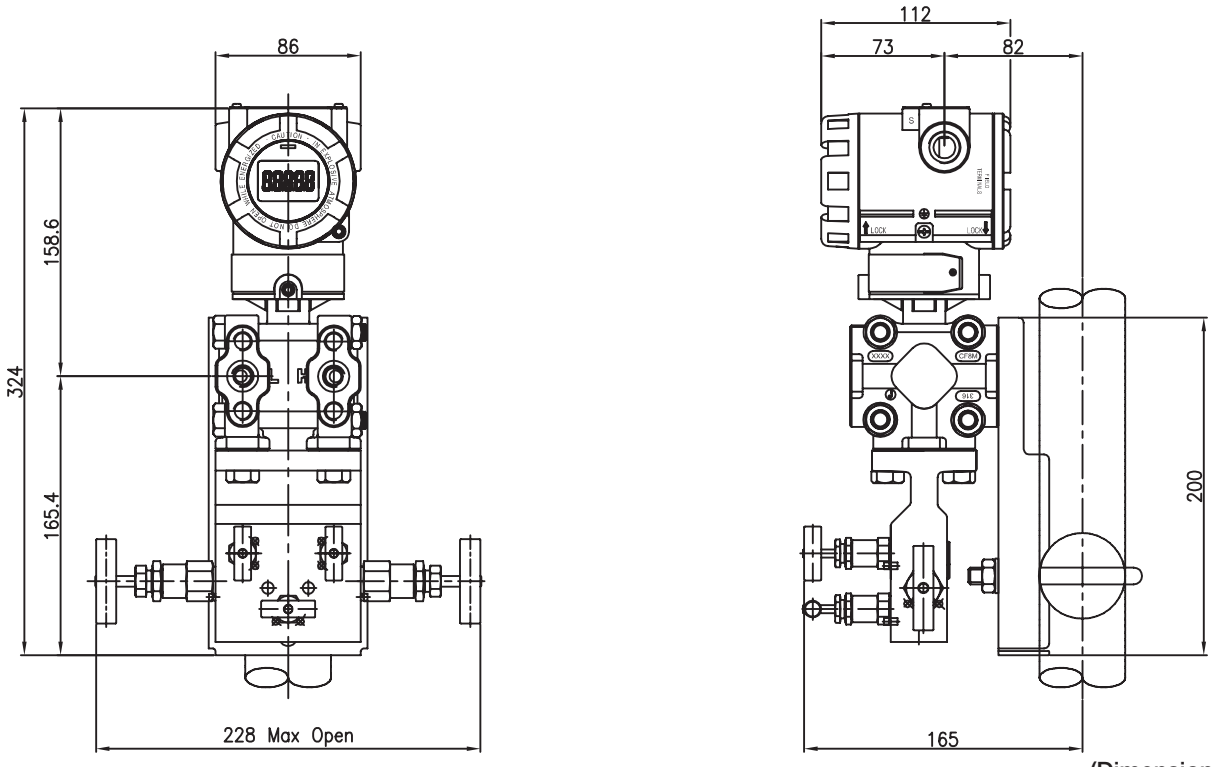
(Dimensions in mm)

Typical bracket mounted installations with 5-way manifold valve (direct mounting)

5-way manifold valve at front and multi-planer process connection

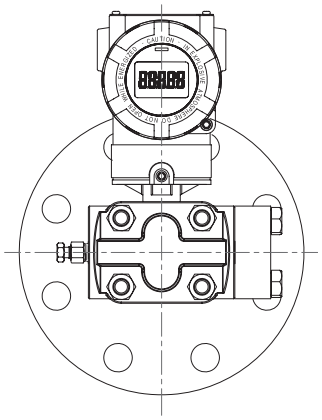


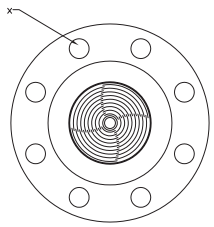
5-way manifold valve at bottom and multi-planer process connection



(Dimensions in mm)

Example of PAD direct assembed with an extended diaphragm seal
(for dimensional details, see DRM data sheet)





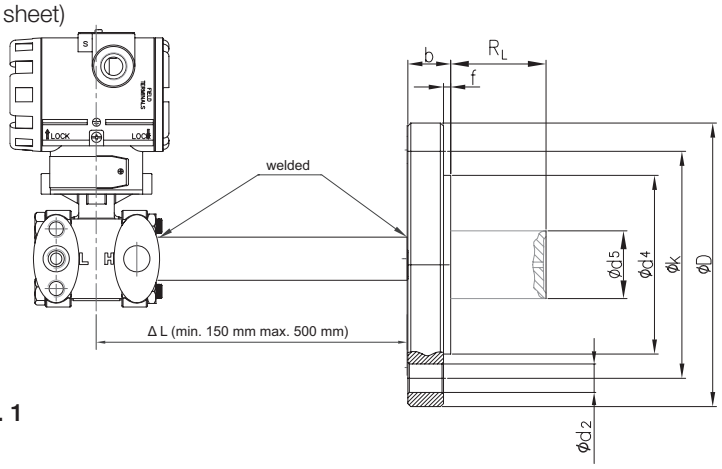


Fig. 1

Dimensions (mm): Examples for DN50 / DN 80/DN100 / 2" ANSI / 3" ANSI/4"ANSI

Flange Type	D	k	d_2	b	f	d_4	X	d_5	R_L
DN50 PN16	165	125	18	18	2	102	4	48	50 mm (2")/ 100 mm (4")/ 150 mm (6")/ 200 mm (8")/ (customer specified)
DN50 PN40	165	125	18	20	2		4	48	
2" ANSI Cl. 150	152.4	120.6	19	19.1	2	92	4	48	
2" ANSI Cl. 300	165.1	127	19	22.3	2		8	48	
DN80 PN16	200	160	18	20	2	138	8	76	
DN80 PN40	200	160	18	24	2		8	76	
3" ANSI Cl. 150	190.5	152.4	19	23.9	1.6	127	4	76	
3" ANSI Cl. 300	209.5	168.3	22	28.4	1.6		8	76	
DN100 PN16	220	180	18	20	2	149	8	89	
DN100 PN40	235	190	22	24	2	149	8	89	
4" ANSI Cl. 150	228.6	190.5	19	24	1.6	157.2	8	89	
4" ANSI Cl. 300	254	200	22	32	1.6	157.2	8	89	

Example of PAD assembed with remote diaphragm seals and capillaries
(for dimensional details, see DRM data sheet)

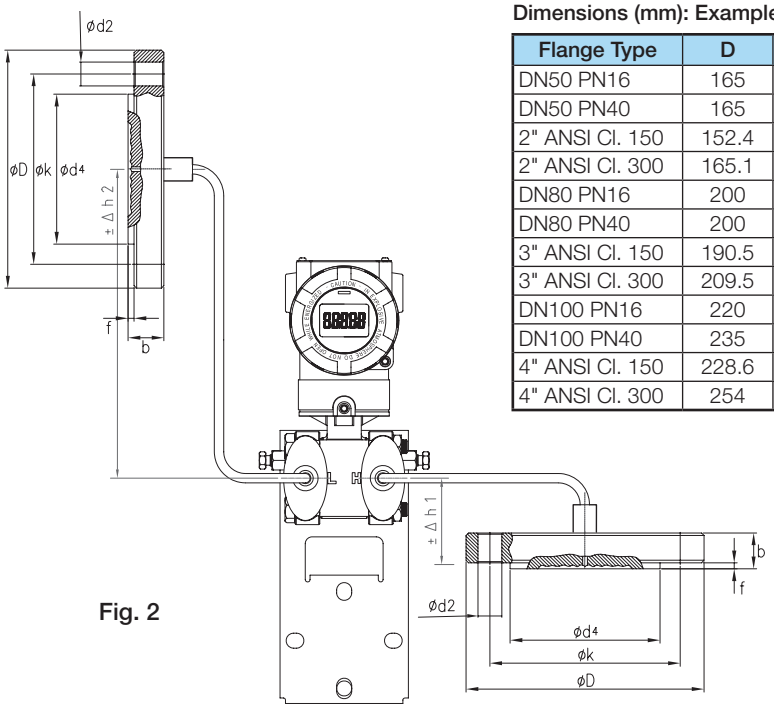
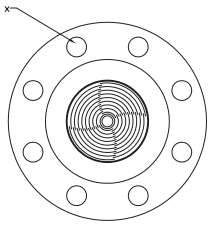


Fig. 2

Dimensions (mm): Examples for DN50 / DN 80 / DN100 / 2" ANSI / 3" ANSI/4"ANSI

Flange Type	D	k	d_2	b	f	d_4	X
DN50 PN16	165	125	18	18	2	102	4
DN50 PN40	165	125	18	20	2		4
2" ANSI Cl. 150	152.4	120.6	19	19.1	2	92	4
2" ANSI Cl. 300	165.1	127	19	22.3	2		8
DN80 PN16	200	160	18	20	2	138	8
DN80 PN40	200	160	18	24	2		8
3" ANSI Cl. 150	190.5	152.4	19	23.9	1.6	127	4
3" ANSI Cl. 300	209.5	168.3	22	28.4	1.6		8
DN100 PN16	220	180	18	20	2	149	8
DN100 PN40	235	190	22	24	2	149	8
4" ANSI Cl. 150	228.6	190.5	19	24	1.6	157.2	8
4" ANSI Cl. 300	254	200	22	32	1.6	157.2	8



Example of PAD-G remote assembled with (extended) diaphragm seal and capillary
(for dimensional details, see DRM data sheet)

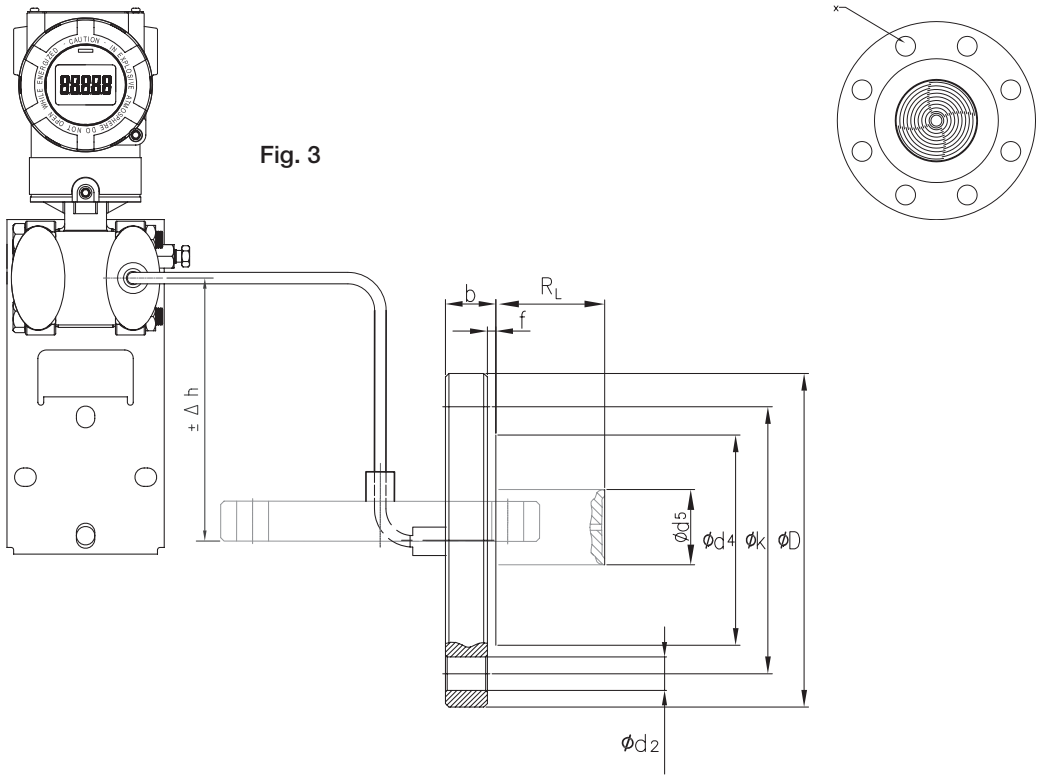


Fig. 3

Dimensions (mm): Examples for DN50 / DN 80 / DN100 / 2" ANSI / 3" ANSI/4" ANSI

Flange Type	D	k	d_2	b	f	d_4	X	d_5	R_L
DN50 PN16	165	125	18	18	2	102	4	48	50 mm (2")/ 100 mm (4")/ 150 mm (6")/ 200 mm (8")/ (customer specified)
DN50 PN40	165	125	18	20	2		4	48	
2" ANSI Cl. 150	152.4	120.6	19	19.1	2	92	4	48	
2" ANSI Cl. 300	165.1	127	19	22.3	2		8	48	
DN80 PN16	200	160	18	20	2	138	8	76	
DN80 PN40	200	160	18	24	2		8	76	
3" ANSI Cl. 150	190.5	152.4	19	23.9	1.6	127	4	76	
3" ANSI Cl. 300	209.5	168.3	22	28.4	1.6		8	76	
DN100 PN16	220	180	18	20	2	149	8	89	
DN100 PN40	235	190	22	24	2	149	8	89	
4" ANSI Cl. 150	228.6	190.5	19	24	1.6	157.2	8	89	
4" ANSI Cl. 300	254	200	22	32	1.6	157.2	8	89	

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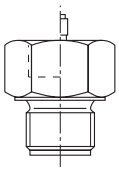
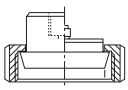
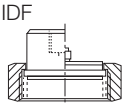
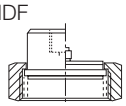
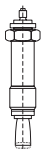
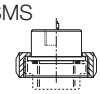
Diaphragm Seal Models (Remote Assembly)

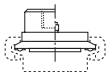
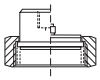
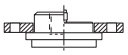
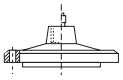
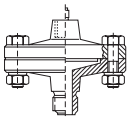
(Standard device without additional options (e.g. coatings, special materials etc.).
For dimensions/technical data, see DRM data sheet. Accuracy: 0.075% of calibrated span + influence of seal).
Over and under ranges of the min./max. span may be possible, but must be verified by KOBOLD for each application.
The indicated min./max. spans do not consider any coating of diaphragm seals. For additional information contact KOBOLD.

Model DRM	Size Code	Size	Note	Ø Diaphragm	Max. Media Temperature	Min. Span [PSIG]	Max. Span [PSIG]
DRM-601 	**R15**	G ½	Fixed male thread with capillary	Ø 18	392 °F	0…87	14500
	R20	G ¾		Ø 23.8		0…36.3	14500
	R25	G 1		Ø 29.5		0…23.2	8700
	R32	G 1 ¼		Ø 38		0…14.5	8700
	R40	G 1 ½		Ø 40		0…14.5	8700
	N15	½" NPT		Ø 18		0…87	14500
	N20	¾" NPT		Ø 18		0…87	14500
	N25	1" NPT		Ø 23.8		0…36.3	8700
	N32	1 ¼" NPT		Ø 34.5		0…23.2	8700
	M20	M20 x 1.5		Ø 18		0…87	8700
	M48	M 48 x 3		Ø 40		0…14.5	8700
DRM-603 DIN 11851 	**R20**	DN 20	Dairy connection, capillary	Ø 18	392 °F	0…87	580
	R25	DN 25		Ø 23.8		0…36.3	580
	R32	DN 32		Ø 29.5		0…23.2	580
	R40	DN 40		Ø 38		0…14.5	580
	R50	DN 50		Ø 45.5		0…8.7	362.5
	R65	DN 65		Ø 64		0…5.8	362.5
	R80	DN 80		Ø 64		0…5.8	362.5
	R1H	DN 100		Ø 64		0…5.8	362.5
DRM-604 IDF 	**R25**	1"	IDF socket with union nut, direct	Ø 29.5	212 °F	0…23.2	580
	R40	1 ½"		Ø 42		0…14.5	580
	R50	2"		Ø 56		0…8.7	580
DRM-605 IDF 	**R25**	1"	IDF socket with union nut, capillary	Ø 29.5	392 °F	0…23.2	580
	R40	1 ½"		Ø 42		0…14.5	580
	R50	2"		Ø 56		0…8.7	580
DRM-606 	**R20**	G ¾	Capsule seal with rotable male, capillary	Short capsule	662 °F	0…145	8700
	R28	M 28 x 1,5				0…145	8700
DRM-608/1 	**R20**	G ¾	Capsule seal with union nut, capillary	Long capsule	662 °F	0…23.2	8700
	R25	G 1	Capsule seal with union nut, capillary	Long capsule		0…23.2	8700
DRM-611 SMS 	**R40**	1 ½"	SMS socket with union nut, capillary	Ø 34.5	392 °F	0…23.2	580
	R50	2"		Ø 45.5		0…8.7	580

* Note: Threaded diaphragm seal only available with PAD-G/A. For PAD-D only flange, clamp connections or union nut are possible

Diaphragm Seal Models (Remote Assembly)

(Standard device without additional options (e.g. coatings, special materials etc.).
For dimensions/technical data, see DRM data sheet. Accuracy: 0.075% of calibrated span + influence of diaphragm seal).

Model DRM	Size Code	Size	Note	Ø Diaphragm	Max. Media Temperature	Min. Span [PSIG]	Max. Span [PSIG]
DRM-613 Clamp 	**R25**	1"	Tri-Clamp, capillary	Ø 18	392 °F	0...87	232
	F40	1 ½"		Ø 35.5		0...23.2	232
	F50	2"		Ø 45.5		0...8.7	232
	R65	2 ½"		Ø 52		0...8.7	232
	R80	3"		Ø 64		0...5.8	145
DRM-615 APV-RJT 	**R20**	1"	Union-nut, capillary	Ø 29.5	392 °F	0...36.3	1450
	R40	1 ½"		Ø 42.5		0...14.5	1450
	R50	2"		Ø 56		0...8.7	1450
DRM-617 	**R45**	M 45 x 2	Union-nut, capillary	Ø 23.8	248 °F	0...36.3	23200
DRM-620 	**R20**	G ¾	Union-nut, capillary	Ø 23.8	662 °F	0...36.3	8700
DRM-620/1 	**R20**	G ¾	Union-nut, capillary	Ø 23.8	662 °F	0...36.3	8700
DRM-622/1 	**F48**	Ø 48 mm	Flange, capillary	Ø 48	392 °F	0...8.7	580
	F48 1	Ø 48 mm		Ø 48		0...8.7	580
	F48 2	Ø 48 mm		Ø 48		0...8.7	580
DRM-624/1 	**F1H**	Ø 100 mm	Flange, capillary	Ø 63.5	482 °F	0...5.8	580
DRM-625/1 	**R15**	G ½	Fixed male, capillary	Ø 63.5	482 °F	0...5.8	580
	N15	½" NPT				0...5.8	580
	I15	G ½ male				0...5.8	580

* Note: Threaded diaphragm seal only available with PAD-G/A. For PAD-D only flange, clamp connections or union nut are possible

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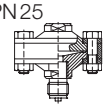
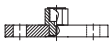
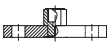
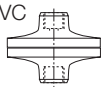
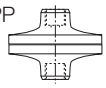
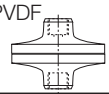
Diaphragm Seal Models (Direct or Remote Assembly)

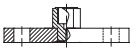
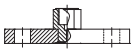
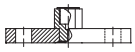
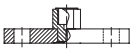
(Standard device without additional options (e.g. coatings, special materials etc.).
For dimensions/technical data, see DRM data sheet. Accuracy: 0.075% of calibrated span + influence of diaphragm seal).

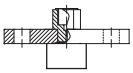
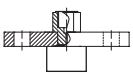
Model DRM	Size Code	Size	Note	Ø Diaphragm	Max. Media Temperature	Min. Span [PSIG]	Max. Span [PSIG]
DRM-627 PN 25 	**R08A025**	G ¼ male	Fixed male, capillary	Ø 56	482 °F	0 ... 8.7	362.5
	R08I025	G ¼ female	Fixed female, capillary	Ø 56		0 ... 8.7	362.5
	R15A025	G ½ male	Fixed male, capillary	Ø 56		0 ... 8.7	362.5
	R15I025	G ½ female	Fixed female, capillary	Ø 56		0 ... 8.7	362.5
	N15A025	½" NPT male	Fixed male, capillary	Ø 56		0 ... 8.7	362.5
DRM-627 PN 100 	**R08A100**	G ¼ male	Fixed male, capillary	Ø 56	482 °F	0 ... 8.7	1450
	R08I100	G ¼ female	Fixed female, capillary	Ø 56		0 ... 8.7	1450
	R15A100	G ½ male	Fixed male, capillary	Ø 56		0 ... 8.7	1450
	R15I100	G ½ female	Fixed female, capillary	Ø 56		0 ... 8.7	1450
	N15A100	½" NPT male	Fixed male, capillary	Ø 56		0 ... 8.7	1450
DRM-627 PN 250 	**R08A250**	G ¼ male	Fixed male, capillary	Ø 56	482 °F	0 ... 8.7	3625
	R08I250	G ¼ female	Fixed female, capillary	Ø 56		0 ... 8.7	3625
	R15A250	G ½ male	Fixed male, capillary	Ø 56		0 ... 8.7	3625
	R15I250	G ½ female	Fixed female, capillary	Ø 56		0 ... 8.7	3625
	N15A250	½" NPT male	Fixed male, capillary	Ø 56		0 ... 8.7	3625
DRM-629 PN 06 	**F25P06**	DN 25	Flange to EN1092-1, capillary	Ø 24	482 °F	0 ... 36.3	87
	F32P06	DN 32		Ø 30		0 ... 36.3	87
	F40P06	DN 40		Ø 38		0 ... 14.5	87
	F50P06	DN 50		Ø 48		0 ... 8.7	87
	F65P06	DN 65		Ø 64		0 ... 5.8	87
	F80P06	DN 80		Ø 64		0 ... 5.8	87
	N1HP06	DN 100		Ø 64		0 ... 5.8	87
DRM-629 PN 16 	**F25P16**	DN 25	Flange to EN1092-1, capillary	Ø 24	482 °F	0 ... 36.3	232
	F32P16	DN 32		Ø 30		0 ... 36.3	232
	F40P16	DN 40		Ø 38		0 ... 14.5	232
	F50P16	DN 50		Ø 48		0 ... 8.7	232
	F65P16	DN 65		Ø 64		0 ... 5.8	232
	F80P16	DN 80		Ø 64		0 ... 5.8	232
	N1HP16	DN 100		Ø 64		0 ... 5.8	232
DRM-629 PN 40 	**F25P40**	DN 25	Flange to EN1092-1, capillary	Ø 24	482 °F	0 ... 36.3	580
	F32P40	DN 32		Ø 30		0 ... 36.3	580
	F40P40	DN 40		Ø 38		0 ... 14.5	580
	F50P40	DN 50		Ø 48		0 ... 8.7	580
	F65P40	DN 65		Ø 64		0 ... 5.8	580
	F80P40	DN 80		Ø 64		0 ... 5.8	580
	N1HP40	DN 100		Ø 64		0 ... 5.8	580
DRM-630/1 PVC 	**R08**	G ¼ female	Fixed female, capillary	Ø 64	104 °F	0 ... 5.8	145
	R15	G ½ female		Ø 64		0 ... 5.8	145
	N15	½" NPT female		Ø 64		0 ... 5.8	145
DRM-631/1 PP 	**R08**	G ¼ female	Fixed female, capillary	Ø 64	104 °F	0 ... 5.8	145
	R15	G ½ female		Ø 64		0 ... 5.8	145
	N15	½" NPT female		Ø 64		0 ... 5.8	145
DRM-632/1 PVDF 	**R08**	G ¼ female	Fixed female, capillary	Ø 64	122 °F	0 ... 5.8	232
	R15	G ½ female		Ø 64		0 ... 5.8	232
	N15	½" NPT female		Ø 64		0 ... 5.8	232

* Note: Threaded diaphragm seal only available with PAD-G/A. For PAD-D only flange, clamp connections or union nut are possible

Diaphragm Seal Models (Direct or Remote Assembly)

(Standard device without additional options (e.g. coatings, special materials etc.).
For dimensions/technical data, see DRM data sheet. Accuracy: 0.075% of calibrated span + influence of diaphragm seal).

Model DRM	Size Code	Size	Note	Ø Diaphragm	Max. Media Temperature	Min. Span [PSIG]	Max. Span [PSIG]
DRM-633/1 	**F50**	DN 50	Flange to DIN2527 Form C, capillary	Ø 64	482 °F	0 ... 3.6	580
	F1H	DN 100		Ø 64		0 ... 3.6	580
DRM-635 150 lbs 	**A25P150**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	145
	A32P150	1¼"		Ø 38		0 ... 14.5	145
	A40P150	1½"		Ø 38		0 ... 14.5	145
	A50P150	2"		Ø 48		0 ... 8.7	145
	A65P150	2½"		Ø 48		0 ... 8.7	145
	A80P150	3"		Ø 64		0 ... 5.8	145
	A90P150	3½"		Ø 64		0 ... 5.8	145
	A1HP150	4"		Ø 64		0 ... 5.8	145
DRM-635 300 lbs 	**A25P300**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	290
	A32P300	1¼"		Ø 38		0 ... 14.5	290
	A40P300	1½"		Ø 38		0 ... 14.5	290
	A50P300	2"		Ø 48		0 ... 8.7	290
	A65P300	2½"		Ø 48		0 ... 8.7	290
	A80P300	3"		Ø 64		0 ... 5.8	290
	A90P300	3½"		Ø 64		0 ... 5.8	290
	A1HP300	4"		Ø 64		0 ... 5.8	290
DRM-635 600 lbs 	**A25P600**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	580
	A32P600	1¼"		Ø 38		0 ... 14.5	580
	A40P600	1½"		Ø 38		0 ... 14.5	580
	A50P600	2"		Ø 48		0 ... 8.7	580
	A65P600	2½"		Ø 48		0 ... 8.7	580
	A80P600	3"		Ø 64		0 ... 5.8	580
	A90P600	3½"		Ø 64		0 ... 5.8	580
	A1HP600	4"		Ø 64		0 ... 5.8	580
DRM-635 1500 lbs 	**A25P1K5**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	1450
	A32P1K5	1¼"		Ø 38		0 ... 14.5	1450
	A40P1K5	1½"		Ø 38		0 ... 14.5	1450
	A50P1K5	2"		Ø 48		0 ... 8.7	1450
	A65P1K5	2½"		Ø 48		0 ... 8.7	1450
	A80P1K5	3"		Ø 64		0 ... 5.8	1450
	A90P1K5	3½"		Ø 64		0 ... 5.8	1450
	A1HP1K5	4"		Ø 64		0 ... 5.8	1450

DRM-638 PN 06 	**F25P06**	DN25	Flange to EN1092-1, capillary	Ø 24	482 °F	0 ... 36.3	87
	F32P06	DN32		Ø 30		0 ... 14.5	87
	F40P06	DN40		Ø 38		0 ... 14.5	87
	F50P06	DN50		Ø 48		0 ... 8.7	87
	F65P06	DN65		Ø 64		0 ... 8.7	87
	F80P06	DN80		Ø 64		0 ... 5.8	87
	F1HP06	DN100		Ø 64		0 ... 5.8	87
DRM-638 PN 16 	**F25P16**	DN25	Flange to EN1092-1, capillary	Ø 24	482 °F	0 ... 36.3	232
	F32P16	DN32		Ø 38		0 ... 14.5	232
	F40P16	DN40		Ø 38		0 ... 14.5	232
	F50P16	DN50		Ø 48		0 ... 8.7	232
	F65P16	DN65		Ø 48		0 ... 8.7	232
	F80P16	DN80		Ø 64		0 ... 5.8	232
	F1HP16	DN100		Ø 64		0 ... 5.8	232

* Note: Threaded diaphragm seal only available with PAD-G/A. For PAD-D only flange, clamp connections or union nut are possible

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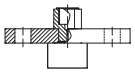
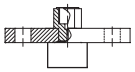
Diaphragm Seal Models (Direct or Remote Assembly)

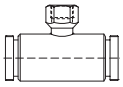
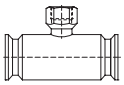
(Standard device without additional options (e.g. coatings, special materials etc.).
For dimensions/technical data, see DRM data sheet. Accuracy: 0.075% of calibrated span + influence of diaphragm seal).

Model DRM	Size Code	Size	Note	Ø Diaphragm	Max. Media Temperature	Min. Span [PSIG]	Max. Span [PSIG]]
DRM-638 PN 40 	**F25P40**	1"	Flange to EN1092-1, capillary	Ø 30	482 °F	0 ... 36.3	580
	F32P40	1¼"		Ø 38		0 ... 14.5	580
	F40P40	1 ½"		Ø 38		0 ... 14.5	580
	F50P40	2"		Ø 48		0 ... 8.7	580
	F65P40	2 ½"		Ø 48		0 ... 8.7	580
	F80P40	3"		Ø 64		0 ... 5.8	580
	F1HP40	3 ½"		Ø 64		0 ... 5.8	580
DRM-640 150 lbs 	**A25P150**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	145
	A32P150	1¼"		Ø 38		0 ... 14.5	145
	A40P150	1 ½"		Ø 38		0 ... 14.5	145
	A50P150	2"		Ø 48		0 ... 8.7	145
	A63P150	2 ½"		Ø 48		0 ... 8.7	145
	A75P150	3"		Ø 64		0 ... 5.8	145
	A85P150	3 ½"		Ø 64		0 ... 5.8	145
	A1HP150	4"		Ø 64		0 ... 5.8	145
DRM-640 300 lbs	**A25P300**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	290
	A32P300	1¼"		Ø 38		0 ... 14.5	290
	A40P300	1 ½"		Ø 38		0 ... 14.5	290
	A50P300	2"		Ø 48		0 ... 8.7	290
	A63P300	2 ½"		Ø 48		0 ... 8.7	290
	A75P300	3"		Ø 64		0 ... 5.8	290
	A85P300	3 ½"		Ø 64		0 ... 5.8	290
	A1HP300	4"		Ø 64		0 ... 5.8	290
DRM-640 600 lbs	**A25P600**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	580
	A32P600	1¼"		Ø 38		0 ... 14.5	580
	A40P600	1 ½"		Ø 38		0 ... 14.5	580
	A50P600	2"		Ø 48		0 ... 8.7	580
	A63P600	2 ½"		Ø 48		0 ...8.7	580
	A75P600	3"		Ø 64		0 ... 5.8	580
	A85P600	3 ½"		Ø 64		0 ... 5.8	580
	A1HP600	4"		Ø 64		0 ... 5.8	580
DRM-640 1500 lbs	**A25P1K5**	1"	Flange to ASME B16.5, capillary	Ø 30	482 °F	0 ... 36.3	1450
	A32P1K5	1¼"		Ø 38		0 ... 14.5	1450
	A40P1K5	1 ½"		Ø 38		0 ... 14.5	1450
	A50P1K5	2"		Ø 48		0 ... 8.7	1450
	A63P1K5	2 ½"		Ø 48		0 ... 8.7	1450
	A75P1K5	3"		Ø 64		0 ... 5.8	1450
	A1HP1K5	4"		Ø 64		0 ... 5.8	1450

* Note: Threaded diaphragm seal only available with PAD-G/A. For PAD-D only flange, clamp connections or union nut are possible

Diaphragm Seal Models (Direct or Remote Assembly)

(Standard device without additional options (e.g. coatings, special materials etc.).
For dimensions/technical data, see DRM data sheet. Accuracy: 0.075% of calibrated span + influence of diaphragm seal).

Model DRM	Size Code	Size	Note	Ø Diaphragm	Max. Media Temperature	Min. Span [PSIG]	Max. Span [PSIG]
DRM 501 ISO Sterile 	**D15**	DN 15	Inline, capillary	Inline	176 °F	0 ... 36.3	580
	D20	DN 20		Inline		0 ... 36.3	580
	D25	DN 25		Inline		0 ... 14.5	580
	D32	DN 32		Inline		0 ... 14.5	580
	D40	DN 40		Inline		0 ... 8.7	580
	D50	DN 50		Inline		0 ... 8.7	580
DRM 503 Clamp ISO 2852 	**D15**	DN 15	Inline, capillary	Inline	176 °F	0 ... 23.2	580
	D20	DN 20		Inline		0 ... 23.2	580
	D25	DN 25		Inline		0 ... 8.7	580
	D32	DN 32		Inline		0 ... 8.7	580
	D40	DN 40		Inline		0 ... 5.8	580
	D50	DN 50		Inline		0 ... 5.8	580

* Note: Threaded diaphragm seal only available with PAD-G/A. For PAD-D only flange, clamp connections or union nut are possible

Application Index

Please fill out the following Application Data Sheet when inquiring about or ordering model PAD assembled with diaphragm seal model DRM

Order/ Inquiry Ref./ Item No.

Pressure Transmitter (Model, Calibration range)	
Diaphragm Seal (Model, Size Code)	
Diaphragm material of DRM (wetted part)	
Process connection material of DRM (wetted part)	

Media:		
Operating density		**g/cm²**
Operating viscosity		**cSt**

Temperature:	**nominal**	**minimal**	**maximum**	
Medium temperature:				**°C/°F**
Ambient temperature:				**°C/°F**
Rinsing temperature diaphragm seal				**°C/°F**
Rinsing temperature capillary				**°C/°F**

Pressure Specification:		**Value**		
1.1) Operating pressure static	or 1.2		**bar/psi**	
1.2) Operating pressure dynamic min + max	or 1.3			**bar/psi**
1.3) Operating pressure as frequency in Hz			**Hz**	
2.) Max. negative pressure				
3.) Max. over pressure				
4.1) Display damping: without / light / middle / strong	or 4.2			
4.2) Pressure decrease with time + range				

Arrangement with Rectangular Connection Rod (Fig. 1):		
1.) Connecting Rod Length (ΔL = min. 150 mm/max. 500 mm) at HP port 'H'		**mm**

Arrangement with Capillary:		
1.) Diaphragm seal needed on both ports	**Yes**	
	No (diaphragm seal connected to high pressure port 'H')	
2.) If answer to 1) is YES, same model diaphragm seal on both ports		
	Yes	
	No	
3.) If answer to 2) is NO, specify DRM models at each port		
	DRM model at high pressure port 'H'	
	DRM model at low pressure port 'L'	

...continued...

Application Index

Order/ Inquiry Ref./ Item No.

Arrangement with Capillary:		
4.) Orientation of diaphragm seals (Mark the appropriate box, see Fig. 2)	Diaphragm seal at port 'H', sealing surface facing DOWN	
	Diaphragm seal at port 'H', sealing surface facing RIGHT	
	Diaphragm seal at port 'H', sealing surface facing LEFT	
	Diaphragm seal at port 'H', sealing surface facing UP	
	Diaphragm seal at port 'H', special orientation, provide sketch	
	Diaphragm seal at port 'L', sealing surface facing DOWN	
	Diaphragm seal at port 'L', sealing surface facing RIGHT	
	Diaphragm seal at port 'L', sealing surface facing LEFT	
	Diaphragm seal at port 'L', sealing surface facing UP	
	Diaphragm seal at port 'L', special orientation, provide sketch	

Capillary:		
Length in 'mm' at port 'H' (if other units, please specify)		mm
Length in 'mm' at port 'L' (if other units, please specify)		mm
Protection hose required (yes/no)		

Height Adjustment:			
1.) Factory calibration for height adjustment required	No		
	Yes, choose from the following option(s) 2 … 5		
2.) PAD higher than DRM at port 'H' (Fig. 2 or 3), specify +Δh(1)			mm
3.) PAD lower than DRM at port 'H' (Fig. 2 or 3), specify -Δh(1)			mm
***Following options "4" and "5" are not valid while ordering PAD-G…**			
4.) PAD higher than DRM at port 'L' (Fig. 2), specify +Δh(2)			mm
5.) PAD lower than DRM at port 'L' (Fig. 2), specify -Δh(2)			mm

Options: Extended diaphragm seal at both ports (see Fig. '1' or Fig. '3' for dimension R_L, mark only if option needed)		
No (extended diaphragm seal only at port 'H')		
If No, length 'R_L' of extended diaphragm seal at port 'H'		
Yes		
If Yes, length 'R_L' of extended diaphragm seal at port 'H'		mm
If Yes, length 'R_L' of extended diaphragm seal at port 'L'		mm

Fill Liquid (Check the desired box)	
Glycerine oil (silicone free, food grade) for Operation temperature (14 … 176 °F)	
Paraffine oil (silicone free, food grade) for Operation temperature (14 … 248 °F)	
Silicone oil for Operation temperature (-40 … 392 °F)	
Silicone oil for Operation temperature (-4 … 662 °F)	
Silicone oil for Operation temperature (-4 … 752 °F)	

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