



Instruction Manual

PDM02

***Differential Pressure Gauge with
Membrane Measuring System***



PKP Prozessmesstechnik GmbH
Borsigstraße 24
D-65205 Wiesbaden-Nordenstadt
Tel.: ++49-(0)6122-7055-0
Fax: ++49-(0)6122-7055-50
Email: info@pkp.de www.pkp.de

Table of Contents

Safety Information.....	2
Mounting and Commissioning.....	3
Magnetic snap-action contact.....	5
Inductive limit value switches.....	7
Maintenance.....	7

Safety Information

General Instructions

To ensure safe operation, the device should only be operated according to the specifications in the instruction manual. The requisite Health & Safety regulations for a given application must also be observed. This statement also applies to the use of accessories.

Every person who is commissioned with the initiation or operation of this device must have read and understood the operating instructions and in particular the safety instructions! The work safety instructions in this manual as well as the safety, accident prevention and environmental protection regulations generally valid for the work area must be observed.

The liability of the manufacturer expires in the event of damage due to improper use, non-observance of this operating manual, use of insufficiently qualified personnel and unauthorized modification of the device.

Proper Usage

The differential pressure gauges of the PDM02 series are used to measure and monitor the pressure for gaseous and liquid media which do not attack the materials used. All other usage is regarded as being improper and outside the scope of the device.

In particular, applications in which shock loads occur (for example, pulsed operation) should be discussed and checked in advance with our technical staff.

The series PDM02 pressure gauges should not be deployed as the sole agents to prevent dangerous conditions occurring in plant or machinery. Machinery and plant need to be designed in such a manner that faulty conditions and malfunctions do not arise that could pose a safety risk for operators.

Dangerous substances

For dangerous media such as e.g. Oxygen, Acetylene, flammable or toxic substances as well as refrigeration systems, compressors, etc. must comply with the relevant regulations beyond the general rules.

Qualified Personnel

The PDM02 devices may only be installed by trained, qualified personnel who are able to mount the devices correctly. Qualified personnel are persons, who are familiar with assembling, installation, placing in service and operating these devices and who are suitably trained and qualified.

Inward Monitoring

Please check directly after delivery the device for any transport damages and deficiencies. Additional with reference to the accompanying delivery note the number of parts must be checked.

Claims for replacement or goods which relate to transport damage can only be considered valid if the delivery company is notified without delay.

Mounting and Commissioning

General:

- The optimum selection of the scale range of the differential pressure gauge is given, if the operating pressure is in the midscale of the scale range.
- The overpressure safety is constructively secured on both sides in the measuring system.
- The pointer must fall within the thickened portion of the zero mark. The influence of temperature on the indication accuracy must be considered.



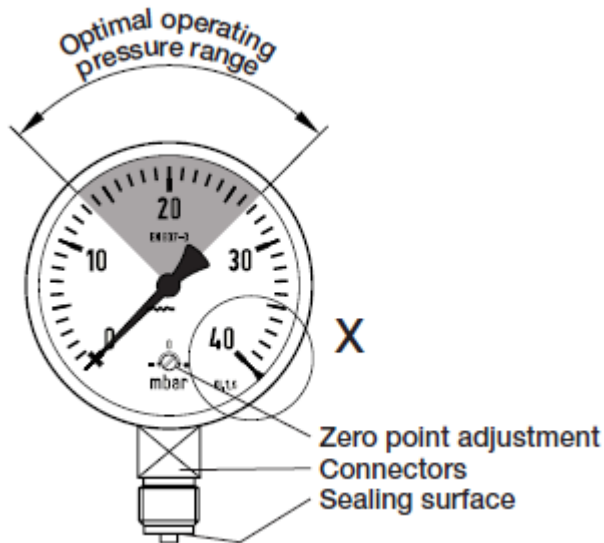
Zero point marking

Preparation:

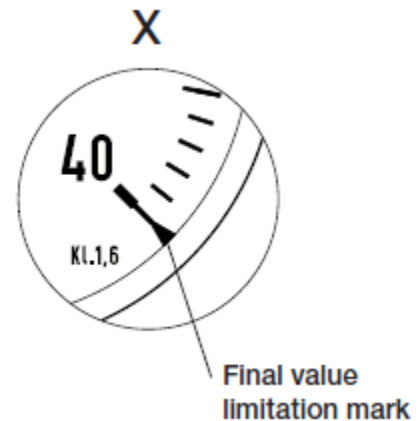
- The tapping points should be prepared according to the indications for tapped holes. Further information you will find on the VDE/VDI directive 3511 and 3512 page 3 of and EN 837-1/2.
- Differential pressure gauges without glycerin/oil filling should be installed such as to avoid exposure to vibration and to allow easy observation of the dial indication.
- We recommend the installation of isolation devices between pressure tapping point and differential pressure gauge facilitating replacement of the pressure gauge or a zero point control while the system is pressurised.
- If the tail pipe is not sufficiently rigid to accept the weight of the differential pressure gauge, particularly where vibrations exists, the gauge should be mounted by means of a mounting device for surface or pipe mounting, if necessary with capillary extension.

- The differential pressure gauge should be installed such as to avoid that the admissible ambient temperature (ambient and medium) and possibly convection and heat radiation will not exceed the temperature span the differential pressure gauge is intended for. Suitably shaped tail pipes or syphons with water filling may be used to separate the gauge and its device from hot pressure media.
- Should the measuring media be subject to rapid fluctuations in pressure, or pressure surges have to be taken into account, these must not be allowed to act on the pressure element. The pressure surges must be restricted in their effect, for example by filling integral restrictor screws (to reduce the cross-section in the canal) or by using an adjustable snubber device.

Mounting:



- Normal gauge position will have the dial facia in its vertical position. Positions other than vertical will be indicated by a symbol on the dial.
- Sealing must correspond to DIN 16258. The correct torque depends on material and shape of the sealing washer. It should not exceed 80 Nm.
- The higher pressure is connected to the + connector and the lower one to the - connector.
- For tightening and removal of the pressure gauge, the connectors are adapted to the measuring point by means of a loose union nut or right/left screwing.



Magnetic snap-action contact

The electrical value limit switches (low-action or snap-action contacts), fitted as auxiliary switches into measuring gauges, which - depending on the direction of movement - make or break an electrical control circuit at the set limit value by means of a contact arm which is moved by the actual value pointer.

Mounting:

Mounting has to be done according to the general technical regulations for pressure and temperature measuring gauges (EN 837-2 or EN 13190). Excessive vibrations can be detrimental to function and service life of the instrument. In consequence, the location should be exempt from vibration. Protection according to EN 60529 against external influences depends on the basic gauge and can be seen in its data sheet.

Electrical connection:

The electrical connection should be performed only by qualified personnel. The terminal location and the switch functions are indicated on the rating plate of the gauge. The earth terminal as well as the connectors (1...6) are marked accordingly.

Safety remarks

When installing, commissioning and operating these instruments, the national safety regulations have to be observed. Always disconnect voltage source and unit when working. Skilled personnel only should be allowed to work with these instruments.

Maximum contact load with resistive load:

Technical data	dry gauges	liquid filled gauges
Max voltage (MSR) U_{eff}	250 V	250 V
Current ratings: Closes rating	1,0 A	1,0 A
Break rating	1,0 A	1,0 A
Continuous load	0,6 A	0,6 A
Maximum load	30 W / 50 VA	20 W / 20 VA
Material of contact points	Silver-nickel (80% silver / 20% Nickel / 10 microns gold plated)	

Over current protection / relays:

Voltage [V]		dry gauges			liquid filled gauges		
		resistive load		inductive Load	resistive load		inductive Load
DC	AC	DC [mA]	AC [mA]	cos φ > 0,7 [mA]	DC [mA]	AC [mA]	cos φ > 0,7 [mA]
220	230	100	120	65	65	90	40
110	110	200	240	130	130	180	85
48	48	300	450	200	190	330	130
24	24	400	600	250	250	450	150

Adjustment of the sett pointer:



The adjustment of the set pointer is made in the adjusting lock of the window by means of the adjusting key supplied. The set pointers of the limit value switches are adjustable over the whole scale range.

Inductive limit value switches

The incorporated inductive limit value switches are non-contact sensors according to EN 50227 and NAMUR and should be used only with a control unit for hazardous areas of zone 1 in accordance to guidelines (ATEX) 2014/34/EU. Signalling take place without time-delay analogously to the movement of actual value pointer.

Mounting:

Mounting has to be done according to the general technical regulations for pressure and temperature measuring gauges (EN 837-2 or EN 13190). Excessive vibrations can be detrimental to function and service life of the instrument. In consequence, the location should be exempt from vibration.

Electrical connection:

The electrical connection should be performed only by qualified personnel. The terminal location and the switch functions are indicated on the type plate of the gauge. The terminal earth as well as the connectors (1...6) are marked accordingly.

Safety remarks

When installing, commissioning and operating these instruments, the national safety regulations have to be observed. Always disconnect voltage source and unit when working. Skilled personal only should be allowed to work with these instruments.

Adjustment of the set pointer:



The adjustment of the set pointer is made in the adjusting lock of the window by means of the adjusting key supplied. The set pointers of the limit value switches are adjustable over the whole scale range.

Maintenance

- No pressure higher than 25 bar must be applied to the differential pressure gauge during hydrostatic pressure test of the system. Otherwise the differential pressure gauge must be isolated or removed during this operation.
- Before removing the differential pressure gauge, the measuring element must be depressurised.
- To avoid damages the differential pressure gauge is stored in its original packing. Storage temperature -40 to +70°C.

PDM02

Differential Pressure Gauge with Membrane Measuring Element

- for gaseous and liquid media
- housing diameter 100 or 160 mm
- connections made of brass or stainless steel
- measuring range from 0...100 mbar to 0...10 bar
- static pressure max. 25 bar
- high overload protection: max. 25 bar
- versions for all installation variants available
- accuracy class 2,5
- max. temperature 100 °C



Description:

The PDM02 differential pressure gauge has two measuring chambers, which are separated from each other by a membrane. Different pressures in the two measuring chambers cause the membrane to deflect, which is indicated on the scale by a pointer mechanism.

The pressure gauges are available in two material combinations, the brass and stainless steel version, each in the case sizes 100 or 160 mm. Housing versions for practically all installation situations are available.

Typical applications:

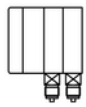
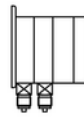
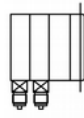
The differential pressure gauge PDM02 is mainly used in the following application areas:

- Filter monitoring
- Petrochemistry
- Oil and gas applications
- Shipbuilding
- general industrial applications

Models:

Nominal size:	Housing diameter 100 or 160 mm
Materials:	
brass version:	connection: brass pressure chambers, Alu, with exhaust diaphragm: st. steel 1.4404, NBR/PA
st. steel version:	connection: st. steel 1.4404 pressure chambers: st. steel. 1.4571 with exhaust diaphragm: st. steel. 1.4404, FPM/PA
general:	housing: st. steel. 1.4301, pointer mechanism: brass drive shaft, nickel silver pointer: aluminium, black dial: aluminium, white sight glass: multi layer safety glass
Designs:	
Version K:	For pipe mounting, connection at bottom
Version B:	For wall mounting, with three-hole ring at back, connection at bottom
Version C:	For panel mounting, with three-hole ring at front, connection at bottom

Measuring ranges:

Measuring range [bar]	pipe mounting	wall mounting	panel mounting
			
Order code			
0...0,1	K63	B63	C63
0...0,16	K64	B64	C64
0...0,25	K65	B65	C65
0...0,4	K66	B66	C66
0...0,6	K67	B67	C67
0...1	K69	B69	C69
0...1,6	K70	B70	C70
0...2,5	K72	B72	C72
0...4	K73	B73	C73
0...6	K74	B74	C74
0...10	K75	B75	C75

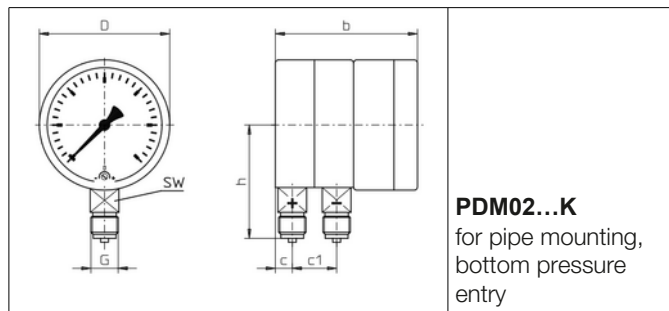
Order Code:

Order number:	PDM02.	10.	M.	15G.	0.	K75.	0.	0
Differential pressure gauge with membrane measuring system								
Models:								
10 = housing diameter 100 mm								
16 = housing diameter 160 mm								
Material version:								
M = brass version								
E = stainless steel version								
Process connection:								
15G = 2 x G 1/2 B								
15N = 2 x 1/2" NPT AG								
S = special connection								
Vibration damping:								
0 = without								
1 = with oil filling (glycerine on request)								
Design and measuring range:								
K63...C75 = see table „Measuring Ranges“								
Additional electrical equipment:								
0 = without								
xxx = see table „Contact Types“								
Options and accessories: (multiple selection possible)								
0 = without								
xxx = see table „Options and Accessories“								

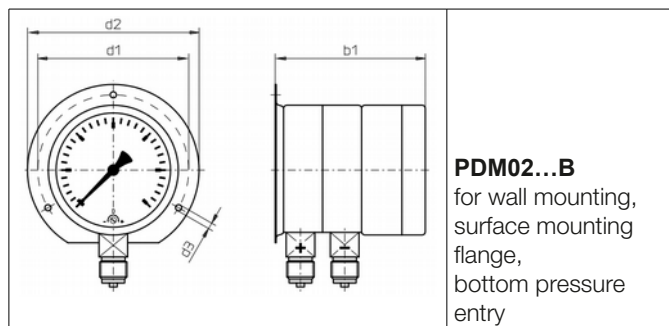
Options and Accessories:

Description	Code
Polished front ring	FP
Degreased pressure element for oxygen	S
Silicon free pressure element	SF
Glycerine filling	G
Restrictor screw in connector	D
Red mark on dial	M
Red mark pointer in window	MS
Red mark pointer on dial	MZ
One-way reset maximum pointer	Z1
Two-way reset maximum pointer	Z2
DAkS-calibrateable	K
Externally zero adjustment in window	N

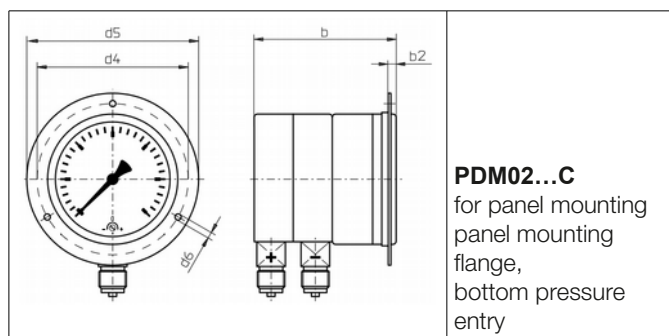
Dimensions:



	Dimensions [mm]	
	Ø 100	Ø 160
D	100	160
b	112	112
G	G ½ B	G ½ B
h	87	116
c	13	13
c1	34	34



	Dimensions [mm]	
	Ø 100	Ø 160
d2	132	132
d1	116	116
d3	4,8	4,8
b1	118,5	118,5



	Dimensions [mm]	
	Ø 100	Ø 160
d5	132	196
d4	116	178
d6	4,8	5,8
b	112	112
b2	6	6

Technical Data:

Housing:	round stainless steel housing 1.4301, d = 100 or 160 mm
Process connection:	2 x G ½ B or 2 x 1/2" NPT successive (marking +/-) other connections on request
Measuring ranges:	see table „Measuring Ranges“
max. static pressure:	25 bar
Overload protection:	+ and - pressure chamber, maximal 25 bar

Working pressure:	
steady:	1,0 x full scale value
fluctuating:	0,9 x full scale value

Media temperature: max. 100 °C

Ambient temperat.: -25...+60 °C

Temperature error:	T _{Ref.} : 20 °C
rising temp.:	+0,3 % FS /10 K
falling temp.:	- 0,3 % FS /10 K

Zero point adjustment: adjusting screw in dial

Accuracy: class 2,5

Protection class: IP54

Contacts:

Alarm contact with magnetic snap-action contact:



Technical Data:

Contact arm bearing:	Ruby stones
Contact material:	AG80 Ni20 10 µm, gold plated
Number of contacts:	max. 4
Voltage:	U_{effmin} : 24 V U_{effmax} : 250 V
Current rating:	make rating: 1,0 A break rating: 1,0 A continuous load: 0,6 A
Accuracy:	ca. 2-5 % FS
Ambient temperature:	-20...+140 °C

Contact Types Magnetic Snap-Action Contact:

Function	Wiring scheme	Configuration	Type
N/O			M1
N/C			M2
SPDC			M3
1. N/O 2. N/O			M11
1. N/O 2. N/C			M12
1. N/C 2. N/O			M21
1. N/C 2. N/C			M22
1. SPDC 2. SPDC			M33
1. N/C 2. N/C 3. SPDC			M221

Inductive alarm sensor contacts:



Technical Data:

Contact arm bearing:	Ruby stones
Number of contacts	max. 4
Operating voltage:	5...25 V _{DC}
Nominal voltage:	8 V _{DC} (Ri ca. 1 kOhm)
Current consumption:	active surface free: ≥ 3 mA active surface damped: ≤ 1 mA
Accuracy:	< 0,5 % FS
Ambient temperature:	-25...+100 °C

Contact Types Inductive Contacts:

Function	Wiring scheme	Configuration	Type
N/O			I1
N/C			I2
1. SPDC 2. SPDC			I11
1. N/O 2. N/C			I12
1. N/C 2. N/O			I21
1. N/C 2. N/C			I22
1. N/C 2. N/C 3. SPDC			I221