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Operating Instructions

PDR04

Differential pressure gauge with double, linked Bourdon tubes

INSTRUCTION LEAFLET FOR PRESSURE GAUGES

WARNING:
Incorrect use of pressure gauges can cause damage and injuries. Under this Directive, the user must ensure that pressure gauges are installed and used in such a way that pressure-related hazards are eliminated to a maximum extent.
Before starting installation, follow the recommendations of standard EN 837-2:
Check that the pressure gauge, designed in compliance with standard EN 837-1/3, is suitable for the planned use in terms of:
- Operating pressure (OP)
- Operating temperature (OT)
- Safety level of the pressure gauge
- Connection interface
- Type of mounting
- Compatibility of materials in contact with the fluid to be measured
- Environmental conditions, vibrations, shocks, pulses, ambient atmosphere
- Check that the pressure gauge is compatible with the surrounding atmosphere

USE IN AN OXYGEN CIRCUIT
Check that the pressure gauge is designed for such an application. The dial must have the word OXYGEN printed in red and the international symbol “oil-free” (a crossed-out burette). The pressure gauge must not have been in contact with oil or grease that is incompatible with oxygen: *RISK OF EXPLOSION!*

Mounting
A pressure gauge must be mounted in compliance with standard practice.
- We advise to mount with an isolation valve.
- The user must check that the connections are perfectly sealed by using suitable seals that are compatible with the fluid to be measured.
- Use a correctly sized spanner to tighten connections. NEVER TWIST THE CASE IN ORDER TO TIGHTEN CONNECTIONS.
- Comply with the instructions given on the device when putting it into service.
- For pressure gauges fitted with a rear blow-out disc for protection against overpressure, ensure that there is a gap of at least 10 mm between the rear panel of the casing and the panel immediately next to it.
- Likewise, for this type of rear blow-out disc and a casing filled with damping fluid, do not remove the disc from its location.
- Only re-use a pressure gauge if the medium is the same as for its first use.

USE
Warning: The operating conditions must be such that the device can be used safely.
THE PRESSURE GAUGE MUST NOT BE SUBJECTED TO:
- Mechanical shocks: if there is a risk install it at a distance with a hose connection.
- Vibrations: if there is a risk install it at a distance with a hose connection or use a liquid filled pressure gauge.
- Pressure pulses: if there is a risk mount a pulsation damper.

Warning: pressure pulses cause a considerable shortening of the operating life of pressure gauges.
- Pressures greater than operating pressures (OP). Otherwise use a pressure relief valve.
- Temperatures greater or less than operating temperatures (OT). If there is a risk use a siphon mount or mount with hose connection to respect the temperature at the pressure gauge.

NOTE:
Failure to observe the conditions above may reduce pressure gauge safety. In such cases contact us.

DISASSEMBLY
- During disassembly, check that the pressure gauge is no longer under pressure. As a precaution, disassemble it slowly.
- Check that the temperature of the pressure gauge body is not sufficient to cause burning.
- Check that residues of the product present in the tube and block of the pressure gauge are not dangerous for the operator and the environment.

MAINTENANCE
- The general safety of a facility often depends on the reliability of indications on the pressure gauges installed in the facility.
- Any pressure gauge that seems to be giving false readings must be removed immediately, then tested. If the tests prove it is unreliable, it must be replaced with a new device.
- Periodic verifications should be carried out to check the accuracy of pressure gauges.
- Any pressure gauge considered to have been subjected to abnormal conditions of use (e.g. fire, wrong fluid, blows, etc.) must not be used.

MAINTENANCE, VERIFICATION OR RECALIBRATION MUST BE CARRIED OUT BY PERSONNEL APPROVED BY THE CONSTRUCTOR AND USING SUITABLE EQUIPMENT.

IMPORTANT
The instructions in this leaflet must be strictly followed.
The manufacturer declines all responsibility for any direct or indirect damage to property or persons as well as for the consequence, for example, of lost production resulting from failure to observe the instructions in this leaflet.

PDR04

Differential Pressure Gauge with Double Bourdon Tube Measuring System with Coupled Bourdon Tubes

- **nominal sizes 100 and 160 mm**
- **accuracy class 1,6**
- **completely made of stainless steel, fully welded version**
- **measuring ranges from 0...0,6 bar to 0...16 bar**
- **static pressure 3-40 bar**
- **optional limit switches available**
- **Ex version according to ATEX optional**

Description:

The differential pressure gauges PDR04 have two bourdon tube measuring systems which are coupled together in such a way that only the pressure difference between the two inputs is displayed on the scale via the pointer mechanism.
An additional, rotatable scale as with other double bourdon tube systems in therefore not necessary.
The devices are always supplied completely in stainless steel in the housing size 100 or 160 mm.
Housing versions are available for practically all installation situations. Optionally, limit switches can be installed in the devices.

Typical applications:

The differential pressure gauges PDR04 are mainly used in the following areas of application:

– filter monitoring
– petrochemistry
– shipbuilding
– offshore applications
– flow measurement by means of orifice plates or acc. to the differential pressure principle

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Models:

Nominal sizes: housing diameter 100 or 160 mm
Materials: stainless steel housing 1.4301, bourdon tube and process connection made of stainless steel 1.4571
Process connection: 2 x G 1/2 male or 2 x 1/2" NPT male, special connection optional

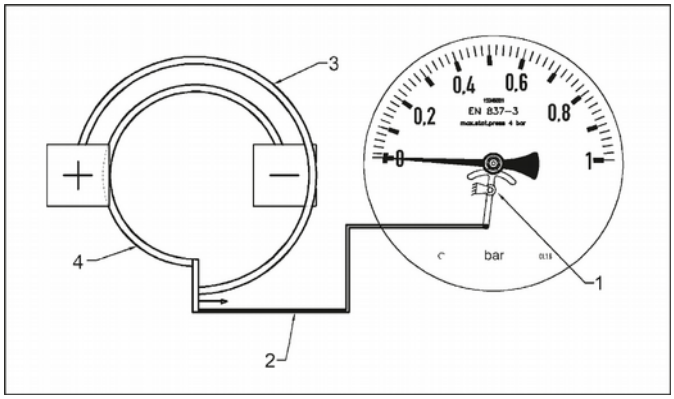
Designs:

Version K: for pipe mounting, connection at bottom
Version L: for wall mounting, with rear rim, connection at bottom
Version M: for pipe mounting, connection at back
Version N: for panel mounting, with three-hole front ring, connection at back
Version O: for panel mounting, with three-hole front ring, connection at bottom
Version H: for panel mounting, with front ring and hangers, connection at back

Measuring Ranges:

Measuring range [bar] (max. static pressure)	Design					
						
	Order code					
0...0,6 (3 bar)	K67	L67	M67	N67	O67	H67
0…1 (4 bar)	K69	L69	M69	N69	O69	H69
0…1,6 (6 bar)	K70	L70	M70	N70	O70	H70
0...2,5 (10 bar)	K72	L72	M72	N72	O72	H72
0…4 (16 bar)	K73	L73	M73	N73	O73	H73
0…6 (25 bar)	K74	L74	M74	N74	O74	H74
0…10 (30 bar)	K75	L75	M75	N75	O75	H75
0…16 (40 bar)	K76	L76	M76	N76	O76	H76

Functional Principle:



1 = pointer mechanism
2 = mechanical connection to measuring element
3 = bourdon tube (+) for high pressure
4 = bourdon tube (-) for low pressure

Order Code:

Order number: PDR04. | 10. | E. | 15G. | 0. | K75. | 0. | 0

Differential pressire gauge with double linked bourdon tubes

Models:
10 = housing diameter 100 mm
16 = housing diameter 160 mm

Material:
E = completely stainless steel

Process connection:
15G = 2 x G ½ male thread
15N = 2 x ½" NPT male thread
S = special connection (see: options)

Vibration damping:
0 = without
1 = with glycerine filling
2 = with oil filling (only for devices with contact)

Design and measuring range:
K67…H76 = see table „Measuring Ranges“

Additional electrical equipment:
0 = without
xxx = see table „Contacts“

Options and accessories: (multiple selection possible)
0 = without
xxx = see table „Options and Accessories“

Technical Data:

Housing:	round stainless steel housing 1.4301, d = 100 or 160 mm
Measuring element:	2 x stainless steel bourdon tube 1.4571
Pointer mechanism:	stainless steel 1.4301
Viewing class:	mineral glass (4 mm)
Scale and pointer:	aluminium, pointer deflection 90-180°
Process connection:	1/2" G or NPT (standard), 1/4", 3/8" G or NPT (optional) made of stainless steel 1.4571, other connections on request
Liquid-filled version:	glycerine (for contact devices with oil filling)
Measuring ranges:	see table „Measuring Ranges"
Max. static pressure:	see table „Measuring Ranges“
Media temperature:	–20 … +100 °C
Accuracy:	class 1,6
Protection class:	IP45 (IP65 for filled devices)

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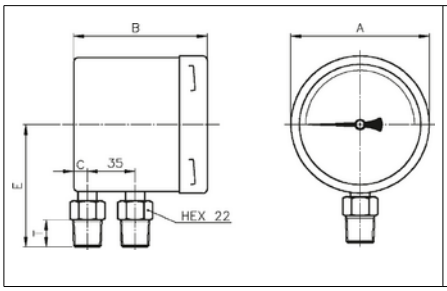
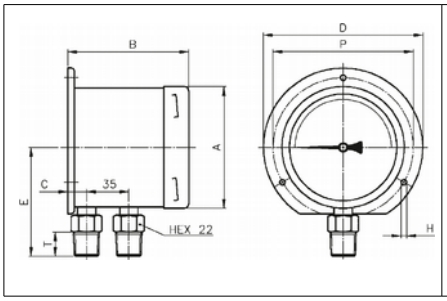
Dimensions:



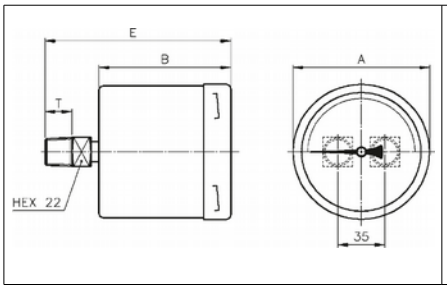
PDR04…K
for pipe mounting, connection at bottom

	Dimensions [mm]			
	Ø 100	**Ø 160**	**Ø 100 + contact**	**Ø 160 + contact**
A	101,5	162	101,5	162
B	97	100	159	163
C	14	18	14	18
E	90	120	90	120
T	20	20	20	20



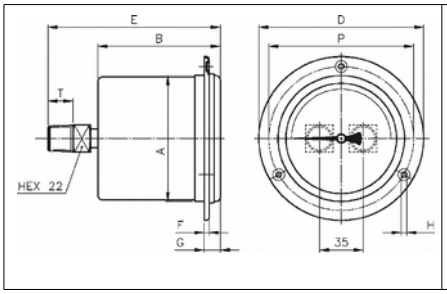
PDR04…L
for wall mounting, with rear rim, connection at bottom

	Dimensions [mm]			
	Ø 100	**Ø 160**	**Ø 100 + contact**	**Ø 160 + contact**
A	101,5	162	101,5	162
B	100	102	162	165
C	14	18	14	18
D	132	196	132	196
E	90	120	90	120
P	116	178	116	178
H	4,5	6	4,5	6
T	20	20	20	20



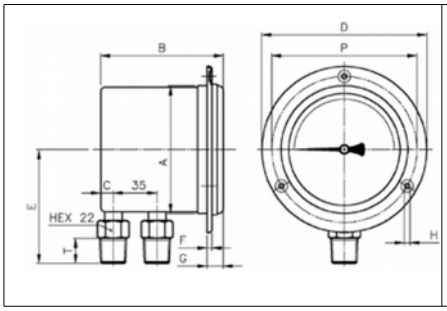
PDR04…M
for pipe mounting, connection at back

	Dimensions [mm]			
	Ø 100	**Ø 160**	**Ø 100 + contact**	**Ø 160 + contact**
A	101,5	162	101,5	162
B	97	100	159	163
E	137	140	199	203
T	20	20	20	20



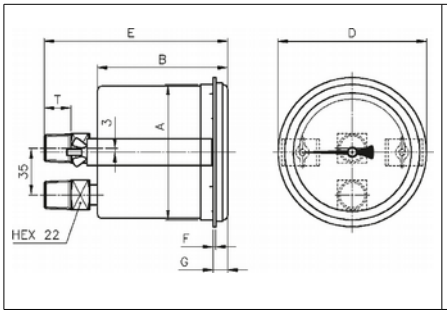
PDR04…N
for panel mounting, with three-hole front ring, connection at back

	Dimensions [mm]			
	Ø 100	**Ø 160**	**Ø 100 + contact**	**Ø 160 + contact**
A	101,5	162	101,5	162
B	97	100	159	163
D	132	196	132	196
E	137	140	199	203
F	3,5	3	3,5	3
G	13	15,5	13	15,5
H	4,5	6	4,5	6
P	116	178	116	178
T	20	20	20	20



PDR04…O
for panel mounting, with three-hole front ring, connection at bottom

	Dimensions [mm]			
	Ø 100	**Ø 160**	**Ø 100 + contact**	**Ø 160 + contact**
A	101,5	162	101,5	162
B	97	100	97	100
C	14	18	14	18
D	132	196	132	196
E	90	120	90	120
F	3,5	3	3,5	3
G	13	15,5	13	15,5
H	4,5	6	4,5	6
P	116	178	116	178
T	20	20	20	20



PDR04…H
for panel mounting, with front ring and hangers, connection at back

	Dimensions [mm]			
	Ø 100	**Ø 160**	**Ø 100 + contact**	**Ø 160 + contact**
A	101,5	162	101,5	162
B	97	100	159	163
D	110	180	110	180
E	137	140	199	203
F	2	2	2	2
G	10,5	9	10,5	9
T	20	20	20	20

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Limit Contacts:

Versions:

Magnetic snap-action contact: as N/O or N/C (max. 2 pieces) as SPDT (max. 1 piece) switching capacity 30 W, 50 VA, switching voltage 24...250 V

Inductive contact: as N/O – output transistor through-connected, or N/C - output transistor disabled (max. 2 pieces) control voltage 8 VDC, Ri = 1kOhm intrinsically safe acc. to EEx ib IIC T6

Description (contact function with increasing pressure, clockwise pointer movement)	**Code** 1 = N/O 2 = N/C 3 = SPDT
1 magnetic snap action contact, N/O	M1
1 magnetic snap action contact, N/C	M2
1 magnetic snap action contact, SPDT	M3
2 magnetic snap action contacts, switching function: x = N/O or N/C	Mxx
1 inductive contact, N/O	I1
1 inductive contact, N/C	I2
2 inductive contacts, switching function: x = N/O or N/C	Ixx

Options and Accessories:

Description	**Code**
scale in psi	P
double scale bar / psi	BP
special scale	SK...
process connection G 1/4	08G
process connection G 3/8	10G
process connection 1/4" NPT	08N
process connection 3/8" NPT	10N
three-spindle stainless steel valve block, process connection: 2 x G 1/4 female instrument connection: 2 x G 1/2 with rotating sleeve	3VD-35

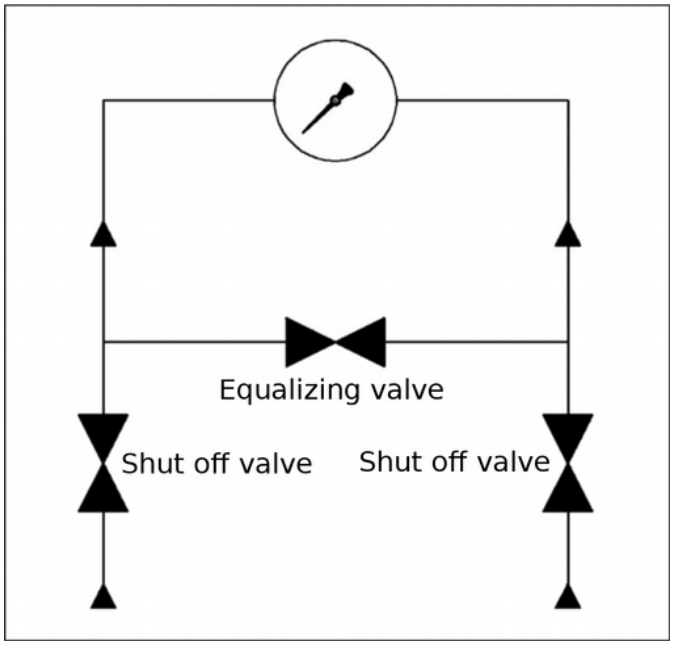
Three-Spindle Valve Block for PDR04:

The 3VD-35 valve block is used to shut off the connection to the process and to equalize the pressure between the two inputs of the differential pressure gauge before the actual measurement.

The device is completely made of stainless steel 1.4401, the packing is made of PTFE.

The valve block can be used for all differential pressure gauges with a centre distance of the process connections of 35 mm.

Function:



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