

Pressure Switches



Bellows-actuated

For neutral gaseous and liquid fluids

Working pressure range -1 ... 25 bar

Catalog Register

A 19, P 19, D 4

Schrift 7500615.06.10.89

**OBSOLETE
DOCUMENT**
Technical
Reference
Only

Description

Pressure switch for air, gas water, steam, refrigerants, oil.

Working viscosity: up to 1000 mm²/s
Repeatability: ± 1%, (for vacuum ± 3% or ± 1.5%) of maximum scale reading

Switching element: Microswitch
Degree of protection: IP 65
Ambient temperature: -10 to + 80 °C (-30 to + 60 °C)⁴⁾

Fluid temperature: -10 to + 100 °C
Temperature at switching element: + 80 °C max.

Mounting position: Optional
Vibrations: 4 g max. (sinusoidal)¹⁾



Type 7 D

Features

- Suited for vacuum- and overpressure range
- Excellent sealing properties (better than $< 10^{-7}$ mbar · l · s⁻¹)
- Works within a large temperature range
- High accuracy (deviation less than < 1%)

Switching function:

Microswitch SPDT

Terminals 1 – 3: Contacts close on rising temperature

Terminals 1 – 2: Contacts open on rising temperature

Parameters (Switching pressure difference not adjustable)

Adjustable range ²⁾ p _{u min} ...p _{u max} (VDI 3283) [bar]	Switching pressure difference		Max. allowable pressure ³⁾ [bar]	Switching cycles per minute	Pressure sensor materials		Connection (internal thread)	Total weight [kg]	Dimensional drawing No.	Cat. No.	DIN-DVGW-Reg.-No.
	Lower range [bar]	Upper range [bar]			Housing	Bellows					
-1 ... 0	0.06	0.07	10(4)	20 max. (no sudden pressure changes)	Brass 2.0401	St.st. 1.4401 soldered	G 1/4	1.0	01	0810100	86.13 f 158
-1 ... 1	0.07	0.08	10(4)				G 1/4	1.0	01	0810200	86.14 f 158
-1 ... 1.6	0.08	0.09	10(4)				G 1/4	1.0	01	0810300	86.15 f 158
-1 ... 2.5	0.09	0.12	10(4)				G 1/4	1.0	01	0810400	86.16 f 158
0.0 ... 1	0.07	0.08	10(4)				G 1/4	1.0	01	0811100	86.21 f 158
0.0 ... 1.6	0.08	0.09	10(4)				G 1/4	1.0	01	0811200	86.22 f 158
0.1 ... 2.5	0.09	0.1	10(4)				G 1/4	1.0	01	0811300	86.23 f 158
0.2 ... 4	0.3	0.30	20(9)				G 1/4	0.85	02	0811400	86.24 f 158
0.3 ... 6	0.3	0.35	20(9)				G 1/4	0.85	02	0811500	86.25 f 158
0.3 ... 10	0.3	0.40	20(13)				G 1/4	0.85	02	0811600	86.26 f 158
0.5 ... 16	0.7	0.8	50(21)				G 1/4	0.9	03	0811700	86.27 f 158
0.5 ... 25	0.7	0.9	50(33)				G 1/4	0.9	03	0811800	86.28 f 158

¹⁾ Tested in accordance with DIN 89011, 5.2., within the frequency range 25...100 Hz; within the range 2...25 Hz, tested with amplitude 1,6 mm.

²⁾ Ref. pressure = atmospheric pressure.

³⁾ Operative use of limiting value not permissible. Even short pressure peaks during operation must not exceed this limiting value. The limiting value corresponds to the max. test pressure.

Limiting value according to DVGW Approval in brackets.

⁴⁾ Ambient temperature according to DVGW Approval in brackets.

With screwed cable joint (M18 x 1.5 or M 24 x 1.5 DIN 89280) also approved by GL Germanischer Lloyd, LR Lloyd's Register of Shipping, BV Bureau Veritas, DNV Det Norske Veritas, PRS Polski Rejestr Statkow, USSR Register of Shipping.

Parameters (Switching pressure adjustable)

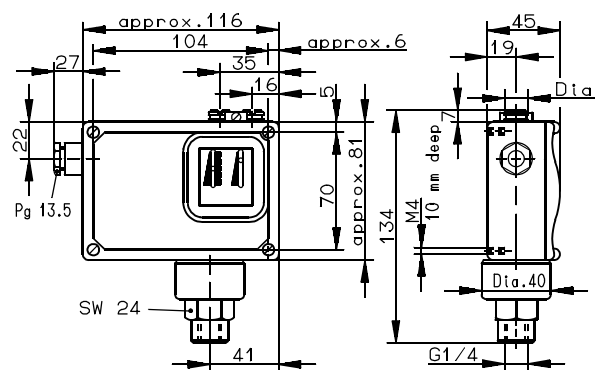
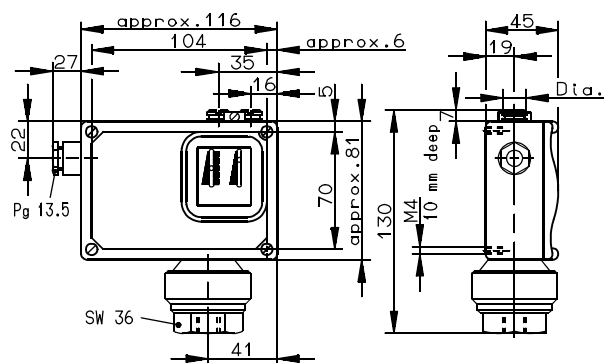
Adjustable range ²⁾	Switching pressure difference		Max. allowable pressure ³⁾	Switching cycles per minute	Pressure sensor materials		Connec- tion (internal thread)	Total weight [kg]	Dimen- sional drawin- g No.	Cat. No.	DIN-DVGW- Reg.-No.
					Housing	Bellows					
$P_{vu \text{ min}} \dots P_{vo \text{ max}}$ (VDI 3283)	min ¹⁾	max.									
[bar]	[bar]	[bar]	[bar]								

Other versions available on request

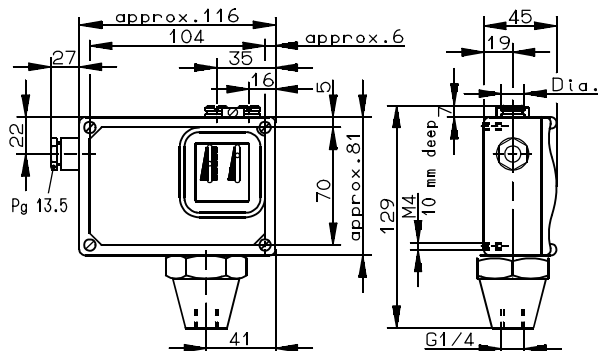
- with a smaller switching pressure difference
- in protection class (Ex)d 3n G5
- with plug-in type electrical connection
- weatherproof design

Dimensional drawings 01

02



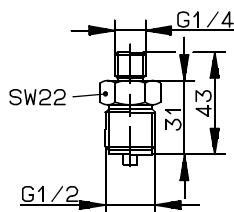
03



Accessories

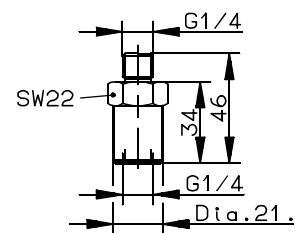
Reducer
G 1/4 to G 1/2
external thread

Cat. No. **0574767**



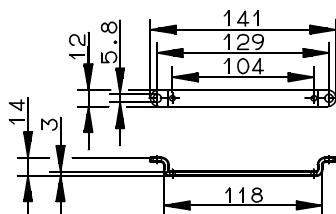
Surge damper
G 1/4

Cat. No. **0574773**



7 D mounting
support
(2 brackets and
4 screws)

Cat. No. **0574772**



Switch selection and instructions

The switching points should normally be in about the middle of the adjustable range.

The specified switching capacity must not be exceeded. Electrical connection by a Pg 13.5 cable gland, in accordance with local regulations. For outdoor installation sufficient protection has to be provided for. Critical conditions are: Aggressiveness of air, high or low temperatures, drastic changes in temperatures, solar radiation, penetration, of water.

A twisting of the pressure sensor is to be avoided by all means. Counterhold when connecting the switch.

Special applications and critical fluids for which the steels 1.4301 and 1.4401 are unsuited, require the use of diaphragm 057926 (material PTFE) to be installed between connecting flange and flange of pressure switch.

On designs with **adjustable** switching pressure difference, use range spindle to set the lower switching point, then use differential spindle to set the upper switching point by adding the desired switching pressure difference.

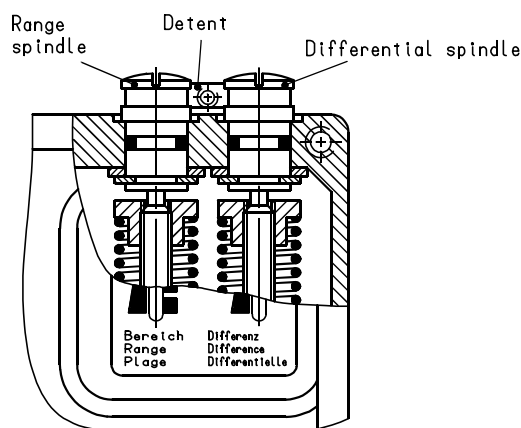
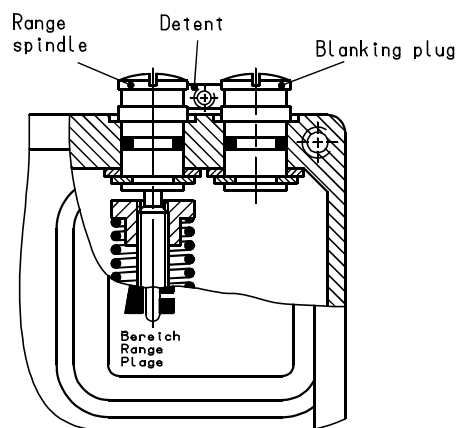
Turning the range spindle anticlockwise shifts both switching points upwards. Turning the differential spindle anticlockwise shifts only the upper switching point upwards, i.e. the switching pressure difference (distance between the upper and lower switching points) increases.

Example:

Desired:	Lower switching point	6 bar
	Upper switching point	8 bar
	Switching pressure difference	2 bar
Setting:	Range spindle	6 bar
	Differential spindle	2 bar

Setting of the switching points

Use range spindle to set the upper or lower switching point on design with **fixed** switching pressure difference. The opposite one is determined by the fixed switching pressure difference.



To set precise switching points, a pressure gauge is required. (The pressure switch is a switching an regulating device and not a measuring instrument – even if it has a scale to assist in the setting).

The setting can be changed at any time, even during operation.

Range- and differential spindle are provided with a releasable detent. If desired, switch can also be leadsealed.

Making and/or breaking capacity

Change-over switch with silver spring contacts

Type of current	Type of load	Voltage [V]			
		24	60	110	220
		Make and break current [A]			
AC	Resistive load	15	15	15	15
AC	Inductive load, $\cos \varphi \approx 0,7$	4	2.5	1.5	0.9
AC	Inductive load, spark quenching with RC-link	6	4	2.5	1.5
DC	Resistive load	2	0.9	0.45	0.2
DC	Inductive load, $L/R \approx 10 \text{ ms}$	1	0.3	0.09	0.02
DC	Inductive load, spark quenching with diode	1.5	0.7	0.35	0.15

Reference number of switchings: 60/min

Reference temperature + 30 °C
(with a reference temperature of + 70 °C, I_{\max} corresponds to 50% of the tabulated values only).

Contact-life appr. 1×10^6 switching cycles at max. current
(at 50% of max. current, contact life is appr. 3 times as long).

Mechanical life appr. 5×10^6 switching cycles.

For non-aggressive atmosphere, which in particular does not contain any sulphur, the following limits are valid:

Microswitch with standard silver contacts:

U_{\min} appr. 8 ... 12 V, I_{\min} appr. 10 mA,
Maximum values acc. to table above

Microswitch with gold-plated contacts:

V_{\min} and I_{\min} : No lower limit

Sensible upper limit:

V_{\max} appr. 48 V, I_{\max} appr. 20 mA;

(for higher values silver spring contacts are completely sufficient).

DCreepage-and air paths correspond to insulation group B according to VDE Reg. 0110 (except contact clearance of microswitch).

Spark quenching (direct current):

1. Diode in parallel to inductive load
Make sure polarity is correct when making connections.

Dimensioning of quenching diode (rectifier):

Rated voltage of diode $V_D \geq 1.4 \times V_{\text{Term}}$.

Rated current of diode $I_{\text{Rated}} \geq I_{\text{Load}}$

Choose quick switching diode
(recovery $t_{\text{rr}} \leq 200 \text{ ns}$).

2. RC-link in parallel to load (or in parallel to switching contact).
Suited for direct and alternating current.

Ratings:

$R [\Omega] \approx 0.2 \times R_{\text{Load}} [\Omega]$

$C [\mu\text{F}] \approx I_{\text{Load}} [\text{A}]$

