# Pressure Switches

**Piston actuated**
**With leakage oil connection**[1)]
**Working pressure range 3 ... 400 bar**

Catalog Register
**H19, D5, T6**

Publication 7500**0616.**06.10.89

OBSOLETE DOCUMENT
Technical Reference Only

## Description (standard unit)

Pressure switch for hydraulic oil
Working pressure up to 300 mm/$^2$s

| | |
|---|---|
| Repeatability: | ± 1% |
| Switching element: | Microswitch |
| Protection class: | IP 65 |
| Ambient temperature: | 0 to + 80 °C |
| Fluid temperature: | 0 to + 100 °C |
| Temperature at switching element: | + 80 °C max. |
| Mounting position: | Vertically downwards (inclination of 15° permissible) |
| Vibrations: | 4 g max. |


Type 7 D

Switching function:
Microswitch SPDT
Terminals 1 – 3: Contacts close on rising pressure
Terminals 1 – 2: Contacts open on rising pressure

## Features

- Sturdy pressure sensor
- High precision
- Especially suited for hydraulic systems

## Parameters

| Adjustable range $p_{v\,min}$...$p_{v\,max}$ (VDI 3283) [bar] | Switching pressure difference Lower range [bar] | Upper range [bar] | Max. allowable pressure[2)] [bar] | Switching cycles per minute | Switching sensor materials Housing | Piston | Connection | Connection (internal thread) | Weight [kg] | Dimensional drawing No. | Cat. No. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Switching pressure difference not adjustable** | | | | | | | | | | | |
| 3 ... 40 | 2 | 4 | 160 | 30 max. for quick pressure changes install damping chamber, overpressure impairs accuracy | Steel 1.0715, galvanized | Steel 1.2210 | Internal thread | G 1/4 | 0.9 | 01 | **0817200** |
| 3 ... 63 | 3 | 6 | 160 | | | | | G 1/4 | 0.9 | 01 | **0817300** |
| 5 ... 100 | 4 | 9 | 300 | | | | | G 1/4 | 0.9 | 01 | **0817400** |
| 5 ... 160 | 6 | 12 | 300 | | | | | G 1/4 | 0.9 | 01 | **0817500** |
| 10 ... 250 | 8 | 20 | 800 | | | | | G 1/4 | 0.9 | 01 | **0817600** |
| 10 ... 400 | 9 | 22 | 800 | | | | | G 1/4 | 0.9 | 01 | **0817700** |
| **Switching pressure difference adjustable** | | | | | | | | | | | |
| 3 ... 40 | 4... 6[3)] | 20 | 160 | max. 30 for quick pressure changes install damping chamber, overpressure impairs accuracy | Steel 1.0715 galvanized | Steel 1.2210 | Internal thread | G 1/4 | 0.95 | 01 | **0807200** |
| 3 ... 63 | 4... 8[3)] | 50 | 160 | | | | | G 1/4 | 0.95 | 01 | **0807300** |
| 5 ... 100 | 7...12[3)] | 80 | 300 | | | | | G 1/4 | 0.95 | 01 | **0807400** |
| 5 ... 160 | 10...16[3)] | 120 | 300 | | | | | G 1/4 | 0.95 | 01 | **0807500** |
| 10 ... 250 | 17...26[3)] | 200 | 800 | | | | | G 1/4 | 0.95 | 01 | **0807600** |
| 10 ... 400 | 20...35[3)] | 300 | 800 | | | | | G 1/4 | 0.95 | 01 | **0807700** |

[1)] For pressureless oil-return (otherwise entering of oil into switching section!)
[2)] Even short pressure peaks must not exceed the maximum allowable pressure (= max. test pressure.)
[3)] These switching pressure differences are maximum values. The first one refers to the beginning –, the second one to the end of the switching pressure range.

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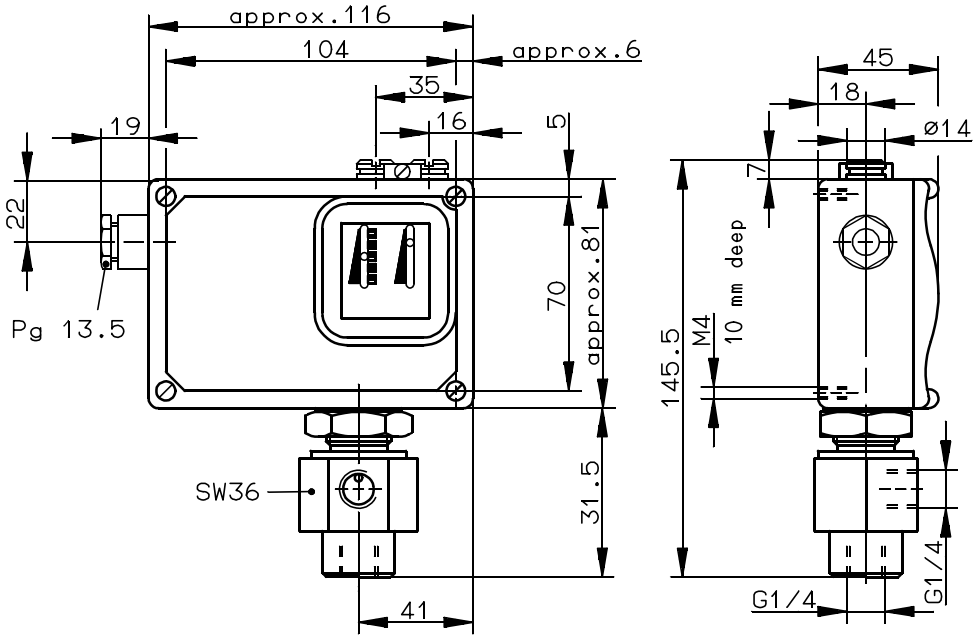
## Other versions available on request

- In protection class (Ex)d 3n G5
- Weather-proof design
- With plug-in type electrical connection
- Microswitch with gold-plated contacts

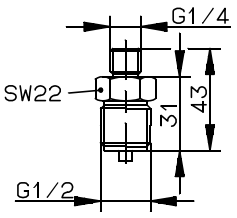
## Dimensional drawing 01




## Accessories

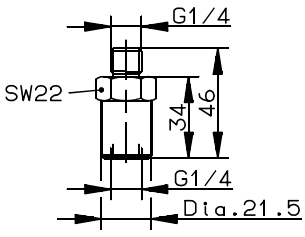
Reducer
G 1/2 to G 1/4
external thread

Cat. Nro. **0574767**



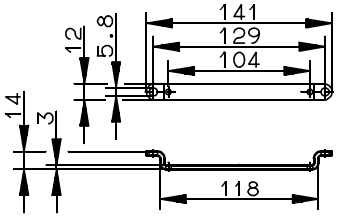

Damping chamber
G 1/4

Cat. No. **0574773**




7 D Mounting
support
(2 brackets and
4 screws)

Cat. No. **0574772**



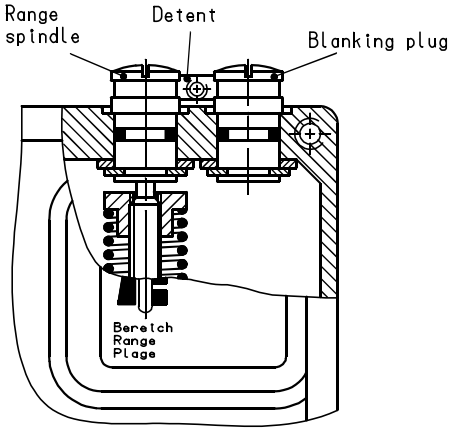
## Switch selection and mounting instructions

The switching points should normally be in about the middle of the adjustable range.
Observe switching pressure range, do not subject switch to max. allowable pressure during normal operation.
Do not exceed electrical ratings.
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: Aggressivenes of air, high or low temperatures, drastic changes in temperature, solar radiation, penetration of water.
For liquid fluids with pressure peaks and/or pulsating pressure, insatall damping chamber upstream to eliminate scattering of switching points and excessive wear.

Avoid twisting of pressure sensor, hold it tight when connecting the switch.

## Setting of the switching points

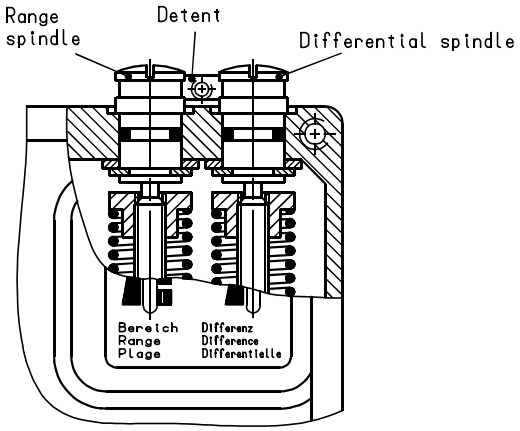
Use range spindle to set the upper or lower switching point on design with **fixed** switching pressure difference.




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 | 40 bar, |
| | Upper switching point | 60 bar, |
| | Switching pressure difference = | 20 bar. |
| Setting: | With range spindle | 40 bar, |
| | With differential spindle | 20 bar. |




To set precise switching points, a pressure gauge is required. (The pressure switch is a switching and 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 lead-sealed.

## Making and/or breaking capacity

**Microswitch with gold-plated contacts:**

$V_{min}$ and $I_{min}$: No lower limit
Recommended upper limit:
$V_{max}$ appr. 48 V, $I_{max}$ appr. 20 mA

Operating pressure switch with a voltage >48 VDC and/or a current >20 mA, will damage the gold plating on the contacts of the microswitch. The pressure switch can then only be used for currents exceeding 20 mA.

The switching capacity with the remaining silver contacts is listed in table below:

| Type of current | Type of load | Voltage [V] | | | |
|---|---|---|---|---|---|
| | | 24 | 60 | 110 | 220 |
| | | Make and/or break current [A] | | | |
| AC | Resistive load | 15 | 15 | 15 | 15 |
| AC | Inductive load, cos φ ≈ 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 ≈ 10 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 temperature of + 70 °C, the switching current corresponds to 50% of the tabulated values only).

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

Mechanical life appr. 5 x $10^6$ switching cycles.

Creepage 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 $V_D \geq 1.4 \times V_{Term.}$
   Rated current of diode $I_{Rated} \geq I_{Load}$

   Choose quick switching diode
   (recovery trr ≤ 200 ns)

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

   Ratings:
   R [Ω] ≈ 0.2 x $R_{Load}$ [Ω]
   C [µF] ≈ $I_{Load}$ [A]