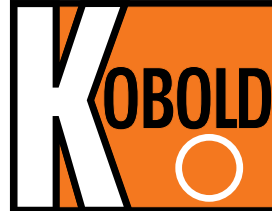




## Mechanical Pressure Switches

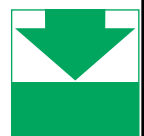
for overpressure, vacuum pressure  
and differential pressure



measuring  
•  
monitoring  
•  
analysing



- Switching range:  
-250 ... +100 mbar,  
1 ... 16 mbar to 16 ... 63 bar
- Temperature:  
max. 70°C
- Material:  
Copper, brass,  
stainless steel, NBR
- Connection: G 1/2



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KOBOLD Messring GmbH  
Nordring 22-24  
D-65719 Hofheim/Ts.  
☎ (06192) 299-0  
Fax (06192) 23398  
E-mail: info.de@kobold.com  
Internet: www.kobold.com

**Model:**  
SCH

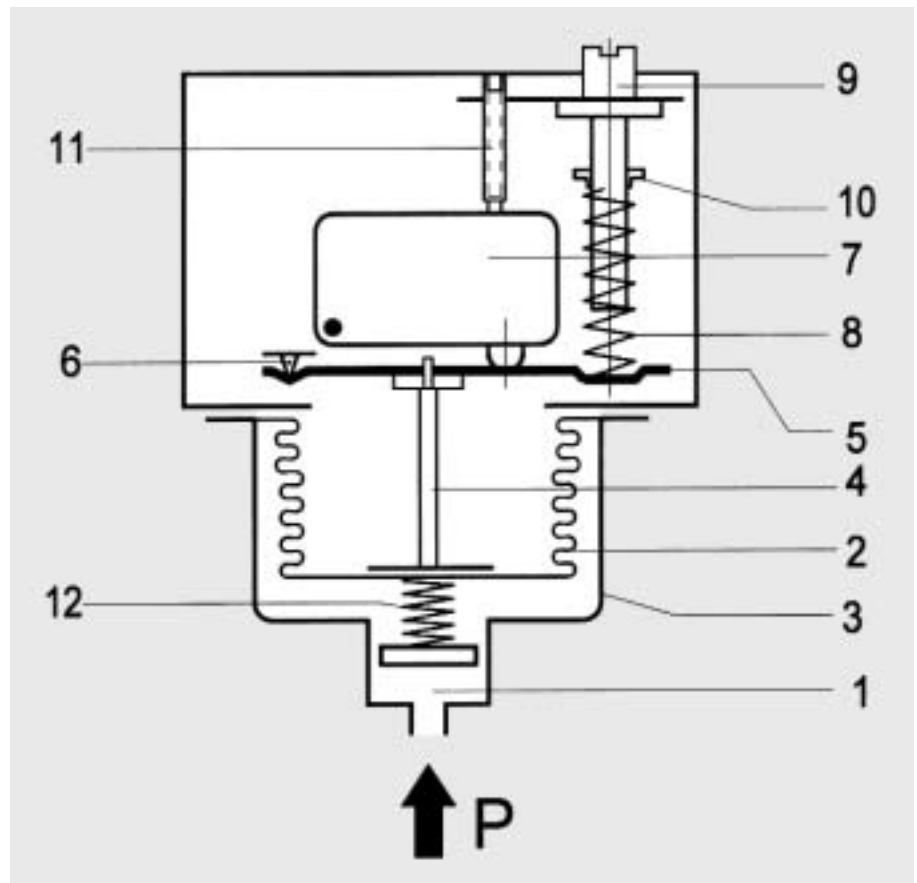
## Pressure switches General description



### Mode of operation

The pressure applied in the sensor housing (1) acts on the measuring bellows (2). Pressure changes lead to movements of the measuring bellows (2) which are transferred through a pressure pin (4) to the switching rocker (5). The switching rocker is supported on hardened pivot points (6). As the pressure increases the switching rocker (5) moves upwards and operates the microswitch (7). The spring (8), the initial stress of which can be changed by the setting screw (9) (switching point setting), acts as opposing force. The traveling nut (10) is moved by turning the setpoint spindle, and the initial stress of the spring (8) is changed. The screw (11) serves for the internal adjustment of the microswitch. The counterpressure spring (12) ensures stable switching behaviour, even for low setting values.

- 1 = pressure connection
- 2 = measuring bellows
- 3 = sensor housing
- 4 = pressure pin
- 5 = switching rocker
- 6 = pivot points
- 7 = microswitch or other switching elements
- 8 = setpoint spring
- 9 = setting spindle (switching point setting)
- 10 = traveling nut (switching point indicator)
- 11 = adjusting screw for microswitch
- 12 = counterpressure spring



### Pressure sensors

With few exceptions in the low pressure range, all pressure sensors are equipped with measuring bellows, partly made of a copper alloy but mostly in high stainless steel quality (1.4571). In comparison with the permissible values, the measuring bellows are subject to low loads and move only slightly. This results in long service life with low switching point drift and high overpressure safety. The movement of the measuring bellows is also restricted by an international stop so that the forces resulting from the overpressure can not be transmitted to the switching mechanism.

The parts of the sensor in contact with the medium are welded together without additional materials and the sensor contain no seals. Cu bellows which are used for low pressure ranges are soldered to the sensor housing. The sensor housing and all parts in the unit in contact with the medium can also be manufactured completely in stainless steel 1.4571 (series DNS). The individual data sheets contain exact data on materials.

### Pressure connection

The pressure connection is designed in accordance with DIN 16288 for all pressure switches (pressure gauge connection G 1/2 A). They can also be connected optionally to the internal thread G 1/4 in accordance with ISO 228 Part 1. The centering pin must then be removed. Max. screw-down depth on the internal thread G 1/4 = 9 mm. When connected to the external thread G 1/2 with seal in the thread (i.e. without the sealing washer customary in the pressure gauge connection), the centering pin must be removed. Differential pressure switches have two pressure connections (max. and min.) and must be connected to one internal thread G 1/4 each.

## The most important technical data



Valid for all pressure switch with microswitches of the DCM, VCM, DNM, DNS, DDC series.  
The technical data of the component tested units deviate partly slightly.  
(Please refer to type sheet)

### Normal version

### Ex-version



#### Switch housing

Aluminium diecast GD Al Si 12

Aluminium diecast GD Al Si 12

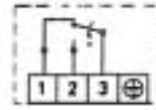
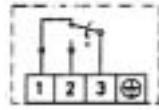
#### Pressure connection

G 1/2 external thread (pressure gauge connection) and G 1/4 internal thread.  
Internal thread G 1/4 at differential pressure switches DDCM.

#### Switching function and connection drawing (applies only for version with microswitch)

Floating change-over contact.  
With rising pressure switching over single-pole from 3-1 to 3-2

Floating change-over contact.  
With rising pressure switching over single-pole from 3-1 to 3-2



#### Switching capacity (applies only for version with microswitch)

8 A at 250 V<sub>AC</sub>  
5 A at 250 V<sub>AC</sub> inductive  
8 A at 24 V<sub>DC</sub>  
0.3 A at 250 V<sub>DC</sub>

3 A at 250 V<sub>AC</sub>  
2 A at 250 V<sub>AC</sub> inductive  
3 A at 24 V<sub>DC</sub>  
0.03 A at 250 V<sub>DC</sub>

#### Installation position

Arbitrary preferably vertical  
See data sheet

Vertical

#### Degree of protection (in vertical position)

IP 54 (on request IP 65 by ZF 351)

IP 65

#### Ex degree of protection

-

Eex de IIC T6 tested to EN 50014/50018/50019 (CENELEC)

#### PTB approval

-

Ex 90.C.1059

#### Electrical connection

Plug connection (200 series) or Terminal connection (300 series)

Terminal connection

#### Cable entry

Pg 11

Pg 11

#### Ambient temperature

See data sheets

-15 to +60 °C

#### Switching point

Adjustable on the spindle.  
In switching mechanism 300 the terminal box lid must be removed.

Adjustable on the spindle after the terminal box is removed.

#### Switching difference

Adjustable or not adjustable (see type overview)

Not adjustable

#### Medium temperature

Max. 70 °C, briefly 85 °C

Max. 60 °C

Higher medium temperatures are possible if the above limit values at the switching mechanism are ensured by suitable measures (e.g. siphon)

#### Vacuum

All pressure switches can operate under vacuum, the device is not damaged by this.

#### Repetition accuracy of the switching points

< 1% of the working range (for pressure ranges > 1 bar)

#### Vibration strength

Upto 4 g no noteworthy deviations.  
The switching difference is reduced slightly at higher accelerations.  
Use able 25 g not permissible.

#### Mechanical life

With sinusoidal pressure application and room temperature, 10 x 10<sup>6</sup> switching cycles.  
The expected life depends strongly upon the type of pressure application, therefore this figure can serve only as rough estimate.  
With pulsating pressure or pressure impacts in hydraulic systems, pressure surge reduction is recommended.

#### Insulation values

Overvoltage category III, contamination class 3, reference surge voltage 4000 V.  
The conformity to DIN VDE 0110 (01.89) will be confirmed.

#### Oil and grease-free

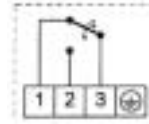
The parts of all pressure switches in contact with the medium are oil and grease-free.  
The sensors are hermetically encapsulated, they contain no seals.

Description

Connection diagrams

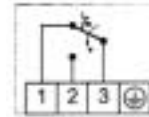
Explanation

**Normal version**  
 microswitch, single pole switching over,  
 switching differential not adjustable



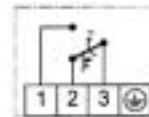
ZF 205

**Maximum limiter**  
 with manual reset device.  
 Interlocking with increasing pressure.



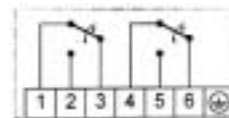
ZF 206

**Minimum limiter**  
 with manual reset device.  
 Interlocking with falling pressure.



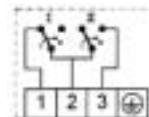
ZF 307

**Two microswitches**, switching in parallel  
 or in succession. Fixed switching interval.  
 Terminal connection case



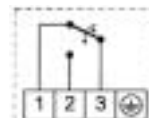
ZF 217

**Two microswitches**,  
 switching in succession,  
 1 plug adjustable switching interval.



ZF 213

**Gilded contacts**  
 Cannot be supplied with  
 adjustable switching differential.



**Switching capacity**  
 max. 24 V<sub>DC</sub>, 100 mA  
 min. 5 V<sub>DC</sub>, 2 mA

**Adjustment according to customer's instruction:**

- one switching point
- two switching points or defined switching differential

**Adjustment and sealing according customer's instruction:**

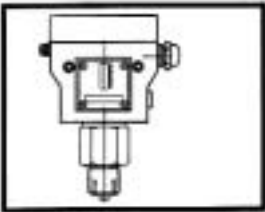
- one switching point
- two switching points or defined switching differential

Specify the  
 switching point  
 and the  
 direction of  
 action

Special packing for oil- and grease-free storage



Pressure switches with special equipment can also be used in the **Ex area  $\geq$  Zone 1**.



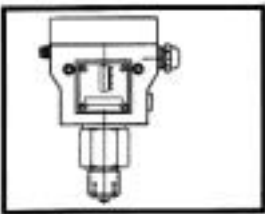
The following alternatives are possible:

**1. Pressure switch with pressure-proof encapsulated switching device, degree of protection EEx de IIC T6.**

The pressure switch in pressure-proof encapsulation can be used directly in the Ex area ( $\geq$  Zone 1). Maximum switching voltage, switching capacity and ambient temperature must be taken into account and the rules for the installation in the Ex area must be observed.

All pressure switches can be equipped with Ex switching mechanisms.

Special circuits as well as versions with adjustable switching differences are not possible.



**2. Pressure switches in EEx-i-version**

All pressure switch in normal version can be used in the Ex area  $\geq$  Zone 1 if they are incorporated in an "intrinsically safe circuit". In principle the intrinsic safety is based on that fact that the control circuit run in the Ex area carries only a small amount of energy which is not able to generate ignitable sparks.

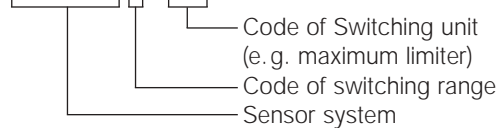
Isolating switching amplifiers, e.g. Type REL-6000 must be tested by the PTB and approved for Ex-installations.

Isolating switching amplifiers must be in any event installed outside the Ex zone.

Pressure switches which are intended for EEx-ia installations can be equipped with blue terminals and cable entries. Because of the low voltages and currents which are carried by the contacts of the microswitch, gold plated contacts are recommended (additional function ZF 513).

**Order Example**

**SCH-DCM 6 - 205**



**Order specification:**

Pressure switch

**SCH-DCM-6-205**

or

**SCH-DCM 6 with ZF 205**

**VdTÜV**  
**Pressure 100/1**

**Steam and hot water**

Pressure monitors and pressure limiters for steam and hot water in systems to DIN 4751 P2 and TRD 604. Series DA and DWR.

**DVGW**  
**DIN 3398 T.1 and 3**

**Fuel gases CE**

Pressure monitors and limiters for fuel gases in accordance with DVGW Worksheet G-260. Series DGM and DWR.

**TÜV**  
**DIN 3398 T.4**

**Liquid fuels**

Pressure monitors and pressure limiters for liquid fuels (heating oil). Serie DWR.

**TÜV**  
**Pressure 100/1 + DIN 3398 T.4**

**Pressure limiters in safety engineering**

For safety-relevant pressure monitoring in liquid gas systems, chemical and processing engineering systems.

**EEx de II CT6**  
**(pressure proof encapsulated)**

**Ex-versions**

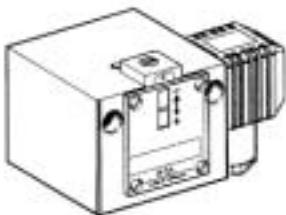
For Ex areas  $\geq$  Zone 1, all pressure switches can be delivered in pressure-proof encapsulated design (Ex degree of protection EEx de II C T6). PTB approval: Ex 90.C.1059

**EEx-ia**  
**(intrinsically safe)**

For intrinsically safe control circuits (Ex degree of protection EEx-ia), the pressure switches can be delivered with gold contacts, proximity switches as well as with the blue terminals and cable entries customary in the EEx-i area. An isolating switching amplifier, which transfer the control commands of the pressure switch form an intrinsically safe control circuit (EEx-ia) into a not intrinsically safe active circuit, is required in addition to the pressure switch.

## Switch housing with switching mechanisms

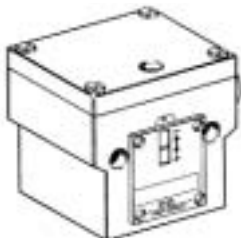
The switch housings consist of high quality and seawater-resistant aluminium diecastings. Three versions are available:



IP 54

**Housing (normal version )**

Plug connections to DIN 43650  
Degree of protection IP 54  
Setpoint setting accessible from the outside.



IP 54  
(IP 65)

**Terminal connection**

With terminal connection box  
Degree of protection IP 54, on request IP 65  
Setpoint setting and terminal connections accessible only after removal of the terminal box lid.



**Ex**  
IP 65

**Ex-Housing (EEx-d version)**

All pressure and differential pressure switches can be equipped with these switch housings and are thus approved for EX  $\geq$  1. Degree of protection IP 65  
Ex degree of protection EEx de IIC T6.

# Pressure limiters with switching status lock (restart lockout)



In limiter functions it is frequently necessary to retain and lock the shutdown status and to release the lock and switch on the system again only after the causes that led to the safety shutdown have been eliminated. There are two possibilities for this:

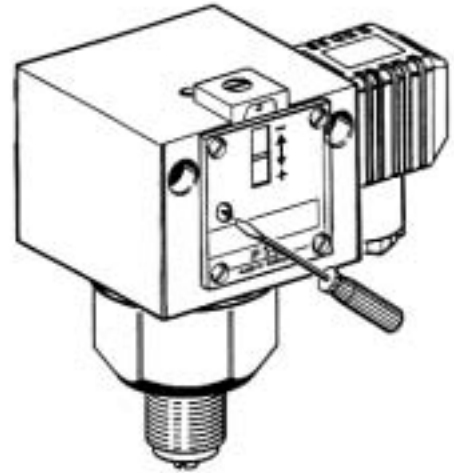
## 1. Mechanical lock inside the pressure switch

A "bistable" microswitch is built into the limiter instead of the microswitch with automatic reset.

When the value set on the scale is reached, the microswitch switches over and remains in this position. The lock must be released by pressing the unlocking button (marked by a red dot on the scale side of the switching device). According to version, the lock can be effective with rising or falling value. Unlocking can take place only if the pressure has dropped by a certain amount or in the case of locking it has risen back to the lower switching point.

When the pressure limiter is selected, a distinction must be made between maximum pressure and minimum pressure monitoring.

Ex-versions cannot be delivered with internal locking.

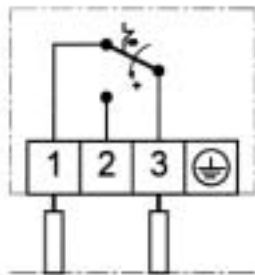


### 1.1 Maximum pressure limitation

Switching over and locking with rising pressure.

Additional function: 205, ZF 305

Connection to terminal 1 and 3.

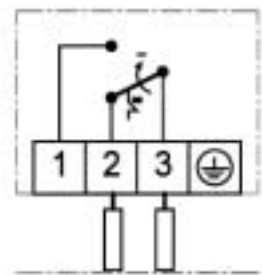


### 1.2 Minimum pressure limitation

Switching over and locking with falling pressure.

Additional function: 206, 306

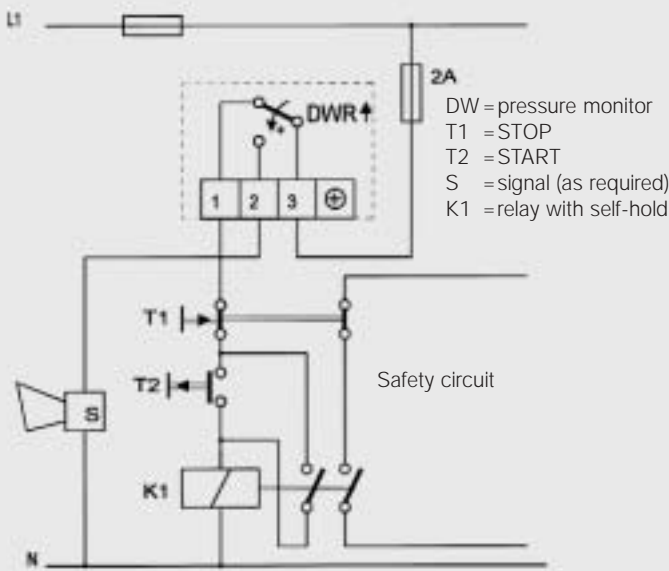
Connection to terminal 2 and 3.



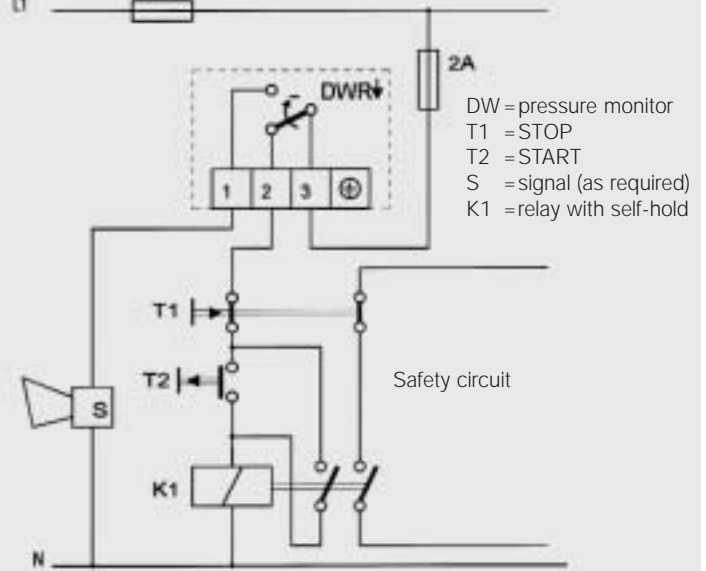
## 2. External electrical interlock in the switchgear cabinet

A pressure monitor (microswitch with automatic reset) can also be used as limiter if an electrical interlock is connected in series. In pressure limitation in steam and hot water boilers, the external interlock is permissible only if it is ensured that the pressure monitor is of "special construction".

### 2.1 Maximum pressure limitation with external interlock



### 2.2 Minimum pressure limitation with external interlock



When the interlock circuit shown above is used, the requirements in accordance with DIN 57 116/VDE 0116 are fulfilled if the electrical equipment such as contactors or relays of the external interlock circuit correspond to VDE 0660 or VDE 0435 respectively.

# SCH-HCD

## Pressure switches and Differential pressure switches For neutral gases (DVGW-tested)



### Technical Data

#### Pressure connection

Pressure connection for overpressure:  
G 1/4 internal thread.  
For vacuum and differential pressure:  
G 1/8 internal thread.

#### Switch case

Aluminium die cast  
Medium berührte Teile:  
Verzinktes Stahlblech, NBR

#### Temperature of medium

-15 up to +60 °C

#### Max. admissible working pressure

See summary of types

#### Installation position

Horizontal with connecting piece pointing downwards

#### Protection

IP44 according to DIN 40050

#### Mounting

Either direct on pipe or with mounting bracket (is supplied as standard) onto a vertical surface.

#### Adjustment of the switching point

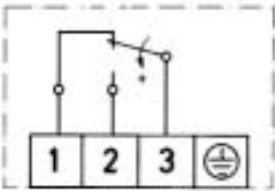
Remove cover and turn the setpoint spindle market with  $\pm$  into the relevant position. The scale indicates only standard values, for exact adjustment of the required value a manometer is necessary which can be connected at the measuring connection (pressure tapping piece 9 mm  $\varnothing$ )

#### Electrical data

#### Switching function

Single pole switching over

#### Electrical connection



3= com = common connection

2= no = normally open

1= nc = normally closed

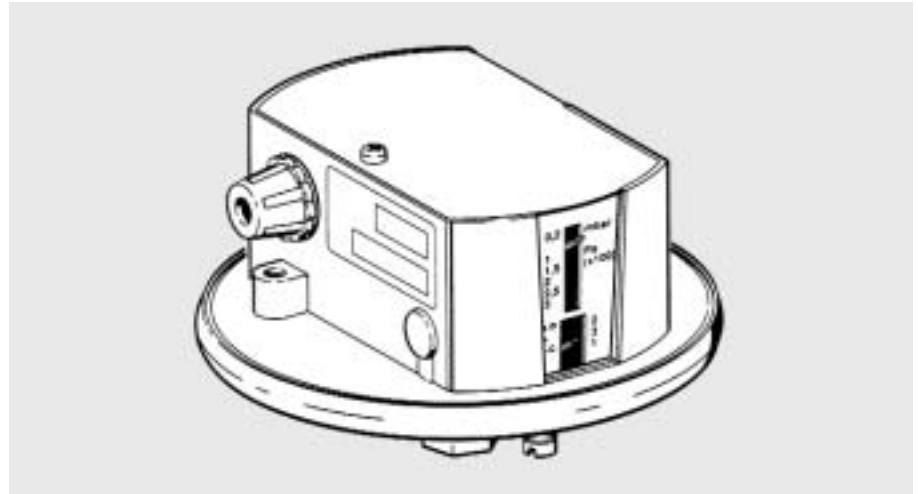
Connection direct at the inner microswitch. The grounding terminal is accessible after removal of the case over.

#### Switching capacity

10 A/220 V (resistive load)  
2.5 A/220 V (inductive load)

#### Cable entry

Pg 13.5



The pressure switches of series HCD are suitable for neutral and non-aggressive gases. They can be used for monitoring overpressure, vacuum as well as differential pressure. For detecting overpressure, connection is made on the pressure side at the lower connecting piece G 1/4 for detecting the vacuum pressure at the upper connecting piece G 1/8 (remove locking clamp). For detecting the differential pressure, the high pressure is applied at the lower connecting piece (G 1/4) and the low pressure at the upper connecting piece (G 1/8).

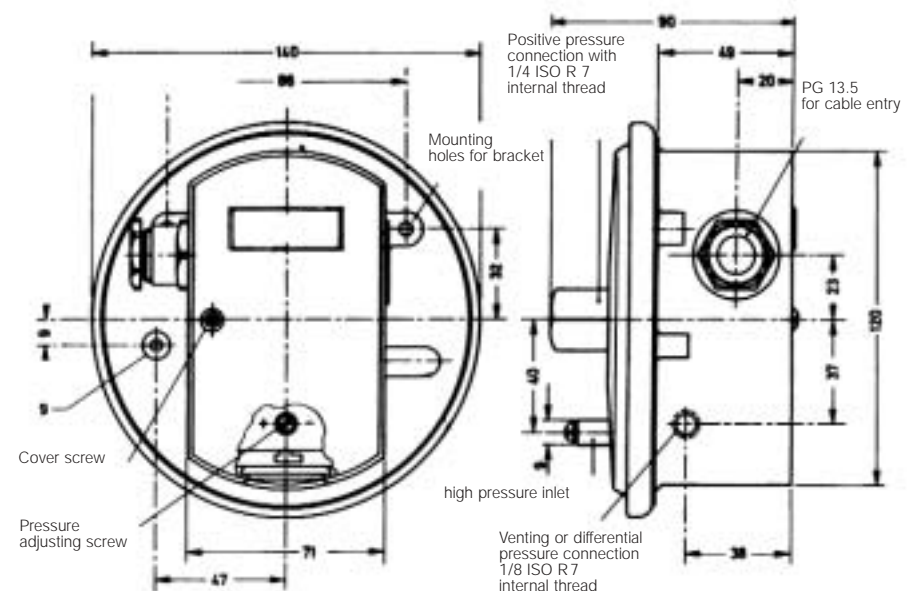
For exact adjustment of the required value a pressure tapping (9 mm  $\varnothing$ ) is available. The pressure switch is tested to DIN 3398 part 1 approved by DVGW for air and fuel gases to DVGW-standards G 260.

Model	Range of adjustment	Switching diff. (mbar) in lower range    in upper range	Max. working pressure	DVGW Re.-No.
<b>SCH-HDC 6003</b>	0.2- 3 mbar	0.3 - 0.5	100 mbar	94.01c050
<b>SCH-HDC 6010</b>	1-10 mbar	0.3 - 1	100 mbar	94.01c050
<b>SCH-HDC 6050</b>	5-50 mbar	1.5 - 3	200 mbar	94.01c050
<b>SCH-HDC 6150</b>	15-150 mbar	4 - 10	300 mbar	94.01c050

The switching differential is not adjustable.

The low switching differentials are valid for the lower range of adjustment, the higher values for the upper ranges.

### Dimensional drawing





# SCH-DPS

## Differential pressure switches for ventilation and air-conditioning



### Technical Data

#### Pressure connection

Plastic connection piece with 6 mm external diameter for measuring hose with 5 mm internal diameter Connection piece P1 for higher pressure, P2 for lower pressure.

#### Pressure medium

Air, as well as non combustibile and non-aggressive gases

#### Switch housing

Switch housing and pressure connection P2 made from PA 6.6

Lower part and pressure connection P1 made of POM.

#### Medium and ambient temperature

-20 °C to +85 °C  
(storage temperature -40 °C to +85 °C)

#### Max. permissible operating pressure

5000 Pa for all types

#### Installation position

Vertical pressure connections below.  
(In horizontal installation position with the cover facing upwards, the scale values are 20 Pa below the actual values, in horizontal installation position with the cover facing downwards, the scale values are 20 Pa higher. Vertical installation is essential for set values below approx. 50 Pa!)

#### Protection

IP 54

#### Installation

By means of mounting pieces integrated in the housing with 2 screws directly onto a vertical surface, e.g. the air-conditioner or the air duct. In the case of installation in the ceiling area, use L brackets if necessary.

#### Switching point adjustment

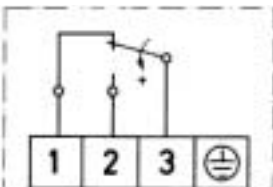
Remove the cover and set the scale to the wanted value. The set values refer to the upper switching point (for maximum pressure monitoring). In the case of minimum pressure monitoring, the switching point is less than the set value by an amount corresponding to the switching differential.

**Weight:** 160 g

#### Switching function

Single pole switching over

#### Electrical connection



Use flat connector 6.3 x 0.8 DIN 46 244 or the screw terminals supplied.

#### Switching capacity

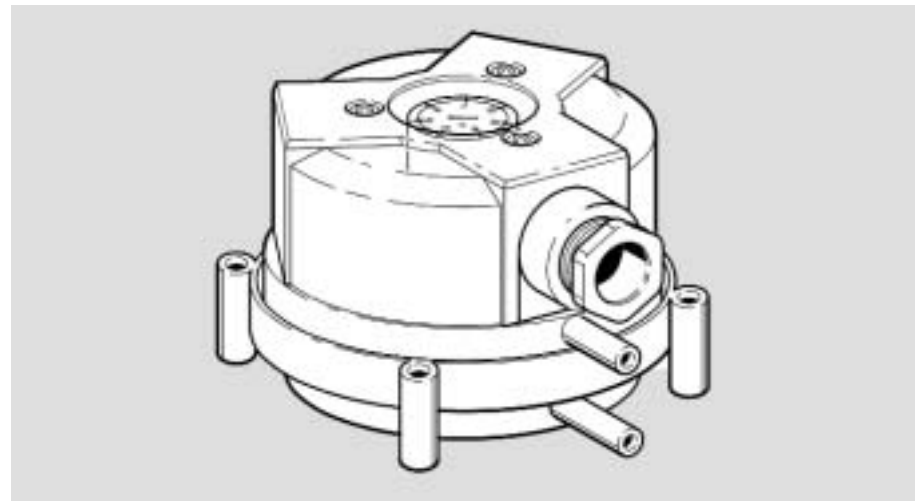
1.5 (0.4) A / 250 V<sub>AC</sub>

#### Cable entry

Pg 11

#### Approvals

Switches tested and approved according to VDE 0630 for 1.5 A.



### Applications

Differential pressure switch for filter, fan or air flow monitoring in air-conditioning and ventilation systems.

### Type overview

Model	Setting range for upper switching pressure	Switching differential (standard values)
SCH-DPS 400	20 Pa - 400 Pa	20 Pa
SCH-DPS 1000	200 Pa - 1000 Pa	20 Pa
SCH-DPS 2500	500 Pa - 2500 Pa	20 Pa

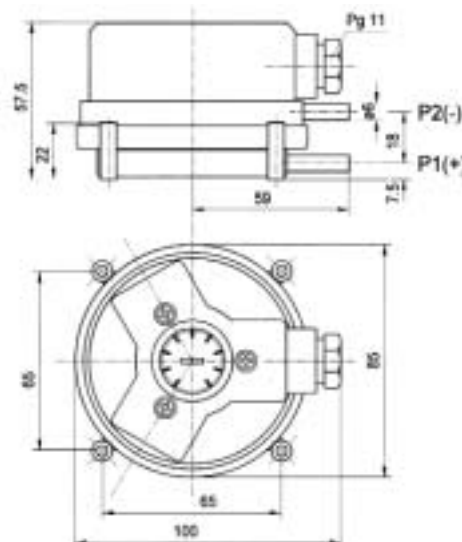
#### Accessories supplied with the device:

- 2 m silicone hose, 2 connection pieces with mounting screws
- 2 self-tapping screws for mounting the housing
- 3 screw terminals for the electrical connection

#### Optional accessory

DPSL L bracket for installation turned by 90°, e.g. in the ceiling area.

#### Dimensional drawing



#### Quotation text:

Differential pressure switch for filter, fan and/or air steam monitoring with adjustable scale. Switching capacity 1.5 (0.4) A at 250 V<sub>AC</sub>.

With approvals according to VDE 0630 for 1.5 A and EN 1854.

Max. operating pressure: 5000 Pa; type of protection IP 54. Pressure and cable connections can be offset in different directions; including pressure connection accessories, consisting of 2 pressure connecting pieces, 2 m silicone hose, 3 screw terminals for the electrical connection and mounting screws.