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krom//schroder

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Operating instructions
Pressure switches for gas DG..B, DG..U

Cert. version 08.12

Safety

Please read and keep in a safe place

Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at www.docuthek.com.

Explanation of symbols

• , 1 , 2 , 3 ... = Action
▷ = Instruction

Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

⚠ DANGER
Indicates potentially fatal situations.

⚠ WARNING
Indicates possible danger to life and limb.

! CAUTION
Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

Changes to edition 03.14

The following chapters have been changed:
– Checking the usage
– Certification

Checking the usage

Gas pressure switches DG for monitoring increasing and decreasing gas or air pressure.

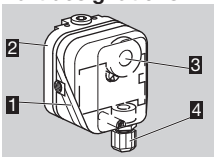
	Positive pressure	Negative pressure	Differential pressure
DG..B	Gas, air, flue gas	–	–
DG..U	Gas, air, flue gas	Air, flue gas	Air, flue gas

This function is only guaranteed when used within the specified limits – see page 3 (Technical data). Any other use is considered as non-compliant.

Type code

Code	Description
DG	Pressure switch for gas
6 – 500	Max. setting in mbar
B	Positive pressure
U	Positive pressure/Negative pressure
G	With gold-plated contacts
	Electrical connection
-3	via screw terminals
-4	via screw terminals, IP 65
-5	4-pin plug, without socket
-6	4-pin plug, with socket
-9	4-pin plug, with socket, IP 65
K2	Red/green pilot LED for 24 V DC/AC
T	Blue pilot lamp for 230 V AC
T2	Red/green pilot LED for 230 V AC
N	Blue pilot lamp for 120 V AC
S	Only for oxygen and ammonia
A	External adjustment

Part designations



1 Upper housing section with cover
2 Lower housing section
3 Hand wheel
4 M16 cable gland

Type label

Max. inlet pressure = withstand pressure, mains voltage, ambient temperature, enclosure: see type label.

GB

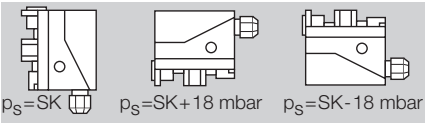
Installation

! CAUTION

Please observe the following to ensure that the DG is not damaged during installation and operation:

- Continuous operation with gases containing more than 0.1 %-by-vol. H_2S or ozone concentrations exceeding 200 µg/m³ accelerate the ageing of elastomer materials and reduce the service life.
- Use approved sealing material only.
- Check max. ambient temperature – see page 3 (Technical data).
- When using silicone tubes, only use silicone tubes which have been sufficiently cured.
- Vapours containing silicone can adversely affect the functioning of electrical contacts.
- Condensation or vapours containing silicone must not be allowed to get into the housing. At subzero temperatures malfunctions/failures due to icing can occur.
- When installing outdoors, place the DG in a roofed area and protect from direct sunlight (even IP 65 version). To avoid condensation, a cover with pressure equalization element (Order No. 74923391) can be used.
- Avoid strong impact on the unit.
- In case of highly fluctuating pressures, install a restrictor orifice (Order No. 75456321).

▷ Installation position as required, preferably with vertical diaphragm. Then the switching point p_S corresponds to the scale value SK set on the hand wheel. In other installation positions, the switching point p_S will change and no longer correspond to the scale value SK set on the hand wheel. Check the switching point.



▷ The DG must not be in contact with masonry. Minimum clearance 20 mm.

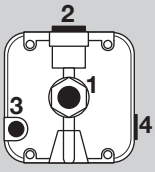
▷ Ensure that there is sufficient installation space.

▷ Ensure unobstructed view of the hand wheel.

1 Disconnect the system from the electrical power supply.

2 Shut off the gas supply.

3 Ensure that the pipeline is clean.



1 and **2**
Positive pressure (Rp ¼)

3 and **4**
Negative pressure (Rp ⅛)

	Connect	Seal	Free
Positive pressure DG..U	**1**	**2**	**3** or **4**
	2	**1**	**3** or **4**
Negative pressure DG..U	**3**	**4**	**1** or **2**
	4	**3**	**1** or **2**
Differential pressure DG..U	**1** or **2** for higher absolute pressure. **3** or **4** for lower absolute pressure. Seal the ports that are not in use.		
Positive pressure DG..B	**1**	–	–

4 If the electrical contacts in the DG could be soiled by dirt particles in the surrounding air or in the medium, use a filter pad (Order No. 74946199) at port **3**/**4**. On IP 65 units, the filter pad is fitted as standard, see type label.

Wiring

▷ If the DG..G has switched a voltage > 24 V and a current > 0.1 A at cos φ = 1 or > 0.05 A at cos φ = 0.6 once, the gold plating on the contacts will have been burnt through. It can then only be operated at this power rating or higher power rating.

▷ Pressure switch DG can be used in Zone 1 (21) and 2 (22) hazardous areas if an isolating amplifier is installed upstream in the safe area as "Ex-i" equipment pursuant to EN 60079-11 (VDE 0170-7):2007.

▷ DG as "simple electrical equipment" pursuant to EN 60079-11:2007 corresponds to the Temperature class T6, Group II. The internal inductance/capacitance is Lo = 0.2 µH/Co = 8 pF.

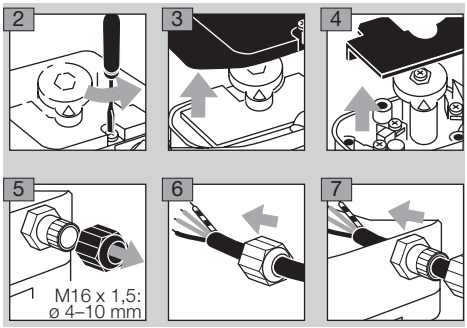
! CAUTION

Please observe the following to ensure that the DG is not damaged during operation:

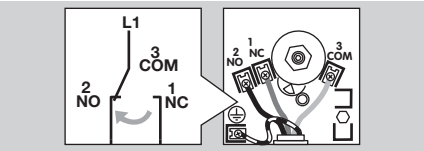
- Note the switching capacity, see page 3 (Technical data).

▷ In the case of low switching capacities, such as 24 V, 8 mA, for example, we recommend using an RC module (22 Ω, 1 µF) in air containing silicone or oil.

1 Disconnect the system from the electrical power supply.



▷ Contacts **3** and **2** close when subject to increasing pressure. Contacts **1** and **3** close when subject to falling pressure.



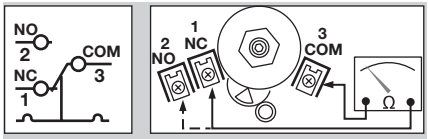
Adjustment

▷ The switching point is adjustable via hand wheel.

1 Disconnect the system from the electrical power supply.

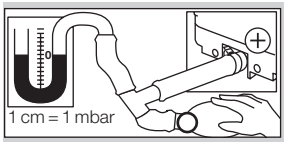
2 Detach the housing cover, see page 3 (Technical data).

3 Connect an ohmmeter.



4 Set the switching point using the hand wheel.

5 Connect a pressure gauge.



6 Apply pressure. In doing so, monitor the ohmmeter and the pressure gauge.

Type	Adjusting range* [mbar]	Switching differential** [mbar]
DG 6	0.4–6	0.2–0.3
DG 10	1–10	0.25–0.4
DG 30	2.5–30	0.35–0.9
DG 50	2.5–50	0.8–1.5
DG 150	30–150	3–5
DG 400	50–400	5–15
DG 500	100–500	8–17

* Adjusting tolerance = ±15% of the scale value.

** Mean switching differential at min. and max. setting.

▷ Deviation from the switching point during testing pursuant to EN 1854 Gas and air pressure switches: ±15%. For DG 6: EN 1854 Air pressure switches: ±15% or ± 0.1 mbar.

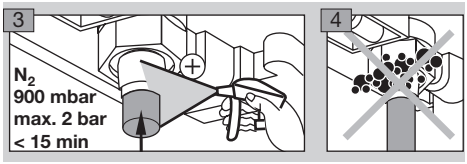
▷ If the DG does not trip at the desired switching point, correct the adjusting range using the hand wheel. Relieve the pressure and repeat the process.

Tightness test

1 Shut off the downstream gas pipeline close to the valve.

2 Open the valve and the gas supply.

▷ Check all used ports for tightness.



Maintenance

In order to ensure smooth operation: check the tightness and function of the DG every year, or every six months if operated with biologically produced methane.

▷ A function check can be carried out in case of decreasing pressure control e.g. with the PIA.

▷ After carrying out the maintenance work, check for tightness, see page 3 (Tightness test).

GB

Technical data

Gas type: natural gas, town gas, LPG (gaseous), flue gas, biologically produced methane (max. 0.1 %-by-vol. H_2S) and air.

Max. inlet pressure p_{max} = withstand pressure = 600 mbar. Max. test pressure for testing the entire system: temporarily < 15 minutes 2 bar.

Switching capacity:

	U	I (cos φ = 1)	I (cos φ = 0,6)
DG	24 – 250 V AC	0,05 – 5 A	0,05 – 1 A
DG..G	5 – 250 V AC	0,01 – 5 A	0,01 – 1 A
	5 – 48 V DC	0,01 – 1 A	

Maximum medium and ambient temperatures: -20 to +80°C.

Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Storage temperature: -20 to +40°C.

Diaphragm pressure switch, silicone-free.

Diaphragm: NBR.

Housing: glass fibre reinforced PBT plastic with low gas release.

Lower housing section: AlSi 12.

Enclosure: IP 54 or IP 65.

Safety class: 1.

Line diameter: 0.5 to 1.8 mm (AWG 24 to AWG 13).

Line entrance: M16 x 1.5, clamping range: diameters of 4 to 10 mm.

Electrical connection type: screw terminals, max. torque: 250 Ncm.

Weight: 270 to 320 g.

Designed lifetime

This information on the designed lifetime is based on using the product in accordance with these operating instructions. Once the designed lifetime has been reached, safety-relevant products must be replaced.

Designed lifetime (based on date of manufacture) in accordance with EN 13611, EN 1854 for pressure switches:

Medium	Designed lifetime	
	Switching cycles	Time [years]
Gas	50,000	10
Air	250,000	10

You can find further explanations in the applicable rules and regulations and on the afecor website (www.afecor.org).
This procedure applies to heating systems. For thermoprocessing equipment, observe local regulations.

GB

Accessories

See Technical Information DG (D, GB, F) – www.docuthek.com

Logistics

Transport
Protect the unit from external forces (blows, shocks, vibration). On receipt of the product, check that the delivery is complete, see page 1 (Part designations). Report any transport damage immediately.

Storage
Store the product in a dry and clean place.
Storage temperature: see page 3 (Technical data).
Storage time: 6 months before using for the first time. If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

Packaging
The packaging material is to be disposed of in accordance with local regulations.

Disposal
Components are to be disposed of separately in accordance with local regulations.

Certification

Declaration of conformity

CE

We, the manufacturer, hereby declare that the product DG, marked with product ID No. CE-0085AP0467, complies with the requirements of the listed Directives and Standards.
Directives: 2009/142/EC, 2006/95/EC
Standards: EN 13611, EN 1854
The relevant product corresponds to the type tested by the notified body 0085. The production is subject to the surveillance procedure pursuant to Directive 2009/142/EC Annex II paragraph 3 and to the Quality System pursuant to DIN EN ISO 9001:2008.
Elster GmbH
Scan of the Declaration of conformity (D, GB) – see www.docuthek.com

SIL, PL
The pressure switches are suitable for single-channel systems (HFT = 0) up to SIL 2/PL d, and up to SIL 3/PL e when two redundant pressure switches are installed in a double-channel architecture (HFT = 1), provided that the complete system complies with the requirements of EN 61508/ISO 13849. The safety function value which is actually achieved is derived by taking all components into account (sensor – logic – actuator). For this, the demand rate and structural measures to avoid/detect nonconformity are to be observed (e.g. redundancy, diversity, monitoring).
Characteristic values for SIL/PL: HFT = 0 (1 device), HFT = 1 (2 devices), SFF > 90, DC = 0, type A/category B, 1, 2, 3, 4, high demand mode, CCF > 65, ß ≥ 2.

$$PFH_D = \lambda_D = \frac{1}{MTTF_d} = \frac{0.1}{B_{10d}} \times n_{op}$$

U	I	B_{10d} value
24 V DC	10 mA	6,689,477
230 V AC	4 mA	
24 V DC	70 mA	4,414,062
230 V AC	20 mA	
230 V AC	2 A	974,800

RoHS compliant, Eurasian Customs Union, AGA approved

RoHS 2011/65/EU

AGA

EAC

Contact

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If you have any technical questions, please contact your local branch office/agent. The addresses are available on the Internet or from Elster GmbH.

We reserve the right to make technical modifications in the interests of progress.

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