

Operating instructions
Pressure switches for gas
DG..H, DG..N
Pressure switch for gas DG..I



Translation from the German

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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 damages 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.

Transport

On receipt of the product, check that the delivery is complete (see Part designations). Report any transport damage immediately.

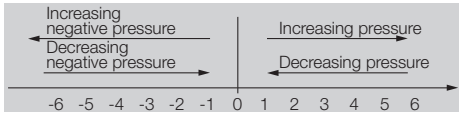
Storage

Store the product in a dry place. Ambient temperature: see Technical data.

Checking the usage

DG..H, DG..N, DG..I

For monitoring increasing and decreasing gas or air pressure.



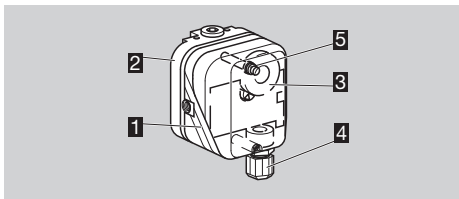
	Positive pressure	Negative pressure	Differential pressure
DG..H, DG..N	Gas, air, flue gas	Air, flue gas	Air, flue gas
DG..I	Air, flue gas	Gas, air, flue gas	Air, flue gas

DG..H switches and locks off with rising pressure, DG..N switches and locks off with falling pressure. They can be unlocked using the manual reset. This function is only guaranteed when used within the specified limits – see page 7 (Technical data). Any other use is considered as non-compliant.

Type code

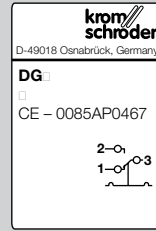
Code	Description
DG	Pressure switch for gas
1,5 – 500	Max. setting in mbar
H	Locks off with rising pressure
N	Locks off with falling pressure
I	Negative pressure for gas
G	With gold-plated contacts
	Electrical connection
-3	via screw terminals
-4	via screw terminals, IP 65
-5	4-pin plug, without socket
-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
A	External adjustment

Part designations



- 1 Upper housing section with cover
- 2 Lower housing section
- 3 Hand wheel
- 4 M16 cable gland
- 5 DG..H, DG..N with manual reset

Type label

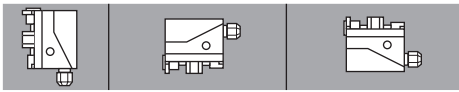


Max. inlet pressure, mains voltage, ambient temperature, enclosure: see type label.

Installation

! CAUTION

- Please observe the following to ensure that the DG is not damaged during installation and operation:
- Continuous operation at high temperatures accelerates the ageing of elastomer materials. In places where a high thermal capacity is required, thermal equipment trips must be installed upstream of the DG.
 - Use approved sealing material only.
 - Check max. ambient temperature – see page 7 (Technical data).
 - When using silicone tubes, only use silicone tubes which have been sufficiently cured.
 - Vapours containing silicone must not be allowed to get into the housing.
 - Condensation must not be allowed to get into the housing. At subzero temperatures malfunctions/failures due to icing can occur.
 - The service life will be shorter if subject to ozone concentrations exceeding $200 \mu\text{g}/\text{m}^3$. 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 (see page 6 (Pressure equalization element)) can be used.
 - Avoid subjecting the DG to strong or violent vibrations.
 - In case of highly fluctuating pressures, install a restrictor orifice (see page 6 (Restrictor orifice)).
- ▷ 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.
 - ▷ 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.



DG..H, DG..N

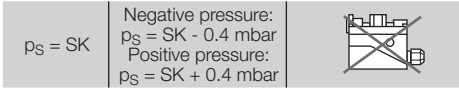
$p_S = SK$ | $p_S = SK + 0.18 \text{ mbar}$ | $p_S = SK - 0.18 \text{ mbar}$
DG 18l



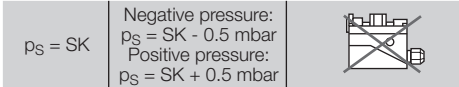
DG 120l, DG 450l



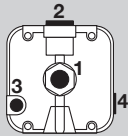
DG 1,5l



DG 12l



Connection facilities



1 and 2
Gas, air, flue gas

3 and 4
Air, flue gas

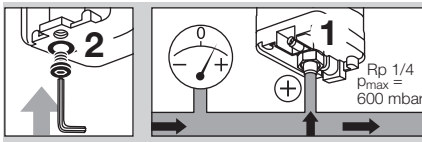
- ▷ Ports **3** and **4** are suitable for air and flue gas only.
- ▷ If the electrical contacts in the DG could be soiled by dirt particles in the surrounding air or in the medium, use a filter pad (see page 5 (Filter pad set)) at port **3/4**. On IP 65 units, the filter pad is fitted as standard, see type label.

- 1** Disconnect the system from the electrical power supply.
- 2** Shut off the gas supply.
- 3** Ensure that the pipeline is clean.
- 4** Purge the pipe.

Installing DG..H, DG..N

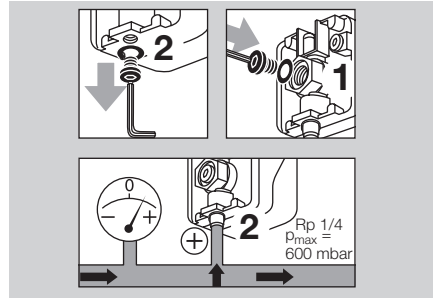
Positive pressure measurement at port 1

- 5** Seal port **2**.



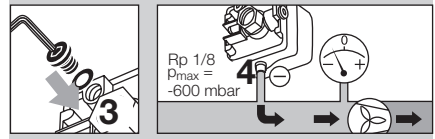
Positive pressure measurement at port 2

- 5** Seal port **1**.



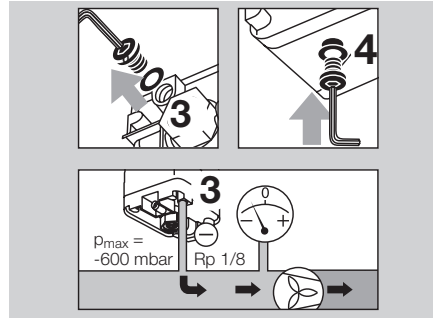
Negative pressure measurement at port 4

- 5** Seal port **3**.



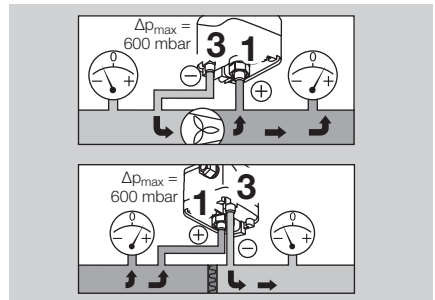
Negative pressure measurement at port 3

- 5** Seal port **4**.



Differential pressure measurement

- ▷ Use port **1** or **2** for the higher absolute pressure and port **3** or **4** for the lower absolute pressure.
- 5** Seal the remaining ports.

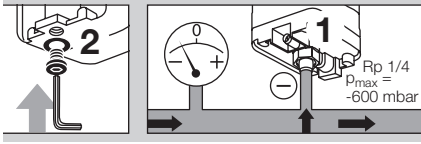


Installing DG..I

- ▷ It is recommended that the port which is best protected from dirt and water be left open.

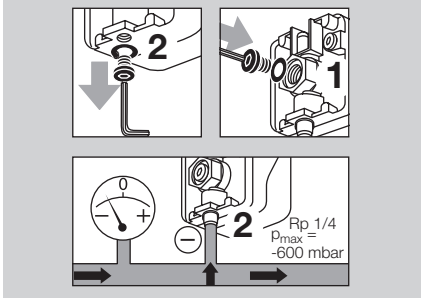
Negative pressure measurement at port 1

5 Seal port 2.



Negative pressure measurement at port 2

5 Seal port 1.



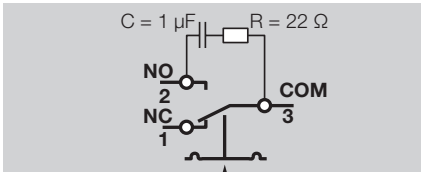
Wiring

- ▷ If the DG..G has switched a voltage > 24 V and a current > 0.1 A 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 and 2 hazardous areas if an isolating amplifier is installed upstream in the safe area as "Ex-" 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 $L_o = 0.2 \mu\text{H}/C_o = 8 \text{ pF}$.

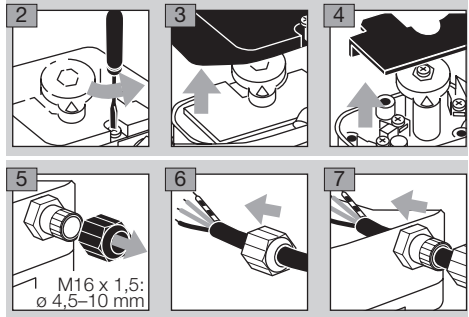
! CAUTION

To ensure that the DG is not damaged during operation, note the switching capacity, see page 7 (Technical data).

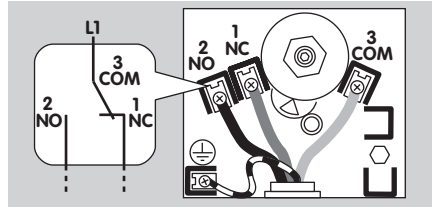
- ▷ In the case of low switching capacities, such as 24 V, 8 mA, for example, we recommend using an RC module (22Ω , $1 \mu\text{F}$) in air containing silicone or oil.



- 1 Disconnect the system from the electrical power supply.

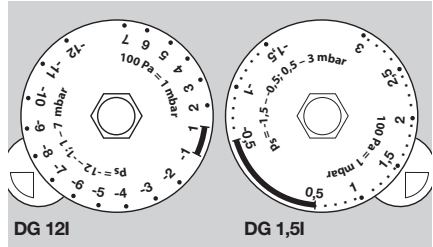


- ▷ Contacts **3** and **2** close when subject to increasing pressure. Contacts **1** and **3** close when subject to falling pressure.

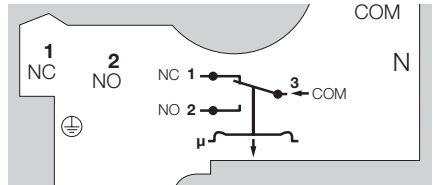


DG 1,5I and DG 12I

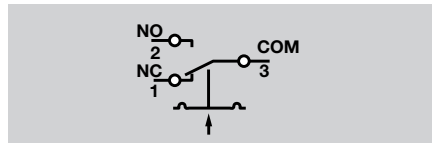
- ▷ The connection of DG 1,5I and DG 12I depends on the positive or negative adjusting range.



- ▷ In the negative adjusting range, the template which can be found in the unit displays the connection diagram.



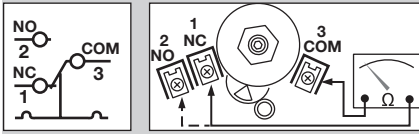
- ▷ In the positive adjusting range, remove the template and wire the unit as shown in the engraved connection diagram.



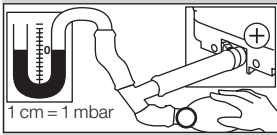
Adjustment

▷ The switching point is adjustable via hand wheel.

- 1 Disconnect the system from the electrical power supply.
- 2 Detach the housing cover, see page 7 (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 switching point on the ohmmeter and the pressure gauge.

Type	Adjusting range* [mbar]	Reset pressure** [mbar]
DG 10H, ..N	1–10	0.4–1
DG 50H, ..N	2.5–50	1–2
DG 150H, ..N	30–150	2–5
DG 500H, ..N	100–500	4–17

Type	Adjusting range* [mbar]	Switching differential*** [mbar]
DG 1,5l	-1.5 to -0.5 and +0.5 to +3	0.2–0.5
DG 12l	-12 to -1 and +1 to +7	0.5–1
DG 18l	-2 to -18	0.5–1.5
DG 120l	-10 to -120	4–11
DG 450l	-80 to -450	10–30

* Adjusting tolerance = $\pm 15\%$ of the scale value.

** Difference between switching pressure and possible reset.

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

▷ Deviation from the switching point during testing pursuant to EN 1854:

Gas pressure switches: $\pm 15\%$.

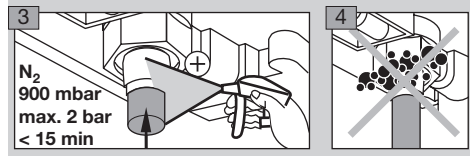
Air pressure switches:

	Deviation
DG..H, ..N, ..l	$\pm 15\%$
DG 1,5l	$\pm 15\%$ or ± 0.4 mbar
DG 12l	$\pm 15\%$ or ± 0.5 mbar
DG 18l	$\pm 15\%$ or ± 0.5 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

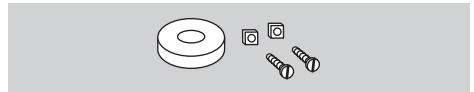
In order to ensure smooth operation: check the tightness and function of the DG every year, or every six months if operated with biologically produced methane.

- ▷ 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 5 (Tightness test).

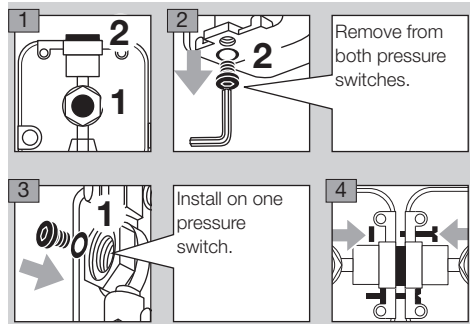
Accessories

Connecting set

For monitoring a minimum and maximum inlet pressure p_u with two pressure switches attached to one another.



Order No.: 74912250



Filter pad set

To protect the electrical contacts in the DG from dirt particles in the surrounding air or in the medium, use a filter pad at the 1/8" negative pressure port. As standard on IP 65 units.

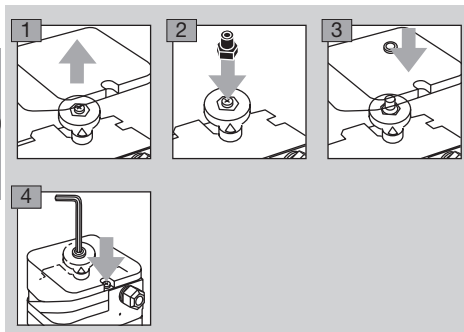
5-piece filter pad set, Order No.: 74916199

External adjustment

In order to set the switching pressure from the outside, the cover for external adjustment (6 mm Allen key) for DG..I can be retrofitted.

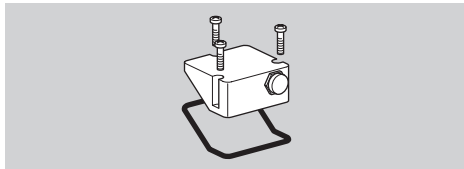


Order No.: 74916155



Pressure equalization element

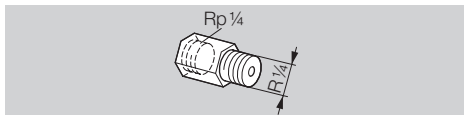
To avoid the formation of condensation, the cover with pressure equalization element can be used. The diaphragm in the screw connector is designed to ventilate the cover, without allowing water to enter.



Order No.: 74923391

Restrictor orifice

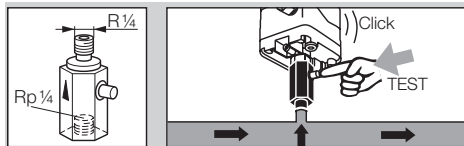
In the case of high pressure fluctuations, we recommend using a restrictor orifice (contains non-ferrous metals).



Hole diameter 0.2 mm, Order No.: 75456321,
hole diameter 0.3 mm, Order No.: 75441317.

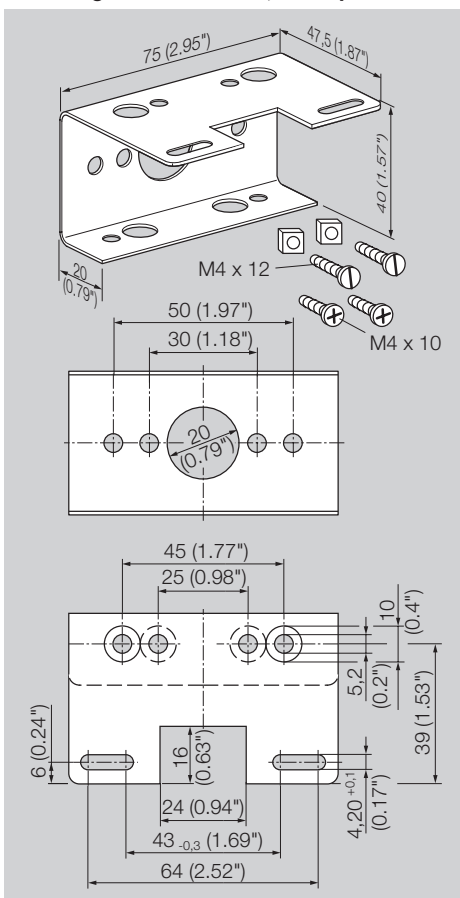
Test key PIA

To test the min. pressure switch, the DG can be vented in its switched state using the PIA test key (contains non-ferrous metals).



Order No.: 74329466

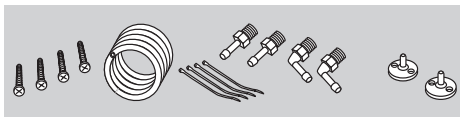
Fastening set with screws, U-shape bracket



Order No.: 74915387

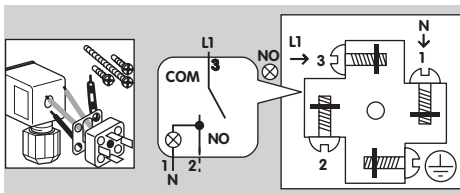
Tube set

To be used with air only.



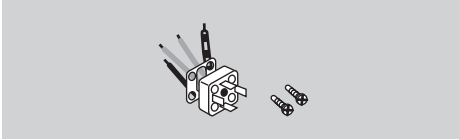
Order No.: 74912952

Standard socket set



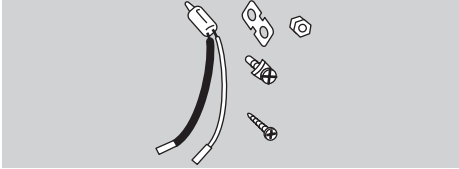
Order No.: 74915388

Standard coupler plug



Order No.: 74920412

Pilot lamp set, red or blue



Pilot lamp, red:

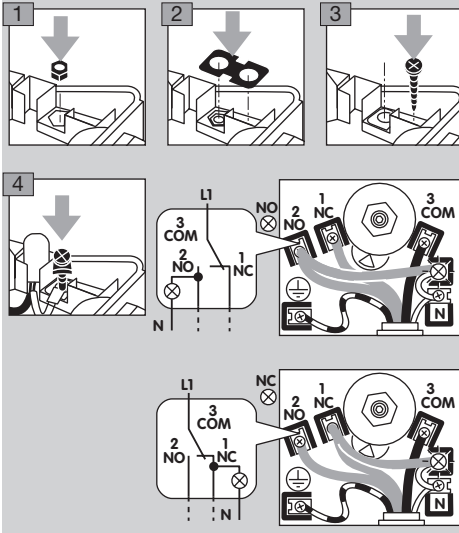
110/120 V AC, $I = 1.2$ mA, Order No.: 74920430;

220/250 V AC, $I = 0.6$ mA, Order No.: 74920429.

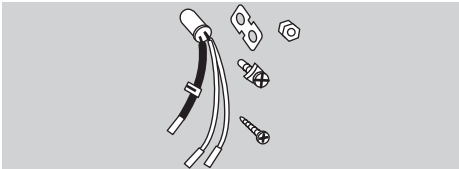
Pilot lamp, blue:

110/120 V AC, $I = 1.2$ mA, Order No.: 74916121;

220/250 V AC, $I = 0.6$ mA, Order No.: 74916122.



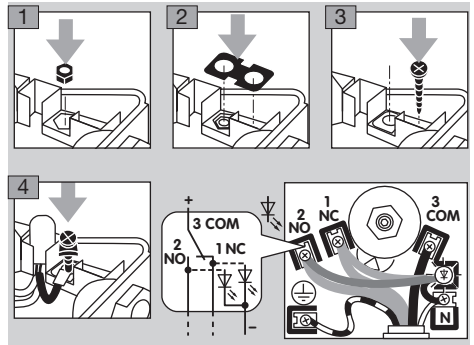
LED set, red/green



24 V DC, $I = 16$ mA; 24 V AC, $I = 8$ mA,

Order No.: 74921089;

230 V AC, $I = 0.6$ mA, Order No.: 74923275.



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. test pressure for testing the entire system: temporarily < 15 minutes 2 mbar.

Switching capacity:

DG:

$U = 24 - 250$ V AC,

$I = 0.05 - 5$ A at $\cos \varphi = 1$,

$I = 0.05 - 1$ A at $\cos \varphi = 0.6$.

DG..G:

$U = 5 - 250$ V AC,

$I = 0.01 - 5$ A at $\cos \varphi = 1$,

$I = 0.01 - 1$ A at $\cos \varphi = 0.6$.

$U = 5 - 48$ V DC,

$I = 0.01 - 1$ A.

Maximum medium temperature:

DG..H, DG..N: -15 to $+60^\circ C$,

DG..I: -15 to $+80^\circ C$.

Storage and transport temperature:

-40 to $+80^\circ C$.

RoHS compliant pursuant to 2002/95/EC.

Diaphragm pressure switch, silicone-free.

Diaphragm: NBR.

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

Lower housing section: AISi 12.

Enclosure: IP 54 or IP 65.

Safety class: 1.

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

Type of connection: screw terminals.

Weight: 270 to 320 g depending on equipment.

Designed lifetime

The Pressure Equipment Directive (PED) and the Energy Performance of Buildings Directive (EPBD) demand regular checks on and maintenance of heating systems in order to ensure a high level of use in the long term, a clean method of operation and safe function.

The service life on which the construction is based, hereinafter referred to simply as the "designed lifetime", is compiled from the relevant standards. You can find further explanations in the applicable rules and regulations and on the afecor website (www.afecor.org).

This information on the designed lifetime is based on using the product in accordance with these operating instructions.

The product must be serviced at regular intervals. Once the specified designed lifetime has been reached, the safety-related functions must be checked in accordance with the section entitled "Maintenance".

If the product passes the aforementioned function tests, you can continue to use it until the next scheduled maintenance operation. At this point, these tests must be repeated.

If the product fails one of the aforementioned tests, it must be replaced immediately.

This procedure applies to heating systems. For thermoprocessing equipment, observe national regulations.

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

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

Declaration of conformity



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 annex II, paragraph 3 of Directive 2009/142/EC 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

Suitable for Safety Integrity Level SIL 1 and 2, in the case of 2 DG also for SIL 3, and Performance Level PL a, b, c, d, e, depending on the demand rate n_{op} (mean number of annual operations).

B_{10d} value (mean number of cycles until 10% of the components fail dangerously) = operating cycles.

U	I	B_{10d} value
24 V DC	10 mA	6,689,477
230 V AC	4 mA	
24 V DC	70 mA	3,887,652
230 V AC	20 mA	
230 V AC	2 A	

RoHS compliant



Contact

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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