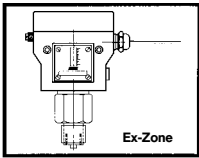


Pressure monitoring in explosion-endangered areas



Pressure switches with special equipment can also be used in the **Ex area Zone 1, 2 and 21, 22**. The following alternatives are possible:

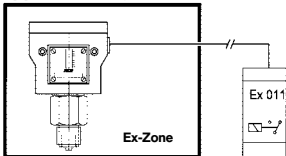
max. 250 VAC, max. 3(2) A



1. Pressure switch with flame-proof enclosure, degree of protection $\text{Ex II 2G/D EEx de IIC T6 IP65 T80}^\circ\text{C}$

The pressure switch in flame-proof enclosure can be used directly in the Ex area (Zone 1 and 2 resp. 21 and 22). 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.

approx. 8 VDC, max. 8 mA



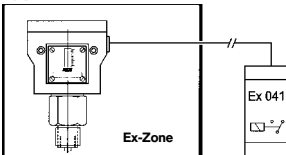
2. Pressure switches in EEx-i-version

All pressure switches in normal version can be used in the Ex area Zone 1 and 2 resp. 21 and 22, 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 Ex 011 or Ex 041 must be tested by the PTB and approved for Ex-installations. Isolating switching amplifiers must in any event be 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 (optional function ZF 513).

approx. 8 VDC, max. 8 mA



3. Pressure switches with microswitch and series resistor for wire breakage and short circuit monitoring

A combination of pressure switch with mechanical microswitch connected with a 1.5 k series resistor and a 10 k parallel resistor and an isolating switching amplifier in safety technology (Type Ex 041) can also be used for Ex zone 1, 2 and 21, 22 (degree of protection EEx-ia). The isolating switching amplifier in safety technology generates an intrinsically safe control circuit and simultaneously monitors the supply line between the isolating switching amplifier and pressure switch for short circuit and line break. Please refer to the chapter on pressure switches in safety technology and data sheet Ex 041.

Pressure monitoring in Ex areas Zone 1 and 2



Ex-D...

Flame-proof enclosed

Ignition protection type:
 $\text{Ex II 2 G/D EEx de IIC T6 IP65 T80}^\circ\text{C}$

PTB approval for the complete switchgear

Switching capacity at 230 V / 3 A.

The pressure switch can be installed inside the Ex zone.



D...-513 + Ex 011

Intrinsically safe

Ignition protection type:
EEx-ia

ATEX approval for isolation switching amplifiers Ex 011.

Pressure switches with gold-plated contacts, blue terminals and blue cable entries.

The isolation switching amplifier must be installed outside the Ex zone.



DWAM...-576 + Ex 041

Intrinsically safe, line break and short circuit monitoring

Ignition protection type:
EEx-ia

PTB approval for isolation switching amplifiers Ex 041.

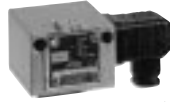
Pressure switches with safety sensor, forced opening micro-switch, gold-plated contacts blue terminals and blue cable entries.

The isolation switching amplifier must be installed outside the Ex zone.

Technical overview pressure switches

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

Normal version Plug connection



...200

Terminal connection

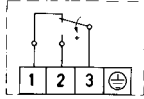
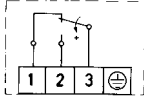


...300

Ex-version



...700

| | | |
|---|---|---|
| Switching device | 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. | 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 VAC 5 A at 250 VAC inductive 8 A at 24 VDC 0.3 A at 250 VDC | 3 A at 250 VAC 2 A at 250 VAC inductive 3 A at 24 VDC 0.03 A at 250 VDC |
| Fitting position | arbitrary, preferably vertical (see data sheet) | vertical |
| Degree of protection (in vertical position) | IP 54, Terminal connection IP 65 | IP 65 |
| Ex degree of protection | - | Ex II 2 G/D EEx de IIC T6 IP65 T80°C |
| PTB approval | - | PTB 02 ATEX 1121 |
| Electrical connection | 200 series: Plug connection 300 series: Terminal connection | Terminal connection |
| Cable entry plug | Pg 11 | |
| Cable entry terminal connection | M 16 x 1,5 | M 16 x 1,5 |
| Ambient temperature | -25 to +70 °C. (with the exception of DA-series -20...+70 °C and DCM 4016, 4025, 1000, VCM 4156) | -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 lid is removed. |
| Switching difference | Adjustable or not adjustable (see type overview) | Not adjustable |
| Medium temperature | Max. 70 °C, briefly 85 °C Higher medium temperatures are possible if the above limit values at the switching mechanism are ensured by suitable measures (e.g. siphon). | Max. 60 °C |

| | |
|--|---|
| 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 | Up to 4 g no noteworthy deviations. |
| Mechanical life | With sinusoidal pressure application and room temperature, 10 x 10 ⁶ switching cycles. The expected life time 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. |
| Isolation 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 (with the exception of series HCD... und DPS...). The sensors are hermetically encapsulated, they contain no seals (see also additional function ZF 1979, special packing). |

Type series DCM

Pressure switches for monitoring and control



DCM 025



DCM 25



DCM 4016

for non-aggressive liquid and gaseous media

| Range of adjustment | Switching difference (Mean value) | Max. allowable pressure | Materials* | Type |
|---------------------|-----------------------------------|-------------------------|------------|------|
|---------------------|-----------------------------------|-------------------------|------------|------|

Switching difference not adjustable

| | | | | |
|-----------------|----------|---------|--------------------|-----------------|
| 1 - 16 mbar | 2 mbar | 1 bar | NBR | DCM 4016 |
| 4 - 25 mbar | 2 mbar | 1 bar | + 1.4301 | DCM 4025 |
| 10 - 100 mbar | 12 mbar | 10 bar | NBR + Ms | DCM 1000 |
| 0.04 - 0.25 bar | 0.03 bar | 6 bar | Cu + Ms | DCM 025 |
| 0.1 - 0.6 bar | 0.04 bar | 6 bar | Cu + Ms | DCM 06 |
| 0.2 - 1.6 bar | 0.04 bar | 6 bar | Cu + Ms | DCM 1 |
| 0.2 - 2.5 bar | 0.1 bar | 16 bar | Sensor- housing | DCM 3 |
| 0.5 - 6 bar | 0.15 bar | 16 bar | | DCM 6 |
| 0.5 - 6 bar | 0.25 bar | 25 bar | | DCM 625 |
| 1 - 10 bar | 0.3 bar | 25 bar | 1.4104 | DCM 10 |
| 3 - 16 bar | 0.5 bar | 25 bar | Pressure | DCM 16 |
| 4 - 25 bar | 1.0 bar | 60 bar | bellow | DCM 25 |
| 8 - 40 bar | 1.3 bar | 60 bar | 1.4571 | DCM 40 |
| 16 - 63 bar | 2.0 bar | 130 bar | | DCM 63 |

* Stainless steel 1.4104 ≈ AISI 430 F. High grade stainless steel 1.4571 ≈ AISI 316 Ti.

DCM 1000: NBR membrane + Brass (sensor housing)

Cu + Ms: Copper (bellow) + Brass (sensor housing)

NBR: Buna rubber

Switching difference adjustable

| | | | | |
|-----------------|-----------------|---------|--------------------|-----------------|
| 0.04 - 0.25 bar | 0.03 - 0.4 bar | 6 bar | Cu + Ms | DCMV 025 |
| 0.1 - 0.6 bar | 0.04 - 0.5 bar | 6 bar | Cu + Ms | DCMV 06 |
| 0.2 - 1.6 bar | 0.07 - 0.55 bar | 6 bar | Cu + Ms | DCMV 1 |
| 0.2 - 2.5 bar | 0.15 - 1.5 bar | 16 bar | Sensor- housing | DCMV 3 |
| 0.5 - 6 bar | 0.25 - 2.0 bar | 16 bar | | DCMV 6 |
| 1 - 10 bar | 0.5 - 2.8 bar | 25 bar | | 1.4104 |
| 3 - 16 bar | 0.7 - 3.5 bar | 25 bar | Pressure | DCMV 16 |
| 4 - 25 bar | 1.3 - 6.0 bar | 60 bar | bellow | DCMV 25 |
| 8 - 40 bar | 2.6 - 6.6 bar | 60 bar | 1.4571 | DCMV 40 |
| 16 - 63 bar | 3.0 - 10 bar | 130 bar | | DCMV 63 |

Cu + Ms = Copper (bellow) + Brass (sensor housing)



-version · Degree of protection II 2 G/D EEx de IIC T6 IP65 T80°C

| Range of adjustment | Switching difference (Mean value) | Max. allowable pressure | Materials* | Type |
|---------------------|-----------------------------------|-------------------------|------------|------|
|---------------------|-----------------------------------|-------------------------|------------|------|

Switching difference not adjustable

| | | | | |
|-------------|--------|-------|-----|--------------------|
| 1 - 16 mbar | 2 mbar | 1 bar | NBR | Ex-DCM 4016 |
| 4 - 25 mbar | 2 mbar | 1 bar | NBR | Ex-DCM 4025 |

Further pressure ranges in Ex-series see following pages.



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