DWAM6-576

DBS

Pressure monitors / pressure limiters

In many aspects, safety engineered pressure limiters offer a higher degree of safety compared with normal pressure switches and are therefore especially suitable for chemical process engineering and thermal installations in which safety is an especially critical factor in pressure monitoring. Pressure switches can also be used in Ex- zones (zone 0, 1, 2 and 20, 21, 22) and, in all cases, require an isolating amplifier.
The isolating amplifier is also responsible for monitoring lines for short circuit and line break and therefore offers an additional safety advantage – even in non Ex-zones. For Ex-applications, the isolating amplifier must be installed outside the Ex-zone. The lines between the isolating amplifier and the pressure switch are monitored for short circuit and line break.

SIL 2 according IEC 61508-2

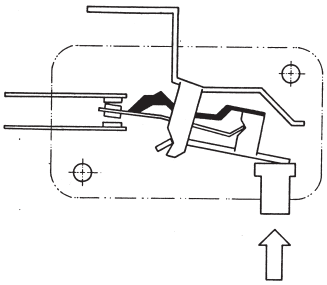
Technical data

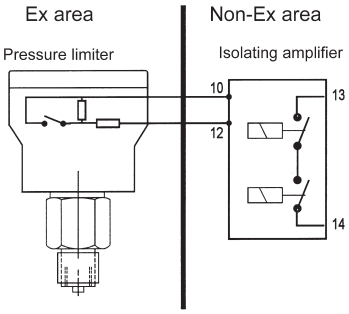
Greater safety
· in process engineering and chemical installations,
· in gas and liquid gas installations

Basic features:
– "Of special construction" according to VdTÜV Memorandum "Pressure 100"
– Line break and short circuit monitoring-between pressure switch and isolating amplifier
– Suitable for Ex-areas (zone 0, 1 & 2 or 20, 21 & 22) (explosion protection Ex-i)
– Protection class IP 65
– Plastic-coated housing (chemical version)

Options:
– Limiter with internal interlock

Type specific features:
– Self-monitoring sensors
– Positive opening microswitches
– Gold plated contacts
– TÜV, DVGW component tests





Safety requirements for pressure limiters

Pressure limiters "of special construction" (DBS) must fulfil additional safety requirements, i.e. breakage or leakage in the mechanical part of the sensor must lead to shutdown to the safe side. The pressure limiter must respond as if the system pressure had already exceeded the maximum limit. The control circuit for the pressure limiter must also be considered from the point of view of safety, as short circuits in the supply lines or other faults in the control current circuit can lead to dangerous conditions.

Switching element with positive opening operation and gold plated contacts

The microswitch is equipped with positive opening operation. Rather than transmitting the plunger force via a spring, which is the usual method with most microswitches, this newly developed microswitch has an additional lever which transmits the movements of the pressure bellows positively to the contact lever. If the spring breaks, the contact lever is moved directly.

Line break and short circuit monitoring in the control circuit

The resistor connected in series with the switching contact limits the current to a defined value with the switch closed. In the event of short circuit in the area between the isolating amplifier and the series resistor, the current rises above the predetermined limit value, the relay of the isolating amplifier drops out, the output current circuit is interrupted and thus the safe condition is achieved. In the event of a line break, the current flow is interrupted, the relay drops to the safe side and interrupts the output current circuit (safety sequence). Furthermore, the isolating amplifier is designed so that, if faults occur in the electronics (conductor interruption, component defect etc.) and in the resulting situations, the safe shutdown condition is assured. These characteristics of the safety engineered isolating amplifier, including line break and short circuit monitoring, satisfy the requirements of DIN/VDE 0660, Part 209.

Connection diagram

For pressure monitoring in Ex-areas, the isolating amplifier must be installed outside the Ex-zone. The pressure limiter has an intrinsically safe control current circuit (Ex-i). This arrangement is suitable for zones 0, 1 and 2, 20, 21 and 22.

Safety engineered maximum pressure monitors

Technical data

Pressure connection
External thread G 1/2 (pressure gauge connection) according to DIN 16 288 and interval thread G 1/4 to ISO 228 Part 1.

Switch housing 500
Die cast aluminium GD Al Si 12. Aluminium housing coated with resistant plastic.

Mounting position
Vertically upright.

Protection class IP 65.

Ex protective category
Ex-i (only when used in conjunction with suitable isolating amplifier).

Component testing See table on page 52.

Pressure sensor materials
Housing: 1.4104
Pressure bellows: 1.4571
All parts fully welded.

Ambient temperature
DWAM: –20°C to +60°C, DWR: –25°C to +60°C. At ambient temperatures at or below 0°C, ensure that condensation cannot occur in the sensor or in the switching device.

Max. temperature of medium at sensor
+ 60°C.

Outdoor installations
Protect the device against direct atmospheric influences. Provide a protective cover.

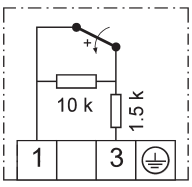
Max. working pressure
See Product Summary

Switching pressure setting
Adjustable with the setting spindle after removing the terminal box.

Mounting
With suitable weld on connections and union nuts or with pressure gauge screw union G 1/2.

Power supply circuit
U_i 14 V DC
R_i 1500 Ohm
C_i 1 nF
L_i 100 µH

Connection scheme



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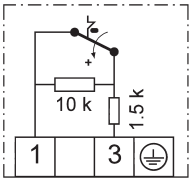

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Maximum pressure monitors

Sensor "of special construction", self monitoring via safety diaphragm, type tested according to VdTÜV Memorandum "Pressure 100". **SIL2 according IEC 61508-2**

Type	Setting range	Switching differential (Tolerance)	Max. permissible pressure	Dimensioned drawing
				page 21 + 22
DWAM06-576	0,1…0,6 bar	20 ... 50 mbar	5 bar	
DWAM1-576	0,2…1,6 bar	20 ... 80 mbar	5 bar	
DWAM2,5-576	0,4…2,5 bar	40 ... 100 mbar	5 bar	3 +
DWAM6-576	1,2…6 bar	0,1 ... 0,26 bar	10 bar	15
DWAM625-576	1,2…6 bar	0,13 ... 0,31 bar	20 bar	
DWAM16-576	3…16 bar	0,2 ... 0,6 bar	20 bar	3 +
DWAM32	6…32 bar	0,6 ... 1,6 bar	45 bar	19

Versions:
ZF577: Maximum pressure limiter (with internal interlock)
Microswitch not positive opening, contacts: silver alloy other equipment like DWAM…576.

Maximum pressure monitors

Sensor "of special construction" made from stainless steel. (Component testing with 2 million operating cycles).
Component tests: VdTÜV Memorandum "Pressure 100", DIN EN1854 (fuel gases), DIN EN764-7, systems in accordance to DIN EN12952-11 and DIN EN12953-9.
SIL 2 according ICE 61508-2

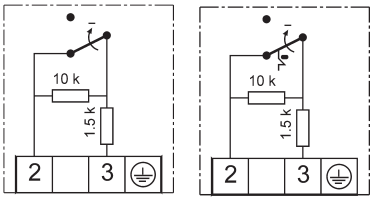
Type	Setting range	Switching differential (Tolerance)	Max. permissible pressure	Dimensioned drawing
				page 21 + 22
DWR06-576	0,1…0,6 bar	35 ... 73 mbar	6 bar	3 +
DWR1-576	0,2…1,6 bar	53 ... 111 mbar	6 bar	15
DWR3-576	0,2…2,5 bar	107 ... 218 mbar	16 bar	3 +
DWR6-576	0,5…6 bar	0,08 ... 0,30 bar	16 bar	18
DWR625-576	0,5…6 bar	0,22 ... 0,45 bar	25 bar	3 +
DWR16-576	3…16 bar	0,40 ... 0,81 bar	25 bar	17
DWR25-576	4…25 bar	0,80 ... 1,67 bar	63 bar	3 +
DWR40-576	8…40 bar	1,32 ... 2,75 bar	63 bar	16

Versions:
ZF577: Maximum pressure limiter (with internal interlock)
Microswitch not positive opening, contacts: silver alloy other equipment like DWR… 576

Calibration
Devices of the **DWR-576** and **DWAM-576** series are calibrated for rising pressure. This means that the adjustable switching pressure on the scale corresponds to the switching point at rising pressure. The reset point is lower by the amount of the switching differential. (See also page 23, 2. Calibration at upper switching point).

Technical data
see page 28

Connection scheme



…574 …575

Safety engineered minimum pressure monitors
Sensor "of special construction" made of stainless steel. (self-monitoring and component testing with 2 million operating cycles). Component tests: VdTÜV Memorandum "Pressure 100", DIN EN3398 (fuel gases) DIN EN764-7, systems in accordance to DIN EN12952-11 and DIN EN12953-9
SIL2 according IEC 61508-2

Type	Setting range	Switching differential (Tolerance)	Max. permissible pressure	Dimen-sioned drawing
				page 21 + 22
DWR06-574	0,1…0,6 bar	35 ... 73 mbar	6 bar	3 +
DWR1-574	0,2…1,6 bar	40 ... 100 mbar	6 bar	15
DWR3-574	0,2…2,5 bar	107 ... 218 mbar	16 bar	3 +
DWR6-574	0,5…6 bar	0,08 ... 0,30 bar	16 bar	18
DWR625-574	0,5…6 bar	0,22 ... 0,45 bar	25 bar	3 +
DWR16-574	3…16 bar	0,2 ... 0,6 bar	25 bar	17
DWR25-574	4…25 bar	0,8 ... 1,67 bar	63 bar	3 + 16

Calibration
The **DWR-574** series is calibrated for falling pressure. This means that the adjustable switching pressure on the scale corresponds to the switching point at falling pressure. The reset point is higher by the amount of the switching differential. (See also page 23, 1. Calibration at lower switching point).

Versions:
ZF575: Minimum pressure limiters (with internal interlock)
Switching contacts: silver alloy
other equipment like DWR… 574

Features of safety engineered pressure monitors and pressure limiters

Devices	Component testing	Features					Options	
	1 = VdTÜV Memorandum "Pressure 100" 2 = DIN EN1854 3 = DIN EN764-7 4 = DIN EN12952-11 / DIN EN12953-9 5 = ATEX / IEXEx	Resistor combination for line break and short circuit monitoring	Ex-i version for intrinsically safe control circuits	Self monitoring pressure sensor	Plastic coated housing Chemical version	Positive opening microswitches	Gold plated contacts	Limiter with internal interlock Chemical version
Maximum pressure monitoring								
FD16-326	1 + 3 + 5	■	■	■		■	■	
FD16-327	1 + 3 + 5	■	■	■				■
DWAM…576	1 + 4 + 5	■	■	■	■	■	■	
DWAM…577	1 + 4 + 5	■	■	■	■			■
DWR…576	1 + 2 + 3 + 4 + 5	■	■		■	■	■	
DWR…577	1 + 2 + 3 + 4 + 5	■	■		■			■
Minimum pressure monitoring								
DWR…574	1 + 2 + 3 + 4 + 5	■	■		■	■	■	
DWR…575	1 + 2 + 3 + 4 + 5	■	■		■			■

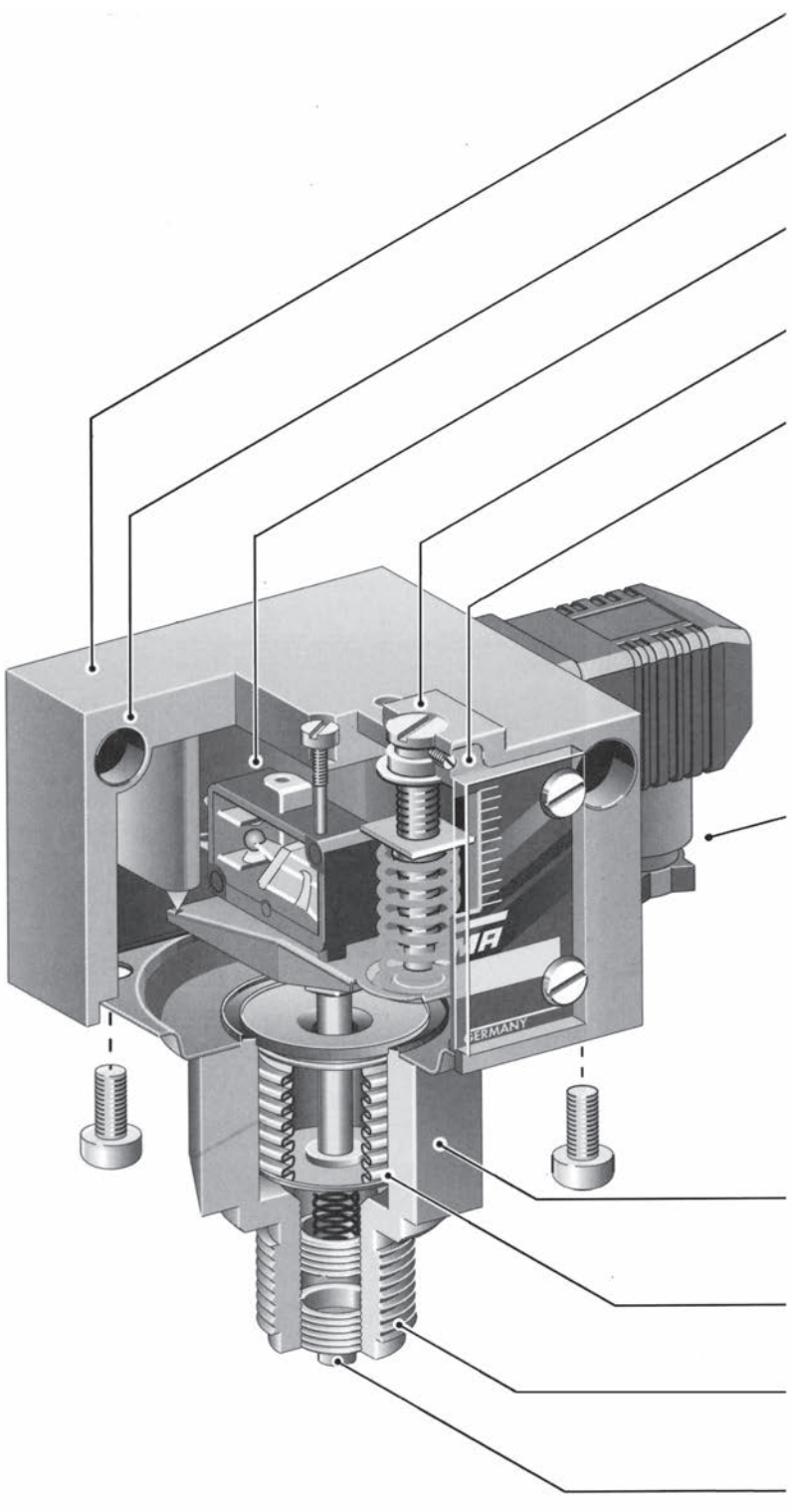
FEMA by Honeywell

CE TÜV tested DIN Geprüft DVGW Ex

Protection Class: IP 65

Mechanical pressure switches

Technical features / Advantages



Diecast aluminium housing
IP 54 or IP 65
Ex version also available

Wall mounting
or directly on the pressure line

Switching element (microswitch)

Lead sealable setpoint adjustment

Setting spindle locking element

Terminal connection
or plug connection to
DIN EN175301 Form A

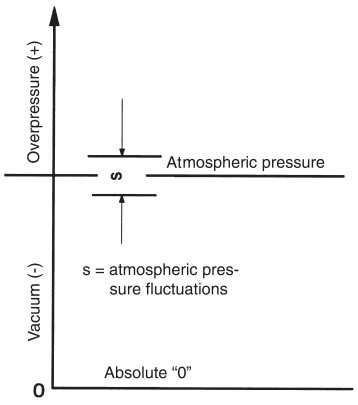
Stainless steel sensor housing

Stainless steel bellows
with internal stop

Pressure connection
G 1/2" external
G 1/4" internal

Centring pin

Definitions



Pressure data

Overpressure Pressure **over** the relevant atmospheric pressure. The reference point is atmospheric pressure.

Vacuum Pressure **under** the relevant atmospheric pressure. The reference point is atmospheric pressure.

Absolute pressure Overpressure relative to absolute vacuum.

Differential pressure Difference in pressure between 2 pressure measuring points.

Relative pressure Overpressure or vacuum relative to atmospheric pressure.

Pressure data in all FEMA documents refers to relative pressure.

That is to say, it concerns pressure differentials relative to atmospheric pressure.
Overpressures have a positive sign, vacuums a negative sign.

Permissible working pressure (maximum permissible pressure)
The maximum working pressure is defined as the upper limit at which the operation, switching reliability and water tightness are in no way impaired (for values see Product summary).

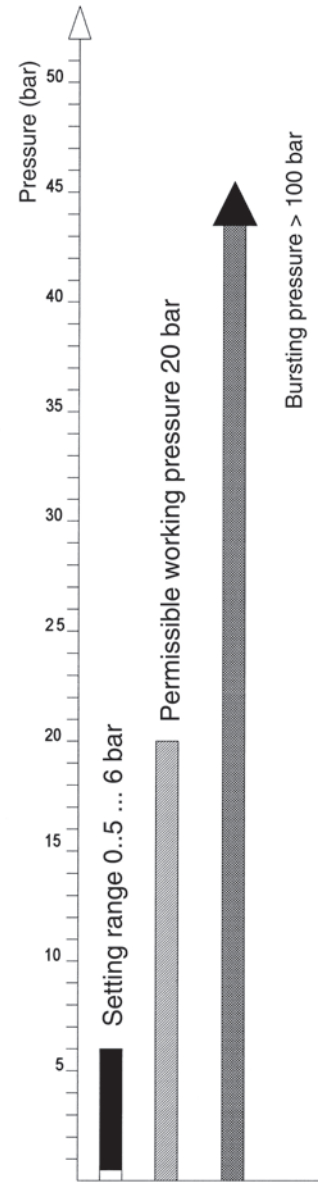
Bursting pressure (test pressure)
Type-tested products undergo a pressure test certified by TÜV affirming that the bursting pressure reaches at least the values mentioned in the Product summary. During the pressure tests the measuring bellows are permanently deformed, but the pressurized parts do not leak or burst. The bursting pressure is usually a multiple of the permissible working pressure.

Setting range
Pressure range in which the cutoff pressure can be set with the setting spindle.

Pressure units

Unit	bar	mbar	Pa	kPa	MPa	(psi) lb/m²
1 bar	1	1000	10^5	100	0.1	14.5
1 mbar	0.001	1	100	0.1	10^{-4}	0.0145
1 Pa	10^{-5}	0.01	1	0.001	10^{-6}	$1.45 \cdot 10^{-4}$
1 kPa	0,01	10	1000	1	0.001	0,145
1 MPa	10	10^4	10^6	1000	1	145

In FEMA documents pressures are stated in **bar** or **mbar**.

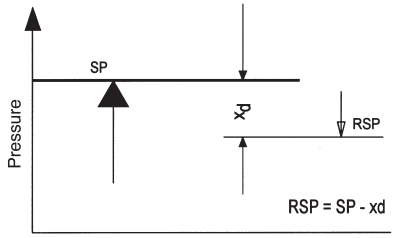


Pressure data for a pressure switchbased on the example of DWR625:
Setting range: 0.5-6 bar
Perm. working pressure: 20 bar
Bursting pressure: >100 bar

Important:
All pressure data refers to overpressures or vacuums relative to atmospheric pressure.
Overpressures have a positive sign, vacuums a negative sign.

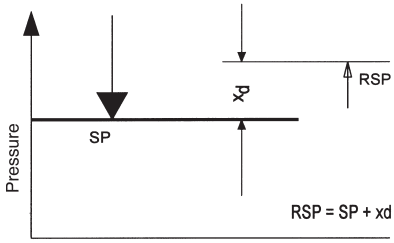
Definitions

Maximum pressure monitoring
RSP = SP – xd

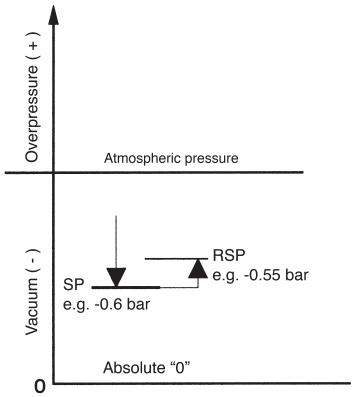


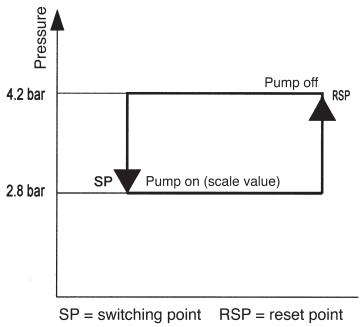
SP = switching point RSP = reset point
xd = switching differential (hysteresis)

Minimum pressure monitoring
RSP = SP + xd



SP = switching point RSP = reset point
xd = switching differential (hysteresis)





SP = switching point RSP = reset point

Switching differential

The switching differential (hysteresis) is the difference in pressure between the **switching point (SP)** and the **reset point (RSP)** of a pressure switch. Switching differential tolerances occur due to tolerances in the microswitches, springs and pressure bellows. Therefore the data in the product summaries always refers to average values. In the case of limiter functions the switching differential has no significance, as one is only interested in the switching point at which cutoff occurs, not the reset point. For a **controller function**, i. e. in the case of pressure switches used to switch a burner, pump etc. **on and off**, a pressure switch with an **adjustable switching differential** should be chosen. The switching frequency of the burner or pump can be varied by changing the switching differential.

Adjustable switching differential/ calibration
In the case of pressure switches with adjustable switching differential, the hysteresis can be set within the specified limits. The switching point (SP) **and** reset point (RSP) are precisely definable. When setting the pressure switch, the switching differential situation and the type of factory calibration must be taken into account. Some pressure switches (e.g. minimum pressure monitors of the DCM series) are calibrated under "falling" pressure, i.e. switching under falling pressure takes place at the scale value with the switching differential being above it. The device switches back at scale value + switching differential. If the pressure switch is calibrated under rising pressure, switching takes place at the scale value and the device switches back at scale value - switching differential (see direction of action). The calibration method is indicated in the data sheets.

Direction of action

In principle, any pressure switch can be used for both maximum pressure and minimum pressure monitoring. This excludes pressure limiters, whose direction of action (maximum or minimum) is predefined. The only thing to remember is that the scale reading may deviate by the amount of the switching differential. See example at bottom left: The scale value is 2.8 bar.

Maximum pressure monitoring
With rising pressure, switching takes place once the preset switching pressure is reached (SP). The reset point (RSP) is lower by the amount of the switching differential.

Minimum pressure monitoring
With falling pressure, switching takes place once the preset switching pressure is reached (SP). The reset point (RSP) is higher by the amount of the switching differential.

Direction of action in vacuum range
It is particularly important to define the direction of action in the vacuum range.
Rising does not mean a rising vacuum, but rising pressure (as viewed from absolute "0"). "Falling" pressure means a rising vacuum.
For example: Vacuum switch set to -0.6 bar falling means: Switching (SP) takes place under falling pressure (rising vacuum) at -0.6 bar. The reset point is higher by the amount of the switching differential (e.g. at -0.55 bar).

Setting a pressure switch

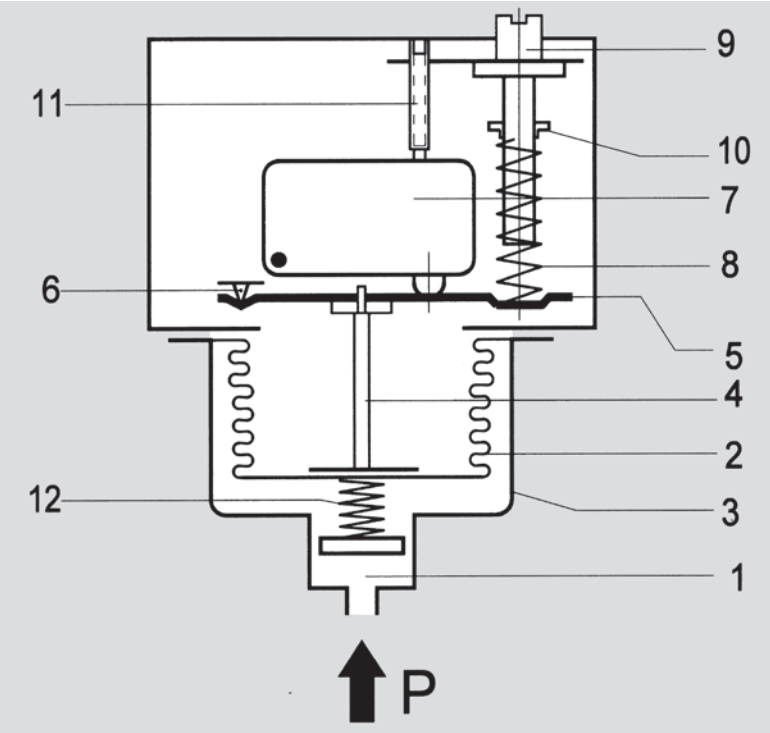
To define the switching point of a pressure switch exactly, it is necessary to determine the direction of action in addition to the pressure. "Rising" means that switching takes place at the set value when the pressure rises.
The reset point is then lower by the amount of the switching differential. "Falling" means exactly the opposite.

Please note when specifying the setting of a pressure switch:
In addition to the switching point it is also necessary to specify the direction of action (falling or rising).

Example for selection of a pressure switch:
A pump is to be turned on at 2.8 bar and off again at 4.2 bar.
Chosen type: DCMV6 according to data sheet DCM. Setting: Scale pointer to 2.8 bar (lower switching point). Switching differential to 1.4 bar (set according to pressure gauge).
Cutoff point: 2.8 bar +1.4 bar = 4.2 bar.

Operating mode
The pressure prevailing in the sensor housing (**1**) acts on the measuring bellows (**2**). Changes in pressure lead to movements of the measuring bellows (**2**) which are transmitted via a thrust pin (**4**) to the connecting bridge (**5**). The connecting bridge is frictionlessly mounted on hardened points (**6**). When the pressure rises the connecting bridge (**5**) moves upwards and operates the microswitch (**7**). A counter-force is provided by the spring (**8**), whose pre-tension can be modified by the adjusting screw (**9**) (switching point adjustment). Turning the setting spindle (**9**) moves the running nut (**10**) and modifies the pre-tension of the spring (**8**). The screw (**11**) is used to calibrate the microswitch in the factory. The counter pressure spring (**12**) ensures stable switching behaviour, even at low setting values.

1 = Pressure connection
2 = Measuring bellows
3 = Sensor housing
4 = Thrust pin
5 = Connecting bridge
6 = Pivot points
7 = Microswitch or other switching elements
8 = Setting spring
9 = Setting spindle (switching point adjustment)
10 = Running nut (switching point indicator)
11 = Microswitch calibration screw (factory calibration)
12 = Counter pressure spring



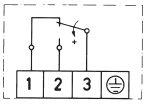
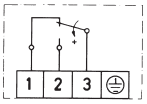
Pressure sensors
Apart from a few exceptions in the low-pressure range, all pressure sensors have measuring bellows, some made of copper alloy, but the majority of high-quality stainless steel. Measured on the basis of permitted values, the measuring bellows are exposed to a minimal load and perform only a small lifting movement. This results in a long service life with little switching point drift and high operating reliability. Furthermore, the stroke of the bellows is limited by an internal stop so that the forces resulting from the overpressure cannot be transmitted to the switching device. The parts of the sensor in contact with the medium are welded together without filler metals. The sensors contain no seals. Copper bellows, which are used only for low pressure ranges, are soldered to the sensor housing. The sensor housing and all parts of the sensor in contact with the medium can also be made entirely from stainless steel 1.4571 (DNS series). Precise material data can be found in the individual data sheets.

Pressure connection
The pressure connection on all pressure switches is executed in accordance with DIN 16288 (pressure gauge connection G 1/2A). If desired, the connection can also be made with a G 1/4 internal thread in accordance with ISO 228 Part 1.
Maximum screw-in depth on the G 1/4 internal thread = 9 mm.

Centring pin
In the case of connection to the G 1/2 external thread with seal in the thread (i.e. without the usual stationary seal on the pressure gauge connection), the accompanying centring pin is not needed. Differential pressure switches have 2 pressure connections (max. and min.), each of which are to be connected to a G 1/4 internal thread.

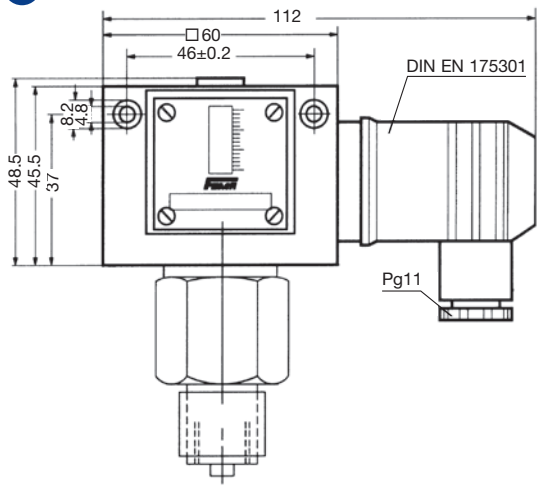
Principal technical data

Valid for all pressure of the DCM, VCM, VNM, DNM, DWR, DGM, DNS, DWAM, DWAMV and DDCM series that have a microswitch. The technical data of type-tested units may differ slightly (please refer to particular type sheet).

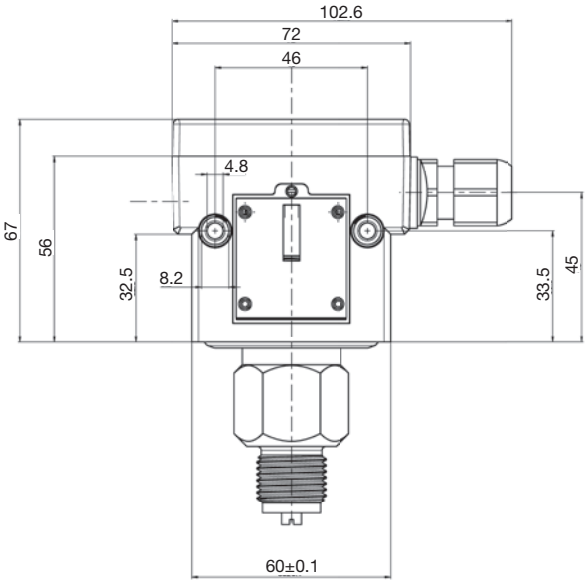
	Ex-i-version	Ex version (Ex-d)
	 …500	 …700
Switch housing	Die cast aluminium GDAlSi 12	Die cast aluminium GDAlSi 12
Pressure connection	G 1/2" external thread (pressure gauge connection) and G 1/4" internal thread. 1/4" internal thread for DDCM differential pressure switches	G 1/2" external thread (pressure gauge connection) and G 1/4" internal thread. 1/4" internal thread for DDCM differential pressure switches
Switching function and connection scheme (applies only to version with microswitch)	Floating changeover contact. With rising pressure single pole switching from 3–1 to 3–2 	Floating changeover contact. With rising pressure single pole switching from 3–1 to 3–2 
Switching capacity	max.: 100mA, 24VDC min.: 2mA, 5VDC	3 A at 250 VAC 2 A at 250 VAC inductive 3 A at 24 VDC 0.1 A at 250 VDC min. 2 mA, 24 VDC
Mounting position	Vertical	Vertical
Protection class (in vertical position)	IP 65	IP 65
Explosion protection Code	Ex II 1/2G Ex ia IIC T6 Ga/Gb Ex II 1/2D Ex ia IIIC T80 °C	Ex II 2G Ex d e IIC T6 Gb Ex II 1/2D Ex ta/tb IIIC T80 °C Da/Db
EC Type Examination Certificate Number	IBExU12ATEX1040	IBExU12ATEX1040
Electrical connection	Terminal connection	Terminal connection
Cabel entry	M 16 x 1.5	M 16 x 1.5
Ambient temperature	–25 to +60 °C (exceptions: DWAM series –20 to +60 °C DGM and FD series: –25 to +60 °C DCM4016, 4025, 1000, VCM4156: –15 to +60 °C)	–20 to +60 °C
Medium temperature	Max. 60 °C	Max. 60 °C
Relative humidity	15 to 95% (non-condensing)	15 to 95% (non-condensing)
Switching point	After removing switch housing cover	After removing switch housing cover
Hysteresis	Not adjustable	Not adjustable
Vacuum	Higher medium temperatures are possible provided the above limits for the switching device are ensured by suitable measures (e.g. siphon). All pressure switches can operate under vacuum. This will not damage the device.	
Repetition accuracy of switching points	< 1 % of the working range (for pressure ranges > 1 bar).	
Vibration resistance	No significant deviations up to 4 g.	
Mechanical durability (pressure sensor)	With sinusoidal pressure application and room temperature, 10 x 106 switching cycles. The expected life depends to a very large extent on the type of pressure application, therefore this figure can serve only as a rough estimate. With pulsating pressure or pressure impacts in hydraulic systems, pressure surge reduction is recommended.	
Electronical durability (microswitch)	100.000 switching cycles at nominal current 8 A, 250 VAC. A reduced contact load increases the number of possible switching cycles.	
Isolation values	Overvoltage category III, contamination class 3, reference surge voltage 4000 V. Conformity to DIN VDE 0110 is confirmed.	
Oil and grease-free	The parts of all pressure switches in contact with the medium are oil and grease free (except the HCD…and DPS…series). The sensors are hermetically sealed and contain no seals (also see ZF1979, special packing).	

Dimensioned drawings of switch housings (mm)

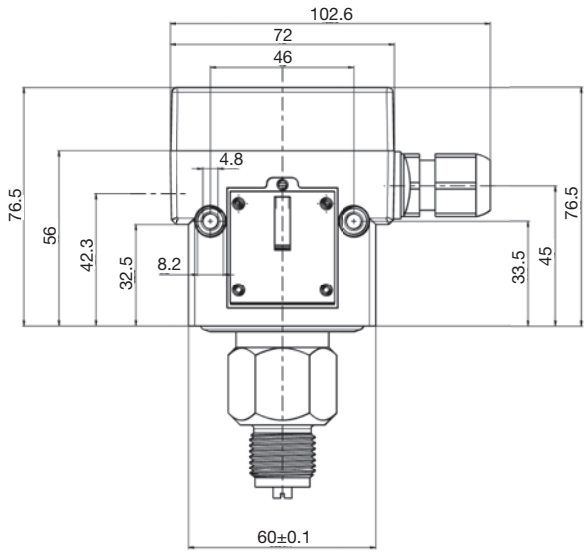
1 Housing 200 (plug connection)



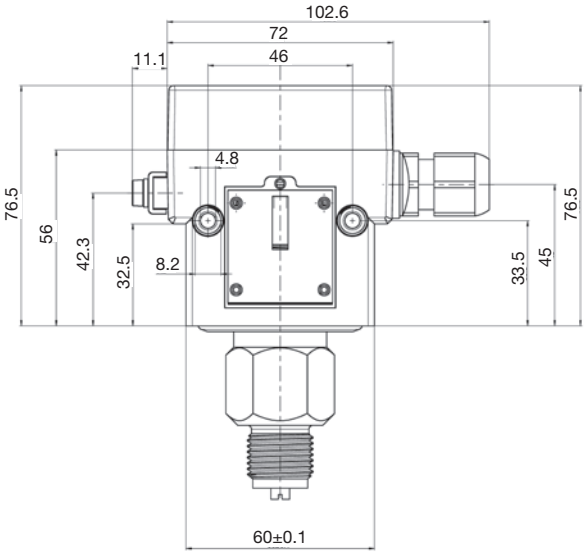
2 Housing 300 (terminal connection)



3 Housing 500 (terminal connection Ex-i)

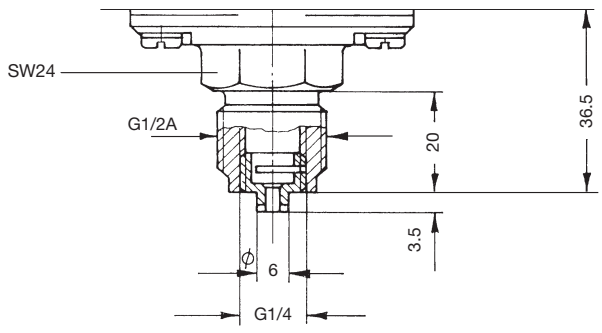


4 Housing 700 (terminal connection Ex-d)

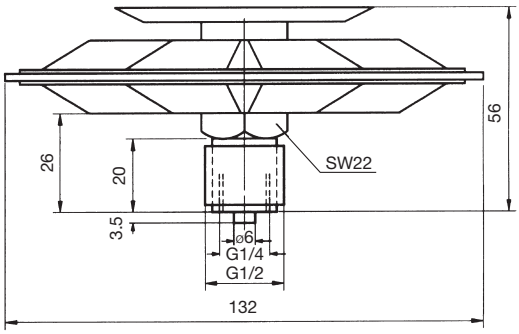


Dimensioned drawings of pressure sensors (mm)

10



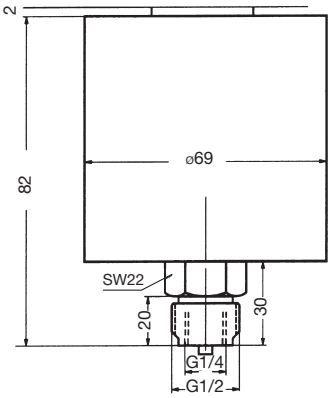
11



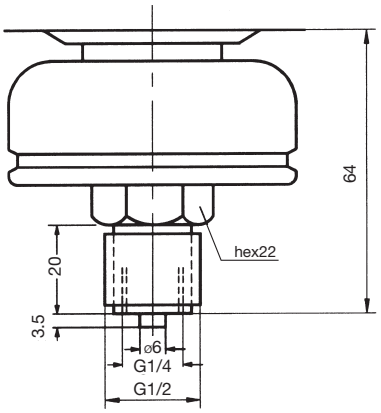
FEMA by Honeywell

Dimensioned drawings of pressure sensors (mm)

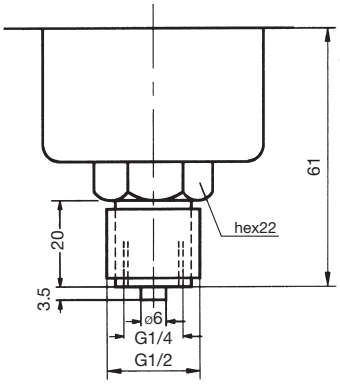
12



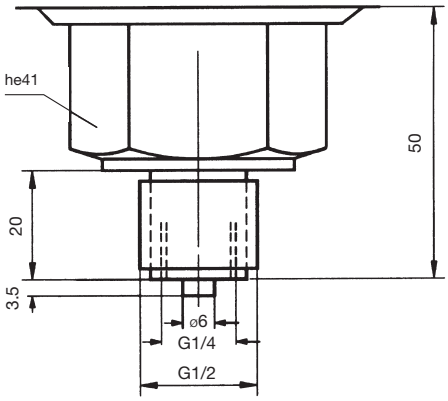
13



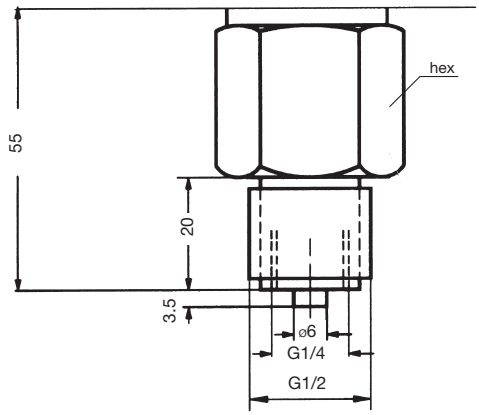
14



15

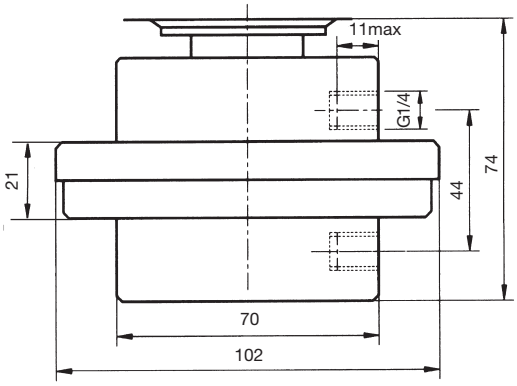


16 – 19

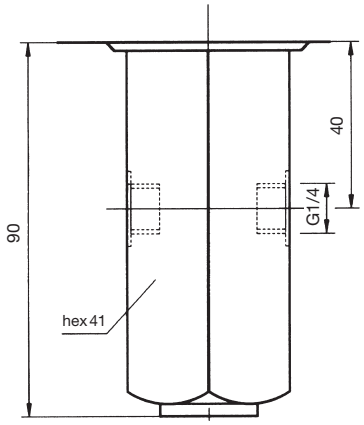


Dimensioned drawing	hex (mm)
16	22
17	24
18	30
19	32

20



21



Pressure switches and pressure monitors

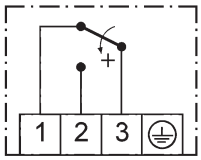
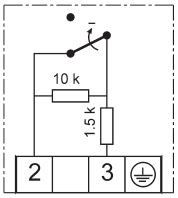
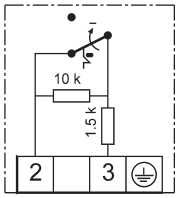
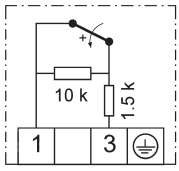
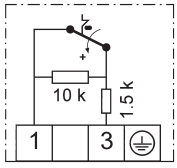
Additional functions for Ex-i-equipment


DWAM6-576

· Housing (500) with terminal connection (IP 65), "blue" cable entry and terminals.
· Also available with resistor combination for line break and short-circuit monitoring (with isolating amplifier).

Important:
All pressure switches with the ZF5… additional functions listed here can only be operated in combination with a suitable isolating amplifier.

Additional information:
Our pressure switches and thermostats are considered to be "simple electrical equipment" within the meaning of standard EN60079-11: 2007. Testing is not mandatory for this type of equipment.

Additional functions for Ex-equipment		Connection scheme
Gold plated contact single pole switching, fixed hysteresis, not adjustable **Switching capacity:** max. 24 VDC, 100 mA, min. 5 VDC, 2 mA **For the power supply circuit:** U_i 24 V DC C_i 1 nF I_i 100 mA L_i 100 µH	**ZF513**	
Versions with resistor combination for line break and short-circuit monitoring in control current circuit, ZF574 – ZF577 see DBS series, pages 50 – 52: **For the power supply circuit:** U_i 14 V DC R_i 1500 Ohm C_i 1 nF L_i 100 µH		
Normally closed contact with resistor combination, for **minimum pressure monitoring,** gold plated contact, plastic-coated housing (chemical version).	**ZF574**	
Normally closed contact **with reclosing lockout** and resistor combination, for **minimum pressure monitoring,** plastic coated housing (chemical version).	**ZF575**	
Normally closed contact with resistor combination, for **maximum pressure monitoring,** gold plated contact, plastic coated housing (chemical version).	**ZF576**	
Normally closed contact **with reclosing lockout** and resistor combination, for **maximum pressure monitoring,** plastic-coated housing (chemical version).	**ZF577**	

Note to non available items:
In our article master all the possible technical combinations are not created. Therefore we recommend the previous request for clarification and selection of an alternative solution.

Service functions

Devices with service functions will be produced according to the customer's specifications.
The system requires that these product combinations are identified in such a way as to prevent any possibility of confusion. These combinations are characterised by a product code with the suffix "-S" on the packaging label as well as separate labels with barcodes for each service function.

Service functions	Plug connection 200 series	Terminal connection 300 series	Ex-i/ Ex-d
Adjustment according to customer's instruction:			
- one switching point	**ZF1970***	**ZF1970***	**ZF1970***
- two switching points or defined switching differential	**ZF1972***	**ZF1972***	**–**
Adjustment and lead sealing according to customer's instruction:			
- one switching point	**ZF1971***	**–**	**–**
- two switching points or defined switching differential	**ZF1973***	**–**	**–**
Labelling of units according to customer's instruction with sticker	**ZF1978**	**ZF1978**	**ZF1978**
Special packing for oil and grease-free storage	**ZF1979**	**ZF1979**	**ZF1979**
Test reports according to EN 10 204			
- Certificate 2.2 based on non specific specimen test	**WZ2.2**	**WZ2.2**	**WZ2.2**
- Inspection test certificate 3.1 based on specific test	**AZ3.1B1**	**AZ3.1B1**	**AZ3.1B1**
- Inspection test certificate for FV separating diaphragms	**AZ3.1-V**	**AZ3.1-V**	**AZ3.1-V**

*** Switching point adjustment:** Please specify **switching point and direction of action** (rising or falling pressure).

Service functions are available for the following type series (including Ex-versions):
Pressure switches: DCM, DNM, DNS, VNS, VCM, VNM, DDCM, DWR, DWAM, DWAMV, SDBAM, DGM, FD

Ordering devices with service functions

Example:
Ordering 1 DCM6, set at 4 bar rising, identified with code PSH008 as requested by the customer and acceptance test certificate 3.1.
The order confirmation contains:

1 DCM6-S ("S" is need for factory = following lines belong to this item)
1 ZF1970: set to 4 bar rising
1 ZF1978: PSH008
1 AZ3.1B1

Included items: Labels with barcodes on the packaging:
DCM6-S
ZF1970: set to 4 bar rising
ZF1978: PSH008
AZ3.1B1

Pack contents: 1 DCM6 (without "S" suffix) marked
1 ZF1970: set to 4 bar rising
1 ZF1978: PSH008
1 AZ3.1 B1 will be sent by extra post
1 Installation and operating instructions