

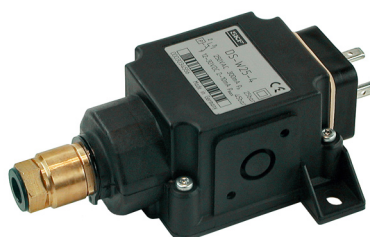
Pressure Switches

for centralized lubrication, hydraulic and compressed air systems

176-...



DS-W1-4



DS-EP-40-D-4



Pressure switches are responsible for monitoring the pressure a system needs in order to function..

The pressure switch is an important monitoring element in centralized lubrication systems.

It is used to keep an eye on the following:

- the functions of the pump unit (pressure buildup and relief)
- the functioning of the directional control valve in the case of zoned centralized lubrication systems
- filter functions (clogging)
- the tubing (leaks, seals).

The amount of time elapsing between the point at which the pump unit or directional control valve is actuated in order to fill the

centralized lubrication system and the point at which the pressure switch responds is an important indicator of whether the centralized lubrication system is working faultlessly. In the opposite case, the time elapsing between the point at which the unit is switched off and the point at which minimal pressure is reached is an important indicator of the system's pressure relief. So, preferentially, the pressure switch should be located at the end of a total-loss centralized lubrication system.

The electrical signal from the pressure switch is evaluated by the centralized lubrication system's control unit or the machine's control system and can, for example, be used for maintenance-related jobs or to shut down the machine.

A number of pressure switches are available for this task. They are listed in the overview (page 2).

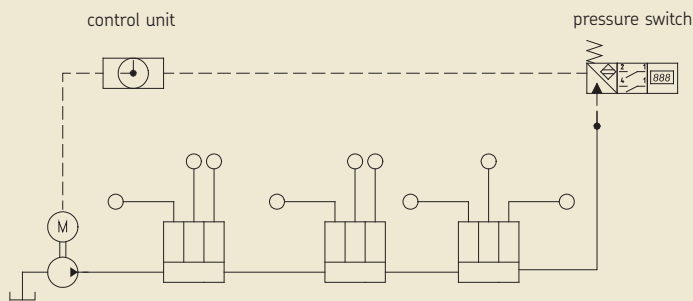
Important criteria for the selection are:

- the hydraulic characteristics of the pressure switch
- the electrical data
- the fluid
- demands made on switching frequency and service life.

Overview

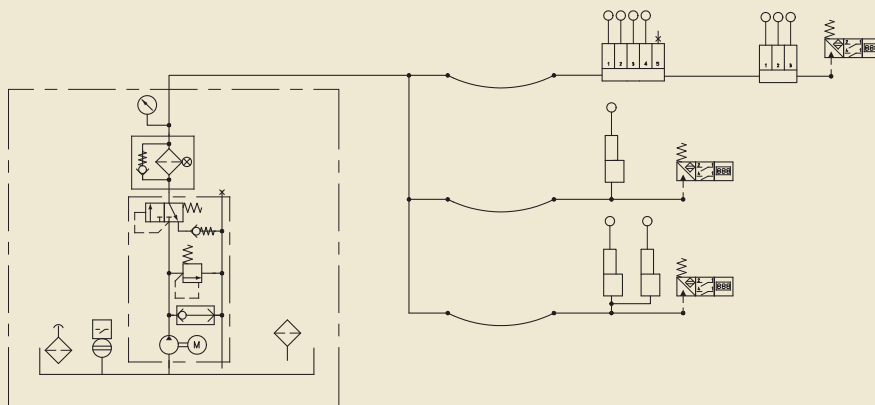
Group	Type	Switching pressure range	Switching pressure	Electrical limit values	Type of contact or signal output	Fig.
DS-EP-40-D-4 with 4 place digital display for pressure and switching point	Membrane of FKM (FPM)	max. 100	adjustable	9 - 35 V DC	PNP-transistor stages	1
176-...-...	Membrane of NBR	0.2 ... 45	nonadjustable	max. 42 V 30 VA	mechanical snap-action contact NO or NC type	2, 4
		1 ... 50	adjustable	5 - 24 V DC gold contact 1 W	changeover contact	3
DS-W	Membrane of FKM (FPM)	1 ... 30	nonadjustable	30 - 250 V AC	micro switch changeover contact	5

Singleline centralized lubrication system with piston distributors



See important product usage information on the back cover.

Piston distributor system for a 3-axis machining center



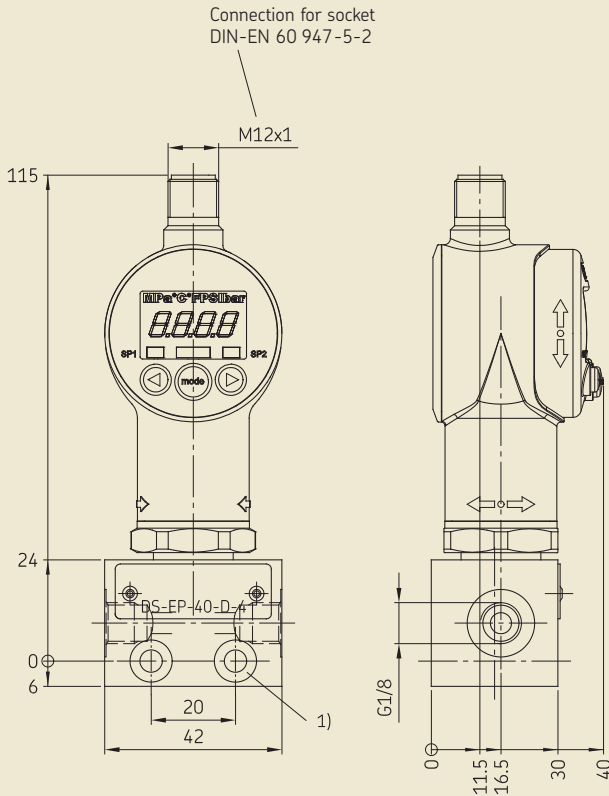
Practical example:

The piston distributors for the individual axes are connected by hoses (cf. example).

It is advisable to install a pressure switch at the end of each branch line in order to have any hose defect signaled at an early point in time.

Electronic pressure switch, Group DS-EP-40-D-4

Fig. 1



1) Counterbore acc. to DIN 974-1
(2 fastening bolts and lock washers are supplied detached)

Technical data

General characteristics

- Rated pressure max. 100 bars
- Permissible overpressure 200 bars
- Rupture pressure > 500 bars
- Display optionally adjustable bars, psi, MPa
- Ambient temperature -25 to +80 °C
- Fluid temperature -25 to +80 °C
- Materials in contact with medium stainless steel, FKM (FPM)
- Type of enclosure IP67
- Mounting position any
- Vibration resistance < 10 g / 0-500 Hz

Deviation from fullscale value

- Accuracy (display) < ± 0.5% type ¹⁾
< ± 1% max. ¹⁾
- Temperature drift < ± 0,25% / 10K
¹⁾ in relation to full measuring scale

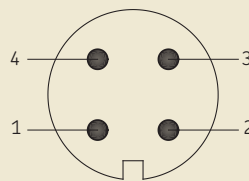
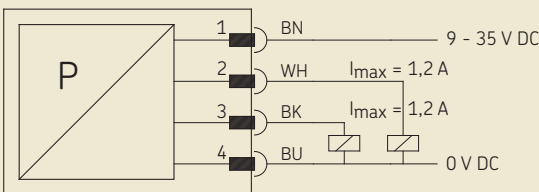
Electrical characteristics

- Rated input voltage 9 - 35 V DC
- Current consumption without switching output max. 35 mA
- Current-carrying capacity of signal outputs 1.2 A
- Number of signal outputs 2
- Type of signal outputs PNP transistor stages
- Electrical connection M12x1 plug, 4-pole type

Accessories

- | | |
|--|-------------|
| | Order No. |
| Cable with socket (straight), length 5 m | DS-E.U2 |
| Cable with socket (angled), length 5 m | 179-990-382 |
| Screw plug G ¹ / ₈ E02 | 466-419-001 |
| Vent screw G ¹ / ₈ E02 | 466-431-009 |
| Socket, angled | 179-990-372 |

Electrical connection



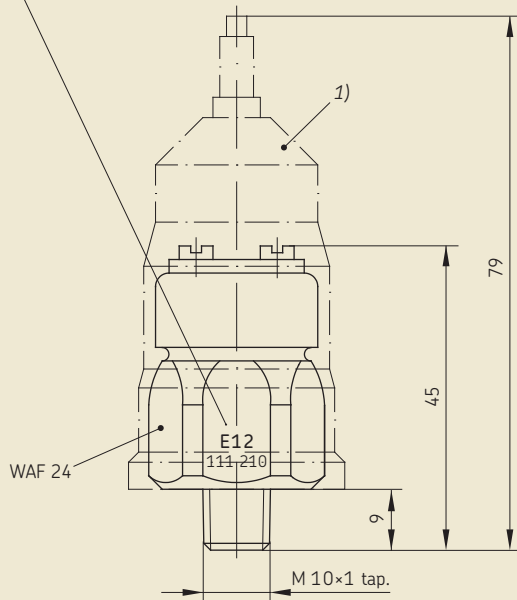
Pin	Function	Core color *)
1	(+)	brown (BN)
2	output 2	white (WH)
3	(-)	blue (BU)
4	output 1	black (BK)

*) When a cable harness with cable socket is used (see accessories).

Pressure switch, group 176-...-...

Fig. 2

Marking
(e.g. E = circuit closer
switching pressure 12 bars)



1) Protective cap, order No. 898-420-001, has to be ordered separately

Fig. 3

Connector for flat tab
receptacles
DIN 46 247- 6,3 x 2,5

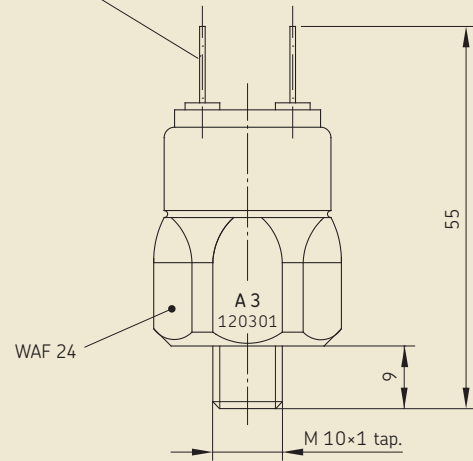
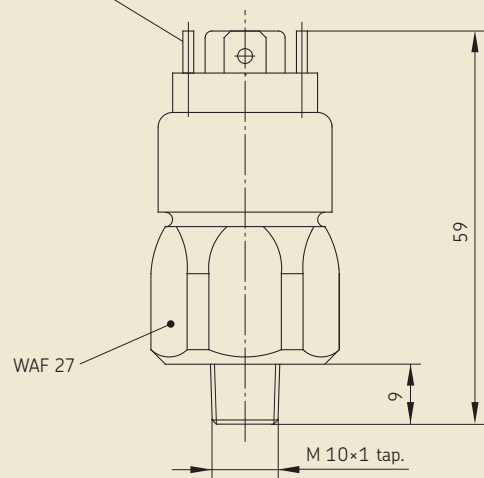


Fig. 4

Connector for flat tab
receptacles
DIN 46 247- 6,3 x 0,8



Pressure switch, group 176-...-...

Version with screw-type terminal
screwed directly into the tubing.

Circuit closer (NO type) Order No.	Circuit opener (NC type) Order No.	Changeover Order No.	Rated switching pressure [bars]	Fig.
			nonadjustable	
176-110-101	–		0.2 $\begin{smallmatrix} +0,2 \\ -0,1 \end{smallmatrix}$	2
176-110-100	176-120-100		0.5 $\begin{smallmatrix} +0,3 \\ -0,1 \end{smallmatrix}$	2
176-110-102	176-120-102		1 ± 0.2	2
176-110-120	–		1.2 ± 0.5	2
176-110-200	176-120-200		2 ± 0.5	2
176-110-250	–		2.5 ± 0.5	2
176-110-300	–		3 ± 0.5	2
176-110-401	176-120-400		4 ± 0.5	2
176-110-450	–		4.5 ± 0.5	2
–	176-120-500		5 ± 0.5	2
176-110-800	176-120-800		8 ± 0.5	2
176-111-201	176-121-202		12 $\begin{smallmatrix} +0,5 \\ -1,5 \end{smallmatrix}$	2
176-112-000	176-122-000		20 ± 1	2
176-112-200	–		22 $\begin{smallmatrix} +2 \\ -1 \end{smallmatrix}$	2
176-112-800	176-122-800		28 $\begin{smallmatrix} +2 \\ -1 \end{smallmatrix}$	2
176-114-500	176-124-500		45 ± 2	2

Version with tab connectors

Order No.	Order No.	Order No.	Rated switching pressure [bars]	Fig.
			nonadjustable	
	176-120-101		0.5 $\begin{smallmatrix} +0,3 \\ -0,1 \end{smallmatrix}$	3
	176-120-301		3 ± 0.5	3
	176-120-801		8 ± 0.5	3
	176-121-001		10 ± 1	3

Version with gold contacts

Order No.	Order No.	Order No.	Rated switching pressure [bars]	Fig.
			adjustable *)	
	176-170-400		1 to 10	4
	176-175-000		10 to 50	4

*) 176-170-400 set for 4 ± 0.5 and 176-175-000 for 12 $\begin{smallmatrix} +0,5 \\ -1,5 \end{smallmatrix}$

Technical data

Circuit closer / Circuit opener
(NO type / NC type)

Contact load 30 VA
Switching voltage, max. 42 V
Switching current, max. 2.5 A
Min. switching current with 12 V DC 50 mA

Permissible operating pressure 50 bars
with type 176-114-500
and 176-124-500 80 bars
Rated switching pressure cf. table

Type of contact NO or NC
Switching frequency 60/min
Switching frequency 10⁶ switching operations

Type of enclosure IP 65, IP 00 terminals
Operating temperature, max. + 80 °C
Fluids mineral oils and
oiled compressed air
Mounting position any

Remark:

Overpressure safety P_{max} static 300 bars
P_{max} dynamic 200 bars
Maximum pressure change-speed 1 bar / msec
Vibration resistance 10g at 5-200 Hz
sinusoidal

Changeover

Switching capacity gold contact 1 W
Switching voltage, min. / max. 5 V DC / 24 V DC
Switching current, min. / max. 5 mA / 50 mA

Rated switching pressure cf. table
Release difference 20%
Permissible operating pressure
at 176-170-400 100 bars
at 176-175-000 300 bars

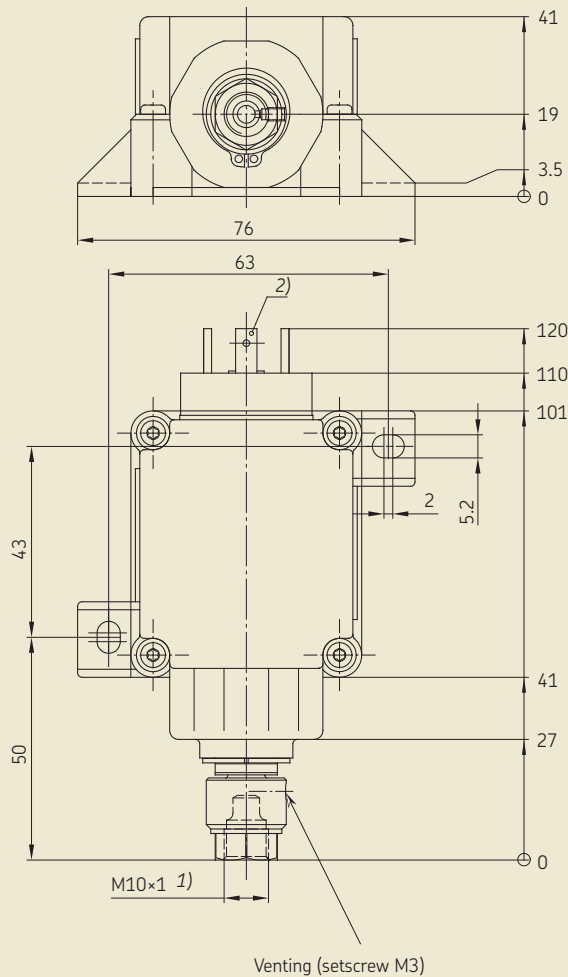
Type of contact changeover
Switching frequency 200/min
Mechanical service life 10⁶ switching operations

Type of enclosure IP 65, IP 00 terminals
Operating temperature, max. + 80 °C
Fluids mineral oils and
oiled compressed air
Mounting position any

Pressure switch, group DS-W

Fig. 5

Pressure switch with connector to DIN EN 175301-803
(Illustration: DS-W.-4)



- 1) Ports tapped for solderless tube connection for tube diam. 6 mm
- 2) Cable sockets for pressure switches with plugs conforming to DIN EN 175301-803 (DS-W.-4) have to be ordered separately;

Cable socket, order No. 179-990-034
 Cable socket with indicator light for 220 V AC, order No. 179-990-110
 Cable socket with indicator light for 24 V DC, order No. 179-990-111

(further plug-and-socket connectors see leaflet 1-1730-EN)

The pressure switches comprising this Group are designed to be mounted on a wall. The switching element (changeover contact) is built into an air-tight, distortion-resistant plastic housing (conforming to UL specifications). When the switching pressure is reached it is actuated by a pin connected to a spring-loaded membrane. The switching pressure is set at the factory and is nonadjustable.

The pressure switch is available in three different plug versions. When inductive loads are switched off it is possible for protective circuits (RC elements or varistors) to limit voltage spikes and thus increase the life of the contacts (spark quenching).

Please note!

An incorrectly dimensioned interference suppression circuit can cause greater wear than none at all. The following guideline value applies to the dimensioning:

1 µF per ampere of switching current for the capacitor C and resistor R, roughly equal to the DC resistance of the switched coil. However, it is always absolutely necessary to test the interference suppression circuit with measurements.

The DIN 43 235 standards sheet provides information on the exact calculations to be performed for overvoltage limitation elements in DC networks.

When the pressure switch signal is evaluated by external control systems (PLC or the like), pay attention to the limit values indicated for the switching contact. If the switch is to be operated outside its limit values, please indicate the same when ordering.

Attention!

When installing the pressure switch and connecting the tubing make sure no strain is placed on the assembly.

Pressure switch, group DS-W

Technical data

Rated switching pressure	cf. table
Permissible operating pressure ¹⁾	45 bars
Contact load, max.	125 VA
Switching voltage, max.	250 V AC / 30 V DC
Switching current	2 mA min. / 300 mA max.
Operating temperature, max.	+ 60 °C
Type of contact	changeover
Switching frequency	30 ¹ /min
Mechanical service life	5x10 ⁶ switching operations
Type of enclosure (with line socket)	IP 65
Housing material	PA6 6GF30, Flammability Test UL94 HB
Contact material / switch module	AuAg25Pt6
Material membrane	FKM (FPM)
Fluids	mineral oils, fluid grease, oiled compressed air
Mounting position	any

¹⁾ A safety valve has to be provided for in the system to keep the maximum permissible pressure from being exceeded.

Connector plug to

DIN EN 175301-803 (cube plug)	DIN EN 175201-804 (6 pole machine plug)	ISO 60947-5-2 (4 pole sensor plug)	Rated switching pressure nonadjustable [bars]
Order No.	Order No.	Order No.	
DS-W1-4	DS-W1-4-S9	DS-W1-5	1 +0.3
DS-W2-4	DS-W2-4-S9	DS-W2-5	2 +0.5
DS-W3-4	DS-W3-4-S9	DS-W3-5	3 -0.5
DS-W5-4	DS-W5-4-S9	DS-W5-5	5 ±0.5
DS-W8-4	DS-W8-4-S9	DS-W8-5	8
DS-W12-4	DS-W12-4-S9	DS-W12-5	12 ^{+0,5} -1,5
DS-W20-4	DS-W20-4-S9	DS-W20-5	20
DS-W25-4	DS-W25-4-S9	DS-W25-5	25
DS-W30-4	DS-W30-4-S9	DS-W30-5	30

Order No. 1-1701-EN

Subject to change without notice! (07/2009)

Important product usage information

All products from SKF may be used only for their intended purpose as described in this brochure and in any instructions. If operating instructions are supplied with the products, they must be read and followed.

Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

Further brochures

1-9201-EN Transport of Lubricants in Centralized Lubrication Systems

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