



PRESSURE MONITORING





Tradition and Innovation

1938
Robert Scheuffele opens a mechanical workshop.

1945
Partnership formed by Robert Scheuffele and Georg Fuhrmann.

1950 ...
Registration of the name SUCO (Scheuffele und Co) as a trademark. Development and production of centrifugal clutches and brakes. Market leader in Germany and abroad. The Company moves into a new production and administration building.

1960 ...
Electromagnetic clutches and brakes incorporated into the production program. Development and production of pressure and vacuum switches started.

1970 ...
Establishment of a comprehensive dealer and sales network throughout Europe. SUCO mechanical pressure and vacuum switches become leaders in their markets.

1985
Start of the development of the American market.

1997 ...
Creation of a distribution network in Asia. ISO 9001 certification of the company.

From a mechanical workshop to an international industrial manufacturer



Design and development of new products using the latest CAD tools.



To simulate realistic environmental conditions and loads, our products are subject to extensive trials and tests.



Assembly and testing of pressure switches on semi or fully automated plants.



Fully-automatic setting of switching point with computer-aided documentation of results.



1999
Founding of a subsidiary company, SUCO VSE, in France.

2001
Certification ISO 9001:2000.

2004
Inauguration of the new building with modern production hall and 600 m² office area.

2005
Change of corporate name to SUCO Robert Scheuffele GmbH & Co. KG.

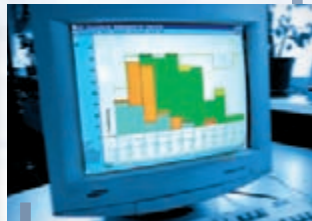
2007
Founding of a subsidiary company, SUCO Technologies Inc., in the USA.

2009
*An additional floor to the manufacturing building was added, creating approx. 1.000 m² of new production capacity.
Newest Certification Standard: ISO 9001:2008.*

2010
Acquisition of the company ESI Technology Ltd., Wrexham, Wales.



Suco cares for qualified training in both commercial and technical professions. Qualified personnel formed by SUCO guarantees the positive development of our company.



Capacity and schedule planning of production orders to make optimum use of the available human, machinery and material resources.



Ultra-modern production plant with integrated, fully-automatic component handling for high efficiency.



Encapsulating equipment for customer-specific ready-wired pressure switches for highest degree of protection (leak tightness).



State-of-the-art measurement and inspection equipment for quality assurance in receiving and production.



From here our products are dispatched to any country in the world.



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Normally Closed or Normally Open**

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max. voltage 42 V

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max. voltage 42 V

- | | | |
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- | | | |
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Selection matrix

Support for selection of suitable pressure switch

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Our worldwide sales network

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Explanation of SUCO order numbers

p _{max.} in bar	Adjustment range in bar	Tolerance in bar at room temperature	Thread	Order number:			
0170 Diaphragm pressure switch with spade terminals							
			M 10x1 keg.	0170	457 01	X	001
100 ¹⁾	0.3 – 1.5	± 0.2	M 12x1.5	0170	457 02	X	002
			G 1/4	0170	457 03	X	003

Your order number: 0170 - 457 02 - 2 - 002

The first four digits indicate the type number: Our example: Diaphragm pressure switch with spade terminals, type 0170

By these three digits, the type of construction and the setting range are determined. Our example: overpressure safe up to 100 bar, adjustment range 0.3 – 1.5 bar.

These two digits provide information about the desired thread. Our example: M 12x1.5.

Important - the code for the seal material:
 1 for NBR (Buna-N): hydraulic fluid, machine oil, heating oil, etc.
 2 for EPDM: water, brake fluid, ozone, acetylene, etc.
 3 for FKM: hydraulic fluid, petrol/gasoline, etc.

The last three digits are reserved for further differentiation of the switch. In our example, 002

Abbreviated coding explanation is embossed on the hex surface areas of the pressure switches.

Example: 0166-40703-1-027 adjusted on rising 1,0 bar

Face front side:

Face back side:

Switch type
 E = normally opened (no)
 A = normally closed (nc)

Adjusted pressure

Short form of the part number

01 66 - 4 0703 - 1 - 027

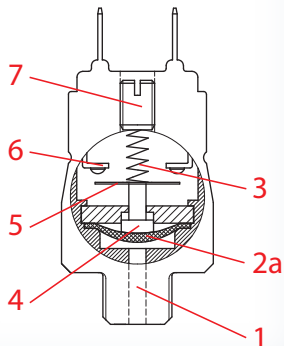
End number if it is a special version

Date of manufacturing according DIN EN 60062

Diaphragm- / seal material
 1 = NBR (Buna-N) 8 = Silicone
 2 = EPDM 9 = H-NBR
 3 = FKM (Viton®)

Diaphragm pressure switch

Normally open



How does a pressure switch work?

Description of operation for a normally open switch whose contacts close at its operating point:

Pressure enters through the connection (1) and acts on the diaphragm (2a) as well as on the piston (2b). If the force resulting from this pressure is greater than the force exerted by the preloaded compression spring (3), then the plunger (4) moves taking with it the contact disc (5), which closes the circuit between the contacts (6). When the pressure falls again by an amount greater than the hysteresis, the switch opens again.

For a normally closed switch, the action of the contacts is reversed. By turning the set screw (7), the pressure switch can be adjusted within its pressure range.

By using a micro-switch with changeover function, the normally open and normally closed operation can be combined into a single pressure switch. The plunger (4) operates the swivel contact (9). In the unpressurized state, the circuit is closed by the normally closed contact (8). If the pressure applied exceeds the adjusted set point, then the swivel contact changes and closes the circuit using the normally open contact (10).

IP degree of protection

The IP degree of protection is a defined labeling for the level of protection (sealing) of electrical equipment enclosures according to IEC 60529 (formerly DIN 40050 - Class 2). It measures the sealing ability of a housing against the entry of solid foreign substances, against the penetration of hazardous materials and against the entry of water.

The IP degree of protection code consists of two digits, describing the protection of a housing against the entry of solid foreign substances and water. The numeric code that is assigned not only reflects the personal safety level but also the functional protection of the respective medium- to long-term functional safety level of an electrical equipment.

Definition of degree of protection IP65, IP67

Definition of the term 6:

Protection against entry of dust (dust proof). Complete contact protection.

Definition of the term 5:

A jet of water from a nozzle applied against the equipment from any direction must not have any harmful effect.

Definition of the term 7:

Protection against water when the equipment (pressure switch) is immersed in water under specified pressure and time conditions. Water must not enter the equipment in harmful quantities.

Definition for the degree of protection IP6K9K

The standard DIN 40050-9 supplements IEC 60529 with added IP degree of protection for high-pressure (80-100 bar) and high temperature (80 °C) in cleaning applications. Devices for these requirements not only have to be dust-proof, but also be able to withstand the stresses during high-pressure cleaning and the use of steam jets.

Definition of the term 6K:

Dust must not penetrate. Letter K:

Specific to the electrical equipment of road vehicles.

Definition of the term 9K:

Protection against the entry of water at high pressure-/ steam jet cleaning. Water that had been applied to from every direction at very high pressure against the body must not cause damaging effects.

We guarantee IP67 or IP6K9K compliance for many of our ready-wired pressure switches, as well as for many switches with integrated plugs.

Hysteresis

Hysteresis (dead bend / differential) is the term given to the difference between the switching points when the pressure is rising and when it is falling. For pressure switches with non-adjustable hysteresis, it is a function of the switch design. For SUCO switches with adjustable hysteresis, it can typically be set in the range 10 to 30% of the switching point. The hysteresis is dependent on the set switching point. The specification represents only a typical average value (see the hysteresis diagram on page 9 on the right side).

Switching frequency

The switching frequency provides information about the possible number of switching cycles per minute. The figure given of 200/minute is intended only as a guideline. Depending on the type of switch and the operating conditions, a considerably higher number of cycles can be achieved.

Vacuum

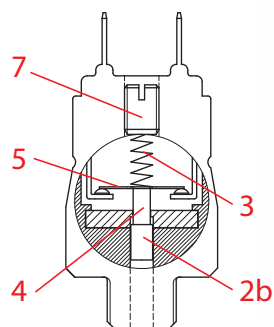
The technical data mentioned for our vacuum range are given in millibars (mbar) below atmospheric pressure.

RoHS compliance

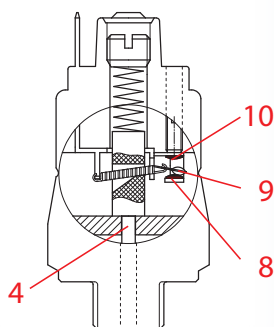
RoHS = Restriction of Hazardous Substances (Directive 2002/95/EC).

Piston pressure switch

Normally closed



Changeover



Gas applications

Our pressure switches are suitable for liquid and gaseous media. Gaseous media, however, place special demands on leak-tightness. The leakage rate varies with the type of gas, the working pressure and the permeability of the seal material.

Due to their lower leakage, diaphragm pressure switches are more suitable for gas applications than piston-type pressure switches. However, the latter can also be used if certain precautions (e.g., venting of the switch body) are taken.

Please consult us if you have gas applications.

Set point tolerances

The switching point tolerances we quote refer to room temperature (RT) operation and a pressure switch in new condition. The effect of temperature and aging can change the switching points additionally.

Membrane materials

NBR (Buna-N)

The most widely used standard material. A special SUCO material mixture, which shows good low temperature flexibility, so that even at low temperatures, the tightness of the pressure switch is maintained.

EPDM

Ideal for those applications with brake fluid. In addition, particularly suitable for applications in which (grey) water is used. For oxygen applications, there exists an approval from the BAM (Federal Institute for Material Testing). Oils must not come in contact with the material as this may cause swelling and softening of the material.

FKM (Viton®)

A diaphragm material that is suitable for high temperature stress and has special chemical resistance properties. It has been tested in the hydraulic sector and has been proven to work successfully with critical oils.

Silicone

Silicone is applicable for use in an extensive temperature range. The SUCO Silicone diaphragm is FDA-approved (Food & Drug Administration) for the food sector. Silicone is a soft material that is reserved for sensitive low pressure applications under 10 bar.

H-NBR

A special SUCO material mixture optimized for bio-oils that are ester-based. Due to the multitude of bio-oils on the market, the suitability of the material for each oil must be determined. This diaphragm material can also be used for a variety of mineral and synthetic oils.

Media compatibility

The data in our catalogue concerning compatibility with various media refers to the seal materials of our pressure switches.

Product information

The technical information in this catalogue is based on tests made during product development and based on empirically gathered values. They may not be applicable in all cases.

It is the responsibility of the user to test the suitability of our products for the particular application (for example, the verification of material compatibility) and use may only be appropriate if proven in field tests.

Category of application

The usage category describes amongst other things, the voltages and currents, as well as the type of load for which our pressure switches are designed to conform to DIN EN 60947-5-1.

Alternating current

AC12: Switching of resistive loads and semiconductor loads in input circuits of optocouplers (e.g., PLC inputs).

AC14: Switching of electromagnetic loads of 72 VA.

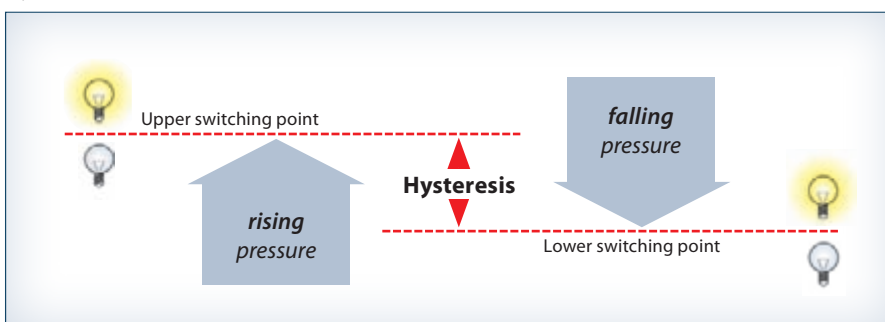
Direct current

DC12: Switching of resistive loads and burdens in semiconductor input circuits of optocouplers (e.g., PLC inputs).

DC13: Switching of solenoid.

Specifications subject to change.

Hysteresis diagram



Conversion table for pressure units

Abbreviation for unit	Name of unit	Pa= N/m ²	bar	Torr	lbf/in ² , PSI
1 Pa = N/m ²	Pascal	1	0.00001	0.0075	0.00014
1 bar	Bar	100 000	1	750.062	14.5
1 Torr = 1 mm Hg	Millimeters of mercury	133.322	0.00133	1	0.01934
1 lbf/in ² = 1 PSI	Pound-force per square inch	6894	0.06894	51.71	1

Conversion table for temperature units

	K	°C	F
K	1	K-273.15	9/5 K-459.67
°C	°C +273.15	1	9/5 °C +32
F	5/9 (F+459.67)	5/9 (F-32)	1

	0110	0111	0112	0113	0114	0115	0116	0117	0118	0119	0120	0121	0122	0123	0140	0141	0150	0151	0159	0161	0162	0163	0164	0165	0166	0167	0168
Catalogue page	12	12	12	12	12	12	12	12	12	12	12	12	12	12	29	29	52	53	43	44	44	18	24	48	20	25	22
Mechanical	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Electronic																											
Pressure	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Vacuum																	■	■									
NO or NC	■	■	■	■	■	■	■	■	■	■	■	■	■	■								■	■		■	■	■
Changeover															■	■	■	■	■	■	■			■			
Voltage	■	■	■	■	■	■	■	■	■	■	■	■	■	■				■				■	■		■	■	■
Max. 42 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■				■				■	■		■	■	■
Max. 250 V															■	■	■	■	■	■	■			■			
Max. 24 V / 50 mA																			■	■	■			■			
5 VDC ± 10%																											
12 – 30 VDC																											
18 – 36 VDC																											
Adjustment range																											
100 – 950 mbar																		■									
200 – 950 mbar																		■									
-1 – 0 bar																											
0 – 10 bar																											
0 – 16 bar																											
0 - 100 bar																											
0 - 250 bar																											
0 - 400 bar																											
0 - 600 bar																											
0 - 1000 bar																											
0.1 - 1 bar	■		■		■		■		■		■		■									■	■		■	■	■
0.2 - 2 bar																			■								
0.3 - 1.5 bar															■												
0.5 - 1 bar																				■	■	■					
0.5 - 5 bar																			■	■	■						
1.0 - 6 bar																								■			
1.0 - 10 bar	■		■		■		■		■		■		■		■				■	■	■	■	■		■	■	■
2.0 - 20 bar																			■	■	■				■	■	■
5.0 - 50 bar																			■					■			
10 - 20 bar	■		■		■		■		■		■		■		■							■	■		■	■	■
10 - 50 bar																			■	■	■						
10 - 100 bar																			■	■	■						
20 - 50 bar	■		■		■		■		■		■		■		■							■	■		■	■	■
20 - 100 bar																								■			
25 - 250 bar																			■	■	■						
40 - 400 bar																			■	■	■						
50 - 100 bar																				■	■	■					
50 - 150 bar		■		■		■		■		■		■		■		■											
50 - 200 bar																											
100 - 300 bar																											
100 - 400 bar																				■	■			■			
200 - 400 bar																								■			
Overpressure safety up to																											
20 bar																											
25 bar																											
35 bar																										■	
100 bar																											
200 bar																				■	■	■		■			
300 bar	■		■		■		■		■		■		■		■										■	■	■
500 bar																											
600 bar		■		■		■		■		■		■		■						■	■	■	■	■			
1500 bar																											
Body form																											
Hex 22																											
Hex 24	■	■	■	■	■	■	■	■	■	■	■	■	■	■				■				■	■		■	■	■
Hex 27															■	■											
Square 30																	■		■	■	■			■			
Square 32																											
Body material	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Zinc-plated steel	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Stainless steel																											
Brass																										■	
Aluminium																				■	■	■			■		
Special versions																											
ATEX-version																											
Special connections															■	■		■				■	■		■	■	■

Pressure switch hex 24 with integrated plug

Normally open or Normally closed, maximum voltage 42 V



■ **Stable switching point even after high load and long use.**

■ **Switching point easily adjustable¹⁾ – also during operation.**

■ **High overpressure safety, small compact switches, available as no or nc.**








- High degree of protection: IP67, IP6K9K (except for AMP Junior Timer)
- Reduced assembly time: simple, quick attachment by rotation or plug connection
- Innovative solution based on long-term proven technology
- Fast mounting with socket wrench (nut) possible (except for 0114 / 0115 and 0116 / 0117)

Technical data

Voltage:	max. 42 V		
Current rating (resistive):	max. 4 Ampere		
Contact capacity:	100 VA		
Temperature stability for diaphragm/ seal materials:	NBR	-40 °C – +100 °C	
	EPDM	-30 °C – +120 °C	
	FKM	-5 °C – +120 °C	
	Silicone	-40 °C – +120 °C	
	HNBR	-30 °C – +120 °C	
Switching frequency:	min: 200 / min.		
Mechanical life expectancy:	10 ⁶ switching cycles (for diaphragm pressure switches the switching life applies to pressure up to a max. of 50 bar)		
Pressure rise rate:	≤ 1 bar / ms		
Hysteresis:	average value 5 – 30% depending on type, not adjustable		
Vibration resistance:	10 g / 5 – 200 Hz sine wave		
Shock resistance:	294 m/s ² ; 14 ms half sine wave		
Degree of protection:	up to IP67 / IP6K9K according to the manufacturer's specifications for the respective plug-in system only when plugged in, otherwise IP00		
Weight in grams:	approx. 90 g		

¹⁾ The pressure switches can also be supplied as preset by the factory. Our preset switches are sealed with lacquer paint and have the set pressure value embossed on their body

Accessories: Female plugs with 2 m cable, 2 x 0,5 mm² except 1-1-22-653-117: 3 x 0,34 mm²

Deutsch DT06-2S (für DT04-2P)	AMP-Superseal	Packard MetriPack 280	Deutsch DT06-3S (für DT04-3P)	AMP Junior Timer	Bayonet DIN 72585 A1-2.1	M12x1 DIN EN 61076-2-LF
						

Order number for female plugs:

1-1-10-653-118	1-1-12-653-113	1-1-14-653-114	1-1-16-653-115	1-1-18-653-116	1-1-20-653-112	1-1-22-653-117
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Plug types

						
Deutsch DT04-2P	AMP Superseal	Packard MetriPack 280	Deutsch DT04-3P (A+B)	AMP Junior Timer	Bayonet DIN 72585 A1-2.1	M12x1 DIN EN 61076-2-D (1+3)
IP67, IP6K9K	IP67	IP67	IP67, IP6K9K	IP65, IPx4K	IP67, IP6K9K	IP67
x ≈ 61 mm	x ≈ 61 mm	x ≈ 62 mm	x ≈ 63 mm	x ≈ 54 mm	x ≈ 49 mm	x ≈ 51 mm

Please insert the respective type designation into your order number:

Order numbers of diaphragm pressure switches see page 14

0110 ...	0112 ...	0114 ...	0116 ...	0118 ...	0120 ...	0122 ...
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Order numbers of piston pressure switches see page 15

0111 ...	0113 ...	0115 ...	0117 ...	0119 ...	0121 ...	0123 ...
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Pressure switch hex 24 with integrated plug

Diaphragm pressure switches



- No or nc, max. voltage 42 V (according to the standard hex 24)
- Made of zinc-plated steel (Cr VI-free)
- Overpressure safe up to 300 bar ¹⁾

Degree of protection IPXX

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations have to be observed. In addition, we recommend that a maximum operating pressure of 10 bar will not be exceeded.

■ Our pressure switches are also available with factory pre-set switching points.

■ We offer other body materials and connecting threads upon request.

■ Other diaphragm materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.

Adjustment range in bar (tolerance in bar at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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Diaphragm pressure switches with integrated plug

0.1 – 1 (± 0.2)	M 10x1 con.	XXXX	403 01	X	009	XXXX	404 01	X	013
	M 12x1.5	XXXX	403 02	X	010	XXXX	404 02	X	014
	G 1/4	XXXX	403 03	X	011	XXXX	404 03	X	015
	NPT 1/8	XXXX	403 04	X	012	XXXX	404 04	X	016
	G 1/8	XXXX	403 28	X	603	XXXX	404 28	X	604
	M 10x1 cyl.	XXXX	403 13	X	003	XXXX	404 13	X	004

1 – 10 (± 0.5)	M 10x1 con.	XXXX	407 01	X	025	XXXX	408 01	X	029
	M 12x1.5	XXXX	407 02	X	026	XXXX	408 02	X	030
	G 1/4	XXXX	407 03	X	027	XXXX	408 03	X	031
	NPT 1/8	XXXX	407 04	X	028	XXXX	408 04	X	032
	G 1/8	XXXX	407 28	X	607	XXXX	408 28	X	608
	M 10x1 cyl.	XXXX	407 13	X	007	XXXX	408 13	X	008

10 – 20 (± 1.0)	M 10x1 con.	XXXX	411 01	X	041	XXXX	412 01	X	045
	M 12x1.5	XXXX	411 02	X	042	XXXX	412 02	X	046
	G 1/4	XXXX	411 03	X	043	XXXX	412 03	X	047
	NPT 1/8	XXXX	411 04	X	044	XXXX	412 04	X	048
	G 1/8	XXXX	411 28	X	611	XXXX	412 28	X	612
	M 10x1 cyl.	XXXX	411 13	X	011	XXXX	412 13	X	012

20 – 50 (± 2.0)	M 10x1 con.	XXXX	415 01	X	057	XXXX	416 01	X	061
	M 12x1.5	XXXX	415 02	X	058	XXXX	416 02	X	062
	G 1/4	XXXX	415 03	X	059	XXXX	416 03	X	063
	NPT 1/8	XXXX	415 04	X	060	XXXX	416 04	X	064
	G 1/8	XXXX	415 28	X	615	XXXX	416 28	X	616
	M 10x1 cyl.	XXXX	415 13	X	015	XXXX	416 13	X	016

Plug types (photo see page 13)

Deutsch DT04-2P	0110	XXX XX	X	XXX	0110	XXX XX	X	XXX
AMP Superseal	0112	XXX XX	X	XXX	0112	XXX XX	X	XXX
Packard MetriPack 280	0114	XXX XX	X	XXX	0114	XXX XX	X	XXX
Deutsch DT04-3P (A+B)	0116	XXX XX	X	XXX	0116	XXX XX	X	XXX
AMP Junior Timer	0118	XXX XX	X	XXX	0118	XXX XX	X	XXX
Bayonet DIN 72585 A1-2.1	0120	XXX XX	X	XXX	0120	XXX XX	X	XXX
M12x1 DIN EN 61076-2-D (1 + 3)	0122	XXX XX	X	XXX	0122	XXX XX	X	XXX

Diaphragm material²⁾ - application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3

Order number:	01XX -XXX XX -X -XXX	01XX -XXX XX -X -XXX
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¹⁾ Static value. Dynamic value is 30-50% lower. The values refer to the hydraulic or pneumatic part of the pressure switch.

²⁾ Temperature range of the seal materials, see page 12.

Pressure switch hex 24 with integrated plug

Piston pressure switches

- No or nc, max. voltage 42 V (according to the standard hex 24)
- Made of zinc-plated steel (Cr VI-free)
- Overpressure safe up to 600 bar ¹⁾



Adjustment range in bar (tolerance in bar at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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Piston pressure switches with integrated plug

50 – 150 (± 5)	M 10x1 con.	XXXX	419 01	X	009	XXXX	420 01	X	013
	M 12x1.5	XXXX	419 02	X	010	XXXX	420 02	X	014
	G 1/4	XXXX	419 03	X	011	XXXX	420 03	X	015
	NPT 1/8	XXXX	419 04	X	012	XXXX	420 04	X	016
	G 1/8	XXXX	419 28	X	603	XXXX	420 28	X	604
	M 10x1 cyl.	XXXX	419 13	X	003	XXXX	420 13	X	004

Plug versions (photo see page 13)

Deutsch DT04-2P	0111	XXX XX	X	XXX	0111	XXX XX	X	XXX
AMP Superseal	0113	XXX XX	X	XXX	0113	XXX XX	X	XXX
Packard MetriPack 280	0115	XXX XX	X	XXX	0115	XXX XX	X	XXX
Deutsch DT04-3P (A+B)	0117	XXX XX	X	XXX	0117	XXX XX	X	XXX
AMP Junior Timer	0119	XXX XX	X	XXX	0119	XXX XX	X	XXX
Bayonet DIN 72585 A1-2.1	0121	XXX XX	X	XXX	0121	XXX XX	X	XXX
M12x1 DIN EN 61076-2-LF (1 + 3)	0123	XXX XX	X	XXX	0123	XXX XX	X	XXX

Seal material ²⁾ - application

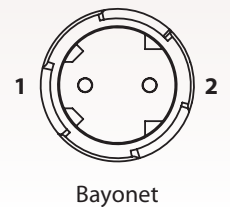
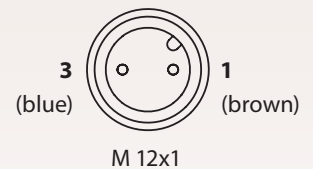
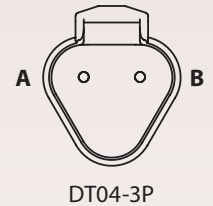
NBR (Buna-N)	Hydraulic / machine oil, heating oil, air, nitrogen, etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3

Order number: 01XX -XXX XX -X -XXX 01XX -XXX XX -X -XXX

Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.



Plug pin assignments (male)



¹⁾ Static value. Dynamic value is 30-50% lower. The values refer to the hydraulic or pneumatic part of the pressure switch.

²⁾ Temperature range of the seal materials, see page 12.

Pressure switches hex 24

Normally open or Normally closed, maximum voltage 42 V



■ **Low-cost solution for mechanical pressure monitoring.**

■ **Stable switching point even after long use and high load.**

■ **Switching point easily adjustable¹ – also during use.**

■ **High pressure resistance, compact, small switch available as normally closed (nc) or normally open (no).**

■ **Ready-wired versions with the plug that you require – see page 38 following.**

Technical data

Voltage	max. 42 V
Current rating (resistive):	max. 4 Ampere
Contact rating:	100 VA
Temperature stability for diaphragm / seal materials:	NBR -40 °C – +100 °C EPDM -30 °C – +120 °C FKM -5 °C – +120 °C Silicone -40 °C – +120 °C HNBR -30 °C – +120 °C
Switching frequency:	200 / min.
Mechanical life expectancy:	10 ⁶ cycles (life expectancy of diaphragm pressure switches only for pressures up to max. 50 bar)
Pressure rise rate:	≤ 1 bar/ms
Hysteresis:	average value 5 – 30 % depending on type, not adjustable
Vibration resistance:	10 g / 5 – 200 Hz sine-wave
Shock resistance:	294 m/s ² ; 14 ms half-sine-wave
Degree of protection:	IP65 Terminals IP00
Weight in grams:	approx. 90 g

¹⁾ The pressure switches can also be factory preset. Our preset switches are sealed with lacquer paint and have the set pressure embossed on their body.

Pressure switches hex 24

With fitted rubber cap: Degree of protection IP54

Technical data

Type:		0163	0164	0166	0167	0168	0169
Material:	Zinc-plated steel (Cr VI-free)	■		■		■	■
	Stainless steel		■				
	Brass				■		
Overpressure safe up to:	35 bar				■		
	300 bar			■		■	
	600 bar	■	■				■



Accessories



Rubber protective cap

with central cable feed for 1.5 - 5 mm diameter cable

With fitted cap IP54

Suitable for voltages up to 42 V

Order number:

1-1-66-621-010



Rubber protective cap

with central cable feed for 1.5 - 5 mm diameter cable

With fitted cap IP54

Suitable for voltages up to 42 V

Order number:

1-1-66-621-003

Degree of protection IPXX

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar (50 bar series 0164) must not be exceeded.



- Zinc-plated steel body (CrVI-free)
- With M3 screw terminals
- Overpressure safe up to 600 bar¹⁾

With male thread



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0163 Diaphragm pressure switches with M3 screw terminals

0.1 – 1 (± 0.2)	M 10x1 con.	0163	401 01	X	001	0163	402 01	X	005
	M 12x1.5	0163	401 02	X	002	0163	402 02	X	006
	G 1/4	0163	401 03	X	003	0163	402 03	X	007
	NPT 1/8	0163	401 04	X	004	0163	402 04	X	008
	G 1/8	0163	401 28	X	601	0163	402 28	X	602
	M 10x1 cyl.	0163	401 13	X	001	0163	402 13	X	002

1 – 10 (± 0.5)	M 10x1 con.	0163	405 01	X	017	0163	406 01	X	021
	M 12x1.5	0163	405 02	X	018	0163	406 02	X	022
	G 1/4	0163	405 03	X	019	0163	406 03	X	023
	NPT 1/8	0163	405 04	X	020	0163	406 04	X	024
	G 1/8	0163	405 28	X	605	0163	406 28	X	606
	M 10x1 cyl.	0163	405 13	X	005	0163	406 13	X	006

10 – 20 (± 1.0)	M 10x1 con.	0163	409 01	X	033	0163	410 01	X	037
	M 12x1.5	0163	409 02	X	034	0163	410 02	X	038
	G 1/4	0163	409 03	X	035	0163	410 03	X	039
	NPT 1/8	0163	409 04	X	036	0163	410 04	X	040
	G 1/8	0163	409 28	X	609	0163	410 28	X	610
	M 10x1 cyl.	0163	409 13	X	009	0163	410 13	X	010

20 – 50 (± 2.0)	M 10x1 con.	0163	413 01	X	049	0163	414 01	X	053
	M 12x1.5	0163	413 02	X	050	0163	414 02	X	054
	G 1/4	0163	413 03	X	051	0163	414 03	X	055
	NPT 1/8	0163	413 04	X	052	0163	414 04	X	056
	G 1/8	0163	413 28	X	613	0163	414 28	X	614
	M 10x1 cyl.	0163	413 13	X	013	0163	414 13	X	014

- Our pressure switches are also available with factory pre-set switching points.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.

Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number: 0163 – XXX XX – X – XXX



Accessories see page 17

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With spade terminals
- Overpressure safe up to 600 bar¹⁾



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0163 Diaphragm pressure switches with spade terminals

0.1 – 1 (± 0.2)	M 10x1 con.	0163	403 01	X	009	0163	404 01	X	013
	M 12x1.5	0163	403 02	X	010	0163	404 02	X	014
	G 1/4	0163	403 03	X	011	0163	404 03	X	015
	NPT 1/8	0163	403 04	X	012	0163	404 04	X	016
	G 1/8	0163	403 28	X	603	0163	404 28	X	604
	M 10x1 cyl.	0163	403 13	X	003	0163	404 13	X	004
1 – 10 (± 0.5)	M 10x1 con.	0163	407 01	X	025	0163	408 01	X	029
	M 12x1.5	0163	407 02	X	026	0163	408 02	X	030
	G 1/4	0163	407 03	X	027	0163	408 03	X	031
	NPT 1/8	0163	407 04	X	028	0163	408 04	X	032
	G 1/8	0163	407 28	X	607	0163	408 28	X	608
	M 10x1 cyl.	0163	407 13	X	007	0163	408 13	X	008
10 – 20 (± 1.0)	M 10x1 con.	0163	411 01	X	041	0163	412 01	X	045
	M 12x1.5	0163	411 02	X	042	0163	412 02	X	046
	G 1/4	0163	411 03	X	043	0163	412 03	X	047
	NPT 1/8	0163	411 04	X	044	0163	412 04	X	048
	G 1/8	0163	411 28	X	611	0163	412 28	X	612
	M 10x1 cyl.	0163	411 13	X	011	0163	412 13	X	012
20 – 50 (± 2.0)	M 10x1 con.	0163	415 01	X	057	0163	416 01	X	061
	M 12x1.5	0163	415 02	X	058	0163	416 02	X	062
	G 1/4	0163	415 03	X	059	0163	416 03	X	063
	NPT 1/8	0163	415 04	X	060	0163	416 04	X	064
	G 1/8	0163	415 28	X	615	0163	416 28	X	616
	M 10x1 cyl.	0163	415 13	X	015	0163	416 13	X	016

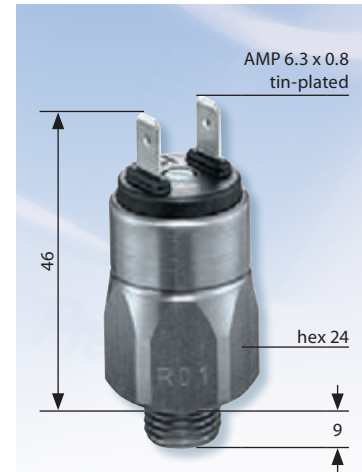
Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number:	0163 –XXX XX–X–XXX
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With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



- Zinc-plated steel body (CrVI-free)
- With M3 screw terminals
- Overpressure safe up to 300 bar¹⁾

With male thread



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0166 Diaphragm pressure switches with M3 screw terminals

0.1 – 1 (± 0.2)	M 10x1 con.	0166	401 01	X	001	0166	402 01	X	005
	M 12x1.5	0166	401 02	X	002	0166	402 02	X	006
	G 1/4	0166	401 03	X	003	0166	402 03	X	007
	NPT 1/8	0166	401 04	X	004	0166	402 04	X	008
	G 1/8	0166	401 28	X	601	0166	402 28	X	602
	M 10x1 cyl.	0166	401 13	X	001	0166	402 13	X	002

1 – 10 (± 0.5)	M 10x1 con.	0166	405 01	X	017	0166	406 01	X	021
	M 12x1.5	0166	405 02	X	018	0166	406 02	X	022
	G 1/4	0166	405 03	X	019	0166	406 03	X	023
	NPT 1/8	0166	405 04	X	020	0166	406 04	X	024
	G 1/8	0166	405 28	X	605	0166	406 28	X	606
	M 10x1 cyl.	0166	405 13	X	005	0166	406 13	X	006

10 – 20 (± 1.0)	M 10x1 con.	0166	409 01	X	033	0166	410 01	X	037
	M 12x1.5	0166	409 02	X	034	0166	410 02	X	038
	G 1/4	0166	409 03	X	035	0166	410 03	X	039
	NPT 1/8	0166	409 04	X	036	0166	410 04	X	040
	G 1/8	0166	409 28	X	609	0166	410 28	X	610
	M 10x1 cyl.	0166	409 13	X	009	0166	410 13	X	010

20 – 50 (± 2.0)	M 10x1 con.	0166	413 01	X	049	0166	414 01	X	053
	M 12x1.5	0166	413 02	X	050	0166	414 02	X	054
	G 1/4	0166	413 03	X	051	0166	414 03	X	055
	NPT 1/8	0166	413 04	X	052	0166	414 04	X	056
	G 1/8	0166	413 28	X	613	0166	414 28	X	614
	M 10x1 cyl.	0166	413 13	X	013	0166	414 13	X	014

■ Our pressure switches are also available with factory pre-set switching points.

■ We offer other body materials and connecting threads upon request.

■ Other diaphragm materials are available on request, e.g. HNBR or silicone.

Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number: 0166 -XXX XX-X-XXX



Accessories see page 17

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With spade terminals
- Overpressure safe up to 300 bar¹⁾



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0166 Diaphragm pressure switches with spade terminals

0.1 – 1 (± 0.2)	M 10x1 con.	0166	403	01	X	009	0166	404	01	X	013
	M 12x1.5	0166	403	02	X	010	0166	404	02	X	014
	G 1/4	0166	403	03	X	011	0166	404	03	X	015
	NPT 1/8	0166	403	04	X	012	0166	404	04	X	016
	G 1/8	0166	403	28	X	603	0166	404	28	X	604
	M 10x1 cyl.	0166	403	13	X	003	0166	404	13	X	004
1 – 10 (± 0.5)	M 10x1 con.	0166	407	01	X	025	0166	408	01	X	029
	M 12x1.5	0166	407	02	X	026	0166	408	02	X	030
	G 1/4	0166	407	03	X	027	0166	408	03	X	031
	NPT 1/8	0166	407	04	X	028	0166	408	04	X	032
	G 1/8	0166	407	28	X	607	0166	408	28	X	608
	M 10x1 cyl.	0166	407	13	X	007	0166	408	13	X	008
10 – 20 (± 1.0)	M 10x1 con.	0166	411	01	X	041	0166	412	01	X	045
	M 12x1.5	0166	411	02	X	042	0166	412	02	X	046
	G 1/4	0166	411	03	X	043	0166	412	03	X	047
	NPT 1/8	0166	411	04	X	044	0166	412	04	X	048
	G 1/8	0166	411	28	X	611	0166	412	28	X	612
	M 10x1 cyl.	0166	411	13	X	011	0166	412	13	X	012
20 – 50 (± 2.0)	M 10x1 con.	0166	415	01	X	057	0166	416	01	X	061
	M 12x1.5	0166	415	02	X	058	0166	416	02	X	062
	G 1/4	0166	415	03	X	059	0166	416	03	X	063
	NPT 1/8	0166	415	04	X	060	0166	416	04	X	064
	G 1/8	0166	415	28	X	615	0166	416	28	X	616
	M 10x1 cyl.	0166	415	13	X	015	0166	416	13	X	016

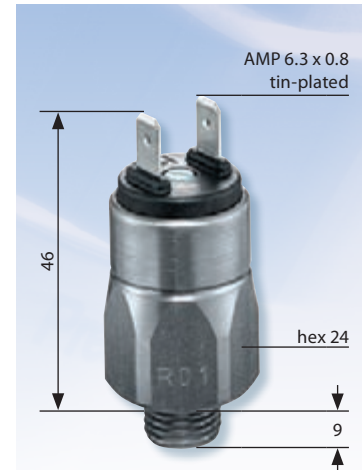
Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number:	0166 –XXX XX –X –XXX
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With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.

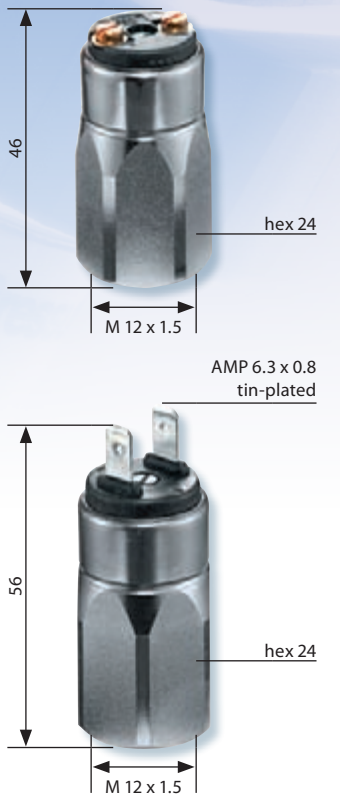


¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



- Zinc-plated steel body (CrVI-free)
- With M3 screw terminals or spade terminals
- Overpressure safe up to 300 bar¹⁾
- With female thread for compression fittings acc. to DIN 2353

With female thread



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0168 Diaphragm pressure switches with M3 screw terminals

0.1 – 1 (± 0.2)	M 12x1.5 female	0168	401	16	X	001	0168	402	16	X	002
1 – 10 (± 0.5)		0168	405	16	X	005	0168	406	16	X	006
10 – 20 (± 1.0)		0168	409	16	X	009	0168	410	16	X	010
20 – 50 (± 2.0)		0168	413	16	X	013	0168	414	16	X	014

0168 Diaphragm pressure switches with spade terminals

0.1 – 1 (± 0.2)	M 12x1.5 female	0168	403	16	X	003	0168	404	16	X	004
1 – 10 (± 0.5)		0168	407	16	X	007	0168	408	16	X	008
10 – 20 (± 1.0)		0168	411	16	X	011	0168	412	16	X	012
20 – 50 (± 2.0)		0168	415	16	X	015	0168	416	16	X	016

Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water, brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

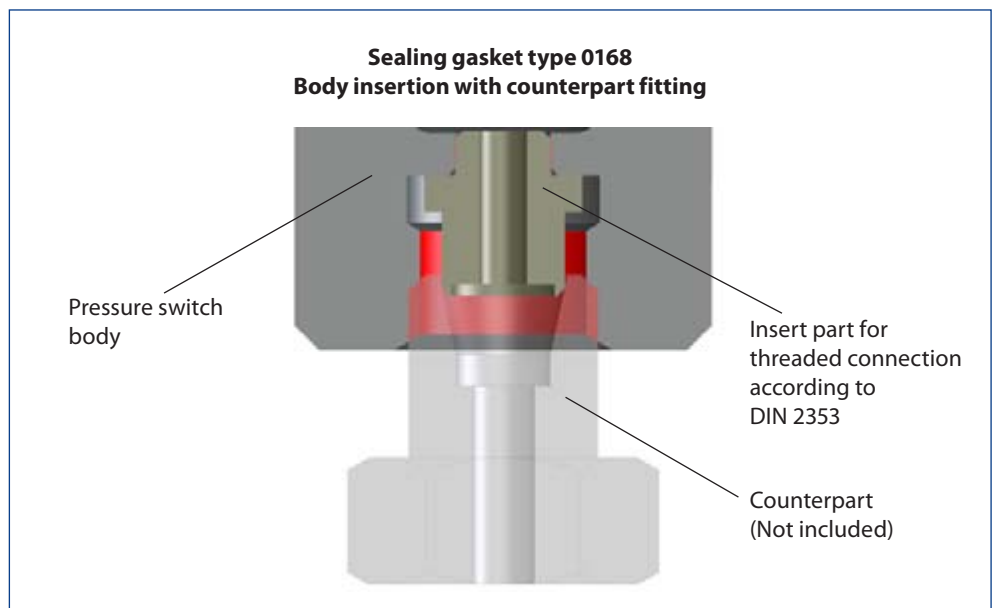
See page 16 for temperature ranges of diaphragm / seal materials

Order number:	0168 – XXX 16 – X – XXX
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- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.



Accessories see page 17



¹⁾ Static value. Dynamic value is 30-50% lower. The values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With M3 screw terminals or spade terminals
- Overpressure safe up to 600 bar¹⁾



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0169 Piston pressure switches with M3 screw terminals

50 – 150 (± 5.0)	M 10x1 con.	0169	417	01	X	001	0169	418	01	X	005
	M 12x1.5	0169	417	02	X	002	0169	418	02	X	006
	G 1/4	0169	417	03	X	003	0169	418	03	X	007
	NPT 1/8	0169	417	04	X	004	0169	418	04	X	008
	G 1/8	0169	417	28	X	601	0169	418	28	X	602
	M 10x1 cyl.	0169	417	13	X	001	0169	418	13	X	002

0169 Piston pressure switches with spade terminals

50 – 150 (± 5.0)	M 10x1 con.	0169	419	01	X	009	0169	420	01	X	013
	M 12x1.5	0169	419	02	X	010	0169	420	02	X	014
	G 1/4	0169	419	03	X	011	0169	420	03	X	015
	NPT 1/8	0169	419	04	X	012	0169	420	04	X	016
	G 1/8	0169	419	28	X	603	0169	420	28	X	604
	M 10x1 cyl.	0169	419	13	X	003	0169	420	13	X	004

Seal material – areas of application

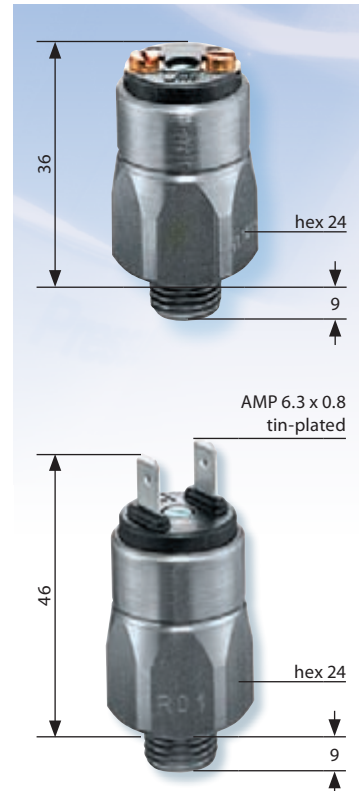
NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number:	0169 – XXX XX – X – XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.



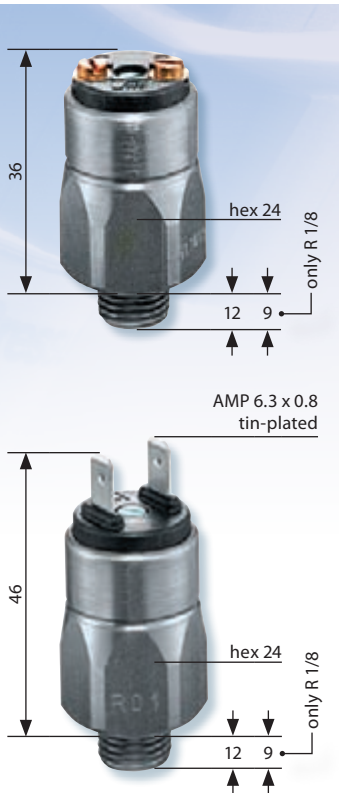
Accessories see page 17

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



- Body made of stainless steel (1.4305 / AISI 303)
- With M3 screw or spade terminals
- Overpressure safe up to 600 bar¹⁾

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.



Accessories see page 17

Setting range in bar (tolerance in bar at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0164 Diaphragm pressure switches with screw terminals

Setting range in bar (tolerance in bar at room temperature)	Thread	Normally open (no) → :				Normally closed (nc) → :					
		0164	401	12	X	001	0164	402	12	X	002
0.1 – 1 (± 0.2)	R1/8	0164	401	12	X	001	0164	402	12	X	002
	G1/4-E	0164	401	41	X	001	0164	402	41	X	002
	R1/4	0164	401	46	X	001	0164	402	46	X	002
1 – 10 (± 0.5)	R1/8	0164	405	12	X	005	0164	406	12	X	006
	G1/4-E	0164	405	41	X	005	0164	406	41	X	006
	R1/4	0164	405	46	X	005	0164	406	46	X	006
10 – 20 (± 1.0)	R1/8	0164	409	12	X	009	0164	410	12	X	010
	G1/4-E	0164	409	41	X	009	0164	410	41	X	010
	R1/4	0164	409	46	X	009	0164	410	46	X	010
20 – 50 (± 2.0)	R1/8	0164	413	12	X	013	0164	414	12	X	014
	G1/4-E	0164	413	41	X	013	0164	414	41	X	014
	R1/4	0164	413	46	X	013	0164	414	46	X	014

0164 Diaphragm pressure switches with spade terminals

Setting range in bar (tolerance in bar at room temperature)	Thread	Normally open (no) → :				Normally closed (nc) → :					
		0164	403	12	X	003	0164	404	12	X	004
0.1 – 1 (± 0.2)	R1/8	0164	403	12	X	003	0164	404	12	X	004
	G1/4-E	0164	403	41	X	003	0164	404	41	X	004
	R1/4	0164	403	46	X	003	0164	404	46	X	004
1 – 10 (± 0.5)	R1/8	0164	407	12	X	007	0164	408	12	X	008
	G1/4-E	0164	407	41	X	007	0164	408	41	X	008
	R1/4	0164	407	46	X	007	0164	408	46	X	008
10 – 20 (± 1.0)	R1/8	0164	411	12	X	011	0164	412	12	X	012
	G1/4-E	0164	411	41	X	011	0164	412	41	X	012
	R1/4	0164	411	46	X	011	0164	412	46	X	012
20 – 50 (± 2.0)	R1/8	0164	415	12	X	015	0164	416	12	X	016
	G1/4-E	0164	415	41	X	015	0164	416	41	X	016
	R1/4	0164	415	46	X	015	0164	416	46	X	016

Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water, brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number:	0164 -XXX XX -X -XXX
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¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Brass body
- With M3 screw terminals or spade terminals
- Overpressure safe up to 35 bar¹⁾



Adjustment range in bar (tolerance at room temperature)	Thread	Normally open (no) → :	Normally closed (nc) → :
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0167 Diaphragm pressure switches with M3 screw terminals

0.1 – 1 (± 0.2)	M 10x1 con.	0167	401 01	X	001	0167	402 01	X	004
	R 1/8	0167	401 12	X	002	0167	402 12	X	005
	R 1/2	0167	401 07	X	003	0167	402 07	X	006
	G 1/4	0167	401 03	X	037	0167	402 03	X	038
	G 1/8	0167	401 28	X	001	0167	402 28	X	002
1 – 10 (± 0.5)	M 10x1 con.	0167	405 01	X	013	0167	406 01	X	016
	R 1/8	0167	405 12	X	014	0167	406 12	X	017
	R 1/2	0167	405 07	X	015	0167	406 07	X	018
	G 1/4	0167	405 03	X	041	0167	406 03	X	042
	G 1/8	0167	405 28	X	005	0167	406 28	X	006
10 – 20 (± 1.0)	M 10x1 con.	0167	409 01	X	025	0167	410 01	X	028
	R 1/8	0167	409 12	X	026	0167	410 12	X	029
	R 1/2	0167	409 07	X	027	0167	410 07	X	030
	G 1/4	0167	409 03	X	045	0167	410 03	X	046
	G 1/8	0167	409 28	X	009	0167	410 28	X	010

0167 Diaphragm pressure switches with spade terminals

0.1 – 1 (± 0.2)	M 10x1 con.	0167	403 01	X	007	0167	404 01	X	010
	R 1/8	0167	403 12	X	008	0167	404 12	X	011
	R 1/2	0167	403 07	X	009	0167	404 07	X	012
	G 1/4	0167	403 03	X	039	0167	404 03	X	040
	G 1/8	0167	403 28	X	003	0167	404 28	X	004
1 – 10 (± 0.5)	M 10x1 con.	0167	407 01	X	019	0167	408 01	X	022
	R 1/8	0167	407 12	X	020	0167	408 12	X	023
	R 1/2	0167	407 07	X	021	0167	408 07	X	024
	G 1/4	0167	407 03	X	043	0167	408 03	X	044
	G 1/8	0167	407 28	X	007	0167	408 28	X	008
10 – 20 (± 1.0)	M 10x1 con.	0167	411 01	X	031	0167	412 01	X	034
	R 1/8	0167	411 12	X	032	0167	412 12	X	035
	R 1/2	0167	411 07	X	033	0167	412 07	X	036
	G 1/4	0167	411 03	X	047	0167	412 03	X	048
	G 1/8	0167	411 28	X	011	0167	412 28	X	012

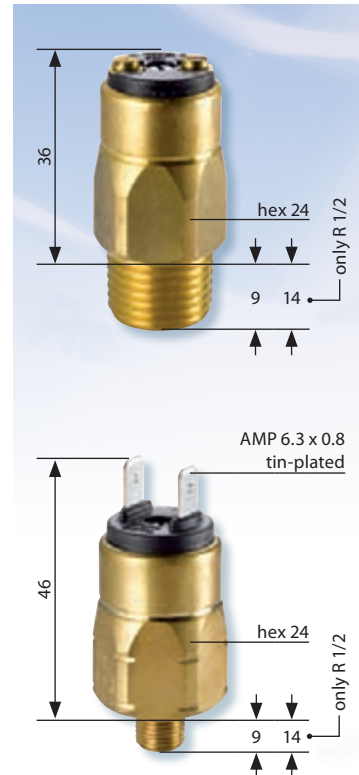
Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water, brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 16 for temperature ranges of diaphragm / seal materials

Order number:	0167 – XXX XX – X – XXX
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With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm materials are available on request, e.g. HNBR or silicone.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

Pressure switch hex 27

Changeover switch with silver or gold contacts

www.suco.de



- **Easily adjustable switching point.**
- **Factory adjustable hysteresis (except type 0140/0141) ¹⁾.**
- **High overpressure safety and long life even under harsh operating conditions.**
- **Ready-wired versions with your desired connectors (see p. 38).**
- **Deliverable with socket device or protective cap according to IP65.**

Technical data

Temperature stability for diaphragm / seal materials:	NBR EPDM FKM Silicone HNBR	-40°C – +100°C -30°C – +120°C -5°C – +120°C -40°C – +120°C -30°C – +120°C
Switching frequency:	200 / min.	
Mechanical life expectancy:	10 ⁶ cycles (life expectancy of diaphragm pressure switches only for pressures up to max. 50 bar)	
Pressure rise rate:	≤ 1 bar / ms	
Hysteresis (Only preset at factory):	adjustable average value 10-30% depending on type Type 0140/0141 not adjustable	
Vibration resistance:	10 g / 5 – 200 Hz sine-wave	
Shock resistance:	294 m / s ² ; 14 ms half-sine-wave	
Degree of protection:	IP65 with suitable connector installed terminals IP00	
Weight in grams:	0140 / 0141 0170 / 0171, 0180 / 0181, 0183, 0186, 0187, 0190 / 0191, 0196, 0197	approx. 100 g
	0184 / 0185, 0194 / 0195	approx. 130 g

¹⁾ Our pre-set switches are sealed with lacquer paint and the set pressure is embossed on the body.



Electrical values

Rated operating voltage U_e	Rated operational current I_e	Utilisation category ²
250 Volt AC 50 / 60 Hz	4 Ampere (2 Ampere) ¹	AC 12
250 Volt AC 50 / 60 Hz	1 Ampere	AC 14
24 Volt DC	4 / 2 Ampere (2 / 1 Ampere) ¹	DC 12 / DC 13
50 Volt DC	2 / 1 Ampere (1 / 0.5 Ampere) ¹	DC 12 / DC 13
75 Volt DC	1 / 0.5 Ampere (0.5 / 0.25 Ampere) ¹	DC 12 / DC 13
125 Volt DC	0.3 / 0.2 Ampere (0.2 / 0.1 Ampere) ¹	DC 12 / DC 13
250 Volt DC	0.25 / 0.2 Ampere (0.15 / 0.1 Ampere) ¹	DC 12 / DC 13
Rated insulation voltage U_i :	300 Volt	
Rated operating current U_{imp} :	2.5 kV (4 kV) ¹	
Rated thermal current I_{the} :	5 Ampere	
Switching overvoltage:	< 2.5 kV	
Rated frequency:	DC and 50 / 60 Hz	
Short circuit current rating of the device:	to 5 Ampere (to 3.5 Ampere) ¹	
Rated short-circuit current:	< 350 Ampere	
IP class of protection according to EN60529:1991+A1:1999:	IP65 with socket device	
Tightening torque of terminal screws:	< 0.35 Nm (concerns only type 0140 / 0141, 0184 / 0185, 0194 / 0195)	
Cable diameter:	0.5 – 1.5 mm ²	

¹⁾ Figures in brackets for series 0140 / 0141

²⁾ Explanations see page 9

CE marking

SUCO pressure switches rated with an operating limit of 250 V are covered by the Low Voltage Directive 73/23/EC.

An EC Declaration of Conformity has been issued for these pressure switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.

Degree of protection IPXX

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar (50 bar for stainless steel enclosures) must not be exceeded.

Switching performance and materials overview

Type	0140	0141	0170	0171	0180	0181	0183	0184	0185	0186	0187	0190	0191	0194	0195	0196	0197
24 V												■	■	■	■	■	■
42 V			■	■													
250 V	■	■			■	■	■	■	■	■	■						
50 mA												■	■	■	■	■	■
2 A	■	■															
4 A			■	■	■	■	■	■	■	■	■						
Gold contacts												■	■	■	■	■	■
Silver contacts	■	■	■	■	■	■	■	■	■	■	■						
Adjustable hysteresis			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Zinc-plated steel (CrVI-free)	■	■	■	■	■	■	■	■	■			■	■	■	■		
Stainless steel 1.4305										■	■					■	■
DIN-socket device								■	■					■	■		

Pressure switch hex 27

Accessories and applications



- Socket device IP65 or rubber capped IP54 for increased protection
- Easy installation with mountable socket device
- Thread adapters for special threads

hex 27 accessories

	 Rubber protective cap with two cable feeds for 1.7 to 2.3 mm diameter cable When rubber cap attached IP54 Suitable for voltages up to 42 V	 Socket device Threaded connection Pg9 (Tightening range 6 - 9 mm) When attached to socket device IP65 Suitable for voltages up to 250 V	 Socket device with indicator light According to DIN EN 175301- 803-A (DIN 43650) Threaded connection Pg9 (Tightening range 6 - 9 mm) When attached to socket device IP65 Suitable for 24 V or 250 V	 Thread adapter for special threads from G1/4-DIN3852-E to R1/4 acc. to DIN 2999 including FKM seals
0170 / 0171	■	■		■
0180 / 0181	■ (Up to max 42 V)	■		■
0183	■ (Up to max 42 V)	■		
0184 / 0185			■ 24 V or 250 V (upon request) see also page 33	■
0190 / 0191	■	■		■
0194 / 0195			■ (24 V on request) also see page 35	■
0186 / 0187	■ (Up to max 42 V)	■		■
0196 / 0197	■	■		■
Order number:	1-1-70-621-007	1-1-80-652-002	24 VDC: 1-1-84-652-011	1-1-00-420-009

250 VAC: 1-1-84-652-010

- Zinc-plated steel body (CrVI-free)
- With integrated changeover switch and silver contacts
- Overpressure safe up to 300 / 600 bar¹⁾
- Incl. polyamide cap, degree of protection IP65



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:			
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0140 Diaphragm pressure switch with screw terminals

300 ¹⁾	0.3 – 1.5	± 0.2	G 1/4	0140	457 03	X	003
			NPT 1/8	0140	457 04	X	300
			NPT 1/4	0140	457 09	X	305
			7/16-20 UNF	0140	457 20	X	310
			9/16-18 UNF	0140	457 21	X	315
	1 – 10	± 0.5	G 1/4	0140	458 03	X	006
			NPT 1/8	0140	458 04	X	301
			NPT 1/4	0140	458 09	X	306
			7/16-20 UNF	0140	458 20	X	311
			9/16-18 UNF	0140	458 21	X	316
	10 – 20	± 1.0	G 1/4	0140	459 03	X	009
			NPT 1/8	0140	459 04	X	302
			NPT 1/4	0140	459 09	X	307
			7/16-20 UNF	0140	459 20	X	312
			9/16-18 UNF	0140	459 21	X	317
	20 – 50	± 2.0	G 1/4	0140	461 03	X	012
			NPT 1/8	0140	461 04	X	303
			NPT 1/4	0140	461 09	X	308
			7/16-20 UNF	0140	461 20	X	313
			9/16-18 UNF	0140	461 21	X	318

0141 Piston pressure switch with screw terminals

600 ¹⁾	50 – 150	± 5.0	G 1/4	0141	460 03	X	003
			NPT 1/8	0141	460 04	X	304
			NPT 1/4	0141	460 09	X	309
			7/16-20 UNF	0141	460 20	X	314
			9/16-18 UNF	0141	460 21	X	319

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

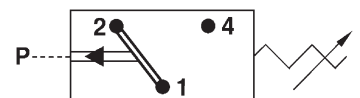
Order number: 014X - XXX XX - X-XXX

Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Protection class 2, protective insulation
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.

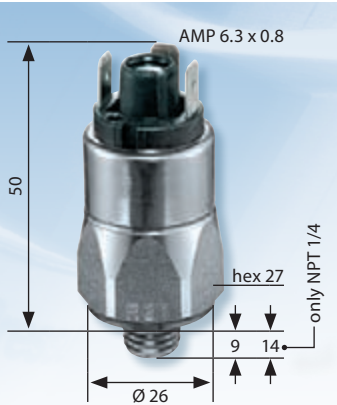


¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

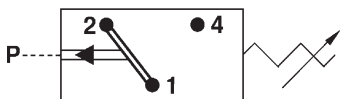


- Zinc-plated steel body (CrVI-free)
- With changeover switch and silver contacts
- Overpressure safe up to 100 / 300 / 600 bar ¹⁾
- Hysteresis adjustable at works

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0170 Diaphragm pressure switch with spade terminals

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0170	457 01	X	001
			M 12x1.5	0170	457 02	X	002
			G 1/4	0170	457 03	X	003
			NPT 1/8	0170	457 04	X	318
			NPT 1/4	0170	457 09	X	314
			7/16-20 UNF	0170	457 20	X	301
			9/16-18 UNF	0170	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0170	458 01	X	040
			M 12x1.5	0170	458 02	X	041
			G 1/4	0170	458 03	X	042
			NPT 1/8	0170	458 04	X	343
			NPT 1/4	0170	458 09	X	340
			7/16-20 UNF	0170	458 20	X	341
			9/16-18 UNF	0170	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0170	459 01	X	007
			M 12x1.5	0170	459 02	X	008
			G 1/4	0170	459 03	X	009
			NPT 1/8	0170	459 04	X	320
			NPT 1/4	0170	459 09	X	316
			7/16-20 UNF	0170	459 20	X	305
			9/16-18 UNF	0170	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0170	461 01	X	010
			M 12x1.5	0170	461 02	X	011
			G 1/4	0170	461 03	X	012
			NPT 1/8	0170	461 04	X	321
			NPT 1/4	0170	461 09	X	317
			7/16-20 UNF	0170	461 20	X	307
			9/16-18 UNF	0170	461 21	X	308

0171 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0171	460 01	X	001
			M 12x1.5	0171	460 02	X	002
			G 1/4	0171	460 03	X	003
			NPT 1/8	0171	460 04	X	304
			NPT 1/4	0171	460 09	X	303
			7/16-20 UNF	0171	460 20	X	301
			9/16-18 UNF	0171	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

Order number:	017X - XXX XX - X - XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With changeover switch and silver contacts
- Overpressure safe up to 100 / 300 / 600 bar ¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0180 Diaphragm pressure switch with spade terminals

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0180	457 01	X	001
			M 12x1.5	0180	457 02	X	002
			G 1/4	0180	457 03	X	003
			NPT 1/8	0180	457 04	X	318
			NPT 1/4	0180	457 09	X	314
			7/16-20 UNF	0180	457 20	X	301
			9/16-18 UNF	0180	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0180	458 01	X	040
			M 12x1.5	0180	458 02	X	041
			G 1/4	0180	458 03	X	042
			NPT 1/8	0180	458 04	X	343
			NPT 1/4	0180	458 09	X	340
			7/16-20 UNF	0180	458 20	X	341
			9/16-18 UNF	0180	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0180	459 01	X	007
			M 12x1.5	0180	459 02	X	008
			G 1/4	0180	459 03	X	009
			NPT 1/8	0180	459 04	X	320
			NPT 1/4	0180	459 09	X	311
			7/16-20 UNF	0180	459 20	X	305
			9/16-18 UNF	0180	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0180	461 01	X	010
			M 12x1.5	0180	461 02	X	011
			G 1/4	0180	461 03	X	012
			NPT 1/8	0180	461 04	X	321
			NPT 1/4	0180	461 09	X	312
			7/16-20 UNF	0180	461 20	X	307
			9/16-18 UNF	0180	461 21	X	308

0181 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0181	460 01	X	001
			M 12x1.5	0181	460 02	X	002
			G 1/4	0181	460 03	X	003
			NPT 1/8	0181	460 04	X	304
			NPT 1/4	0181	460 09	X	303
			7/16-20 UNF	0181	460 20	X	301
			9/16-18 UNF	0181	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

Order number:	018X - XXX XX - X - XXX
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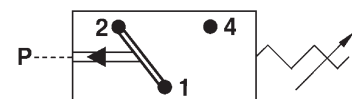
Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

With male thread



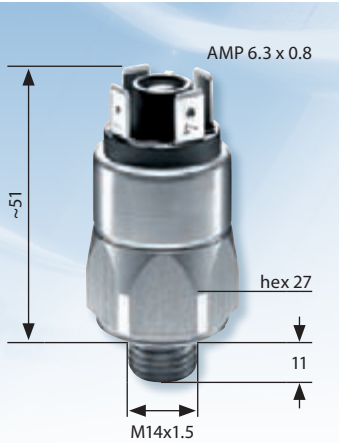
- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



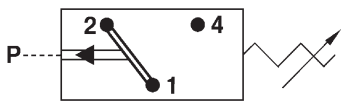
Accessories see page 28



Thread similar ISO 6149-3
(Incl. O-ring for sealing)



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



- Zinc-plated steel body (CrVI-free)
- With changeover switch and silver contacts
- Overpressure safe up to 600 bar¹⁾, hysteresis adjustable at works
- Adjustment range: 100 – 400 bar
- Installation height only 62 mm

p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0183 Piston pressure switch with spade terminals

600 ¹⁾	100 – 300	± 10.0	M 14x1.5	0183	462	45	X	051
	200 – 400			0183	463	45	X	061

Seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of seal materials see page 26

Order number:	0183 - XXX 45 - X - XXX
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Accessories

<p>Adapter From M 14 x 1.5 to G 1/4</p>	<p>Adapter From M 14 x 1.5 to M 12 x 1.5</p>	<p>Adapter From M 14 x 1.5 to NPT 1/8</p>
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<p>Order number: 1-1-83-420-006</p>	<p>Order number: 1-1-83-420-007</p>	<p>Order number: 1-1-83-420-008</p>
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.



Accessories see page 28

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With socket device similar to DIN EN 175301 (DIN 43650)
- With changeover switch and silver contacts
- Overpressure safe up to 100 / 300 / 600 bar¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0184 Diaphragm pressure switch

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0184	457 01	X	001
			M 12x1.5	0184	457 02	X	002
			G 1/4	0184	457 03	X	003
			NPT 1/8	0184	457 04	X	318
			NPT 1/4	0184	457 09	X	314
			7/16-20 UNF	0184	457 20	X	301
			9/16-18 UNF	0184	457 21	X	302

	1 – 10	± 0.5	M 10x1 con.	0184	458 01	X	040
			M 12x1.5	0184	458 02	X	041
			G 1/4	0184	458 03	X	042
			NPT 1/8	0184	458 04	X	343
			NPT 1/4	0184	458 09	X	340
			7/16-20 UNF	0184	458 20	X	341
			9/16-18 UNF	0184	458 21	X	342

300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0184	459 01	X	007
			M 12x1.5	0184	459 02	X	008
			G 1/4	0184	459 03	X	009
			NPT 1/8	0184	459 04	X	320
			NPT 1/4	0184	459 09	X	311
			7/16-20 UNF	0184	459 20	X	305
			9/16-18 UNF	0184	459 21	X	306

	10 – 100	± 3.0– 5.0	M 10x1 con.	0184	461 01	X	010
			M 12x1.5	0184	461 02	X	011
			G 1/4	0184	461 03	X	012
			NPT 1/8	0184	461 04	X	321
			NPT 1/4	0184	461 09	X	312
			7/16-20 UNF	0184	461 20	X	307
			9/16-18 UNF	0184	461 21	X	308

0185 Piston pressure switch

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0185	460 01	X	001
			M 12x1.5	0185	460 02	X	002
			G 1/4	0185	460 03	X	003
			NPT 1/8	0185	460 04	X	304
			NPT 1/4	0185	460 09	X	303
			7/16-20 UNF	0185	460 20	X	301
			9/16-18 UNF	0185	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

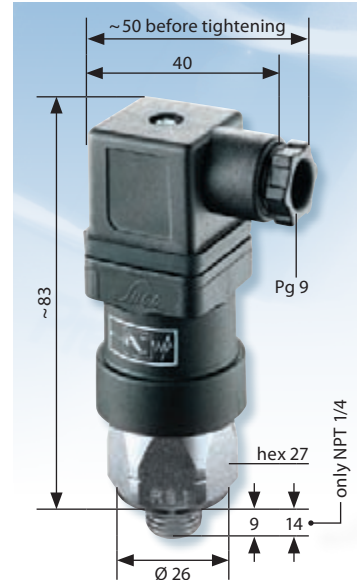
Temperature ranges of diaphragm / seal materials see page 26

Order number:	018X - XXX XX - X - XXX
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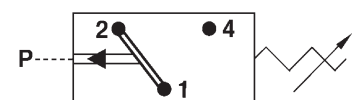
Piston pressure switches are only to a limited extent suitable for use with gases.
See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

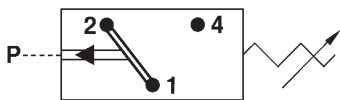


- Zinc-plated steel body (CrVI-free), with spade terminals
- With changeover switch
- Max. voltage 24 V
- Overpressure safe up to 100/300/600 bar¹⁾
- Hysteresis adjustable at works

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:			
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0190 Diaphragm pressure switch with spade terminals

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0190	457 01	X	001
			M 12x1.5	0190	457 02	X	002
			G 1/4	0190	457 03	X	003
			NPT 1/8	0190	457 04	X	318
			NPT 1/4	0190	457 09	X	314
			7/16-20 UNF	0190	457 20	X	301
			9/16-18 UNF	0190	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0190	458 01	X	040
			M 12x1.5	0190	458 02	X	041
			G 1/4	0190	458 03	X	042
			NPT 1/8	0190	458 04	X	343
			NPT 1/4	0190	458 09	X	340
			7/16-20 UNF	0190	458 20	X	341
			9/16-18 UNF	0190	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0190	459 01	X	007
			M 12x1.5	0190	459 02	X	008
			G 1/4	0190	459 03	X	009
			NPT 1/8	0190	459 04	X	320
			NPT 1/4	0190	459 09	X	316
			7/16-20 UNF	0190	459 20	X	305
			9/16-18 UNF	0190	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0190	461 01	X	010
			M 12x1.5	0190	461 02	X	011
			G 1/4	0190	461 03	X	012
			NPT 1/8	0190	461 04	X	321
			NPT 1/4	0190	461 09	X	317
			7/16-20 UNF	0190	461 20	X	307
			9/16-18 UNF	0190	461 21	X	308

0191 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0191	460 01	X	001
			M 12x1.5	0191	460 02	X	002
			G 1/4	0191	460 03	X	003
			NPT 1/8	0191	460 04	X	304
			NPT 1/4	0191	460 09	X	303
			7/16-20 UNF	0191	460 20	X	301
			9/16-18 UNF	0191	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

Order number:	019X - XXX XX - X-XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Zinc-plated steel body (CrVI-free)
- With socket device similar to DIN EN 175301 (DIN 43650)
- With changeover switch
- Overpressure safe up to 100/300/600 bar¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0194 Diaphragm pressure switch

100 ¹⁾	0.3 – 1.5	± 0.2	M 10x1 con.	0194	457 01	X	001
			M 12x1.5	0194	457 02	X	002
			G 1/4	0194	457 03	X	003
			NPT 1/8	0194	457 04	X	318
			NPT 1/4	0194	457 09	X	314
			7/16-20 UNF	0194	457 20	X	301
			9/16-18 UNF	0194	457 21	X	302
	1 – 10	± 0.5	M 10x1 con.	0194	458 01	X	040
			M 12x1.5	0194	458 02	X	041
			G 1/4	0194	458 03	X	042
			NPT 1/8	0194	458 04	X	343
			NPT 1/4	0194	458 09	X	340
			7/16-20 UNF	0194	458 20	X	341
			9/16-18 UNF	0194	458 21	X	342
300 ¹⁾	10 – 50	± 3.0	M 10x1 con.	0194	459 01	X	007
			M 12x1.5	0194	459 02	X	008
			G 1/4	0194	459 03	X	009
			NPT 1/8	0194	459 04	X	320
			NPT 1/4	0194	459 09	X	311
			7/16-20 UNF	0194	459 20	X	305
			9/16-18 UNF	0194	459 21	X	306
	10 – 100	± 3.0 – 5.0	M 10x1 con.	0194	461 01	X	010
			M 12x1.5	0194	461 02	X	011
			G 1/4	0194	461 03	X	012
			NPT 1/8	0194	461 04	X	321
			NPT 1/4	0194	461 09	X	312
			7/16-20 UNF	0194	461 20	X	307
			9/16-18 UNF	0194	461 21	X	308

0195 Piston pressure switch

600 ¹⁾	50 – 200	± 5.0	M 10x1 con.	0195	460 01	X	001
			M 12x1.5	0195	460 02	X	002
			G 1/4	0195	460 03	X	003
			NPT 1/8	0195	460 04	X	304
			NPT 1/4	0195	460 09	X	303
			7/16-20 UNF	0195	460 20	X	301
			9/16-18 UNF	0195	460 21	X	302

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

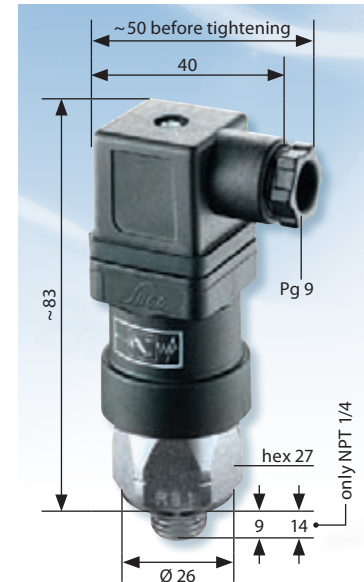
Temperature ranges of diaphragm / seal materials see page 26

Order number:	019X - XXX XX - X-XXX
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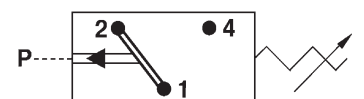
Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

With male thread



- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28



- Stainless steel (1.4305 / AISI 303) body
- With changeover switch and silver contacts
- Max. voltage 250 V
- Overpressure safe up to 300/600 bar¹⁾
- Hysteresis adjustable at works

With male thread



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0186 Diaphragm pressure switch with spade terminals

300 ¹⁾	0.5 – 5	± 0.2	G 1/4	0186	457 03	X	003
	1 – 10	± 0.5		0186	458 03	X	006
	10 – 50	± 3.0		0186	459 03	X	009
	10 – 100	± 3.0 – 5.0		0186	461 03	X	012

0187 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	G 1/4	0187	460 03	X	003
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Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water ²⁾ , Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 26

²⁾ Not recommended for piston pressure switches.

Order number:	018X - XXX 03 - X-XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

- Our pressure switches are also available with factory pre-set switching points.
- Ready-wired versions can be found starting on page 38 following.
- We offer other body materials and connecting threads upon request.
- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.
- For further technical data see page 26/27.



Accessories see page 28

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Stainless steel (1.4305 / AISI 303) body
- With changeover switch and gold contacts
- Max. voltage 24 V
- Overpressure safe up to 300/600 bar¹⁾
- Hysteresis adjustable at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0196 Diaphragm pressure switch with spade terminals

300 ¹⁾	0.5 – 5	± 0.2	G 1/4	0196	457 03	X	003
	1 – 10	± 0.5		0196	458 03	X	006
	10 – 50	± 3.0		0196	459 03	X	009
	10 – 100	± 3.0 – 5.0		0196	461 03	X	012

0197 Piston pressure switch with spade terminals

600 ¹⁾	50 – 200	± 5.0	G 1/4	0197	460 03	X	003
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Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Water ²⁾ , Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

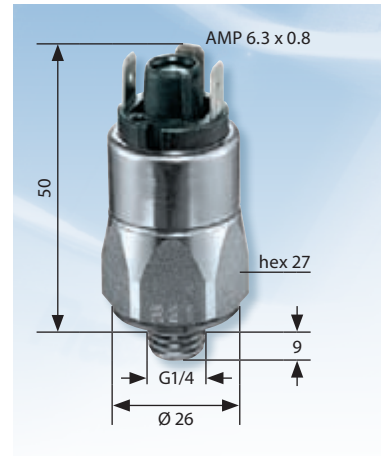
Temperature ranges of diaphragm / seal materials see page 26

²⁾ Not recommended for piston pressure switches.

Order number:	019X - XXX 03 - X-XXX
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

With male thread



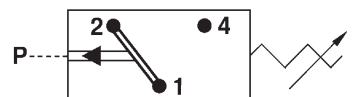
■ Our pressure switches are also available with factory pre-set switching points.

■ Ready-wired versions can be found starting on page 38 following.

■ We offer other body materials and connecting threads upon request.

■ Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.

■ For further technical data see page 26/27.



Accessories see page 28

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



■ **Connector types with different cable lengths according to customer needs for all switches of the hex 24 and hex 27 series.**

■ **Degree of protection according to the connector specification of the manufacturer.**

■ **Adjustable switching points that maintain their setting.**

■ **0240 / 0241 also adjustable even after sealing.**

■ **Factory pre-set pressure switching points are embossed on the switch body.**

Technical explanations

Our pressure switches mostly have a degree of protection IP65. This may not be adequate for all applications. Especially for commercial vehicles, mobile hydraulics and similar applications where IP67 or IP6K9K may be required.

Ready-wired switches offer a maximum of protection against dust and water. This allows that the pressure switch itself can be used in any possible assembly position while the electrical connection can be transferred to climate-wise uncritical and vibration-free places.

SUCO is able to ready-wire all commercially available connectors attaching customized cable lengths. This not only ensures a great deal of flexibility but also the possibility to supply small quantities without claiming expensive tooling costs.





The technical data of ready-wired pressure switch types are substantially the same as those of the standard types. Differences in the technical data will be agreed with the customer and defined on a customer-specific drawing of the ready-wired pressure switch.

Ready-wired pressure switches hex 24 / hex 27

Customized finishing

- Many pressure switches series of hex series 24 and 27 can be individually wired according to customer needs.
- Let us advise you.

Standard ranges suitable for ready-wiring

			
0163 / 0166 0164 0167 0169	0168	0170 / 0171 0180 / 0181 0190 / 0191 0196 / 0197	0140 / 0141
See pages 16 bis 25 for technical data	See pages 16 / 17 and 22 for technical data	See pages 26 bis 37 for technical data	See pages 26 / 27 and 29 for technical data
The switching point is factory pre-set and cannot be changed subsequently. It is therefore essential that the switching point is stated when the order is placed.			The switching point is adjustable even after sealing.

- *SUCO has developed special solutions of pressure switches for pneumatic and gaseous applications. Please ask for individual technical advice with regard to your special application.*

A selection from the wide variety of connectors we can supply

Bayonet-connector acc. DIN 72585	
AMP Junior Timer	
Cannon connector	
AMP Superseal	
Packard connector (Weather Pack 2-wire)	
Packard connector (Weather Pack 3-wire)	
Deutsch connector (DT 06 - 2S)	
Deutsch connector (DT 04 - 2P)	
Deutsch connector (DT 04 - 3P)	

- *Further connectors available on request.*
- *We supply the type and length of cable you need.*



- With changeover switch and silver contacts
- Switching point can be adjusted after potting, degree of protection IP67
- Depending on connection, suitable for 42 V or 250 V

CE marking

SUCO pressure switches rated with an operating limit of 250 V are covered by the Low Voltage Directive 73/23/EC.

An EC Declaration of Conformity has been issued for these pressure switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.



Degree of protection type IP67


The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar must not be exceeded.

Technical data

Voltage:	max. 42 V / 250 V depending on connection	
Current:	max. 2 Ampere	
Protection class:	2, protective insulation <input type="checkbox"/>	
Temperature resistance of the membrane / seal materials	NBR (Buna-N)	-40°C – +100°C
	EPDM	-30°C – +120°C
	FKM	-5°C – +120°C
	Silicone	-40°C – +120°C
	HNBR	-30°C – +120°C
Switching frequency:	200 / min.	
Mechanical life expectancy:	10 ⁶ cycles (for diaphragm pressure switches, life expectancy value only applicable for pressures up to max. 50 bar)	
Pressure rise rate:	≤ 1 bar / ms	
Hysteresis:	Average value of 10-20% (not adjustable)	
Vibration resistance:	10 g / 5 – 200 Hz sine wave	
Shock resistance:	294 m / s ² ; 14 ms half sine wave	
Materials:	Zinc-plated steel body Protective cover anodised aluminium	
Cable:	Standard length 2 m with wire end sleeves	
Degree of protection:	IP67	
Weight in grams:	approx. 100 g	

- Made of zinc-plated steel (Cr VI-free)
- Overpressure safe to 300 / 600 bar¹⁾
- Switching point adjustable during operation
- Safety class 2, safety insulation 



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0240 Diaphragm pressure switches

300 ¹⁾	0.3 – 1.5	± 0.2	G 1/4	0240	457 03	X	003
			NPT 1/8	0240	457 04	X	300
			NPT 1/4	0240	457 09	X	305
			7/16-20 UNF	0240	457 20	X	310
			9/16-18 UNF	0240	457 21	X	315
	1 – 10	± 0.5	G 1/4	0240	458 03	X	006
			NPT 1/8	0240	458 04	X	301
			NPT 1/4	0240	458 09	X	306
			7/16-20 UNF	0240	458 20	X	311
			9/16-18 UNF	0240	458 21	X	316
	10 – 20	± 1.0	G 1/4	0240	459 03	X	009
			NPT 1/8	0240	459 04	X	302
			NPT 1/4	0240	459 09	X	307
			7/16-20 UNF	0240	459 20	X	312
			9/16-18 UNF	0240	459 21	X	317
	20 – 50	± 2.0	G 1/4	0240	461 03	X	012
			NPT 1/8	0240	461 04	X	303
			NPT 1/4	0240	461 09	X	308
			7/16-20 UNF	0240	461 20	X	313
			9/16-18 UNF	0240	461 21	X	318

0241 Piston pressure switches

600 ¹⁾	50 – 150	± 5.0	G 1/4	0241	460 03	X	003
			NPT 1/8	0241	460 04	X	304
			NPT 1/4	0241	460 09	X	309
			7/16-20 UNF	0241	460 20	X	314
			9/16-18 UNF	0241	460 21	X	319

Diaphragm / seal material – areas of application

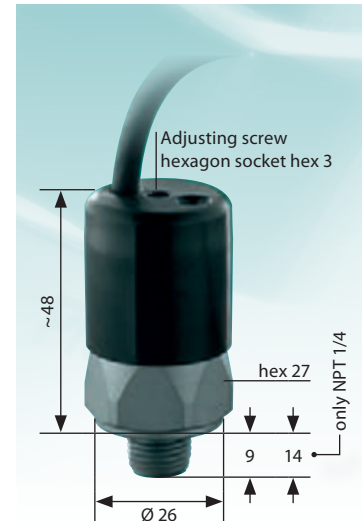
NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 40

Order number:	024X - XXX XX - X - XXX
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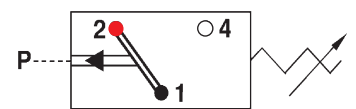
Piston pressure switches are only to a limited extent suitable for use with gases.
See explanation on page 9.

With male thread



Contact assignment:

- 1 = black
- 2 = red
- 4 = white



Options:

- other cable lengths and connectors on request
- fixed pre-set switching point

- We offer other body materials and connecting threads upon request.

- Other diaphragm- / seal materials are available on request, e.g. HNBR or silicone for diaphragm pressure switches.

¹⁾ Static value. Dynamic value is 30-50% lower. The values refer to the hydraulic or pneumatic part of the pressure switch.

Pressure switches 30 A/F

Changeover switch

www.suco.de

CE marking

SUCO pressure switches rated with an operating limit of 250 V are covered by the Low Voltage Directive 73/23/EC.

An EC Declaration of Conformity has been issued for these pressure switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.



■ **Mounting options for wall or manifold mounting enable easy, free-maintenance installation.**

■ **Easily user-adjustable switching point.**

■ **High overpressure safety.**

■ **Socket device allows easy assembly on site.**

Technical data

Temperature stability for diaphragm / seal materials:	NBR EPDM FKM	-40 °C – +100 °C -30 °C – +120 °C -5 °C – +120 °C
Switching frequency:	200 / min.	
Mechanical life expectancy:	10 ⁶ cycles (life expectancy of diaphragm pressure switches only for pressures up to max. 50 bar)	
Pressure rise rate:	≤ 1 bar/ms	
Hysteresis:	Type 0159:	approx. 10 – 30 % (not adjustable)
	Type 0161, 0162, 0175:	approx. 10 – 30 % (factory adjustable)
Vibration resistance:	10 g / 5 – 200 Hz sine-wave	
Shock resistance:	294 m/s ² ; 14 ms half-sine-wave	
Body material:	Aluminium	
Degree of protection:	IP 65 socket device fitted	
Weight in grams:	Type 0159, 0161, 0162	approx. 240 g
	Type 0175:	approx. 310 g

Electrical Values

	0159	0161/0162	
Rated operating voltage U _e :	Rated operating current I _e		Application category
250 Volt AC 50 / 60 Hz	2.5 Ampere	5 Ampere	AC 12
250 Volt AC 50 / 60 Hz	1 Ampere	1 Ampere	AC 14
24 Volt DC	2 / 2 Ampere	3.5 / 3.5 Ampere	DC 12 / DC 13
50 Volt DC	1 / 0.5 Ampere	2 / 1 Ampere	DC 12 / DC 13
75 Volt DC	0.75 / 0.4 Ampere	1 / 0.5 Ampere	DC 12 / DC 13
125 Volt DC	0.3 / 0.2 Ampere	0.3 / 0.2 Ampere	DC 12 / DC 13
250 Volt DC	0.3 / 0.2 Ampere	0.25 / 0.2 Ampere	DC 12 / DC 13

Rated insulation voltage U _i :	300 V
Rated impulse withstand voltage U _{imp} :	2.5 kV
Rated thermal current I _{the} :	6 Ampere
Switching overvoltage:	< 2.5 kV
Rated frequency:	DC und 50 / 60 Hz
Short circuit current rating:	0159: To 2.5 Ampere 0161/0162: To 6.3 Ampere
Rated short-circuit current:	< 350 Ampere
Tightening torque of terminal screws:	< 0.35 Nm
Cross section:	0.5 – 1.5 mm ²

- Aluminium body
- With changeover switch and silver contacts
- Overpressure safe to 200 / 600 bar¹⁾
- Max. voltage 250 V
- Switching point continuously adjustable by turning knurled screw while in operation.



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0159 Diaphragm pressure switches

200 ¹⁾	0.2 – 2	± 0.2 – 0.3	G 1/4 female	0159	426	14	X	001
	0.5 – 5	± 0.2 – 0.5		0159	427	14	X	001
	1 – 10	± 0.5		0159	428	14	X	001
	2 – 20	± 1.0		0159	429	14	X	001
	5 – 50	± 3.0		0159	430	14	X	001
	10 – 100	± 3.0 – 5.0		0159	431	14	X	001

0159 Piston pressure switches

600 ¹⁾	10 – 100	± 3.0 – 5.0	G 1/4 female	0159	432	14	X	001
	25 – 250	± 5.0 – 7.0		0159	433	14	X	001
	40 – 400	± 5.0 – 9.0		0159	434	14	X	001

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

Temperature ranges of diaphragm / seal materials see page 42

Order number:	0159 - XXX 14 - X - 001
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Degree of protection IP65

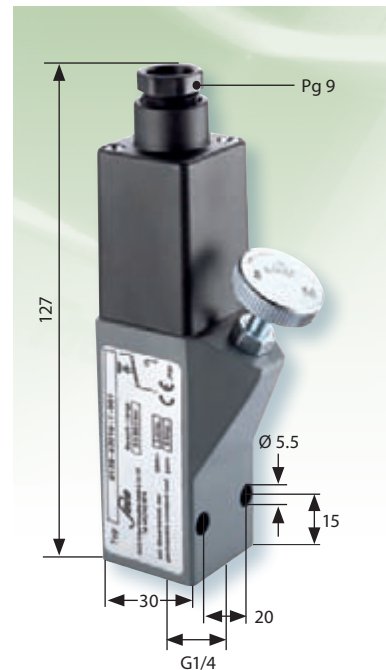
The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated, and whether it can be used for special applications which could not be foreseen by us.

Warning!

When using oxygen, the relevant accident prevention regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar is not exceeded.

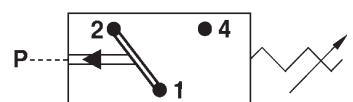
Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

With female thread



■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data and electrical values see page 42.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

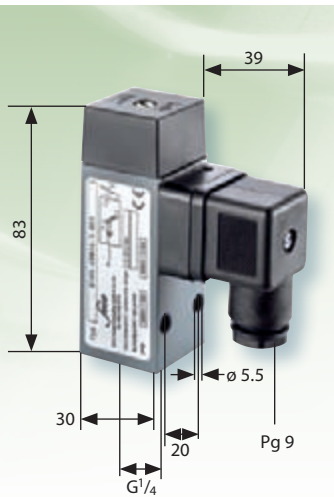
0161/0162

Diaphragm / piston pressure switches 250 V



- Aluminium body
- With changeover switch and silver contacts
- Overpressure safe to 200 / 600 bar¹⁾
- With socket device similar to DIN EN 175301 (DIN 43650)
- Adjustable hysteresis at works

0161 With female thread



$p_{max.}$ in bar	Adjustment range in bar (tolerance at room temperature)	dim. A in mm	Female thread G 1/4	Manifold mounting
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Diaphragm pressure switches

	0161				0162 ²⁾								
	0.5 – 1 (± 0.2)	0.5 – 5 (± 0.2 – 0.5)	1 – 10 (± 0.5)	10 – 50 (± 3.0)	0161	436 14	X	001	0162	436 14	X	001	
200 ¹⁾	15	0161	437 14	X	001	0162	437 14	X	001	0162	438 14	X	001
		0161	439 14	X	001	0162	439 14	X	001	0162	440 14	X	001
		0161	440 14	X	001	0162	440 14	X	001				

Piston pressure switches

				0161				0162 ²⁾					
600 ¹⁾	100 – 400	(± 5.0 – 9.0)	19.5	0161	441 14	X	001	0162	441 14	X	001		

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

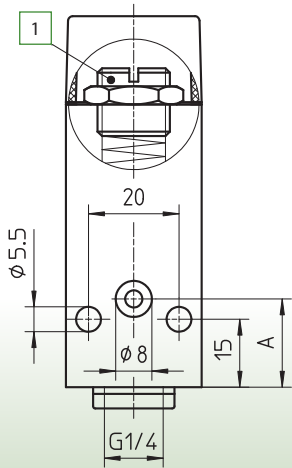
See page 42 for temperature ranges of diaphragm materials

Order number:	016X – XXX 14 – X – 001
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²⁾ **0162:** Scope of supply includes O-ring NBR 5x1.5mm

1 To adjust the set point, loose the locknut and turn the set screw with a screwdriver. Clock-wise screwing increases the switching pressure. After adjusting, tighten the locknut again.

0162 Manifold mounting



■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data and electrical values see page 42.



Degree of protection IP65

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated, and whether it can be used for special applications which could not be foreseen by us.

Warning!

When using oxygen, the relevant accident prevention regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar is not exceeded.

Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

- Aluminium body
- With changeover switch and silver contacts
- Overpressure safe to 25 bar¹⁾
- With socket device similar to DIN EN 175301 (DIN 43650)
- Adjustable hysteresis at works



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0175 Diaphragm pressure switches

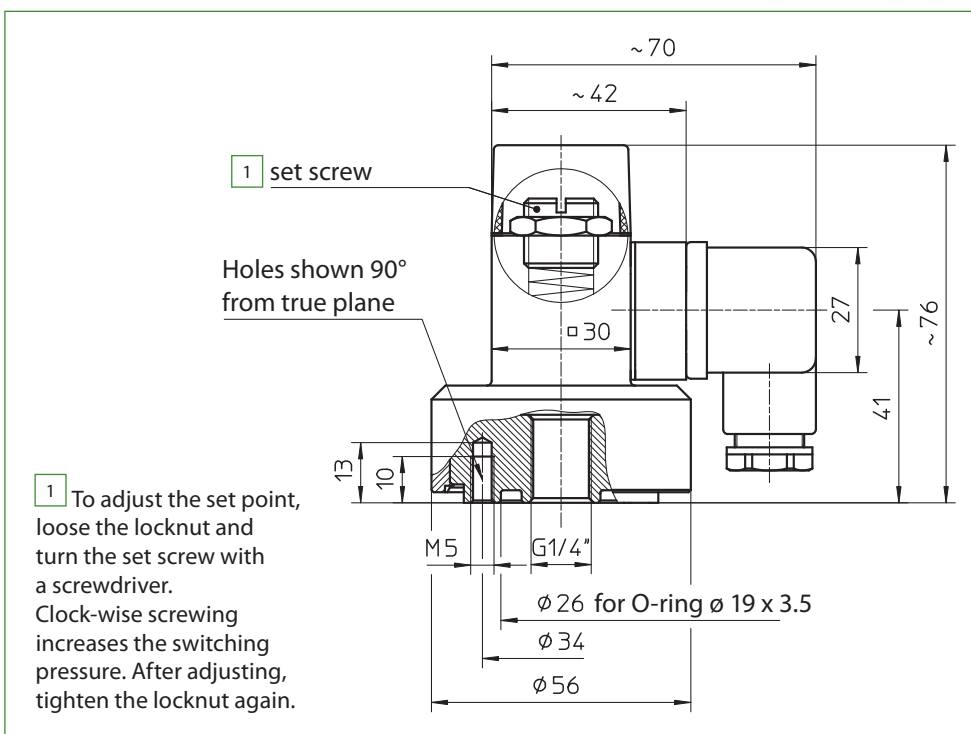
25 ¹⁾	0.1 – 1	± 0.1 – 0.2	G 1/4 female	0175 435 14 X 001
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Diaphragm material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 42 for temperature ranges of diaphragm materials

Order number:	0175 - 435 14 - X - 001
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Degree of protection IP65

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated, and whether it can be used for special applications which could not be foreseen by us.

Warning !

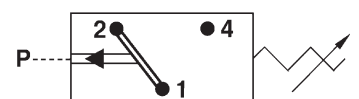
When using oxygen, the relevant accident prevention regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar is not exceeded.

With female thread



■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data and electrical values see page 42.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



■ **ATEX-certified for use in potentially explosive areas.**

■ **Changeover switch for reliable operation.**

■ **Switching point can be easily adjusted by the user while in operation.**

■ **Compact design.**

■ **Outstanding price / performance ratio.**

Technical data

	0165	0340	0341
ATEX protection zone:	1 and 2	22	22
Contact rating:	max. 1 A / 250 VAC max. 0.25 A / 250 VDC	max. 2 A / 250 VAC	
Temperature range:	NBR: -20 °C – +80 °C EPDM: -20 °C – +80 °C FKM: -5 °C – +80 °C		
Switching frequency:	200 / min.		
Mechanical life expectancy:	10 ⁶ cycles		
Pressure rise rate:	≤ 1 bar/ms		
Hysteresis:	10 – 30 % (depending on type, non-adjustable)		
Vibration resistance:	10 g / 5 – 200 Hz sine-wave		
Shock resistance:	294 m/s ² ; 14 ms half-sine-wave		
Cable length:	standard length 2 m with wire end sleeves, also available with lengths up to 5 m		
Conductor cross-section:	3 x 0.75 mm ²	3 x 0.5 mm ²	
Body material:	aluminium	zinc-plated steel (CrVI-free) anodised aluminium	
Degree of protection:	IP65		
Weight in grams:	approx. 380 g	approx. 230 g	approx. 230 g



Technical explanations

Explosion-protected pressure switches are classified by ATEX and approved according to the type of combustible material that may be expected where they are to be used.

The sub-divisions are:

Gases and Vapours	Dusts	Methane dust
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Our pressure switches are suitable for gases and vapours, or for dust according to the type chosen. **They are not suitable for use in methane dust (mining applications).**

The table provides an overview of the sub-division into zones, equipment groups and equipment categories.

Conditions in locations with potentially explosive atmosphere

Com- bustible material	Occurrence of combustible material in location	Designation of location with specified hazard	Marking required on equipment to be used in the specified zone	
			Equipment group	Equipment category
Gases Vapours	Continuously present, for long periods or frequently	Zone 0	II	1G
	Occurs occasionally	Zone 1	II	2G or 1G
	Unlikely to occur, and then only seldom or for short periods	Zone 2	II	3G or 2G or 1G
Dusts	Continuously present, for long periods or frequently	Zone 20	II	1D
	Occurs occasionally	Zone 21	II	2D or 1D
	Occurs if accumulated dust is whirled up, and then only seldom or for short periods	Zone 22	II	3D or 2D or 1D
Methane dust	-	Mining industry	I	M1
	-	Mining industry	I	M1 or M2

CE marking

SUCO pressure switches meet ATEX Standards which refer to Explosive Safety Directive 94/9/EC.

An EC Declaration of Conformity has been issued for these series of pressure switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.

Degree of protection IP65

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar must not be exceeded.





ATEX 0102 CE

II 2G Ex d II C T6 / T5 X (gas-protected zone 1 and 2)

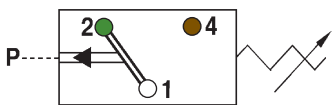
- Aluminium body
- With changeover switch
- Max. voltage 250 V
- Overpressure safe up to 200 / 600 bar¹⁾

With female thread



Contact assignment:

- 1 = white
- 2 = green
- 4 = brown



■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data see page 46.

$p_{max.}$ in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0165 Diaphragm pressure switches

$p_{max.}$ in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:			
				0165	448 14	X	001
200 ¹⁾	1 – 6	± 0.5	G 1/4 female	0165	448 14	X	001
	5 – 50	± 3.0		0165	449 14	X	001

0165 Piston pressure switches

$p_{max.}$ in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:			
				0165	450 14	X	001
600 ¹⁾	20 – 100	± 3.0 – 5.0	G 1/4 female	0165	450 14	X	001
	100 – 400	± 5.0 – 9.0		0165	451 14	X	001

Diaphragm / seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 46 for temperature ranges of diaphragm / seal materials

Order number:	0165 - XXX 14 - X - 001
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Piston pressure switches are only to a limited extent suitable for use with gases. See explanation on page 9.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

ATEX CE

II 3D IP65 T90°C (dust-protected zone 22)

- Zinc-plated steel body (CrVI-free), protective cover anodised aluminium
- With changeover switch
- Max. voltage 250 V, protection class 2, protective insulation □
- Overpressure safe up to 300 / 600 bar¹⁾



p _{max.} in bar	Adjustment range in bar	Tolerance at room temperature	Thread	Order number:
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0340 Diaphragm pressure switches

300 ¹⁾	0.3 – 1.5	± 0.2	G 1/4	0340	457 03	X	003
	1 – 10	± 0.5 – 1.0		0340	458 03	X	006
	10 – 20	± 1.0		0340	459 03	X	009
	20 – 50	± 2.0		0340	461 03	X	012

0341 Piston pressure switches

600 ¹⁾	50 – 150	± 5.0	G 1/4	0341	460 03	X	003
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Diaphragm / seal material – areas of application

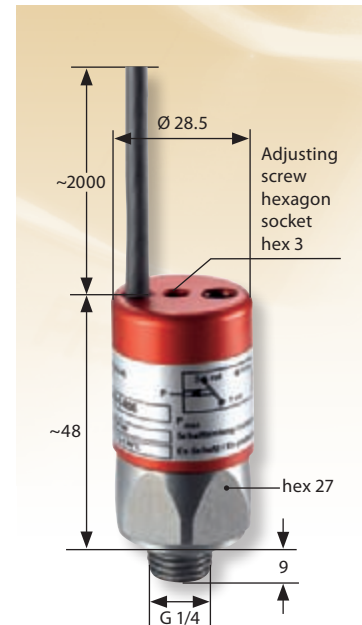
NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD). petrol/gasoline etc.	3

See page 46 for temperature ranges of diaphragm / seal materials

Order number:	034X - XXX 03 - X - XXX
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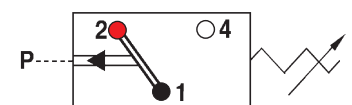
Piston pressure switches are only to a limited extent suitable for use with gases.
See explanation on page 9.

With male thread



Contact assignment:

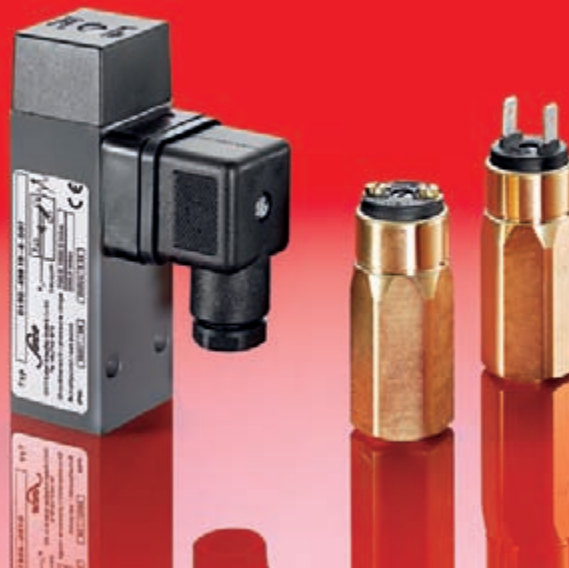
- 1 = black
- 2 = red
- 4 = white



■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data see page 46.

¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



- *Switching point easily adjustable.*
- *High overpressure resistance and long working life even under harsh operating conditions.*
- *Type 0150 as a change-over switch and with the possibility for manifold mounting.*
- *Type 0151 as normally open or normally closed.*

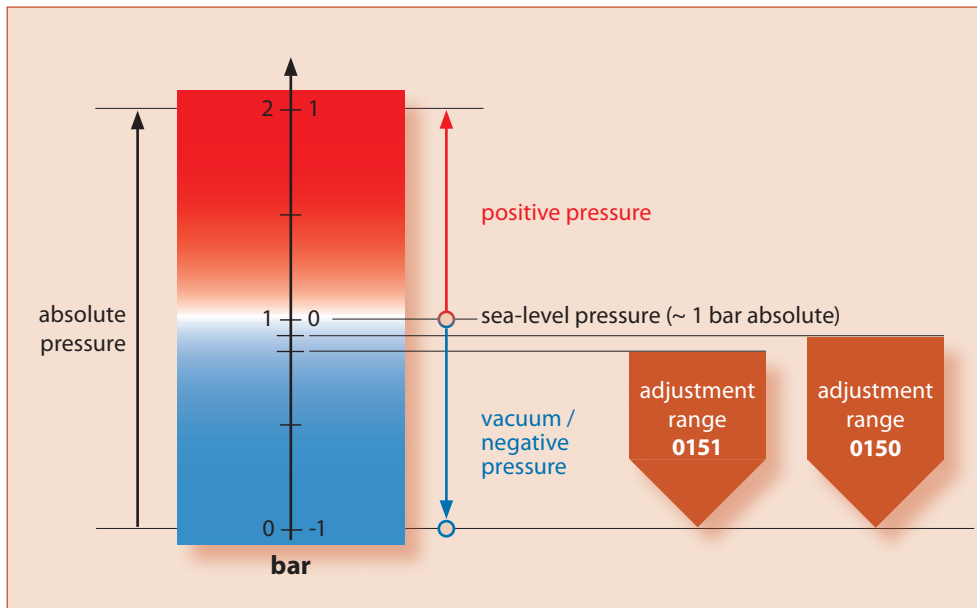
0150 / 0151 Technical data

Type:	0150	0151
Voltage:	max. 250 V	max. 42 V
Contact rating:	see table below*	≤ 4 A / 100 VA
Temperature stability:	-20 °C – +100 °C	-5 °C – +120 °C
Switching frequency:	200 / min.	
Mechanical life expectancy:	10 ⁶ cycles	
Pressure rise rate:	≤ 1 bar/ms	
Vibration resistance:	10 g / 5 – 200 Hz sine-wave	
Shock resistance:	294 m/s ² ; 14 ms half-sine-wave	
Body material:	aluminium	brass
Degree of protection:	IP65 socket device fitted	IP65, terminals IP00
Weight in grams:	approx. 270 g	approx. 140 g

*0150 Electrical values (for technical explanation see also page 9)

Rated operating voltage U _e :	Rated operational current I _e / Application category
250 Volt AC 50 / 60 Hz	5 Ampere / AC 12
250 Volt AC 50 / 60 Hz	1 Ampere / AC 14
24 Volt DC	3.5 / 3.5 Ampere / DC 12 / DC 13
50 Volt DC	2 / 1 Ampere / DC 12 / DC 13
75 Volt DC	1 / 0.5 Ampere / DC 12 / DC 13
125 Volt DC	0.3 / 0.2 Ampere / DC 12 / DC 13
250 Volt DC	0.25 / 0.2 Ampere / DC 12 / DC 13
Rated insulation voltage U _i :	300 Volt
Rated operating current U _{imp} :	2.5 kV
Rated thermal current I _{the} :	6 Ampere
Switching overvoltage:	< 2.5 kV
Rated frequency:	DC and 50 / 60 Hz
Short circuit current rating of the device:	to 6.3 Ampere
Rated short-circuit current:	< 350 Ampere
Tightening torque of terminal screws:	< 0.35 Nm
Cable diameter:	0.5 – 1.5 mm ²

Comparison absolute pressure / relative pressure



Indication: Desired switching points within the range of the vacuum have to be indicated relatively to the atmospheric pressure (normal pressure).

Accessories

 <p>60 Ø 28</p>	 <p>46 Ø 28</p>	
<p>Rubber protective cap for series 0151</p> <p>with central cable feed for 1.5 – 5 mm cable diameter</p> <p>With fitted cap IP54</p> <p>Suitable for voltages up to 42 V</p>	<p>Rubber protective cap for series 0151</p> <p>with two cable entries for 1.7 – 2.2 mm cable diameter</p> <p>With fitted cap IP54</p> <p>Suitable for voltages up to 42 V</p>	<p>Socket device with indicator light for series 0150</p> <p>acc. to DIN EN 175301-803-A (DIN 43650) Screw fixing Pg9 (cramping of cable to 6-9 mm)</p> <p>With fitted socket device IP65</p> <p>Suitable for 24 V or 250 V</p>
<p>Order number:</p>	<p>Order number:</p>	<p>Order number:</p>
<p>1-1-66-621-010</p>	<p>1-1-66-621-003</p>	<p>24 VDC: 1-1-61-652-021</p>
<p>250 VAC: 1-1-61-652-020</p>		



CE marking

SUCO vacuum switches rated with a voltage up to 250 V are covered by the Low Voltage Directive 73/23/EEC. An EC Declaration of Conformity has been issued for these vacuum switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.

Degree of protection IPXX

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

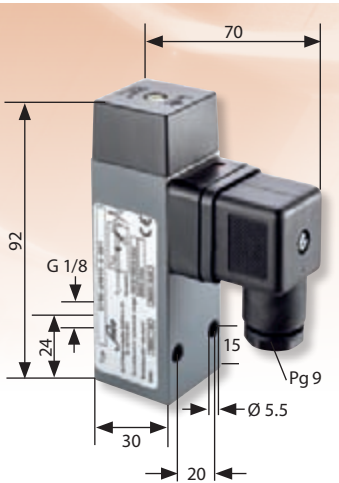
Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar must not be exceeded.



- Aluminium body
- Max. voltage 250 V
- Overpressure safe up to 20 bar¹⁾
- With socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis approx. 50 – 150 mbar (non-adjustable)

With female thread



p _{max.} in bar	Adjustment range in mbar (rel.)	Tolerance in mbar (at room temperature)	Thread	Order number:
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0150 Vacuum switch

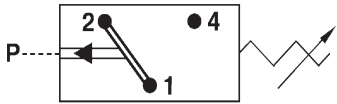
20 ¹⁾	100 – 950	± 50	G 1/8 female	0150 456 15 4 001
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Diaphragm material – areas of application

ECO	Air, oils, greases, fuels	4
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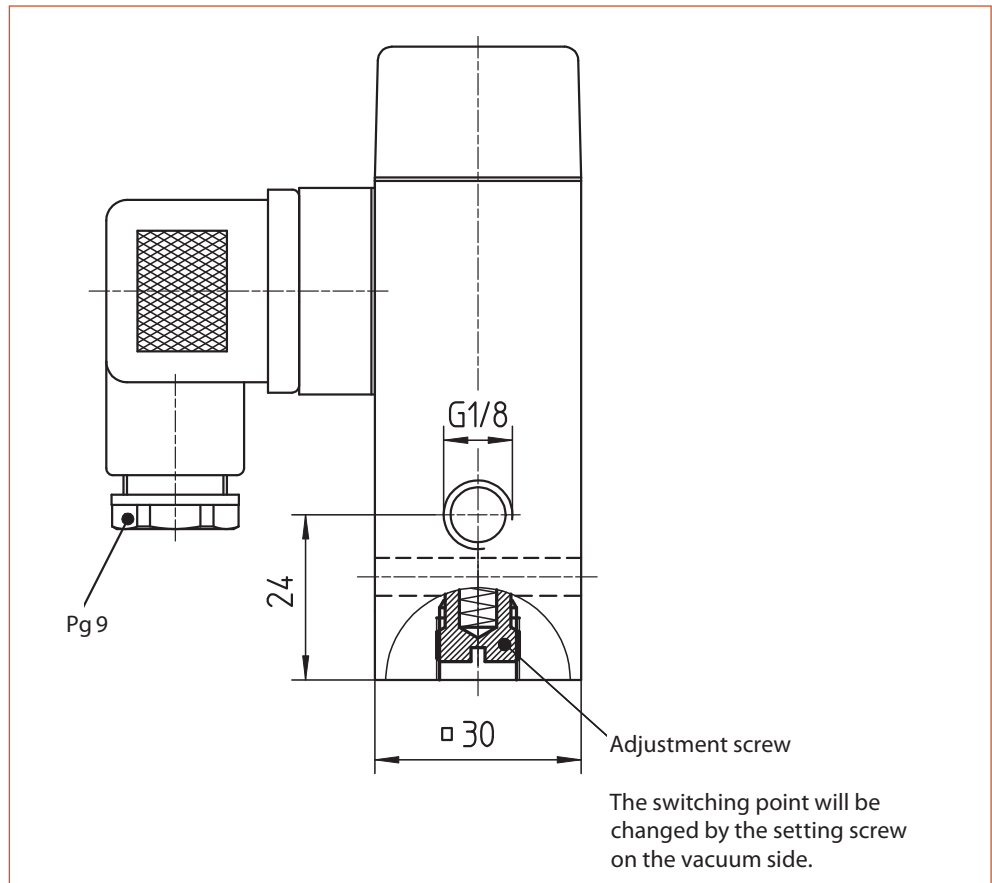
Temperature stability: -20 °C – +100 °C

Order number:	0150 - 456 15 - 4 - 001
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■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data and accessories see page 50/51.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

0151

Vacuum switch 42 V, normally open or normally closed

- Brass body
- With M3 screw or spade terminals
- Max. voltage 42 V
- Overpressure safe up to 35 bar¹⁾



p _{max.} in bar	Adjustment range in mbar (rel.)	Tolerance in mbar (at room temperature)	Thread	Order number:
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0151 Vacuum switch with screw terminals, normally open (no) →|:

35 ¹⁾	200 – 950	± 100	G 1/8 female	0151	452	15	3	001
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0151 Vacuum switch with M3 screw terminals, normally closed (nc) →:|:

35 ¹⁾	200 – 950	± 100	G 1/8 female	0151	453	15	3	001
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0151 Vacuum switch with spade terminals, normally open (no) →|:

35 ¹⁾	200 – 950	± 100	G 1/8 female	0151	454	15	3	001
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0151 Vacuum switch with spade terminals, normally closed (nc) →:|:

35 ¹⁾	200 – 950	± 100	G 1/8 female	0151	455	15	3	001
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Diaphragm material – areas of application

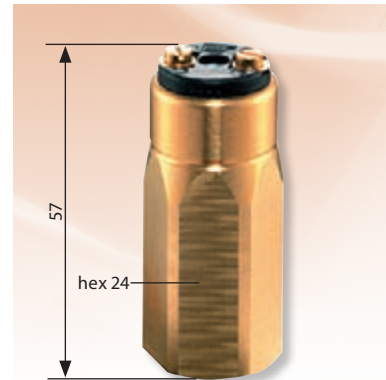
FKM	Air, oils, greases, fuels	3
-----	---------------------------	---

Temperature range: - 5 °C – + 120° C

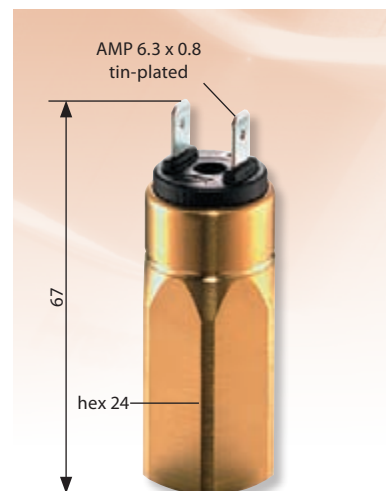


Order number:	0151 – XXX 15 – 3 – 001
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With female thread



With female thread



■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data and accessories see page 50/51.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



CE marking

SUCO electronic switches are covered by the EMC Directive 89/336/EC.

An EC Declaration of Conformity has been issued for these pressure switches and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.

- Ceramic sensor with thick film technology for high accuracy
- Electronic evaluation of switching point permits extremely small or very large hysteresis settings
- Switching point easily set by the user (menu guided for type 0570)

Technical data

	0520	0570
Switching function:	Normally open / normally closed	Normally open / normally closed, programmable, 2 switching points, time-delayed switching, zero-resetting, peak-value memory (within setting range), switching-point counter
Hysteresis:	2 – 95 % programmable at our works (max. tolerance ± 1.0 % full scale)	1 – 99 % programmable using key-pad
Adjustment:	Switching point can be set on site by the customer using a screw-driver via setting potentiometer when operating voltage is applied	Programmable using key-pad on front face
Outputs:	Transistor output (1.4 A DC12 / PNP)	2 transistor outputs (each 1.4 A DC12 / PNP) 1 analogue output (4 – 20 mA)
Indication of output status:	–	By 2 LEDs (yellow)
Time-delayed switching:	–	Adjustable 0 – 3.0 s
Pressure display:	–	Current pressure can be shown in bar or PSI on 3-digit LED-display (red)
Materials:	zinc-plated steel body (CrVI-free)	Medium-contact parts anodised aluminium, body made of die-casted zinc
Access coding:	–	The switch can have a number code between 1 and 999
Supply voltage:	18 – 36 VDC	12 – 30 VDC
Degree of protection:	IP65	
Switching time:	< 4 ms	
Accuracy:	± 0.5 % (full scale at room temperature)	
Temperature range:	NBR, EPDM: - 20 °C – +80 °C FKM: - 5 °C – + 80 °C	
Temperature compensation:	- 20 °C – + 80 °C, error $\leq \pm 1.5$ % overall	
Temperature drift:	± 0.2 % / 10 K	
Life expectancy:	5 x 10 ⁶ cycles	
Pressure rise rate:	≤ 1 bar / ms	
Vibration resistance:	10 g at 5 – 2000 Hz sine-wave	
Shock resistance:	294 m / s ² , 14 ms half-sine-wave to DIN 40046	
EMV:	acc. to EN 50081-1, EN 50081-2, EN 50082-2	
Weight in grams:	approx. 240 g	approx. 340 g

Degree of protection IP65

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar must not be exceeded.





- Zinc-plated steel body (CrVI-free)
- Ceramic sensor of thick film technology
- High accuracy
- Supply voltage 18 – 36 VDC
- Overpressure safe to 20 / 150 / 500 bar¹⁾
- Hysteresis programmable in our works from 2 – 95 %
- Simple, mechanical adjustment of switching point

With female thread



$p_{max.}$ in bar	Burst pressure in bar	Adjustment range in bar	Hysteresis ²⁾ in bar	Thread	Order number:
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0520 Electronic pressure switches normally open (no) → |:

$p_{max.}$	Burst pressure	Adjustment range	Hysteresis	Thread	Order number
20 ¹⁾	25	0 – 10	0.5 ²⁾	G 1/4 female	0520 470 14 X 001
150 ¹⁾	175	0 – 100	5 ²⁾		0520 472 14 X 001
500 ¹⁾	600	0 – 250	10 ²⁾		0520 474 14 X 001

0520 Electronic pressure switches normally closed (nc) → |:

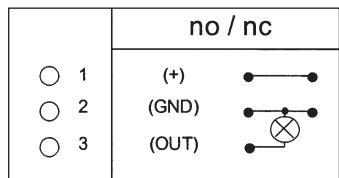
$p_{max.}$	Burst pressure	Adjustment range	Hysteresis	Thread	Order number
20 ¹⁾	25	0 – 10	0.5 ²⁾	G 1/4 female	0520 471 14 X 001
150 ¹⁾	175	0 – 100	5 ²⁾		0520 473 14 X 001
500 ¹⁾	600	0 – 250	10 ²⁾		0520 475 14 X 001

Seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

See page 55 for temperature ranges of seal materials

Order number:	0520 -XXX 14 -X - 001
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■ Our pressure switches are also available with factory pre-set switching points.

■ For further technical data and electrical values see page 55.

¹⁾ Static pressure, dynamic pressures should be 30 to 50 % lower. These values refer to the hydraulic or pneumatic part of the pressure switch.

²⁾ Factory set, if no special customer request.

- Anodised aluminium and zinc die-cast body
- Ceramic sensor of thick film technology
- Supply voltage 12 – 30 VDC
- Overpressure safe up to 20 / 150 / 600 bar¹⁾
- Programmable using key-pad on front side
- Time-delayed switching (adjustable 0 – 3 s)
- Peak-value memory (within setting range)
- Coding to prevent misuse



p _{max.} in bar	Burst pressure in bar	Adjustment range in bar	Thread	Order number:
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0570 Electronic pressure switches

20 ¹⁾	25	0 – 10	G 1/4 female	0570	467	14	X	001
150 ¹⁾	175	0 – 100		0570	468	14	X	001
600 ¹⁾	700	0 – 400		0570	469	14	X	001

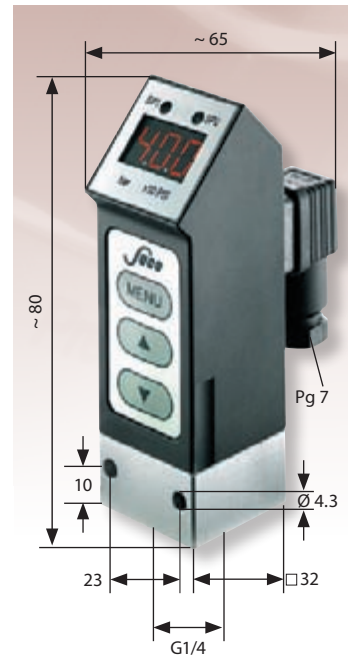
Seal material – areas of application

NBR	Hydraulic / machine oil, heating oil, air, nitrogen etc.	1
EPDM	Brake fluid, ozone, acetylene, hydrogen etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline etc.	3

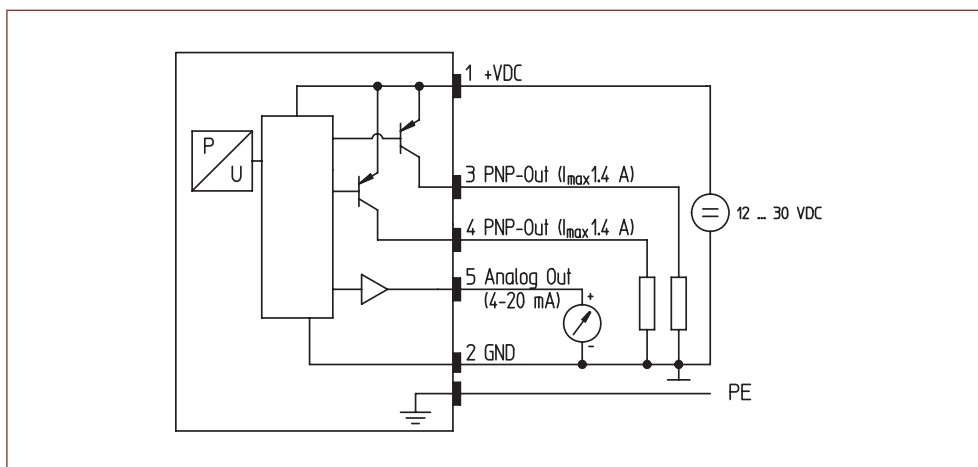
See page 55 for temperature ranges of seal materials

Order number:	0570 -XXX 14 -X - 001
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With female thread



Socket device included into the scope of delivery.



■ For further technical data and electrical values see page 55.

¹⁾ Static pressure, dynamic pressures should be 30 to 50 % lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



- The pressure transmitters shown in this catalog are only a small range of our possibilities
- High overpressure safety for use in mobile hydraulics
- Long life time even with high pressure change rates
- Wetted parts made of stainless steel to ensure problem-free medium compatibility
- Highest accuracy and reliability for safe process monitoring
- Customized versions on request
- For further product series see also www.esi-tec.com



Type	0605	0610	0620
Output signal:	0.5 – 4.5 V radiometrically	0 – 10 V (3-wire)	4 – 20 mA (2-wire)
Supply voltage U_b :	5 VDC \pm 10 %	12 – 32 VDC	12 – 32 VDC
Maximum load:	\geq 4.7 k Ω	\geq 4.7 k Ω	$\leq (U_b - 12 \text{ V}) / 20 \text{ mA}$
Current consumption (without load):	\leq 10 mA	\leq 15 mA	–
Pressure ranges p_{range} :	-1 – 0 bar; 0 – 10 bar; 0 – 16 bar; 0 – 100 bar; 0 – 250 bar; 0 – 400 bar; 0 – 600 bar; 0 – 1000 bar		
Accuracy:	\pm 0.5 % full scale at room temperature		
Response time (10 – 90 %):	max. 2 ms		
Temperature range:	-40 °C – +125 °C	-40 °C – +105 °C	-40 °C – +100 °C
Temperature drift:	approx. \pm 0.2 % / 10 K		
Mechanical life expectancy:	10^7 pulses up to nominal p_{range}		
Overpressure safety ¹⁾ :	2 x p_{range} up to 350 bar; 1.5 x p_{range} up to 600 bar; 1.2 x p_{range} at 1000 bar		
Bursting pressure ¹⁾ :	3 x p_{range} up to 350 bar; 2 x p_{range} up to 600 bar; 1.5 x p_{range} at 1000 bar		
Materials:	Body material: 1.4301 / AISI 304 Diaphragm: < 500 bar: 1.4301 / AISI 304 Diaphragm: > 500 bar: 1.4542 / AISI 630		
Reverse polarity protection:	built-in		
Protection according to DIN EN 60 529:	IP67 for M12x1, DIN 72585, AMP Superseal and Deutsch DT04-4P IP65 for DIN EN 175301-803, AMP JT and cable connection		
Weight:	approx. 120 g (DIN EN 175301 approx. 130 g)		
Vibration resistance:	20 g at 4 – 2000 Hz sine		
Max. length of connection cable:	30 m / 100 ft		
EMC Standards:	DIN EN 61000-6-2, DIN EN 61000-6-3		

CE marking

SUCO pressure transmitters are covered by the EMV-directive 89/336/EC.

An EC Declaration of Conformity has been issued for these pressure transmitters and is on file at our offices. The corresponding switches bear the CE mark in our catalogue.

Degree of protection IP65

The type approval does not apply without restriction to all environmental conditions. It is the responsibility of the user to check whether the electrical connection complies with regulations other than those stated and whether it can be used for special applications which could not be foreseen by us.

Oxygen warning!

When using oxygen, the relevant safety regulations must be observed. In addition, we recommend that a maximum operating pressure of 10 bar must not be exceeded.



¹⁾ Static pressure, dynamic pressures should be 30 to 50% lower. These values refer to the hydraulic or pneumatic part of the pressure switch.



* DIN EN 175301-803-A socket device included into the scope of delivery.

DIN EN 175301-803-A

0605+0610	0620
1: U _{out}	1: nc
2: Gnd	2: I _{out}
3: U _{v+}	3: U _{v+}

x ≈ 88 mm*
d = Ø 22 mm
Order number: **001**

M12

0605+0610	0620
1: U _{v+}	1: U _{v+}
2: U _{out}	2: nc
3: Gnd	3: I _{out}
4: nc	4: nc

x ≈ 61 mm
d = Ø 22 mm
Order number: **002**

AMP Junior-Timer

0605+0610	0620
1: U _{v+}	1: U _{v+}
2: U _{out}	2: nc
3: Gnd	3: I _{out}

x ≈ 57 mm
d = Ø 22 mm
Order number: **003**

DIN 72585-A1-4.1

0605+0610	0620
1: U _{v+}	1: U _{v+}
2: Gnd	2: nc
3: U _{out}	3: I _{out}
4: nc	4: nc

x ≈ 61 mm
d = Ø 27 mm
Order number: **004**

AMP Superseal

0605+0610	0620
1: U _{out}	1: nc
2: Gnd	2: I _{out}
3: U _{v+}	3: U _{v+}

x ≈ 70 mm
d = Ø 22 mm
Order number: **007**

DEUTSCH DT04-4P

0605+0610	0620
1: Gnd	1: I _{out}
2: U _{v+}	2: U _{v+}
3: nc	3: nc
4: U _{out}	4: nc

x ≈ 70 mm
d = Ø 22 mm
Order number: **008**



Order number: **03**

Order number: **41**

Order number: **31**

Order number: **13**

Order number: **42**

Order number: **20**

Order number: **09**

Order number: **04**

Order number: **21**

	Type	Pressure range	Pressure connector	Diaphragm	Electrical connector
Type	↓	↓	↓		↓
0.5 – 4.5 V radiometrically	0605				
0 – 10 V 3-wire	0610				
4 – 20 mA 2-wire	0620				
Pressure range	↓				
-1 – 0 bar Vacuum		356			
0 – 10 bar		480			
0 – 16 bar		509			
0 – 100 bar		481			
0 – 250 bar		482			
0 – 400 bar		501			
0 – 600 bar		483			
0 – 1000 bar		484			
Pressure connector		↓			
G 1/4 - DIN 3852-E			41		
G 1/4 - DIN 3852-A (not for vacuum)			03		
NPT 1/8 (up to 250 bar)			04		
NPT 1/4			09		
M 10 x 1 cyl. (up to 250 bar)			13		
7 / 16 – 20 UNF			20		
9 / 16 – 18 UNF			21		
female thread – 7 / 16 – 20 UNF (from 100 bar)			31		
M 14 x 1.5 – DIN 3852-E			42		
Electrical plug			↓		
DIN EN 175301-803-A (DIN 43 650-A)					001
M 12					002
AMP – Junior-Timer					003
DIN 72585-A1- 4.1 (Bayonet)					004
AMP Superseal					007
DEUTSCH DT04-4P					008
Cable connection					105
Order number:	↓	↓	↓		↓
Order number:	06XX	—	XXX	XX	— 0 — XXX

Customer specified versions on request.

Accessories (not included)

Socket device M12x1 straight



Order number:
1-6-00-652-016

Socket device M12x1 angular



Order number:
1-6-00-652-017



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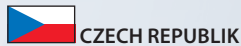
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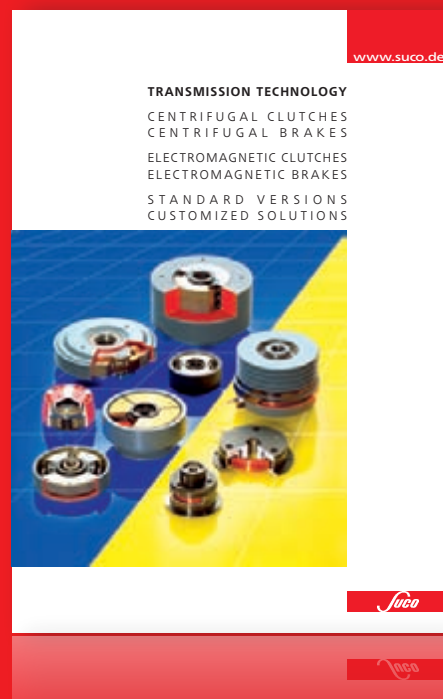
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