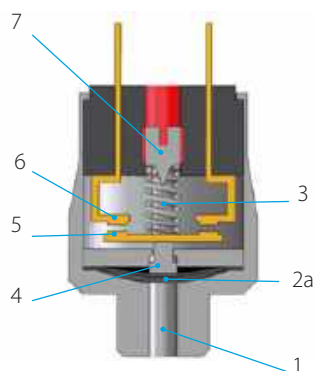


M. Mechanical Pressure Switches

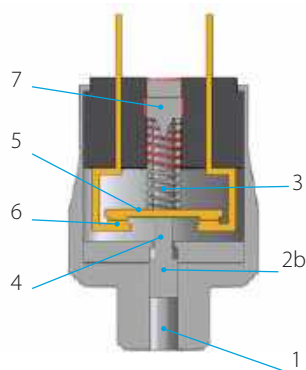


Technical explanations for mechanical pressure switches

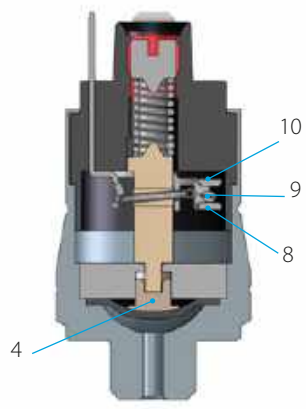
Diaphragm pressure switch
NO



Piston pressure switch
NC



Change-over



What is a mechanical pressure switch?

Mechanical pressure switches from SUCO monitor the pressure of liquid or gaseous media, and close or open an electrical circuit on reaching a set threshold.

Diaphragm pressure switches

SUCO diaphragm pressure switches are used in pressure ranges from 0.1 bar to 100 bar, meaning overpressure safety of 35, 100, 300 / 400 and 600 / 700 bar, depending on the used diaphragm type.

Piston pressure switches

Pressure ranges from 10 bar to 400 bar can be monitored with SUCO piston pressure switches (dependent on size); overpressure safety of up to 600 / 700 bar can be attained.

Sizes of pressure switches

Mechanical pressure switches from SUCO can be divided into sizes hex 24, hex 27 and 30 A/F. Each particular size has specific hydraulic, pneumatic and electric properties (specified on the relevant catalogue page in the technical details).

How does a pressure switch work?

Function description for **normally open (NO)**: Pressure is applied to the diaphragm (2a) / pistons (2b) through the pressure connector (1).

If the generated pressure force is greater than the force of the pre-tensioned pressure spring (3), the plunger (4) moves towards the counter-contact (6), carrying along the contact disc (5), and closes the circuit.

The switch opens again when the pressure is reduced by the hysteresis value.

Function description for **normally closed (NC)**: Engaging happens in the reverse order.

The adjustment screw (7) enables the switching point to be changed within the adjustment range.

The micro switch of a **change-over contact system** (snap-action) offers both, a NC and a NO contact.

The swivel contact (9) is activated by the plunger (4). The circuit is closed by the NC (8) as long as no pressure is applied.

When the applied pressure exceeds the set switching point, the swivel contact changes over and closes the circuit via the NO (10).

Utilisation category

The utilisation category specifies for example voltages and currents, and the type of load, our pressure switches are designed for (according to DIN EN 60947-5-1).

AC voltage

AC12: Control of ohmic loads and semiconductor loads in input circuits of opto-couplers (such as PLC inputs).

AC14: Control of electromagnetic loads, 72 VA.

DC voltage

DC12: Control of ohmic loads and semiconductor loads in input circuits of opto-couplers (such as PLC inputs).

DC13: Control of electromagnets.

B10d value

According to DIN EN ISO 13849-1, the B10d value specifies the anticipated service life (with a 10% probability of failure). The B10d value is therefore directly dependent on the respective application of the pressure switch. For ohmic loads and currents < 1 A, we specify the B10d value as 1 million cycles of electrical life.

The specification of a MTTF time (mean time to failure) is not possible without knowing the specific conditions in the application. However, the MTTF time can be determined easily from the B10d value:

$$MTTF_d = \frac{B_{10d}}{0,1 n_{op}}$$

n_{op} : number of cycles per year

B_{10d} : number of cycles until 10 % of components have failed.

Minimum current / minimum working voltage

The minimum working current and minimum working voltage depend greatly on operating and ambient conditions. Physically, the build-up of impurity layers on the contact rivets must be countered with mechanical friction and/or electrical erosion.

Classification of electrical switch functions

			Contact form DIN EN- 60947-5-1	Symbol IEC 60617
NO	NO, normally open	SPST single pole, single throw	X	
NC	NC, normally closed	SPST single pole, single throw	Y	
Change-over contacts	CO, change over (snap action)	SPDT single pole, double throw	C	

It has proven useful in many applications to deploy our pressure switches with silver contact rivets ensuring that they are fail safe to 10 mA and 10 V. Variants with gold contacts are available in our catalogue for even lower currents and voltages.

Potential-free – galvanically isolated

Mechanical pressure switches from SUCO are potential-free, i.e. no auxiliary energy is required. Also, there is no electrical contact between the individual, live parts and the housing.

Adjustment range of switching point

The pressure range, within which the switching point of a pressure switch can be set, is called adjustment range. The switching point corresponds to the pressure value at which the electric circuit is opened or closed by the pressure applied.

If no switching point is specified on order, the pressure switches are adjusted by approximately half the adjustment range at factory.

The setting ranges specified for the respective device series apply to increasing pressure. For switching points that are specified for falling pressure and are within the maximum value of the setting range minus the hysteresis, the next higher setting range must be selected (see also section „Hysteresis“).

Switching point tolerances

The switching point tolerances specified by us pertain to room temperature (RT) and condition as new.

The values can change as a result of temperature, ageing and deployment conditions.

It is not possible to specify generally applicable value for switching point tolerances over temperature as the medium has a significant influence on the sealing materials in the pressure switch.

Double the tolerance stated for RT and condition as new can be assumed as a typical magnitude for the tolerance over the entire temperature range.

Based on their design, piston switches may exhibit an increase in switching points due to storage (dry run, stick-slip effect). Following a short start phase, the switching points return to the value set at the factory.

Pressure change rates of > 1bar/s may have an effect on the switching point for diaphragm pressure switches.

The switching point (for rising pressure) and hysteresis increase, whilst the switch-back point (for falling pressure) sinks.

Also, the effect of the maximum (system) pressure on the switchback point (for falling pressure ramp) must be factored in for tolerance-critical applications. The higher the (system) pressure, the lower the resulting switch-back value.

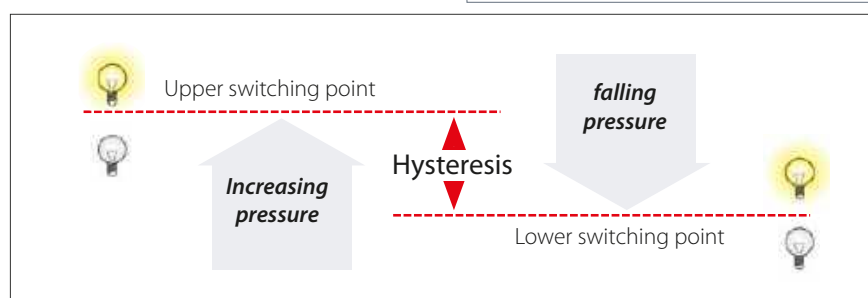
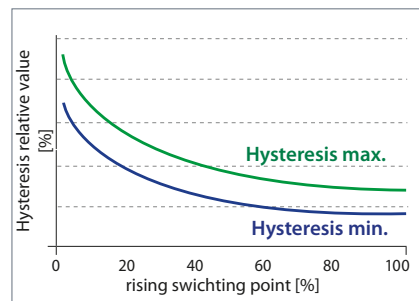
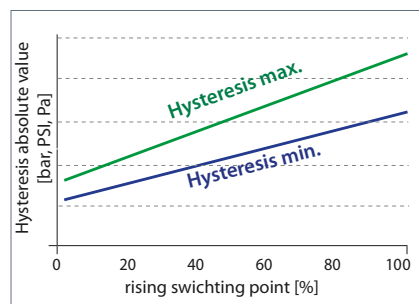
Hysteresis

Rising / falling switching point

The pressure difference between the rising (upper) and falling (lower) switching points (refer to the figure, e.g. NO) is known as hysteresis (switch-back difference).

Hysteresis has no constant value due to the structural layout of a mechanical pressure switch. In absolute values, the hysteresis is also the smallest with the smallest adjustment range. The hysteresis increases with increasing adjustment range.

Hysteresis over rising switching point



Technical explanations for mechanical pressure switches

Hysteresis can be set at SUCO in range from approx. 10 % (at end of adjustment range) to 30 % or higher (at start of adjustment range), related to the respective switching point for hex 27 and 30 A/F pressure switches with adjustable hysteresis.

Due to their design, pressure switches with an overpressure resistance of 100 bar have smaller hystereses than the series with 300 bar or 400 bar overpressure resistance. Piston pressure switches have a slightly larger hysteresis than diaphragm pressure switches.

The specifications in the catalogue only represent typical average values. Please ask about the possible setting ranges you may require. Our electronic pressure switches are excellently suited to extremely low or high hysteresis. The lowest possible hysteresis is set if nothing is specified in the order.

Switching frequency

The switching frequency provides information on the possible number of cycles in one minute. The value of 200/min specified by us is a guideline value. Higher switching frequencies can be attained depending on switch type and conditions of use.

Sealing materials

The priority in sealing material selection is the chemical resistance. The temperature range only becomes a selection criterion when different sealing materials are suitable for the medium.

NBR (Buna-N)

This is the standard material most commonly used. It is a special SUCO material mix with high level of cold flexibility so that the sealing properties of the pressure switch are also retained at low temperatures.

NBR is denoted by number „1“ in our order number.

EPDM

This material is the solution of choice for applications with brake fluids. It is particularly suitable for applications with (process) water. Approval from the BAM (Federal Institute for Material Testing) is in place for oxygen applications.

The safety regulations from country-specific authorities must be observed for oxygen applications. EPDM may not come into contact with oil because this would entail swelling and softening of the material, and so failure of the pressure switch.

EPDM is denoted by number „2“ in our order number.

EPDM-TW with drinking water approval

This EPDM material is intended for drinking water applications (up to max. 35 bar overpressure safety) according to Elastomer Guideline, WRAS (Water Regulation Advisory Scheme), ACS (Attestation de Conformité Sanitaire) and NSF 61 (National Sanitation Foundation) and for use in medical and pharmaceutical applications.

EPDM-TW may not come into contact with oil because this would entail swelling and softening of the material, and so failure of the pressure switch. Sealing is only available upon request, so please consult us before ordering.

EPDM-TW is denoted by number „5“ in our order number.

FKM / FPM (Viton®)

This is a diaphragm material suitable for high temperature exposure and exhibits special chemical resistance. It has been tested in the hydraulic sector and has been proven to work successfully with critical oils. FKM / FPM is denoted by number „3“ in our order number.

FFKM

This diaphragm material is suitable for temperature exposure up to 120°C and can withstand very aggressive conditions such as chemical species including organic or inorganic acids, diluted alkalis, ketones, esters, alcohols, fuels and hot water. FFKM is denoted by number „6“ in our order number.

TPE (Thermoplastic elastomers)

This sealing material is available only for our electronical products of the Performance Series.

TPE offers similar media compatibility like NBR, e.g. suitable for mineral oil and hydraulic fluids.

Additionally the material can be used with diluted acids and bases and cold water, too.

TPE is denoted by number „7“ in our order number.

ECO (epichlorhydrin)

ECO is only used in our vacuum switches. This material has similar properties to NBR in terms of chemical resistance, and can be used in gas applications as well as oil and fuel applications.

ECO is denoted by number „4“ in our order number.

Silicone

Silicone is suitable for use within a wide temperature range. The SUCO silicone diaphragm is FDA-approved (Food & Drug Administration) for the food sector.

Silicone is a soft material reserved for sensitive applications in the low pressure range (below 10 bar) with maximum overpressure safety to 35 bar. Piston switches are therefore not offered with silicone seals. Silicone is also not suitable for oil applications.

Silicone is denoted by number „8“ in our order number.

H-NBR

This is a special SUCO material mixture optimised for ester-based bio-oils. The multitude of bio-oils on the market means suitability of the material for the respective oil must be determined. This diaphragm material can also be used for a number of mineral and synthetic oils.

H-NBR is denoted by number „9“ in our order number.

Medium compatibility

The specifications on medium compatibility in this catalogue cannot be generalised as they pertain to the sealing materials used in our pressure switches.

Saturated and superheated steam applications

The sealing materials mentioned are not suitable for saturated or superheated steam applications.

Conversion table for pressure units

Unit symbol	Unit name	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 mmHg	Millimetres, mercury column	133.322	0.00133	1	0.01934
1 lbf/in ² = 1 PSI	Pound-force per square inch	6 894	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

Water applications

Standard piston switches are not suitable for water applications.

Pressure switches in stainless steel with EPDM seal have a special sealing system and can therefore also be used for water with corrosion protection, water mixtures or emulsions. The use of other fluid mixtures should be clarified with SUICO (e.g. swelling of EPDM sealing could happen by water – oil mixture).

Pressure switches with stainless steel housings with EPDM-TW diaphragm, SUICO type „5“ are designed for the use of drinking water.

Gas applications

Our pressure switches are suitable for liquid and gaseous media. Gaseous media place particular demands on leak-tightness however. The leakage rate is dependent on the respective gaseous medium, the working pressure and the permeability of the seal material used in the pressure switch.

Their lower leakage rates mean diaphragm pressure switches are better suited for gas pressures than piston pressure switches. The latter can also be used however if certain measures are taken (such as venting of the housing).

For gaseous applications below 10 bar (145 PSI) in combination with pressure switches with high IP class, i.e. IP 67 and IP6K9K, in general we recommend to use ventilation. Please consult us; we are able to offer suitable solutions.

Oxygen applications

Our mechanical pressure switches are suitable for use with oxygen. We recommend the use of our EPDM diaphragm. The resistance to internal burnout of the diaphragm has been tested by the BAM (Federal Institute for Material Testing).

Pressure switches with steel housings with zinc-nickel coating are, in conjunction with oxygen, only approved to a maximum working pressure of 10 bar.

Pressure switches with brass housings are, in conjunction with oxygen, only approved to a maximum working pressure of 35 bar.

Pressure switches with stainless steel housings are, in conjunction with oxygen, only approved to a maximum working pressure of 50 bar.

DGUV accident prevention regulations (such as DGUV 500, Section 2.32 and BGI 617) must be observed for first operation.

Please specify when ordering „oil and grease-free, for use with oxygen“.

Underpressure safety of pressure switches

Our pressure switches are underpressure safe down to 300 mbar (relative).

Overpressure safety of vacuum switches

Our vacuum switches are overpressure safe up to 20 or 35 bar depending on type.

cCSAus approval

Almost all of our mechanical pressure switches (sizes hex 24 and hex 27), and vacuum switch 0151, have cCSAus approval. The CSA mark together with „c“ and „us“ combines the control stamps for introduction onto the Canadian and American markets. The cCSAus certificate also includes the test of the relevant UL standard.

Checked by an official institution and verified with regular company visits by CSA inspectors, this approval guarantees the highest levels of quality and operational reliability for our products.

You can download the current cCSAus certificate on the download area of our homepage: <http://www.suco.de/en/downloads>

Product information

The technical information in this catalogue is based upon fundamental testing during product development, as well as upon empirical values. The information cannot be used for all application scenarios.

Testing of the suitability of our products for a specific application (e.g. also the checking of material compatibilities) rests under the responsibility of the user. It may be the case that suitability can only be guaranteed with appropriate field testing.

Please consult us about gas, water and oxygen applications.

Subject to technical changes.

[illegible]

M.1

hex 24
with integrated connector

M.2

hex 27
with integrated connector

		M.1																M.2				
		hex 24 with integrated connector																hex 27 with integrated connector				
		0110	0111	0112	0113	0114	0115	0116	0117	0118	0119	0120	0121	0122	0123	0124	0125	0132	0133	0134	0135	0136
Page		26	27	26	27	26	27	26	27	26	27	28	29	26	27	26	27	34	34	34	34	34
Function	Overpressure	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Vacuum																					
	NO / NC	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	Changeover contacts																	■	■	■	■	■
Voltage	max. 42 V	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	max. 48 V																	■	■	■	■	■
	max. 250 V																					
	max. 24 V / 50 mA																					
Adjustment range	100 – 950 mbar																					
	200 – 950 mbar																					
	0,1 – 1 bar	■		■		■		■		■		■		■		■						
	0,2 – 2 bar																					
	0,3 – 1,5 bar																	■		■		■
	0,5 – 1 bar																					
	0,5 – 3 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 (200) – 400 bar																					
Overpressure safety up to	35 bar																					
	100 bar																					
	200 bar																					
	300 (400) bar	■		■		■		■		■		■		■		■		■		■		■
	600 (700) bar		■		■		■		■		■		■		■		■		■		■	
Size	hex 24	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■					
	hex 27																	■	■	■	■	■
	30 A/F																					
Housing material	Zinc-plated steel	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	stainless steel																					
	Brass																					
	Aluminium																					
Custom variant	ATEX																					
	Configurable																					
	additional functions																					
	cCSAus approval 	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

						M.3						M.4						M.5								
						hex 24 NO / NC						hex 27 CO						hex 27 Configured								
	0137	0184	0185	0194	0195	0163	0164	0166	0167	0168	0169	0140	0141	0170	0171	0180	0181	0183	0186	0187	0190	0191	0196	0197	0240	0241
Page	34	36	37	38	39	42	48	44	50	46	47	55	55	56	56	57	57	58	59	59	60	60	61	61	65	65
Overpressure	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Vacuum																										
NO / NC						■	■	■	■	■	■															
Changeover contacts	■	■	■	■	■							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
max. 42 V						■	■	■	■	■	■			■	■											
max. 48 V	■																									
max. 250 V		■	■									■	■			■	■	■	■	■					■	■
max. 24 V / 50 mA				■	■																■	■	■	■		
100 – 950 mbar																										
200 – 950 mbar																										
0,1 – 1 bar						■	■	■	■	■																
0,2 – 2 bar																										
0,3 – 1,5 bar		■		■								■		■		■					■				■	
0,5 – 1 bar																										
0,5 – 3 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 (200) – 400 bar																		■								
35 bar									■																	
100 bar		■		■										■		■					■					
200 bar																										
300 (400) bar		■		■				■		■		■		■		■			■		■		■		■	
600 (700) bar	■		■		■	■	■				■		■		■		■	■		■		■		■		■
hex 24						■	■	■	■	■	■															
hex 27	■	■	■	■	■							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
30 A/F																										
Zinc-platted steel	■	■	■	■	■	■		■		■	■	■	■	■	■	■	■	■			■	■				
stainless steel							■												■	■			■	■		
Brass									■																	
Aluminium																										
ATEX																										
Configurable						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
additional functions																										
cCSAus approval 	■	■	■	■	■	■	■	■	■	■	■			■	■	■	■		■	■	■	■	■	■		

M.6 Pressure Switches <i>PLUS</i> hex 24 with intelligent electronic functions														M.7 hex 30 CO				M.8 ATEX Variant			M.9 Vacuum Switch		Page		
0410	0411	0412	0413	0414	0415	0416	0417	0418	0419	0422	0423	0424	0425	0159	0161	0162	0175	0165	0340	0341	0150	0151			
70	72	70	72	70	72	70	72	70	72	70	72	70	72	76	77	77	78	83	84	84	88	89		Function	
■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■				Overpressure	
																					■	■		Vacuum	
■	■	■	■	■	■	■	■	■	■	■	■	■	■									■			NO / NC
														■	■	■	■	■	■	■	■				Changeover contacts
■	■	■	■	■	■	■	■	■	■	■	■	■	■										■		max. 42 V
																									max. 48 V
														■	■	■	■	■	■	■	■				max. 250 V
																									max. 24 V / 50 mA
																						■			100 – 950 mbar
																							■		200 – 950 mbar
■		■		■		■		■		■		■					■		■						0,1 – 1 bar
														■											0,2 – 2 bar
																									0,3 – 1,5 bar
															■	■	■								0,5 – 1 bar
																									0,5 – 3 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 (200) – 400 bar
																	■				(■)	■		35 bar	
																									100 bar
														■	■	■		■							200 bar
■		■		■		■		■		■		■							■						300 (400) bar
	■		■		■		■		■		■		■	■	■	■		■		■					600 (700) bar
■	■	■	■	■	■	■	■	■	■	■	■	■	■									■			hex 24
																			■	■					hex 27
														■	■	■	■	■			■				30 A/F
■	■	■	■	■	■	■	■	■	■	■	■	■	■						■	■	■				Zinc-platted steel
																									stainless steel
																						■			Brass
														■	■	■	■	■				■			Aluminium
																			■	■	■				ATEX
																				■	■		■		Configurable
■	■	■	■	■	■	■	■	■	■	■	■	■	■							■	■		■		additional functions
																						■			cCSAus approval 

Pressure switches hex 24 with integrated connector

NC or NO, maximum operating voltage up to 42 V

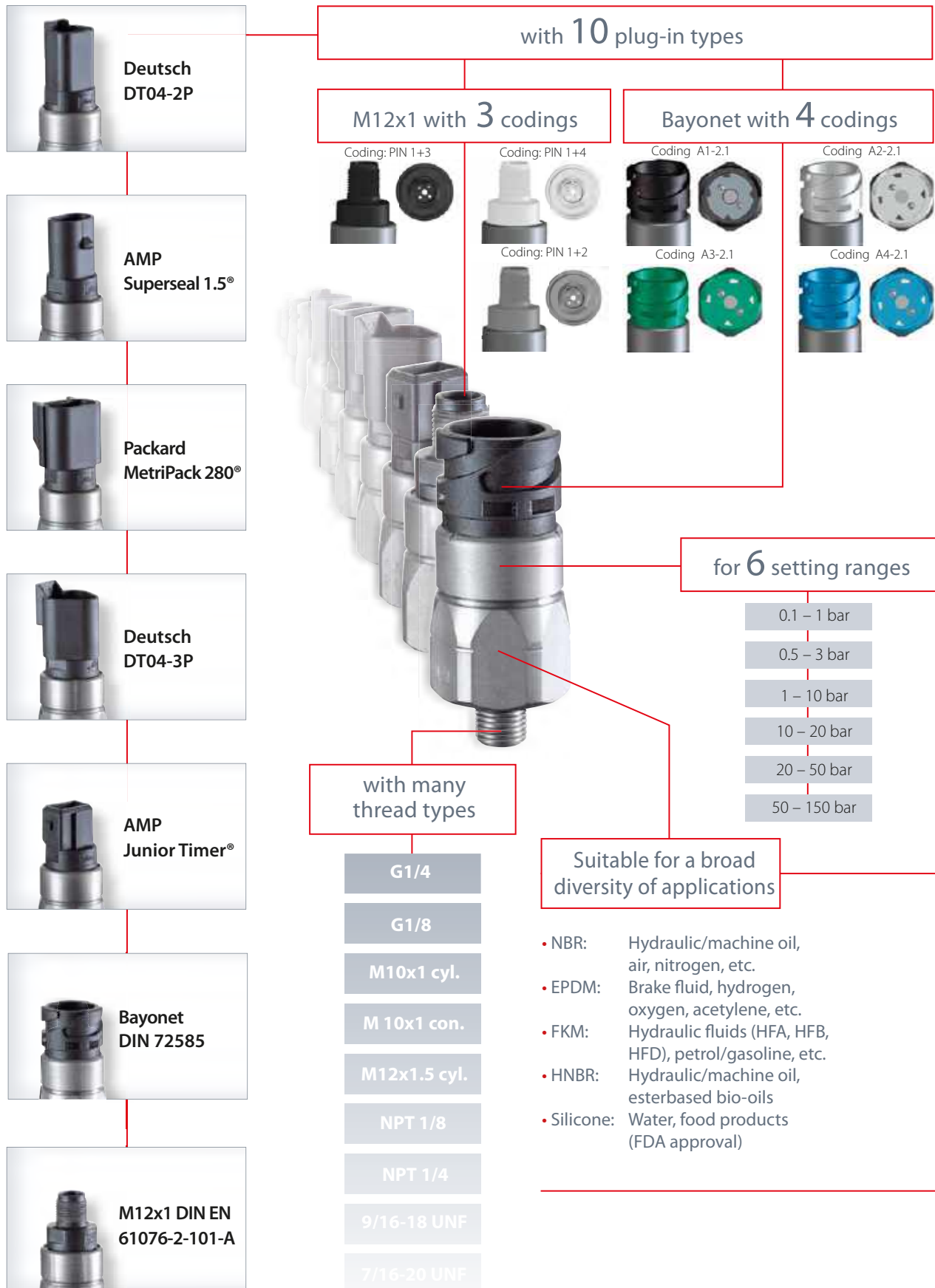


- Large selection of electrical plug-in types for quick attachment and reliable connection
- High protection class (to IP67 or IP6K9K)
- Compact and rugged design in industrial environments like construction and agricultural machinery or commercial vehicles
- Switching point can be set on site with adjusting screw in the connector¹⁾
- High overpressure resistance, compact, small switches, available as normally open or normally closed
- Vacuum switches with integrated connector available on request

¹⁾ Pressure switches can also be supplied preset at factory.
The switching point is embossed onto pressure switches preset at factory.

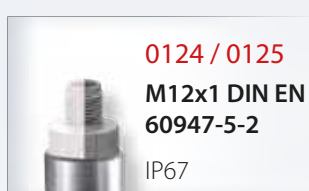
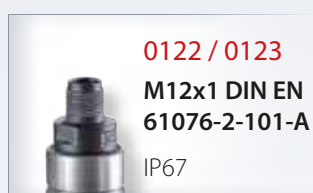
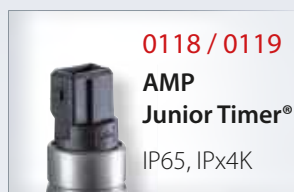
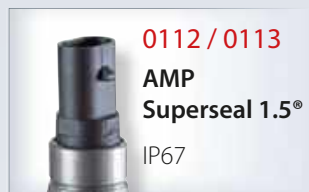
The all-rounder with the broad selection of options

NC or NO, maximum operating voltage up to 42 V



Pressure switches hex 24 with integrated connector

Technical details



Rated working voltage:	10 ... 42 VAC/DC	
Rated current range (resistive load, DC12 / AC12):	10 mA ... 4 A	
Switching power DC12 / AC12:	100 W / 100 VA	
Temperature resistance of sealing materials:	NBR (diaphragm pressure switch)	-40 °C ... +100 °C
	NBR (piston pressure switch)	-30 °C ... +100 °C
	EPDM	-30 °C ... +120 °C
	FKM (diaphragm pressure switch)	-5 °C ... +120 °C
	FKM (piston pressure switch)	-15 °C ... +120 °C
	FFKM	-20 °C ... +120 °C
	Silicone	-40 °C ... +120 °C
	HNBR	-30 °C ... +120 °C
Burst pressure (diaphragm pressure switch):	400 bar	
Burst pressure (piston pressure switch):	700 bar (for threads M10, G 1/8, R 1/8 and NPT 1/8 up to max. 600 bar)	
Switching frequency:	200 / min	
Mechanical life expectancy:	1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures 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, DIN EN 60068-2-6	
Shock resistance:	294 m/s²; 14 ms half sine wave; DIN EN 60068-2-27	
Protection class:	Up to IP67 / IP6K9K according to manufacturer's specifications for the respective plug-in system only when plugged in, otherwise IP00	
Weight:	approx. 90 g	

Contact assignment for bayonet connectors

Coding A1-2.1	Coding A2-2.1	Coding A3-2.1	Coding A4-2.1

0110/0112/0114/0116/0118/0122/0124

Diaphragm pressure switches with integrated connector

- Setting ranges to up to 50 bar (higher settings refer to page 26)
- NC or NO, maximum voltage 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 300 bar¹⁾

Plug-in types for diaphragm pressure switches

Deutsch DT04-2P	0110 - XXX XX - X - XXX	0110 - XXX XX - X - XXX
AMP Superseal 1.5*	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	0116 - XXX XX - X - XXX	0116 - XXX XX - X - XXX
AMP Junior Timer*	0118 - XXX XX - X - XXX	0118 - XXX XX - X - XXX
M12x1 DIN EN 61076-2-101-A (PIN 1+3)	0122 - XXX XX - X - XXX	0122 - XXX XX - X - XXX
M12x1 DIN EN 60947-5-2 (PIN 1+2 / PIN 1+4)	0124 - XXX XX - X - XXX	0124 - XXX XX - X - XXX

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	-------------	---------------------------	---------------------------

Diaphragm pressure switches with integrated connector

0.1 - 1 (± 0.2) bar	G1/4	XXXX - 403 03 - X - 011	XXXX - 404 03 - X - 015
	G1/8	XXXX - 403 28 - X - 603	XXXX - 404 28 - X - 604
	M10x1 cyl.	XXXX - 403 13 - X - 003	XXXX - 404 13 - X - 004
	M10x1 con.	XXXX - 403 01 - X - 009	XXXX - 404 01 - X - 013
	M12x1.5 cyl.	XXXX - 403 02 - X - 010	XXXX - 404 02 - X - 014
	NPT1/8	XXXX - 403 04 - X - 012	XXXX - 404 04 - X - 016
0.5 - 3 (± 0.3) bar	G1/4	XXXX - 423 03 - X - 070	XXXX - 424 03 - X - 070
	G1/8	XXXX - 423 28 - X - 070	XXXX - 424 28 - X - 070
	M10x1 cyl.	XXXX - 423 13 - X - 070	XXXX - 424 13 - X - 070
	M10x1 con.	XXXX - 423 01 - X - 070	XXXX - 424 01 - X - 070
	M12x1.5 cyl.	XXXX - 423 02 - X - 070	XXXX - 424 02 - X - 070
	NPT1/8	XXXX - 423 04 - X - 070	XXXX - 424 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	XXXX - 407 03 - X - 027	XXXX - 408 03 - X - 031
	G1/8	XXXX - 407 28 - X - 607	XXXX - 408 28 - X - 608
	M10x1 cyl.	XXXX - 407 13 - X - 007	XXXX - 408 13 - X - 008
	M10x1 con.	XXXX - 407 01 - X - 025	XXXX - 408 01 - X - 029
	M12x1.5 cyl.	XXXX - 407 02 - X - 026	XXXX - 408 02 - X - 030
	NPT1/8	XXXX - 407 04 - X - 028	XXXX - 408 04 - X - 032

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

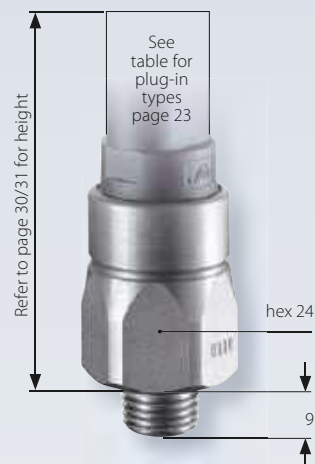
Refer to page 24 for the temperature range and application thresholds of sealing materials.



Article number:	01XX - XXX XX - X - XXX
-----------------	-------------------------

M.1

hex 24 integrated



M



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

M.1

hex 24 integrated

0110/0112/0114/0116/0118/0122/0124

Diaphragm pressure switches with integrated connector

- Setting ranges up to 50 bar (lower settings refer to page 25)
- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 300 bar¹⁾

Plug-in types for diaphragm pressure switches

Deutsch DT04-2P	0110 - XXX XX - X - XXX	0110 - XXX XX - X - XXX
AMP Superseal 1.5*	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	0116 - XXX XX - X - XXX	0116 - XXX XX - X - XXX
AMP Junior Timer*	0118 - XXX XX - X - XXX	0118 - XXX XX - X - XXX
M12x1 DIN EN 61076-2-101-A (PIN 1+3)	0122 - XXX XX - X - XXX	0122 - XXX XX - X - XXX
M12x1 DIN EN 60947-5-2 (PIN 1+2 / PIN 1+4)	0124 - XXX XX - X - XXX	0124 - XXX XX - X - XXX



0122 Coding: PIN 1+3



0124 Coding: PIN 1+4 (NO)



0124 Coding: PIN 1+2 (NC)



Adjustment range (tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	---------------------------	--------------------------

Diaphragm pressure switches with integrated connector

10 - 20 (± 1) bar	G1/4	XXXX - 411 03 - X - 043	XXXX - 412 03 - X - 047
	G1/8	XXXX - 411 28 - X - 611	XXXX - 412 28 - X - 612
	M10x1 cyl.	XXXX - 411 13 - X - 011	XXXX - 412 13 - X - 012
	M10x1 con.	XXXX - 411 01 - X - 041	XXXX - 412 01 - X - 045
	M12x1.5 cyl.	XXXX - 411 02 - X - 042	XXXX - 412 02 - X - 046
	NPT1/8	XXXX - 411 04 - X - 044	XXXX - 412 04 - X - 048
20 - 50 (± 2) bar	G1/4	XXXX - 415 03 - X - 059	XXXX - 416 03 - X - 063
	G1/8	XXXX - 415 28 - X - 615	XXXX - 416 28 - X - 616
	M10x1 cyl.	XXXX - 415 13 - X - 015	XXXX - 416 13 - X - 016
	M10x1 con.	XXXX - 415 01 - X - 057	XXXX - 416 01 - X - 061
	M12x1.5 cyl.	XXXX - 415 02 - X - 058	XXXX - 416 02 - X - 062
	NPT1/8	XXXX - 415 04 - X - 060	XXXX - 416 04 - X - 064

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.



Article number: 01XX - XXX XX - X - XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

0111/0113/0115/0117/0119/0123/0125

Piston pressure switches with integrated connector

- Setting range up to 150 bar
- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 600 bar¹⁾

Plug-in types for piston pressure switches

Deutsch DT04-2P	0111 - XXX XX - X - XXX	0111 - XXX XX - X - XXX
AMP Superseal 1.5®	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	0117 - XXX XX - X - XXX	0117 - XXX XX - X - XXX
AMP Junior Timer®	0119 - XXX XX - X - XXX	0119 - XXX XX - X - XXX
M12x1 DIN EN 61076-2-101-A (PIN 1+3)	0123 - XXX XX - X - XXX	0123 - XXX XX - X - XXX
M12x1 DIN EN 60947-5-2 (PIN 1+2 / PIN 1+4)	0125 - XXX XX - X - XXX	0125 - XXX XX - X - XXX

Adjustment range (tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	---------------------------	---------------------------

Piston pressure switches with integrated connector

50 - 150 (± 5) bar	G1/4	XXXX - 419 03 - X - 011	XXXX - 420 03 - X - 015
	G1/8	XXXX - 419 28 - X - 603	XXXX - 420 28 - X - 604
	M10x1 cyl.	XXXX - 419 13 - X - 003	XXXX - 420 13 - X - 004
	M10x1 con.	XXXX - 419 01 - X - 009	XXXX - 420 01 - X - 013
	M12x1.5 cyl.	XXXX - 419 02 - X - 010	XXXX - 420 02 - X - 014
	NPT1/8	XXXX - 419 04 - X - 012	XXXX - 420 04 - X - 016

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.

Article number: 01XX - XXX XX - X - XXX

M.1

hex 24 integrated



0123 Coding: PIN 1+3



0125 Coding: PIN 1+4 (NO)



0125 Coding: PIN 1+2 (NC)



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.



0120

Diaphragm pressure switches with integrated bayonet connector

- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Overpressure safety up to 300 bar¹⁾

Bayonet ISO 15170
(DIN 72585)



Adjustment range (tolerance at room temperature)	male thread	Article number NO → :	Article number NC → :
---	----------------	--------------------------	--------------------------

0120 Diaphragm pressure switches with integrated connector

0.1 - 1 (± 0.2) bar	G1/4	0120 - X03 03 - X - 011	0120 - X04 03 - X - 015
	G1/8	0120 - X03 28 - X - 603	0120 - X04 28 - X - 604
	M10x1 cyl.	0120 - X03 13 - X - 003	0120 - X04 13 - X - 004
	M10x1 con.	0120 - X03 01 - X - 009	0120 - X04 01 - X - 013
	M12x1.5 cyl.	0120 - X03 02 - X - 010	0120 - X04 02 - X - 014
	NPT1/8	0120 - X03 04 - X - 012	0120 - X04 04 - X - 016
0.5 - 3 (± 0.3) bar	G1/4	0120 - X23 03 - X - 070	0120 - X24 03 - X - 070
	G1/8	0120 - X23 28 - X - 070	0120 - X24 28 - X - 070
	M10x1 cyl.	0120 - X23 13 - X - 070	0120 - X24 13 - X - 070
	M10x1 con.	0120 - X23 01 - X - 070	0120 - X24 01 - X - 070
	M12x1.5 cyl.	0120 - X23 02 - X - 070	0120 - X24 02 - X - 070
	NPT1/8	0120 - X23 04 - X - 070	0120 - X24 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0120 - X07 03 - X - 027	0120 - X08 03 - X - 031
	G1/8	0120 - X07 28 - X - 607	0120 - X08 28 - X - 608
	M10x1 cyl.	0120 - X07 13 - X - 007	0120 - X08 13 - X - 008
	M10x1 con.	0120 - X07 01 - X - 025	0120 - X08 01 - X - 029
	M12x1.5 cyl.	0120 - X07 02 - X - 026	0120 - X08 02 - X - 030
	NPT1/8	0120 - X07 04 - X - 028	0120 - X08 04 - X - 032

Coding

A1-2.1	4XX	4XX
A2-2.1	3XX	3XX
A3-2.1	2XX	2XX
A4-2.1	1XX	1XX

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.

Article number:

0120 - XXX XX - X - XXX

0120 / 0121

Diaphragm/piston pressure switches with integrated bayonet

- NC or NO, maximum operating voltage up to 42 V
- Zinc-plated steel (Cr VI-free)
- Diaphragm variant: Overpressure safety up to 300 bar¹⁾
- Piston variant: Overpressure safety up to 600 bar¹⁾

Adjustment range (tolerance at room temperature)	male thread	Article number NO → :	Article number NC → :
---	----------------	--------------------------	--------------------------

0120 Diaphragm pressure switches with integrated connector

10 - 20 ((± 1) bar)	G1/4	0120 - X11 03 - X - 043	0120 - X12 03 - X - 047
	G1/8	0120 - X11 28 - X - 611	0120 - X12 28 - X - 612
	M10x1 cyl.	0120 - X11 13 - X - 011	0120 - X12 13 - X - 012
	M10x1 con.	0120 - X11 01 - X - 041	0120 - X12 01 - X - 045
	M12x1.5 cyl.	0120 - X11 02 - X - 042	0120 - X12 02 - X - 046
	NPT1/8	0120 - X11 04 - X - 044	0120 - X12 04 - X - 048
20 - 50 ((± 2) bar)	G1/4	0120 - X15 03 - X - 059	0120 - X16 03 - X - 063
	G1/8	0120 - X15 28 - X - 615	0120 - X16 28 - X - 616
	M10x1 cyl.	0120 - X15 13 - X - 015	0120 - X16 13 - X - 016
	M10x1 con.	0120 - X15 01 - X - 057	0120 - X16 01 - X - 061
	M12x1.5 cyl.	0120 - X15 02 - X - 058	0120 - X16 02 - X - 062
	NPT1/8	0120 - X15 04 - X - 060	0120 - X16 04 - X - 064

0121 Piston pressure switches with integrated connector

50 - 150 ((± 5) bar)	G1/4	0121 - X19 03 - X - 011	0121 - X20 03 - X - 015
	G1/8	0121 - X19 28 - X - 603	0121 - X20 28 - X - 604
	M10x1 cyl.	0121 - X19 13 - X - 003	0121 - X20 13 - X - 004
	M10x1 con.	0121 - X19 01 - X - 009	0121 - X20 01 - X - 013
	M12x1.5 cyl.	0121 - X19 02 - X - 010	0121 - X20 02 - X - 014
	NPT1/8	0121 - X19 04 - X - 012	0121 - X20 04 - X - 016

Coding

A1-2.1	4XX	4XX
A2-2.1	3XX	3XX
A3-2.1	2XX	2XX
A4-2.1	1XX	1XX

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.

Article number:

012X - XXX XX - X - XXX

M.1

hex 24 integrated

suco

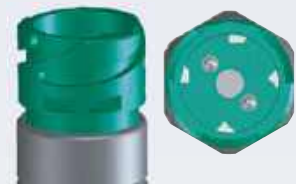
Coding A1-2.1



Coding A2-2.1



Coding A3-2.1



Coding A4-2.1



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

Technical details, contact assignment & accessories

for hex 24 pressure switches with integrated connector

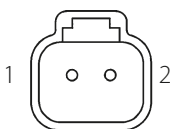
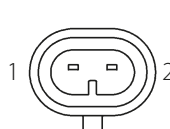
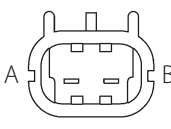
Please note:
Mating plugs are not included in the delivery and can be ordered separately.

Mating plug accessories ¹⁾

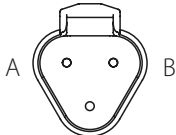
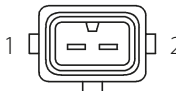
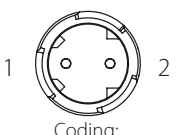
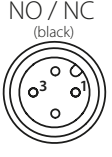
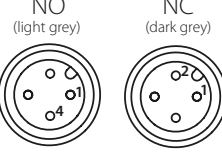
Mating plug type	Deutsch DT04-2P (for DT06-2S)	AMP Superseal 1.5®	Packard MetriPack 280®
Including 2 m cable			
Cable cross-section	2 x 0,5 mm ² Radox cables	2 x 0,5 mm ² Radox cables	2 x 0,5 mm ² Radox cables
Protection class	IP65	IP65	IP65
Article number	1-1-10-653-118	1-1-12-653-113	1-1-14-653-114

¹⁾ For the pin assignment of the wires please refer to chapter M.10 Accessories (page 91)

Plug-in types for hex 24 diaphragm and piston pressure switches

Model / Type	0110 / 0111	0112 / 0113	0114 / 0115
			
Connector	Deutsch DT04-2P	AMP Superseal 1.5®	Packard MetriPack 280®
Protection class	IP67, IP6K9K	IP67	IP67
Overall height	H ≈ 61 mm	H ≈ 61 mm	H ≈ 62 mm
Contact assignment			

Deutsch DT04-3P (for DT04-3P)	AMP Junior Timer®	Bayonet DIN 72585/ISO 15170 A1 - 2.1	M12x1 DIN EN 61076-2-101-LF
			
2 x 0,5 mm² PUR cables	2 x 0,5 mm² Radox cables	2 x 0,5 mm² Radox cables	4 x 0.34 mm² PUR cables
IP67	IP65	IP65	IP67
1-1-36-653-160	1-1-18-653-116	1-1-20-653-112	1-1-00-653-162

0116 / 0117	0118 / 0119	0120 / 0121	0122 / 0123	0124 / 0125
				
Deutsch DT04-3P	AMP Junior Timer®	Bayonet DIN 72585/ISO 15170	M12x1 DIN EN 61076-2-101-A	M12x1 DIN EN 60947-5-2
IP67, IP6K9K	IP65, IPx4K	IP67, IP6K9K	IP67	IP67
H ≈ 63 mm	H ≈ 54 mm	H ≈ 49 mm	H ≈ 51 mm	H ≈ 51 mm
				
		Coding: A1-2.1	NO / NC (black) 1: brown 3: blue	NO (light grey) NC (dark grey) 1: brown 2: black 4: white

Pressure switches hex 27 with integrated connector

Changeover switch with silver or gold contacts



- Large selection of electrical plug-in types for quick attachment and reliable connection
- Hysteresis adjustable at factory
- High protection class (to IP67 or IP6K9K)
- Compact and rugged design in industrial environments like construction and agricultural machinery or commercial vehicles
- Switching point can be set on site with adjusting screw¹⁾
- Very high overpressure safety
- Corresponding mating plugs are available as accessories (please refer to page 34)

¹⁾ Pressure switches can also be supplied preset at factory.
The switching point is embossed onto pressure switches preset at factory.

Pressure switches hex 27 with integrated connector

Technical details

M.2
hex 27 integrated



Types:	0132-0137	0184 / 0185	0194 / 0195
Rated working voltage:	10 ... 48 VAC/DC	10 ... 250 VAC/DC	5 ... 24 VDC
Rated current: (resistive load, DC12 / AC12)	10 mA ... 4 A	10 mA ... 4 A	3 ... 50 mA
Temperature resistance of sealing materials:	NBR (diaphragm pressure switch, p _{max} = 400 bar)	-40 °C ... +100 °C	
	NBR (diaphragm pressure switch, p _{max} = 100 bar) (piston pressure switch)	-30 °C ... +100 °C	
	EPDM	-30 °C ... +120 °C	
	FKM (diaphragm pressure switch)	-5 °C ... +120 °C	
	FKM (piston pressure switch)	-15 °C ... +120 °C	
	FFKM	-20 °C ... +120 °C	
	Silicone	-40 °C ... +120 °C	
	HNBR	-30 °C ... +120 °C	
Burst pressure (diaphragm pressure switch, overpressure resistance 100 bar)	200 bar		
Burst Pressure (diaphragm pressure switch, overpressure resistance 400 bar)	700 bar (for threads M10, G 1/8, R 1/8 and NPT 1/8 up to max. 600 bar)		
Burst pressure (Piston pressure switch)	1,000 bar (for threads M10, G 1/8, R 1/8 and NPT 1/8 up to max. 600 bar)		
Switching frequency:	200 / min		
Mechanical life expectancy:	1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar)		
Pressure rise rate:	≤ 1 bar/ms		
Hysteresis: (can only be set at factory) ¹⁾ :	Adjustable average value 10 ... 30 % depending on type		
Vibration resistance:	10 g; 5 ... 200 Hz sine wave; DIN EN 60068-2-6		
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27		
Weight:	approx. 100 g	approx. 130 g	approx. 130 g

Overview of maximum working voltage and current and contact materials

Type:	0132	0133	0134	0135	0136	0137	0184	0185	0194	0195
5 ... 24 VDC									●	●
10 ... 48 VAC/DC	●	●	●	●	●	●				
10 ... 250 VAC/DC							●	●		
3 ... 50 mA									●	●
10 mA ... 4 A	●	●	●	●	●	●	●	●		
Gold contacts	○	○	○	○	○	○			●	●
Silver contacts	●	●	●	●	●	●	●	●		
Adjustable hysteresis (can only be set at factory)	●	●	●	●	●	●	●	●	●	●
Connector type	AMP Superseal 1.5*		M12x1 DIN EN 61076-2-101-A		Deutsch DT04-3P		DIN EN 175301			
Protection class	IP67		IP67		IP67, IP6K9K		IP65			

○ Available as an option

¹⁾ see notes on hysteresis in the technical explanations (page 15-16)

0132 / 0133 / 0134 / 0135 / 0136 / 0137

Diaphragm/piston pressure switches with integrated connector, maximum operating voltage up to 48 V

- Simple, quick and reliable electrical connection with easy-to-fit connectors
- Quick fitting with socket wrench (spanner)
- Changeover with silver contacts (gold contacts available as option)
- Hysteresis adjustable at factory
- Made of zinc-plated steel (CrVI-free, other housing materials available as option)

Model / type ►

Height without thread ►

Contact assignments ►

Circuit diagrams ►

Accessory ►

Not included
in the delivery.

Please order separately.

Cable cross-section / IP protection ►

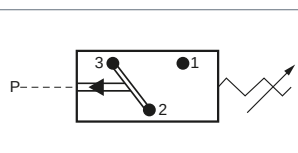
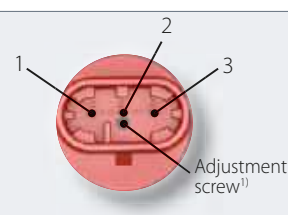
Article number ►

0132 / 0133



TE AMP Superseal 1.5°
IP67

H ≈ 73 mm

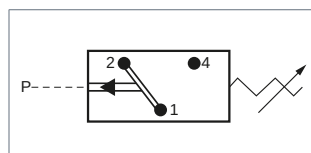
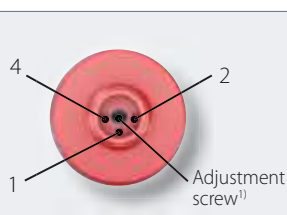


0134 / 0135



M12x1 EN 61076-2-101-A
Contact assignment
DIN 60947-5-2
IP67

H ≈ 65 mm

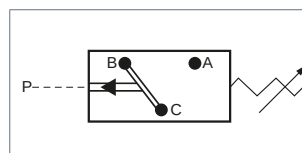
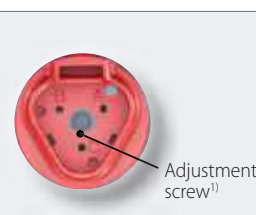


0136 / 0137



Deutsch DT04-3P°
IP67, IP6K9K

H ≈ 71 mm



¹⁾ Blade of screwdriver max. 2 mm

Mating plug with 2 m cable ²⁾

TE AMP Superseal 1.5°



3 x 0,5 mm² Radox cable / IP65

1-1-32-653-158

M12x1 DIN EN 61076-2-101-LF



4 x 0,34 mm² PUR cable / IP67

1-1-00-653-162

Deutsch DT06-3S°



3 x 0,5 mm² PUR cable / IP67

1-1-36-653-160

²⁾ For the pin assignment of the wires please refer to chapter M.10 Accessories (page 91)

0132 / 0133 / 0134 / 0135 / 0136 / 0137

Diaphragm/piston pressure switches with integrated connector,
maximum operating voltage up to 48 V

M.2
hex 27 integrated



p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Thread	Article number
----------------------------	----------------------------	---	--------	----------------

0132 / 0134 / 0136 Diaphragm pressure switches

100 ¹⁾	0.3 - 1.5	± 0.2	G1/4	013X - 457 03 - X - 003
			M10x1 con.	013X - 457 01 - X - 001
			M12x1.5 cyl.	013X - 457 02 - X - 002
			NPT1/8	013X - 457 04 - X - 318
			NPT1/4	013X - 457 09 - X - 314
			7/16-20 UNF	013X - 457 20 - X - 301
			9/16-18 UNF	013X - 457 21 - X - 302
400 ¹⁾	1 - 10	± 0.5	G1/4	013X - 458 03 - X - 042
			M10x1 con.	013X - 458 01 - X - 040
			M12x1.5 cyl.	013X - 458 02 - X - 041
			NPT1/8	013X - 458 04 - X - 343
			NPT1/4	013X - 458 09 - X - 340
			7/16-20 UNF	013X - 458 20 - X - 341
			9/16-18 UNF	013X - 458 21 - X - 342
	10 - 50	± 3.0	G1/4	013X - 459 03 - X - 009
			M10x1 con.	013X - 459 01 - X - 007
			M12x1.5 cyl.	013X - 459 02 - X - 008
			NPT1/8	013X - 459 04 - X - 320
			NPT1/4	013X - 459 09 - X - 316
			7/16-20 UNF	013X - 459 20 - X - 305
			9/16-18 UNF	013X - 459 21 - X - 306
	10 - 100	± 3.0 - 5.0	G1/4	013X - 461 03 - X - 012
			M10x1 con.	013X - 461 01 - X - 010
			M12x1.5 cyl.	013X - 461 02 - X - 011
			NPT1/8	013X - 461 04 - X - 321
			NPT1/4	013X - 461 09 - X - 317
			7/16-20 UNF	013X - 461 20 - X - 307
			9/16-18 UNF	013X - 461 21 - X - 308

0133 / 0135 / 0137 Piston pressure switches

700 ^{1) 2)}	50 - 200	5.0	G1/4	013X - 460 03 - X - 003
			M10x1 con.	013X - 460 01 - X - 001
			M12x1.5 cyl.	013X - 460 02 - X - 002
			NPT1/8	013X - 460 04 - X - 304
			NPT1/4	013X - 460 09 - X - 303
			7/16-20 UNF	013X - 460 20 - X - 301
			9/16-18 UNF	013X - 460 21 - X - 302

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR ³⁾	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 33 for the temperature range and application thresholds of sealing materials.

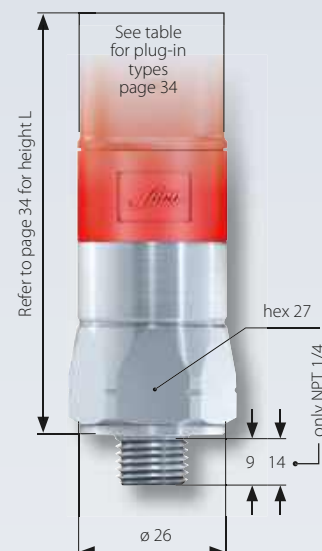


Article number: 013 X - XXX XX - X - XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.

³⁾ HNBR diaphragm not available for pressure ranges 0.3 - 1.5 bar.



M.2

hex 27 integrated

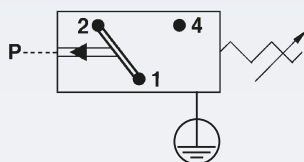
0184

Diaphragm pressure switches up to 250 V

- Made of zinc-plated steel (CrVI-free, other housing materials available as option)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with silver contacts
- Overpressure safety up to 100 / 400 bar¹⁾
- Hysteresis adjustable at factory



Socket device
included in the delivery



p_{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
---------------------	----------------------------	---	-------------	----------------

0184 Diaphragm pressure switches

100 ¹⁾	0.3 - 1.5	± 0.2	G1/4	0184 - 457 03 - X - 003
			M10x1 con.	0184 - 457 01 - X - 001
			M12x1.5 cyl.	0184 - 457 02 - X - 002
			NPT1/8	0184 - 457 04 - X - 318
			NPT1/4	0184 - 457 09 - X - 314
			7/16-20 UNF	0184 - 457 20 - X - 301
			9/16-18 UNF	0184 - 457 21 - X - 302
400 ¹⁾	1 - 10	± 0.5	G1/4	0184 - 458 03 - X - 042
			M10x1 con.	0184 - 458 01 - X - 040
			M12x1.5 cyl.	0184 - 458 02 - X - 041
			NPT1/8	0184 - 458 04 - X - 343
			NPT1/4	0184 - 458 09 - X - 340
			7/16-20 UNF	0184 - 458 20 - X - 341
			9/16-18 UNF	0184 - 458 21 - X - 342
400 ¹⁾	10 - 50	± 3.0	G1/4	0184 - 459 03 - X - 009
			M10x1 con.	0184 - 459 01 - X - 007
			M12x1.5 cyl.	0184 - 459 02 - X - 008
			NPT1/8	0184 - 459 04 - X - 320
			NPT1/4	0184 - 459 09 - X - 311
			7/16-20 UNF	0184 - 459 20 - X - 305
			9/16-18 UNF	0184 - 459 21 - X - 306
400 ¹⁾	10 - 100	$\pm 3.0 - 5.0$	G1/4	0184 - 461 03 - X - 012
			M10x1 con.	0184 - 461 01 - X - 010
			M12x1.5 cyl.	0184 - 461 02 - X - 011
			NPT1/8	0184 - 461 04 - X - 321
			NPT1/4	0184 - 461 09 - X - 312
			7/16-20 UNF	0184 - 461 20 - X - 307
			9/16-18 UNF	0184 - 461 21 - X - 308

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR ²⁾	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 33 for the temperature range and application thresholds of sealing materials.



Article number:

0184 - XXX XX - X - XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ HNBR diaphragm not available for pressure ranges 0.3 - 1.5 bar.

0185

Piston pressure switches up to 250 V

- Made of zinc-plated steel (CrVI-free, other housing materials available as option)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with silver contacts
- Overpressure safety up to 700 bar ¹⁾
- Hysteresis adjustable at factory

p_{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
---------------------	----------------------------	---	-------------	----------------

0185 Piston pressure switches

700 ^{1) 2)}	50 - 200	± 5.0	G1/4	0185 - 460 03 - X - 003
			M10x1 con.	0185 - 460 01 - X - 001
			M12x1.5 cyl.	0185 - 460 02 - X - 002
			NPT1/8	0185 - 460 04 - X - 304
			NPT1/4	0185 - 460 09 - X - 303
			7/16-20 UNF	0185 - 460 20 - X - 301
			9/16-18 UNF	0185 - 460 21 - X - 302

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 33 for the temperature range and application thresholds of sealing materials.

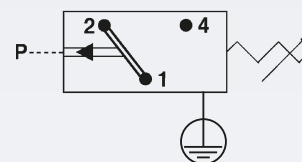
Article number:

0185 - 460 XX - X - XXX

M.2
hex 27 integrated



Socket device
included in the delivery



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.



M.2

hex 27 integrated



Socket device
included in the delivery



0194

Diaphragm pressure switches up to 24 V with gold contacts

- Made of zinc-plated steel (CrVI-free)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with gold contacts
- Overpressure safety up to 100 / 400 bar¹⁾
- Hysteresis adjustable at factory

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0194 Diaphragm pressure switches

100 ¹⁾	0.3 - 1.5	± 0.2	G1/4	0194 - 457 03 - X - 003
			M10x1 con.	0194 - 457 01 - X - 001
			M12x1.5 cyl.	0194 - 457 02 - X - 002
			NPT1/8	0194 - 457 04 - X - 318
			NPT1/4	0194 - 457 09 - X - 314
			7/16-20 UNF	0194 - 457 20 - X - 301
			9/16-18 UNF	0194 - 457 21 - X - 302
400 ¹⁾	1 - 10	± 0.5	G1/4	0194 - 458 03 - X - 042
			M10x1 con.	0194 - 458 01 - X - 040
			M12x1.5 cyl.	0194 - 458 02 - X - 041
			NPT1/8	0194 - 458 04 - X - 343
			NPT1/4	0194 - 458 09 - X - 340
			7/16-20 UNF	0194 - 458 20 - X - 341
			9/16-18 UNF	0194 - 458 21 - X - 342
	10 - 50	± 3.0	G1/4	0194 - 459 03 - X - 009
			M10x1 con.	0194 - 459 01 - X - 007
			M12x1.5 cyl.	0194 - 459 02 - X - 008
			NPT1/8	0194 - 459 04 - X - 320
			NPT1/4	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	G1/4	0194 - 461 03 - X - 012
			M10x1 con.	0194 - 461 01 - X - 010
			M12x1.5 cyl.	0194 - 461 02 - X - 011
			NPT1/8	0194 - 461 04 - X - 321
			NPT1/4	0194 - 461 09 - X - 312
			7/16-20 UNF	0194 - 461 20 - X - 307
			9/16-18 UNF	0194 - 461 21 - X - 308

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR ²⁾	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 33 for the temperature range and application thresholds of sealing materials.



Article number:

0194 – XXX XX – X – XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ HNBR diaphragm not available for pressure ranges 0.3 - 1.5 bar.

0195

Piston pressure switches up to 24 V with gold contacts

- Made of zinc-plated steel (CrVI-free)
- Socket device similar to DIN EN 175301 (DIN 43650)
- Changeover with gold contacts
- Overpressure safety up to 700 bar ¹⁾
- Hysteresis adjustable at factory

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0195 Piston pressure switches

700 ^{1) 2)}	50 - 200	± 5.0	G1/4	0195 - 460 03 - X - 003
			M10x1 con.	0195 - 460 01 - X - 001
			M12x1.5 cyl.	0195 - 460 02 - X - 002
			NPT1/8	0195 - 460 04 - X - 304
			NPT1/4	0195 - 460 09 - X - 303
			7/16-20 UNF	0195 - 460 20 - X - 301
			9/16-18 UNF	0195 - 460 21 - X - 302

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 33 for the temperature range and application thresholds of sealing materials.

Article number:	0195 - 460 XX - X - XXX
-----------------	-------------------------

M.2
hex 27 integrated



Socket device
included in the delivery



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.
²⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.



Pressure switches hex 24

NC or NO, maximum voltage 42 V



- Most cost-effective solution for mechanical pressure monitoring
- Stable switching point even after long use and high load
- Switching point can be adjusted when fitted on site¹⁾
- High pressure resistance, compact, small switches, available as normally closed (NC) or normally open (NO)
- For solutions with integrated connectors, please refer to chapter M.1, starting at page 22
- For customized and ready-wired pressure switches, please refer to chapter M.5, starting at page 62.

¹⁾ Pressure switches can also be supplied preset at factory.
Our preset switches are sealed with lacquer paint, set points are embossed on the housing.

Pressure switches hex 24

Technical details

M.3

hex 24



Rated working voltage:	10 ... 42 VAC/DC	
Rated current range (resistive load, DC12 / AC12):	10 mA ... 4 A	
Switching power DC12 / AC12:	100 W / 100 VA	
Temperature resistance of sealing materials:	NBR (diaphragm pressure switch)	-40 °C ... +100 °C
	NBR (piston pressure switch)	-30 °C ... +100 °C
	EPDM	-30 °C ... +120 °C
	EPDM-TW (diaphragm pressure switch)	-20 °C ... +100 °C
	FKM (diaphragm pressure switch)	-5 °C ... +120 °C
	FKM (piston pressure switch)	-15 °C ... +120 °C
	FFKM	-20 °C ... +120 °C
	Silicone (diaphragm pressure switch)	-40 °C ... +120 °C
	HNBR	-30 °C ... +120 °C
Burst pressure (diaphragm pressure switch):	400 bar	
Burst pressure (piston pressure switch)	700 bar (for threads M10, G 1/8, R 1/8 and NPT 1/8 up to max. 600 bar)	
Switching frequency:	200 / min	
Mechanical life expectancy:	1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching 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; DIN EN 60068-2-6	
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27	
Protection class:	IP65 with socket device, terminals IP00	
Weight:	approx. 90 g	

Overview of contact materials and maximum overpressure safety

Type:		0163	0164	0166	0167	0168	0169
Material:	Zinc-plated steel (CrVI-free)	●		●		●	●
	Stainless steel		●				
	Brass				●		
Overpressure safety up to:	35 bar				●		
	300 bar			●		●	
	600 bar	●	●				●



M



0163

Diaphragm pressure switches up to 42 V with spade terminal

- Made of zinc-plated steel (CrVI-free)
- Spade terminal
- Overpressure safety up to 600 bar, Burst pressure safety up to 700 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → : :	Article number NC → : :
---	----------------	----------------------------	----------------------------

0163 Diaphragm pressure switches with spade terminal

0.1 - 1 (± 0.2) bar	G1/4	0163 - 403 03 - X - 011	0163 - 404 03 - X - 015
	G1/8	0163 - 403 28 - X - 603	0163 - 404 28 - X - 604
	M10x1 cyl.	0163 - 403 13 - X - 003	0163 - 404 13 - X - 004
	M10x1 con.	0163 - 403 01 - X - 009	0163 - 404 01 - X - 013
	M12x1.5 cyl.	0163 - 403 02 - X - 010	0163 - 404 02 - X - 014
	NPT1/8	0163 - 403 04 - X - 012	0163 - 404 04 - X - 016
0.5 - 3 (± 0.3) bar	G1/4	0163 - 423 03 - X - 070	0163 - 424 03 - X - 070
	G1/8	0163 - 423 28 - X - 070	0163 - 424 28 - X - 070
	M10x1 cyl.	0163 - 423 13 - X - 070	0163 - 424 13 - X - 070
	M10x1 con.	0163 - 423 01 - X - 070	0163 - 424 01 - X - 070
	M12x1.5 cyl.	0163 - 423 02 - X - 070	0163 - 424 02 - X - 070
	NPT1/8	0163 - 423 04 - X - 070	0163 - 424 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0163 - 407 03 - X - 027	0163 - 408 03 - X - 031
	G1/8	0163 - 407 28 - X - 607	0163 - 408 28 - X - 608
	M10x1 cyl.	0163 - 407 13 - X - 007	0163 - 408 13 - X - 008
	M10x1 con.	0163 - 407 01 - X - 025	0163 - 408 01 - X - 029
	M12x1.5 cyl.	0163 - 407 02 - X - 026	0163 - 408 02 - X - 030
	NPT1/8	0163 - 407 04 - X - 028	0163 - 408 04 - X - 032
10 - 20 (± 1.0) bar	G1/4	0163 - 411 03 - X - 043	0163 - 412 03 - X - 047
	G1/8	0163 - 411 28 - X - 611	0163 - 412 28 - X - 612
	M10x1 cyl.	0163 - 411 13 - X - 011	0163 - 412 13 - X - 012
	M10x1 con.	0163 - 411 01 - X - 041	0163 - 412 01 - X - 045
	M12x1.5 cyl.	0163 - 411 02 - X - 042	0163 - 412 02 - X - 046
	NPT1/8	0163 - 411 04 - X - 044	0163 - 412 04 - X - 048
20 - 50 (± 2.0) bar	G1/4	0163 - 415 03 - X - 059	0163 - 416 03 - X - 063
	G1/8	0163 - 415 28 - X - 615	0163 - 416 28 - X - 616
	M10x1 cyl.	0163 - 415 13 - X - 015	0163 - 416 13 - X - 016
	M10x1 con.	0163 - 415 01 - X - 057	0163 - 416 01 - X - 061
	M12x1.5 cyl.	0163 - 415 02 - X - 058	0163 - 416 02 - X - 062
	NPT1/8	0163 - 415 04 - X - 060	0163 - 416 04 - X - 064

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.



Article number:

0163 - XXX XX - X - XXX

0163

Diaphragm pressure switches up to 42 V with M3 screw terminal

- Made of zinc-plated steel (CrVI-free)
- M3 screw terminal
- Overpressure safety up to 600 bar, Burst pressure safety up to 700 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → ;	Article number NC → ;
---	----------------	--------------------------	--------------------------

0163 Diaphragm pressure switches with M3 screw terminal

0.1 - 1 (± 0.2) bar	G1/4	0163 - 401 03 - X - 003	0163 - 402 03 - X - 007
	G1/8	0163 - 401 28 - X - 601	0163 - 402 28 - X - 602
	M10x1 cyl.	0163 - 401 13 - X - 001	0163 - 402 13 - X - 002
	M10x1 con.	0163 - 401 01 - X - 001	0163 - 402 01 - X - 005
	M12x1.5 cyl.	0163 - 401 02 - X - 002	0163 - 402 02 - X - 006
	NPT1/8	0163 - 401 04 - X - 004	0163 - 402 04 - X - 008
0.5 - 3 (± 0.3) bar	G1/4	0163 - 421 03 - X - 070	0163 - 422 03 - X - 070
	G1/8	0163 - 421 28 - X - 070	0163 - 422 28 - X - 070
	M10x1 cyl.	0163 - 421 13 - X - 070	0163 - 422 13 - X - 070
	M10x1 con.	0163 - 421 01 - X - 070	0163 - 422 01 - X - 070
	M12x1.5 cyl.	0163 - 421 02 - X - 070	0163 - 422 02 - X - 070
	NPT1/8	0163 - 421 04 - X - 070	0163 - 422 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0163 - 405 03 - X - 019	0163 - 406 03 - X - 023
	G1/8	0163 - 405 28 - X - 605	0163 - 406 28 - X - 606
	M10x1 cyl.	0163 - 405 13 - X - 005	0163 - 406 13 - X - 006
	M10x1 con.	0163 - 405 01 - X - 017	0163 - 406 01 - X - 021
	M12x1.5 cyl.	0163 - 405 02 - X - 018	0163 - 406 02 - X - 022
	NPT1/8	0163 - 405 04 - X - 020	0163 - 406 04 - X - 024
10 - 20 (± 1.0) bar	G1/4	0163 - 409 03 - X - 035	0163 - 410 03 - X - 039
	G1/8	0163 - 409 28 - X - 609	0163 - 410 28 - X - 610
	M10x1 cyl.	0163 - 409 13 - X - 009	0163 - 410 13 - X - 010
	M10x1 con.	0163 - 409 01 - X - 033	0163 - 410 01 - X - 037
	M12x1.5 cyl.	0163 - 409 02 - X - 034	0163 - 410 02 - X - 038
	NPT1/8	0163 - 409 04 - X - 036	0163 - 410 04 - X - 040
20 - 50 (± 2.0) bar	G1/4	0163 - 413 03 - X - 051	0163 - 414 03 - X - 055
	G1/8	0163 - 413 28 - X - 613	0163 - 414 28 - X - 614
	M10x1 cyl.	0163 - 413 13 - X - 013	0163 - 414 13 - X - 014
	M10x1 con.	0163 - 413 01 - X - 049	0163 - 414 01 - X - 053
	M12x1.5 cyl.	0163 - 413 02 - X - 050	0163 - 414 02 - X - 054
	NPT1/8	0163 - 413 04 - X - 052	0163 - 414 04 - X - 056

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.

Article number:

0163 - XXX XX - X - XXX

M.3
hex 24



M



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.



0166

Diaphragm pressure switches up to 42 V with spade terminal

- Made of zinc-plated steel (CrVI-free)
- Spade terminal
- Overpressure safety up to 300 bar, Burst pressure safety up to 400 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	---------------------------	--------------------------

0166 Diaphragm pressure switches with spade terminal

0.1 - 1 (± 0.2) bar	G1/4	0166 - 403 03 - X - 011	0166 - 404 03 - X - 015
	G1/8	0166 - 403 28 - X - 603	0166 - 404 28 - X - 604
	M10x1 cyl.	0166 - 403 13 - X - 003	0166 - 404 13 - X - 004
	M10x1 con.	0166 - 403 01 - X - 009	0166 - 404 01 - X - 013
	M12x1.5 cyl.	0166 - 403 02 - X - 010	0166 - 404 02 - X - 014
	NPT1/8	0166 - 403 04 - X - 012	0166 - 404 04 - X - 016
0.5 - 3 (± 0.3) bar	G1/4	0166 - 423 03 - X - 070	0166 - 424 03 - X - 070
	G1/8	0166 - 423 28 - X - 070	0166 - 424 28 - X - 070
	M10x1 cyl.	0166 - 423 13 - X - 070	0166 - 424 13 - X - 070
	M10x1 con.	0166 - 423 01 - X - 070	0166 - 424 01 - X - 070
	M12x1.5 cyl.	0166 - 423 02 - X - 070	0166 - 424 02 - X - 070
	NPT1/8	0166 - 423 04 - X - 070	0166 - 424 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0166 - 407 03 - X - 027	0166 - 408 03 - X - 031
	G1/8	0166 - 407 28 - X - 607	0166 - 408 28 - X - 608
	M10x1 cyl.	0166 - 407 13 - X - 007	0166 - 408 13 - X - 008
	M10x1 con.	0166 - 407 01 - X - 025	0166 - 408 01 - X - 029
	M12x1.5 cyl.	0166 - 407 02 - X - 026	0166 - 408 02 - X - 030
	NPT1/8	0166 - 407 04 - X - 028	0166 - 408 04 - X - 032
10 - 20 (± 1.0) bar	G1/4	0166 - 411 03 - X - 043	0166 - 412 03 - X - 047
	G1/8	0166 - 411 28 - X - 611	0166 - 412 28 - X - 612
	M10x1 cyl.	0166 - 411 13 - X - 011	0166 - 412 13 - X - 012
	M10x1 con.	0166 - 411 01 - X - 041	0166 - 412 01 - X - 045
	M12x1.5 cyl.	0166 - 411 02 - X - 042	0166 - 412 02 - X - 046
	NPT1/8	0166 - 411 04 - X - 044	0166 - 412 04 - X - 048
20 - 50 (± 2.0) bar	G1/4	0166 - 415 03 - X - 059	0166 - 416 03 - X - 063
	G1/8	0166 - 415 28 - X - 615	0166 - 416 28 - X - 616
	M10x1 cyl.	0166 - 415 13 - X - 015	0166 - 416 13 - X - 016
	M10x1 con.	0166 - 415 01 - X - 057	0166 - 416 01 - X - 061
	M12x1.5 cyl.	0166 - 415 02 - X - 058	0166 - 416 02 - X - 062
	NPT1/8	0166 - 415 04 - X - 060	0166 - 416 04 - X - 064

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.



Article number:

0166 - XXX XX - X - XXX

0166

Diaphragm pressure switches up to 42 V with M3 screw terminal

- Made of zinc-plated steel (CrVI-free)
- M3 screw terminal
- Overpressure safety up to 300 bar, Burst pressure safety up to 400 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	--------------------------	--------------------------

0166 Diaphragm pressure switches with M3 screw terminal

0.1 - 1 (± 0.2) bar	G1/4	0166 - 401 03 - X - 003	0166 - 402 03 - X - 007
	G1/8	0166 - 401 28 - X - 601	0166 - 402 28 - X - 602
	M10x1 cyl.	0166 - 401 13 - X - 001	0166 - 402 13 - X - 002
	M10x1 con.	0166 - 401 01 - X - 001	0166 - 402 01 - X - 005
	M12x1.5 cyl.	0166 - 401 02 - X - 002	0166 - 402 02 - X - 006
	NPT1/8	0166 - 401 04 - X - 004	0166 - 402 04 - X - 008
0.5 - 3 (± 0.3) bar	G1/4	0166 - 421 03 - X - 070	0166 - 422 03 - X - 070
	G1/8	0166 - 421 28 - X - 070	0166 - 422 28 - X - 070
	M10x1 cyl.	0166 - 421 13 - X - 070	0166 - 422 13 - X - 070
	M10x1 con.	0166 - 421 01 - X - 070	0166 - 422 01 - X - 070
	M12x1.5 cyl.	0166 - 421 02 - X - 070	0166 - 422 02 - X - 070
	NPT1/8	0166 - 421 04 - X - 070	0166 - 422 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0166 - 405 03 - X - 019	0166 - 406 03 - X - 023
	G1/8	0166 - 405 28 - X - 605	0166 - 406 28 - X - 606
	M10x1 cyl.	0166 - 405 13 - X - 005	0166 - 406 13 - X - 006
	M10x1 con.	0166 - 405 01 - X - 017	0166 - 406 01 - X - 021
	M12x1.5 cyl.	0166 - 405 02 - X - 018	0166 - 406 02 - X - 022
	NPT1/8	0166 - 405 04 - X - 020	0166 - 406 04 - X - 024
10 - 20 (± 1.0) bar	G1/4	0166 - 409 03 - X - 035	0166 - 410 03 - X - 039
	G1/8	0166 - 409 28 - X - 609	0166 - 410 28 - X - 610
	M10x1 cyl.	0166 - 409 13 - X - 009	0166 - 410 13 - X - 010
	M10x1 con.	0166 - 409 01 - X - 033	0166 - 410 01 - X - 037
	M12x1.5 cyl.	0166 - 409 02 - X - 034	0166 - 410 02 - X - 038
	NPT1/8	0166 - 409 04 - X - 036	0166 - 410 04 - X - 040
20 - 50 (± 2.0) bar	G1/4	0166 - 413 03 - X - 051	0166 - 414 03 - X - 055
	G1/8	0166 - 413 28 - X - 613	0166 - 414 28 - X - 614
	M10x1 cyl.	0166 - 413 13 - X - 013	0166 - 414 13 - X - 014
	M10x1 con.	0166 - 413 01 - X - 049	0166 - 414 01 - X - 053
	M12x1.5 cyl.	0166 - 413 02 - X - 050	0166 - 414 02 - X - 054
	NPT1/8	0166 - 413 04 - X - 052	0166 - 414 04 - X - 056

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.



Article number: 0166 - XXX XX - X - XXX

M.3
hex 24



M

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.





0168

Diaphragm pressure switches up to 42 V

- Made of zinc-plated steel (CrVI-free)
- Spade or M3 screw terminal
- Overpressure safety up to 300 bar, Burst pressure safety up to 400 bar¹⁾
- With female thread with compression type fitting 6L to DIN EN ISO 8434-1 (former DIN 2353)

Adjustment range (Tolerance at room temperature)	Female thread	Article number NO → :	Article number NC → :
---	------------------	---------------------------	--------------------------

0168 Diaphragm pressure switches with spade terminal

0.1 - 1 (± 0.2) bar	M12x1.5 female DIN EN ISO 8434-1	0168 - 403 16 - X - 003	0168 - 404 16 - X - 004
0.5 - 3 (± 0.3) bar		0168 - 423 16 - X - 070	0168 - 424 16 - X - 070
1 - 10 (± 0.5) bar		0168 - 407 16 - X - 007	0168 - 408 16 - X - 008
10 - 20 (± 1) bar		0168 - 411 16 - X - 011	0168 - 412 16 - X - 012
20 - 50 (± 2) bar		0168 - 415 16 - X - 015	0168 - 416 16 - X - 016

0168 Diaphragm pressure switches with M3 screw terminal

0.1 - 1 (± 0.2) bar	M12x1.5 female DIN EN ISO 8434-1	0168 - 401 16 - X - 001	0168 - 402 16 - X - 002
0.5 - 3 (± 0.3) bar		0168 - 421 16 - X - 070	0168 - 422 16 - X - 070
1 - 10 (± 0.5) bar		0168 - 405 16 - X - 005	0168 - 406 16 - X - 006
10 - 20 (± 1) bar		0168 - 409 16 - X - 009	0168 - 410 16 - X - 010
20 - 50 (± 2) bar		0168 - 413 16 - X - 013	0168 - 414 16 - X - 014

Seal material – Application areas

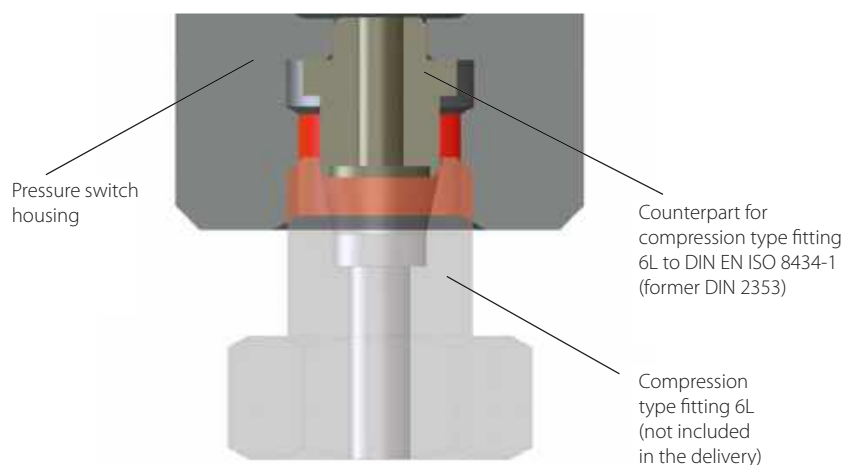
NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.

Article number:

0168 - XXX 16 - X - XXX

Seal type 0168 with counterpart 6L



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

0169

Piston pressure switches up to 42 V

- Made of zinc-plated steel (CrVI-free)
- Spade or M3 screw terminal
- Overpressure safety up to 600 bar, Burst pressure safety up to 700 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	---------------------------	--------------------------

0169 Piston pressure switches with spade terminal

50 - 150 (± 5) bar	G1/4	0169 - 419 03 - X - 011	0169 - 420 03 - X - 015
	G1/8	0169 - 419 28 - X - 603	0169 - 420 28 - X - 604
	M10x1 cyl.	0169 - 419 13 - X - 003	0169 - 420 13 - X - 004
	M10x1 con.	0169 - 419 01 - X - 009	0169 - 420 01 - X - 013
	M12x1.5 cyl.	0169 - 419 02 - X - 010	0169 - 420 02 - X - 014
	NPT1/8	0169 - 419 04 - X - 012	0169 - 420 04 - X - 016

100 - 200 (± 5) bar	G1/4	0169 - 493 03 - X - 011	0169 - 494 03 - X - 015
	G1/8	0169 - 493 28 - X - 603	0169 - 494 28 - X - 604
	M10x1 cyl.	0169 - 493 13 - X - 003	0169 - 494 13 - X - 004
	M10x1 con.	0169 - 493 01 - X - 009	0169 - 494 01 - X - 013
	M12x1.5 cyl.	0169 - 493 02 - X - 010	0169 - 494 02 - X - 014
	NPT1/8	0169 - 493 04 - X - 012	0169 - 494 04 - X - 016

0169 Piston pressure switches with M3 screw terminal

50 - 150 (± 5) bar	G1/4	0169 - 417 03 - X - 003	0169 - 418 03 - X - 007
	G1/8	0169 - 417 28 - X - 601	0169 - 418 28 - X - 602
	M10x1 cyl.	0169 - 417 13 - X - 001	0169 - 418 13 - X - 002
	M10x1 con.	0169 - 417 01 - X - 001	0169 - 418 01 - X - 005
	M12x1.5 cyl.	0169 - 417 02 - X - 002	0169 - 418 02 - X - 006
	NPT1/8	0169 - 417 04 - X - 004	0169 - 418 04 - X - 008

100 - 200 (± 5) bar ²⁾	G1/4	0169 - 491 03 - X - 003	0169 - 492 03 - X - 007
	G1/8	0169 - 491 28 - X - 601	0169 - 492 28 - X - 602
	M10x1 cyl.	0169 - 491 13 - X - 001	0169 - 492 13 - X - 002
	M10x1 con.	0169 - 491 01 - X - 001	0169 - 492 01 - X - 005
	M12x1.5 cyl.	0169 - 491 02 - X - 002	0169 - 492 02 - X - 006
	NPT1/8	0169 - 491 04 - X - 004	0169 - 492 04 - X - 008

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.

Article number:

0169 – XXX XX – X – XXX

M.3
hex 24



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Please consult us before ordering the pressure switch 0169 in the adjustment range 100-200 bar with small threads (e.g. G1/8, NPT 1/8).



0164

Diaphragm pressure switches up to 42 V with stainless steel housing

- Stainless steel housing (1.4305 / AISI 303)
- Spade terminal
- Overpressure safety up to 600 bar, Burst pressure safety up to 700 bar¹⁾
(EPDM-TW and silicone diaphragm up to 35 bar²⁾)

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	--------------------------	--------------------------

0164 Diaphragm pressure switches with spade terminal

0.1 - 1 (± 0.2) bar	G1/4-E	0164 - 403 41 - X - 003	0164 - 404 41 - X - 004
	R1/8	0164 - 403 12 - X - 003	0164 - 404 12 - X - 004
	R1/4	0164 - 403 46 - X - 003	0164 - 404 46 - X - 004
	NTP1/8	0164 - 403 04 - X - 003	0164 - 404 04 - X - 004
0.5 - 3 (± 0.3) bar	G1/4-E	0164 - 423 41 - X - 070	0164 - 424 41 - X - 070
	R1/8	0164 - 423 12 - X - 070	0164 - 424 12 - X - 070
	R1/4	0164 - 423 46 - X - 070	0164 - 424 46 - X - 070
	NTP1/8	0164 - 423 04 - X - 070	0164 - 424 04 - X - 070
1 - 10 (± 0.5) bar	G1/4-E	0164 - 407 41 - X - 007	0164 - 408 41 - X - 008
	R1/8	0164 - 407 12 - X - 007	0164 - 408 12 - X - 008
	R1/4	0164 - 407 46 - X - 007	0164 - 408 46 - X - 008
	NTP1/8	0164 - 407 04 - X - 007	0164 - 408 04 - X - 008
10 - 20 (± 1) bar	G1/4-E	0164 - 411 41 - X - 011	0164 - 412 41 - X - 012
	R1/8	0164 - 411 12 - X - 011	0164 - 412 12 - X - 012
	R1/4	0164 - 411 46 - X - 011	0164 - 412 46 - X - 012
	NTP1/8	0164 - 411 04 - X - 011	0164 - 412 04 - X - 012
20 - 50 (± 2) bar	G1/4-E	0164 - 415 41 - X - 015	0164 - 416 41 - X - 016
	R1/8	0164 - 415 12 - X - 015	0164 - 416 12 - X - 016
	R1/4	0164 - 415 46 - X - 015	0164 - 416 46 - X - 016
	NTP1/8	0164 - 415 04 - X - 015	0164 - 416 04 - X - 016

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water ($p_{max} \leq 35$ bar)	5
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone ³⁾	Water, food products, air, etc. ($p_{max} \leq 35$ bar)	8
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.



Article number: **0164 - XXX XX - X - XXX**

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Overpressure safety of pressure switch up to 600 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-TW and silicone.

³⁾ The G1/4-E thread has an EPDM sealing ring if the silicone membrane is selected.

0164

Diaphragm pressure switches up to 42 V with stainless steel housing

- Stainless steel housing (1.4305 / AISI 303)
- M3 screw terminal
- Overpressure safety up to 600 bar, Burst pressure safety up to 700 bar¹⁾
(EPDM-TW and silicone diaphragm up to 35 bar²⁾)

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → : :	Article number NC → : :
---	----------------	----------------------------	----------------------------

0164 Diaphragm pressure switches with screw terminal M3

0.1 - 1 (± 0.2) bar	G1/4-E	0164 - 401 41 - X - 001	0164 - 402 41 - X - 002
	R1/8	0164 - 401 12 - X - 001	0164 - 402 12 - X - 002
	R1/4	0164 - 401 46 - X - 001	0164 - 402 46 - X - 002
	NTP1/8	0164 - 401 04 - X - 001	0164 - 402 04 - X - 002
0.5 - 3 (± 0.3) bar	G1/4-E	0164 - 421 41 - X - 070	0164 - 422 41 - X - 070
	R1/8	0164 - 421 12 - X - 070	0164 - 422 12 - X - 070
	R1/4	0164 - 421 46 - X - 070	0164 - 422 46 - X - 070
	NTP1/8	0164 - 421 04 - X - 070	0164 - 422 04 - X - 070
1 - 10 (± 0.5) bar	G1/4-E	0164 - 405 41 - X - 005	0164 - 406 41 - X - 006
	R1/8	0164 - 405 12 - X - 005	0164 - 406 12 - X - 006
	R1/4	0164 - 405 46 - X - 005	0164 - 406 46 - X - 006
	NTP1/8	0164 - 405 04 - X - 005	0164 - 406 04 - X - 006
10 - 20 (± 1) bar	G1/4-E	0164 - 409 41 - X - 009	0164 - 410 41 - X - 010
	R1/8	0164 - 409 12 - X - 009	0164 - 410 12 - X - 010
	R1/4	0164 - 409 46 - X - 009	0164 - 410 46 - X - 010
	NTP1/8	0164 - 409 04 - X - 009	0164 - 410 04 - X - 010
20 - 50 (± 2) bar	G1/4-E	0164 - 413 41 - X - 013	0164 - 414 41 - X - 014
	R1/8	0164 - 413 12 - X - 013	0164 - 414 12 - X - 014
	R1/4	0164 - 413 46 - X - 013	0164 - 414 46 - X - 014
	NTP1/8	0164 - 413 04 - X - 013	0164 - 414 04 - X - 014

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water ($p_{max} \leq 35$ bar)	5
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone ³⁾	Water, food products, air, etc. ($p_{max} \leq 35$ bar)	8
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 41 for the temperature range and application thresholds of sealing materials.

Article number: 0164 - XXX XX - X - XXX

M.3
hex 24



suco

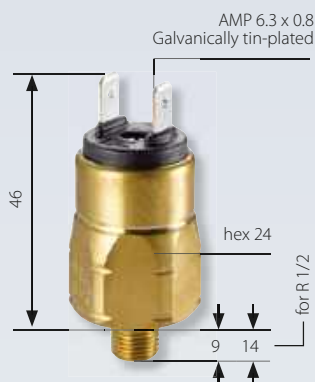
M

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Overpressure safety of pressure switch up to 600 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-TW and silicone.

³⁾ The G1/4-E thread has an EPDM sealing ring if the silicone membrane is selected.





0167

Diaphragm pressure switches up to 42 V with brass housing

- Brass housing
- Spade terminal
- Overpressure safety up to 35 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO →: :	Article number NC →>:
---	----------------	---------------------------	--------------------------

0167 Diaphragm pressure switches with spade terminal

0.1 - 1 (± 0.2) bar	G1/4	0167 - 403 03 - X - 039	0167 - 404 03 - X - 040
	G1/8	0167 - 403 28 - X - 003	0167 - 404 28 - X - 004
	R1/8	0167 - 403 12 - X - 008	0167 - 404 12 - X - 011
	R1/2	0167 - 403 07 - X - 009	0167 - 404 07 - X - 012
	M10x1 con.	0167 - 403 01 - X - 007	0167 - 404 01 - X - 010
	NPT1/8	0167 - 403 04 - X - 012	0167 - 404 04 - X - 016
0.5 - 3 (± 0.3) bar	G1/4	0167 - 423 03 - X - 070	0167 - 424 03 - X - 070
	G1/8	0167 - 423 28 - X - 070	0167 - 424 28 - X - 070
	R1/8	0167 - 423 12 - X - 070	0167 - 424 12 - X - 070
	R1/2	0167 - 423 07 - X - 070	0167 - 424 07 - X - 070
	M10x1 con.	0167 - 423 01 - X - 070	0167 - 424 01 - X - 070
	NPT1/8	0167 - 423 04 - X - 070	0167 - 424 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0167 - 407 03 - X - 043	0167 - 408 03 - X - 044
	G1/8	0167 - 407 28 - X - 007	0167 - 408 28 - X - 008
	R1/8	0167 - 407 12 - X - 020	0167 - 408 12 - X - 023
	R1/2	0167 - 407 07 - X - 021	0167 - 408 07 - X - 024
	M10x1 con.	0167 - 407 01 - X - 019	0167 - 408 01 - X - 022
	NPT1/8	0167 - 407 04 - X - 028	0167 - 408 04 - X - 032
10 - 20 (± 1.0) bar	G1/4	0167 - 411 03 - X - 047	0167 - 412 03 - X - 048
	G1/8	0167 - 411 28 - X - 011	0167 - 412 28 - X - 012
	R1/8	0167 - 411 12 - X - 032	0167 - 412 12 - X - 035
	R1/2	0167 - 411 07 - X - 033	0167 - 412 07 - X - 036
	M10x1 con.	0167 - 411 01 - X - 031	0167 - 412 01 - X - 034
	NPT1/8	0167 - 411 04 - X - 044	0167 - 412 04 - X - 048

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water ($p_{max} \leq 35$ bar)	5
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone	Water, food products, air, etc. ($p_{max} \leq 35$ bar)	8

Refer to page 41 for the temperature range and application thresholds of sealing materials.



Article number: 0167 - XXX XX - X - XXX

0167

Diaphragm pressure switches up to 42 V with brass housing

- Brass housing
- M3 screw terminal
- Overpressure safety up to 35 bar¹⁾

Adjustment range (Tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	--------------------------	--------------------------

0167 Diaphragm pressure switches with M3 screw terminal

0.1 - 1 (± 0.2) bar	G1/4	0167 - 401 03 - X - 037	0167 - 402 03 - X - 038
	G1/8	0167 - 401 28 - X - 001	0167 - 402 28 - X - 002
	R1/8	0167 - 401 12 - X - 002	0167 - 402 12 - X - 005
	R1/2	0167 - 401 07 - X - 003	0167 - 402 07 - X - 006
	M10x1 con.	0167 - 401 01 - X - 001	0167 - 402 01 - X - 004
	NPT1/8	0167 - 401 04 - X - 004	0167 - 402 04 - X - 008
0.5 - 3 (± 0.3) bar	G1/4	0167 - 421 03 - X - 070	0167 - 422 03 - X - 070
	G1/8	0167 - 421 28 - X - 070	0167 - 422 28 - X - 070
	R1/8	0167 - 421 12 - X - 070	0167 - 422 12 - X - 070
	R1/2	0167 - 421 07 - X - 070	0167 - 422 07 - X - 070
	M10x1 con.	0167 - 421 01 - X - 070	0167 - 422 01 - X - 070
	NPT1/8	0167 - 421 04 - X - 070	0167 - 422 04 - X - 070
1 - 10 (± 0.5) bar	G1/4	0167 - 405 03 - X - 041	0167 - 406 03 - X - 042
	G1/8	0167 - 405 28 - X - 005	0167 - 406 28 - X - 006
	R1/8	0167 - 405 12 - X - 014	0167 - 406 12 - X - 017
	R1/2	0167 - 405 07 - X - 015	0167 - 406 07 - X - 018
	M10x1 con.	0167 - 405 01 - X - 013	0167 - 406 01 - X - 016
	NPT1/8	0167 - 405 04 - X - 020	0167 - 406 04 - X - 024
10 - 20 (± 1.0) bar	G1/4	0167 - 409 03 - X - 045	0167 - 410 03 - X - 046
	G1/8	0167 - 409 28 - X - 009	0167 - 410 28 - X - 010
	R1/8	0167 - 409 12 - X - 026	0167 - 410 12 - X - 029
	R1/2	0167 - 409 07 - X - 027	0167 - 410 07 - X - 030
	M10x1 con.	0167 - 409 01 - X - 025	0167 - 410 01 - X - 028
	NPT1/8	0167 - 409 04 - X - 036	0167 - 410 04 - X - 040

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water ($p_{\max} \leq 35$ bar)	5
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone	Water, food products, air, etc. ($p_{\max} \leq 35$ bar)	8

Refer to page 41 for the temperature range and application thresholds of sealing materials.

Article number: 0167 - XXX XX - X - XXX

M.3
hex 24



suco

M



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

Pressure switches hex 27

Changeover with silver or gold contacts



- Switching point can be adjusted when fitted on site¹⁾
- Factory adjustable hysteresis (except types 0140 and 0141)
- High overpressure safety and long service life under harsh conditions
- Operating voltage up to 250 V
- Series 0140 / 0141 with protective insulation ☐
- For ready-wired customized versions refer to chapter M.5, starting at page 62
- For pressure switches with integrated connectors refer to chapter M.2, starting at page 32

¹⁾ Pressure switches can also be supplied preset at factory.

Our preset switches are sealed with lacquer paint, set points are embossed on the housing.

Pressure switches hex 27

Technical details

M.4

hex 27



Temperature resistance of sealing materials	NBR (diaphragm pressure switches, $p_{max} = 300 / 400$ bar)	-40 °C ... +100 °C
	NBR (diaphragm pressure switch, $p_{max} = 100$ bar) (piston pressure switch)	-30 °C ... +100 °C
	EPDM	-30 °C ... +120 °C
	EPDM-TW (diaphragm pressure switch)	-20 °C ... +100 °C
	FKM (diaphragm pressure switch)	-5 °C ... +120 °C
	FKM (piston pressure switch)	-15 °C ... +120 °C
	FFKM	-20 °C ... +120 °C
	Silicone (diaphragm pressure switch)	-40 °C ... +120 °C
	HNBR	-30 °C ... +120 °C
Burst pressure (diaphragm pressure switch, overpressure resistance 100 bar)	200 bar	
Burst Pressure (diaphragm pressure switch, overpressure resistance 400 bar)	700 bar (for threads M10, G 1/8, R 1/8, NPT 1/8 and type 0140 up to max. 600 bar)	
Burst pressure (Piston pressure switch)	1,000 bar (for threads M10, G 1/8, R 1/8, NPT 1/8 and type 0140 up to max. 600 bar)	
Switching frequency	200 / min	
Mechanical life expectancy	1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar)	
Pressure rise rate	≤ 1 bar/ms	
Hysteresis (only adjustable at factory) ¹⁾	Adjustable average value 10 ... 30 % depending on type Types 0140 and 0141 cannot be adjusted	
Vibration resistance	10 g; 5 ... 200 Hz sine wave; DIN EN 60068-2-6	
Shock resistance	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-6, DIN EN 60068-2-29	
Protection class	IP65 with socket device, terminals IP00	
Weight	approx. 100 g	

Switching performance and materials overview

Type	0140	0141	0170	0171	0180	0181	0183	0186	0187	0190	0191	0196	0197
5 ... 24 V DC										●	●	●	●
10 ... 42 V AC/DC			●	●									
10 ... 250 V AC/DC	●	●			●	●	●	●	●				
3 ... 50 mA										●	●	●	●
10 mA ... 2 A	●	●											
10 mA ... 4 A			●	●	●	●	●	●	●				
Gold contacts										●	●	●	●
Silver contacts	●	●	●	●	●	●	●	●	●				
Adjustable hysteresis			●	●	●	●	●	●	●	●	●	●	●
Zinc-plated steel (CrVI-free)	●	●	●	●	●	●	●			●	●		
Stainless steel 1.4305								●	●			●	●

¹⁾ see notes on hysteresis in the technical explanations (page 15-16)



Pressure switches hex 27

Electrical values

0140 / 0141		
Rated working voltage U_e :	Rated working current I_e	Usage category ¹⁾
250 VAC 50 / 60 Hz	2 A	AC12
24 VDC	2 / 1 A	DC12 / DC13
50 VDC	1 / 0.5 A	DC12 / DC13
75 VDC	0.5 / 0.25 A	DC12 / DC13
125 VDC	0.2 / 0.1 A	DC12 / DC13
250 VDC	0.15 / 0.1 A	DC12 / DC13
Rated insulation voltage U_i :	300 V	
Rated impulse withstand voltage U_{imp} :	4 kV	
Conventional thermal current I_{the} :	5 A	
Switching overvoltage:	< 2.5 kV	
Rated frequency:	DC and 50 / 60 Hz	
Nominal current of short-circuit mechanism:	to 3.5 A	
Rated short-circuit current:	< 350 A	
IP class of protection according to DIN EN 60529:1991+A1:1999:	IP65 with socket device, terminals IP00	
Tightening torque of terminal screws:	< 0.35 Nm	
Connector cross-section:	0.5 - 1.5 mm ²	

0170 / 0171 / 0180 / 0181 / 0183 / 0186 / 0187 / 0190 / 0191 / 0196 / 0197		
Rated working voltage U_e :	Rated working current I_e	Usage category ¹⁾
250 VAC 50 / 60 Hz	4 A	AC12
250 VAC 50 / 60 Hz	1 A	AC14
24 VDC	4 / 2 A	DC12 / DC13
50 VDC	2 / 1 A	DC12 / DC13
75 VDC	1 / 0.5 A	DC12 / DC13
125 VDC	0.3 / 0.2 A	DC12 / DC13
250 VDC	0.25 / 0.2 A	DC12 / DC13
Rated insulation voltage U_i :	300 V	
Rated impulse withstand voltage U_{imp} :	2.5 kV	
Conventional thermal current I_{the} :	5 A	
Switching overvoltage:	< 2.5 kV	
Rated frequency:	DC and 50 / 60 Hz	
Nominal current of short-circuit mechanism:	to 5 A	
Rated short-circuit current:	< 350 A	
IP class of protection according to DIN EN 60529:1991+A1:1999:	IP65 with socket device, terminals IP00	

0140 / 0141

Diaphragm / piston pressure switches 250 V

- Protection class 2, protective insulation ☐
- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 300 / 600 bar¹⁾
- Includes polyamide cap, protection class IP65

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0140 Diaphragm pressure switches with screw terminals

300 ¹⁾	0.3 - 1.5	± 0.2	G1/4	0140 - 457 03 - X - 003
			NPT1/8	0140 - 457 04 - X - 300
			NPT1/4	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	G1/4	0140 - 458 03 - X - 006
			NPT1/8	0140 - 458 04 - X - 301
			NPT1/4	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	G1/4	0140 - 459 03 - X - 009
			NPT1/8	0140 - 459 04 - X - 302
			NPT1/4	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	G1/4	0140 - 461 03 - X - 012
			NPT1/8	0140 - 461 04 - X - 303
			NPT1/4	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 switches with screw terminals

600 ¹⁾	50 - 150	± 5.0	G1/4	0141 - 460 03 - X - 003
			NPT1/8	0141 - 460 04 - X - 304
			NPT1/4	0141 - 460 09 - X - 309
			7/16-20 UNF	0141 - 460 20 - X - 314
			9/16-18 UNF	0141 - 460 21 - X - 319

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.

Article number:

014X - XXX XX - X - XXX

M.4
hex 27



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

M.4

hex 27



0170 / 0171

Diaphragm / piston pressure switches up to 42 V

- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 100 / 400 / 700 bar¹⁾
- Hysteresis adjustable at factory

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread
----------------------------	----------------------------	---	-------------

Article number

0170 Diaphragm pressure switches with spade terminal

100 ¹⁾	0.3 - 1.5	± 0.2	G1/4
			M10x1 con.
			M12x1.5 cyl.
			NPT1/8
			NPT1/4
			7/16-20 UNF
			9/16-18 UNF

0170 - 457 03 - X - 003
0170 - 457 01 - X - 001
0170 - 457 02 - X - 002
0170 - 457 04 - X - 318
0170 - 457 09 - X - 314
0170 - 457 20 - X - 301
0170 - 457 21 - X - 302

	1 - 10	± 0.5	G1/4
			M10x1 con.
			M12x1.5 cyl.
			NPT1/8
			NPT1/4
			7/16-20 UNF
			9/16-18 UNF

0170 - 458 03 - X - 042
0170 - 458 01 - X - 040
0170 - 458 02 - X - 041
0170 - 458 04 - X - 343
0170 - 458 09 - X - 340
0170 - 458 20 - X - 341
0170 - 458 21 - X - 342

400 ¹⁾	10 - 50	± 3.0	G1/4
			M10x1 con.
			M12x1.5 cyl.
			NPT1/8
			NPT1/4
			7/16-20 UNF
			9/16-18 UNF

0170 - 459 03 - X - 009
0170 - 459 01 - X - 007
0170 - 459 02 - X - 008
0170 - 459 04 - X - 320
0170 - 459 09 - X - 316
0170 - 459 20 - X - 305
0170 - 459 21 - X - 306

	10 - 100	± 3.0 - 5.0	G1/4
			M10x1 con.
			M12x1.5 cyl.
			NPT1/8
			NPT1/4
			7/16-20 UNF
			9/16-18 UNF

0170 - 461 03 - X - 012
0170 - 461 01 - X - 010
0170 - 461 02 - X - 011
0170 - 461 04 - X - 321
0170 - 461 09 - X - 317
0170 - 461 20 - X - 307
0170 - 461 21 - X - 308

0171 Piston pressure switches with spade terminal

700 ^{1) 2)}	50 - 200	± 5.0	G1/4
			M10x1 con.
			M12x1.5 cyl.
			NPT1/8
			NPT1/4
			7/16-20 UNF
			9/16-18 UNF

0171 - 460 03 - X - 003
0171 - 460 01 - X - 001
0171 - 460 02 - X - 002
0171 - 460 04 - X - 304
0171 - 460 09 - X - 303
0171 - 460 20 - X - 301
0171 - 460 21 - X - 302

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR ³⁾	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.



Article number:

017X - XXX XX - X - XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.

³⁾ HNBR diaphragm not available for pressure ranges between 0.3 - 1.5 bar.

0180 / 0181

Diaphragm / piston pressure switches up to 250 V

- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 100 / 400 / 700 bar¹⁾
- Hysteresis adjustable at factory

P _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0180 Diaphragm pressure switches with spade terminal

100 ¹⁾	0.3 - 1.5	± 0.2	G1/4	0180 - 457 03 - X - 003
			M10x1 con.	0180 - 457 01 - X - 001
			M12x1.5 cyl.	0180 - 457 02 - X - 002
			NPT1/8	0180 - 457 04 - X - 318
			NPT1/4	0180 - 457 09 - X - 314
			7/16-20 UNF	0180 - 457 20 - X - 301
			9/16-18 UNF	0180 - 457 21 - X - 302
400 ¹⁾	1 - 10	± 0.5	G1/4	0180 - 458 03 - X - 042
			M10x1 con.	0180 - 458 01 - X - 040
			M12x1.5 cyl.	0180 - 458 02 - X - 041
			NPT1/8	0180 - 458 04 - X - 343
			NPT1/4	0180 - 458 09 - X - 340
			7/16-20 UNF	0180 - 458 20 - X - 341
			9/16-18 UNF	0180 - 458 21 - X - 342
	10 - 50	± 3.0	G1/4	0180 - 459 03 - X - 009
			M10x1 con.	0180 - 459 01 - X - 007
			M12x1.5 cyl.	0180 - 459 02 - X - 008
			NPT1/8	0180 - 459 04 - X - 320
			NPT1/4	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	G1/4	0180 - 461 03 - X - 012
			M10x1 con.	0180 - 461 01 - X - 010
			M12x1.5 cyl.	0180 - 461 02 - X - 011
			NPT1/8	0180 - 461 04 - X - 321
			NPT1/4	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 switches with spade terminal

700 ^{1) 2)}	50 - 200	± 5.0	G1/4	0181 - 460 03 - X - 003
			M10x1 con.	0181 - 460 01 - X - 001
			M12x1.5 cyl.	0181 - 460 02 - X - 002
			NPT1/8	0181 - 460 04 - X - 304
			NPT1/4	0181 - 460 09 - X - 303
			7/16-20 UNF	0181 - 460 20 - X - 301
			9/16-18 UNF	0181 - 460 21 - X - 302

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR ³⁾	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.

Article number:

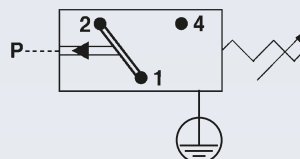
018X - XXX XX - X - XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.

³⁾ HNBR diaphragm not available for pressure ranges between 0.3 - 1.5 bar.

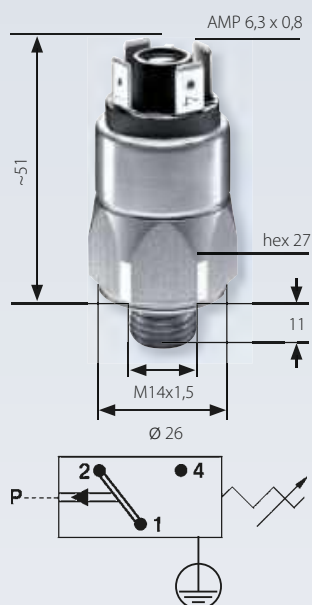
M.4
hex 27



M.4

hex 27

Thread similar to ISO 6149-3
(including O-ring for sealing)



0183

Piston pressure switches up to 250 V

- Zinc-plated steel (CrVI-free)
- Changeover with silver contacts
- Overpressure safety up to 600 bar¹⁾, Hysteresis adjustable at factory
- Adjustment range: 100 – 400 bar
- Height only 51 mm

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0183 Piston pressure switches with spade terminal

600 ¹⁾	100 - 300	± 10.0	M14x1.5 DIN 6149-3	0183 - 462 45 - X - 051
	200 - 400			0183 - 463 45 - X - 061

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.

Article number: **0183 - 46X 45 - X - XXX**

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

Accessory ►

Not included in the delivery.
Please order separately.

Article number ►

Thread adapters

from M14 x 1.5		
to G1/4	to M12 x 1.5	to NPT1/8
1-1-83-420-006	1-1-83-420-007	1-1-83-420-008

0186 / 0187

Diaphragm / piston pressure switches up to 250 V
with stainless steel housing

- Stainless steel housing (1.4305 / AISI 303)
- Changeover with silver contacts
- Overpressure safety up to 400 / 700 bar¹⁾
(EPDM-TW and silicone diaphragm up to 35 bar²⁾)
- Hysteresis adjustable at factory

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0186 Diaphragm pressure switches with spade terminal

400 ^{1) 2)}	0.5 - 5	± 0.3	G1/4	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 switches with spade terminal

700 ^{1) 3)}	50 - 200	± 5.0	G1/4	0187 - 460 03 - X - 003
----------------------	----------	-------	------	-------------------------

Seal material – Application areas

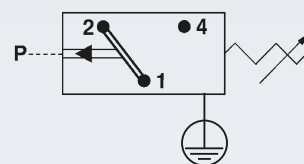
NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water (p _{max} ≤ 35 bar)	5
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone	Water, food products, air, etc. (p _{max} ≤ 35 bar)	8
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.

Article number: 018X - XXX 03 - X - XXX

M.4
hex 27

suco



M

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Overpressure safety of diaphragm pressure switch up to 400 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-TW and silicone.

³⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.



- Zinc-plated steel (CrVI-free), with spade terminal
- Changeover with gold contacts
- Overpressure safety up to 100 / 400 / 700 bar¹⁾
- Hysteresis adjustable at factory



$p_{\max}$ in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------	----------------------------	---	-------------	----------------

0190 Diaphragm pressure switches with spade terminal

100 ¹⁾	0.3 - 1.5	± 0.2	G1/4	0190 - 457 03 - X - 003
			M10x1 con.	0190 - 457 01 - X - 001
			M12x1.5 cyl.	0190 - 457 02 - X - 002
			NPT1/8	0190 - 457 04 - X - 318
			NPT1/4	0190 - 457 09 - X - 314
			7/16-20 UNF	0190 - 457 20 - X - 301
			9/16-18 UNF	0190 - 457 21 - X - 302
400 ¹⁾	1 - 10	± 0.5	G1/4	0190 - 458 03 - X - 042
			M10x1 con.	0190 - 458 01 - X - 040
			M12x1.5 cyl.	0190 - 458 02 - X - 041
			NPT1/8	0190 - 458 04 - X - 343
			NPT1/4	0190 - 458 09 - X - 340
			7/16-20 UNF	0190 - 458 20 - X - 341
			9/16-18 UNF	0190 - 458 21 - X - 342
	10 - 50	± 3.0	G1/4	0190 - 459 03 - X - 009
			M10x1 con.	0190 - 459 01 - X - 007
			M12x1.5 cyl.	0190 - 459 02 - X - 008
			NPT1/8	0190 - 459 04 - X - 320
			NPT1/4	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	G1/4	0190 - 461 03 - X - 012	
		M10x1 con.	0190 - 461 01 - X - 010	
		M12x1.5 cyl.	0190 - 461 02 - X - 011	
		NPT1/8	0190 - 461 04 - X - 321	
		NPT1/4	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 switches with spade terminal

700 ²⁾	50 - 200	± 5.0	G1/4	0191 - 460 03 - X - 003
			M10x1 con.	0191 - 460 01 - X - 001
			M12x1.5 cyl.	0191 - 460 02 - X - 002
			NPT1/8	0191 - 460 04 - X - 304
			NPT1/4	0191 - 460 09 - X - 303
			7/16-20 UNF	0191 - 460 20 - X - 301
			9/16-18 UNF	0191 - 460 21 - X - 302

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR ³⁾	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.



Article number:

019X - XXX XX - X - XXX

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.

³⁾ HNBR diaphragm not available for pressure ranges between 0.3 - 0.5 bar.

0196 / 0197

Diaphragm / piston pressure switches up to 24 V with stainless steel housing

- Stainless steel housing (1.4305 / AISI 303)
- Fitted with changeover contact and gold contacts
- Overpressure safety up to 400 / 700 bar¹⁾
(EPDM-TW and silicone diaphragm up to 35 bar²⁾)
- Hysteresis adjustable at factory

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

0196 Diaphragm pressure switches with spade terminal

400 ^{1) 2)}	0.5 - 5	± 0.3	G1/4	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 switches with spade terminal

700 ^{1) 3)}	50 - 200	± 5.0	G1/4	0197 - 460 03 - X - 003
----------------------	----------	-------	------	-------------------------

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Water, Brake fluid, hydrogen, oxygen, acetylene, etc.	2
EPDM-TW	Drinking water (p _{max} ≤ 35 bar)	5
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
Silicone	Water, food products, air, etc. (p _{max} ≤ 35 bar)	8
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 53 for the temperature range and application thresholds of sealing materials.

Article number:	019X – XXX 03 – X – XXX
-----------------	-------------------------

M.4
hex 27



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.
²⁾ Overpressure safety of diaphragm pressure switch up to 400 bar. Functional reliability only up to 35 bar with diaphragm materials EPDM-TW and silicone.
³⁾ Excluding the thread sizes G 1/8, R 1/8, NPT 1/8 and M10x1 cylindrical/conical.



M.5

hex 24 / 27
Ready-wired

Hex 24 / hex 27

Ready-wired pressure switches

Custom designs



- Available with all commercial plug-in types and individual cable length.
- Technical details of ready-wired pressure switch types correspond to those of the same standard pressure switch types¹⁾
- High protection classes IP67 or IP6K9K, required in particular in commercial vehicle construction, mobile hydraulics and similarly demanding applications
- With ready-wired pressure switches, the plug connections can be moved in climatically uncritical or low-vibration areas, if required.
- The modular layout also enables the production of lower volumes.
- The switching point is factory-set to a fixed value.²⁾

¹⁾ Different technical details will be agreed with the customer.

²⁾ Exception: The switching point of 0240 / 0241 can be adjusted on site even after the sealing process.

Hex 24 / hex 27

Custom designs

All hex 24 and hex 27 pressure switches can be individually wired according to customer needs.

Standard types suitable for ready-wiring

0163 / 0166 0164 0167 0169	0168	0170 / 0171 0180 / 0181 0190 / 0191 0196 / 0197	0140 / 0141
			
Technical details page 41	Technical details page 41	Technical details page 53	Technical details page 53
The switching point is factory preset and cannot be changed subsequently, so please state the switching point when ordering.			The switching point is adjustable even after sealing.

A selection from the wide variety of connectors we can supply

Connector to DIN 72585-A1-4.1	
AMP Junior Timer®	
Cannon connector	
AMP Superseal 1.5°	
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)	

M.5
hex 24 / 27
Ready-wired



Please note our detailed information on

- CE marking
- protection class
- custom applications

in the general technical explanations on page 8, and the technical explanations on mechanical pressure switches on page 14.

For gas applications below 10 bar (145 PSI) we generally recommend venting the housing for encapsulated pressure switches.

Please contact us so we can offer you a suitable solution.



Technical details

Refer to page 54 for electrical values

Rated working voltage:	max. 42 V / 250 V depending on connection	
Rated working current:	max. 2 A	
Protection class:	2, protective insulation 	
Temperature resistance of sealing materials:	NBR (diaphragm pressure switch)	-40 °C ... +100 °C
	NBR (piston pressure switch)	-30 °C ... +100 °C
	EPDM	-30 °C ... +120 °C
	FKM (diaphragm pressure switch)	-5 °C ... +120 °C
	FKM (piston pressure switch)	-15 °C ... +120 °C
	FFKM	-20 °C ... +120 °C
	Silicone	-40 °C ... +120 °C
	HNBR	-30 °C ... +120 °C
Switching frequency:	200 / min	
Mechanical life expectancy:	1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures to max. 50 bar)	
Pressure rise rate:	≤ 1 bar/ms	
Hysteresis:	Average value 10 – 20 % (not adjustable)	
Vibration resistance:	10 g / 5 – 200 Hz sine wave, DIN EN 60068-2-6	
Shock resistance:	294 m/s ² ; 14 ms half sine wave, DIN EN 60068-2-6	
Materials:	Housing material: zinc-plated steel Protective cap: anodised aluminium	
Protection class: IP67	IP67	
Cable:	Standard length 2 m with wire end sleeves	
Weight:	approx. 120 g	

Options for 0240 / 0241

- Other cable lengths and plug-in systems
- Fixed switching point, factory-set, set point embossed on housing
- Alternative housing materials and connection threads
- Other sealing materials, such as silicone for diaphragm pressure switches

0240 / 0241

Diaphragm / piston pressure switches, hex 27

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 300 / 600 bar¹⁾
- Switching point can also be adjusted during use
- Protection class 2, protective insulation ☐

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Male thread	Article number
----------------------------	----------------------------	---	-------------	----------------

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

Seal material – Application areas²⁾

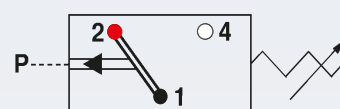
NBR	Hydraulic/machine oil, air, nitrogen ²⁾ , etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene ²⁾ etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 64 for the temperature range and application thresholds of sealing materials.

Article number:

024X – XXX XX – X – XXX

M.5
hex 27
Ready-wired



Contact assignment:

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

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ For gas applications below 10 bar (145 PSI) we generally recommend venting the housing for encapsulated pressure switches. Please contact us so we can offer you a suitable solution.



Pressure switches *PLUS*

with integrated connector and supplementary functions

Hex 24, NC or NO, voltage up to 42 V



Intelligent, supplementary electronic functions broaden the capabilities of mechanical pressure switches by adding numerous features:

- NAMUR diagnostic function (fail-safe) with short-circuit and cable break detection
- Overvoltage protection for prolonging the contact service life
- Active reduction of EMC emissions
- Temperature-controlled switching function (e.g. cold start, i.e. inactive switching function until a certain temperature is reached)
- In-rush current limitation (overload limitation of the switching contacts when switching load is too high, e.g. lamp load, motor start-up)
- Display of the switching status with LED
- Overload protection with self-resetting electrical fuse
- High protection class up to IP67 and IP6K9K
- Switching point can be set on site with adjusting screw in the connector¹⁾

¹⁾ Pressure switches can also be supplied preset at factory.
The switching point is embossed onto pressure switches preset at factory.

Pressure switches *PLUS*

with integrated connector and supplementary functions

M.6
hex 24
PS *PLUS*



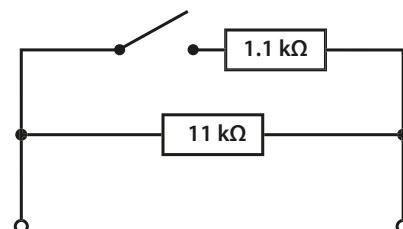
Overview of possible supplementary functions

Circuit	Symbole	Function	Application	Code for order number
Resistor Resistor circuit to NAMUR, refer to page 68		Diagnostic function (fail-safe) with short-circuit and cable break detection	Safety systems such as brake systems, hydrostatic steering systems and fire extinguisher systems	04XX - R
Varistor Circuit with varistor for overvoltage limitation, refer to page 69		- Overvoltage protection for the prolonging of contact service life under conditions of inductive load and long connection length - Active reduction of EMC emissions on switching of the pressure switch	The flyback voltage is effectively limited if the pressure switch interrupts the current in circuits with magnetic valves, relays or motors	04XX - V
NTC thermistor		- Temperature-controlled switch behaviour (e.g. filter monitoring) - In-rush current limitation, e.g. for motors („soft start“) and in PSUs - On-delay (in series) and dropout delay (in parallel) for relays	For a cold start in a mobile hydraulic application, a pressure switch used for filter monitoring may activate due to the high viscosity of the oil at low temperatures, and signals a blocked filter. The NTC thermistor integrated in the pressure switch means the circuit remains interrupted until the pressure switch, and so also the thermistor, have warmed up; not until then does the circuit become low impedance.	04XX - N
PTC thermistor		- Protection against overcurrent - In-rush current limitation, such as for filament lamps and condenser load	E.g. brake light monitoring in mobile hydraulics: The in-rush current can be up to 8 times the nominal current of a filament lamp. This high current is only reduced at the moment of switch-on, thereby protecting the contact system of the pressure switch from overload.	upon request ¹⁾
LED		Displays the switching status by an integrated LED	Direct switching status display for applications in which the controller is physically remote; e.g. in an automation system or permanently installed extinguishing or gas systems.	upon request ¹⁾
Multifuse, PPTC		- Protection against overcurrent - Self-resetting: After removing the short-circuit (cooling the MF) the fuse resets	In applications which need to be protected against overcurrent e.g. electronic applications	upon request ¹⁾

¹⁾ Available from a minimum order quantity of 2,000 pieces.

The additional circuitry of the switching contact of the pressure switch enables not only the states to be shown enabled and disabled, it also enables interrogation for line breaks (standby current principle) and short-circuits in the electric circuit.

The resistor circuitry is designed such that the NAMUR specifications can be satisfied. An operating voltage of 8.2 VDC must be provided for NAMUR-compliant operation. A resistance of 11 kΩ is present in the circuit when the switch contact is open. The resistance is 1 kΩ when the switch contact is closed. Other resistance values can also be realised.



Switching status	Closed	Open	Short-circuit SC	Line Break LB
Contact				
Resistor				
Current				
Example: Supply voltage 12 VDC	$I = \frac{U_{cc}}{1 \text{ k}\Omega} = \frac{12 \text{ V}}{1 \text{ k}\Omega} = 12 \text{ mA}$	$I = \frac{U_{cc}}{11 \text{ k}\Omega} = \frac{12 \text{ V}}{11 \text{ k}\Omega} = 1,1 \text{ mA}$	$I \gg \frac{U_{cc}}{1 \text{ k}\Omega} \quad I \gg \frac{12 \text{ V}}{1 \text{ k}\Omega} \quad I \gg 12 \text{ mA}$	$I = 0 \text{ mA}$

Technical details

Rated working voltage U_{cc} :	8.2 VDC ... 30 VDC
Maximum rated operating current:	$\leq 30 \text{ mA}$
Switching capacity:	$< 1 \text{ W}$
Switching frequency:	200 / min.
Mechanical and electrical service life:	1,000,000 cycles
Permitted pressure rise rate:	$\leq 1 \text{ bar / ms}$
Vibration resistance:	10 g; 5 ... 200 Hz sine wave; DIN EN 60068-2-6
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27
Protection class:	Refer to the table on the following pages: According to manufacturer specifications for the respective plug-in system (only when plugged in), otherwise IP00.

Pressure switches *PLUS*

Circuit with varistor for overvoltage limitation
(pressure switches with part numbers 04XX-**V**)

M.6
hex 24
PS **PLUS**



The switching off inductive consumers such as valves, relays and motors by a mechanical pressure switch generates a high voltage peak. The cause for this is the energy stored in the magnetic field of inductance, which entails an induction voltage when the current is changed.

The induction voltage (or flyback voltage) is defined as follows:

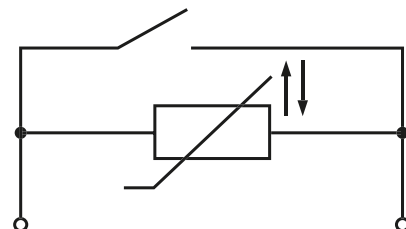
$$U_L = -L \frac{di}{dt}$$

where L = Inductance
 di/dt = Change of current over time

This induction voltage can result in discharge effects and the occurrence of arcs at the opening contacts. This gives rise to localised, very hot places on the contact surfaces which are able to fuse the contact material. Increasing load damages the contact surface and the contact transition resistance rises. This can result in sporadic interruption, adhesion and welding of the contacts, and so lead to complete failure of the pressure switch.

The effect of induction voltage is countered by means of a varistor – a resistor which reduces its ohmic resistance with increasing connection voltage. The induction voltage is limited to the responding value of the varistor, and the energy is converted to heat in the varistor.

Varistors are suitable for DC and AC in equal measure. In DC circuits, the response voltage of the varistor must be greater than the highest value of the supply voltage. In AC circuits, it must be 1.5 times the peak-to-peak value of the supply voltage.



Technical details

Rated operating voltage U_{cc} :	10 V ... 24 ... 30 VDC / 10 V ... 21 VAC
Rated operating current, ohmic load DC12 / AC12:	10 mA ... 4 A
Rated operating current, inductive load DC13 / AC13:	10 mA ... 1 A
AC / DC switching capacity:	< 100 W / 100 VA
Switching frequency:	200 / min.
Varistor response voltage:	41 VDC $\pm$ 10 % at 1 mA
Maximum varistor energy:	0.4 J (10/1000 μ s); 0.3 J (2 ms)
Maximum varistor peak current:	120 A (8/20 μ s, one-off loading), 60 A (8/20 μ s, dual loading)
Mechanical service life:	1,000,000 cycles
Permitted pressure rise rate:	$\leq$ 1 bar / ms
Vibration resistance:	10 g; 5 – 200 Hz sine wave; DIN EN 60068-2-6
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27
Protection class:	Refer to the table on the following pages: According to manufacturer specifications for the respective plug-in system (only when plugged in), otherwise IP00.

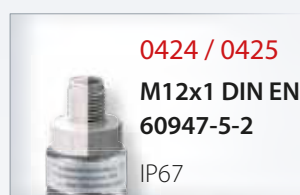
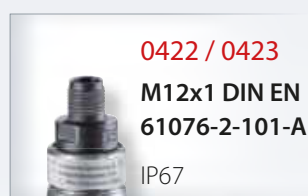
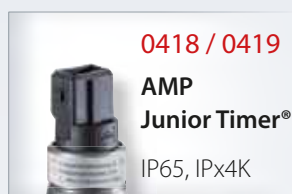
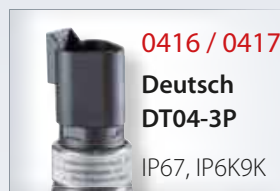
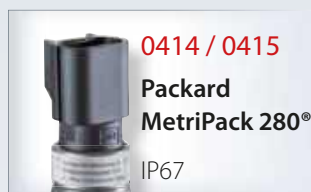
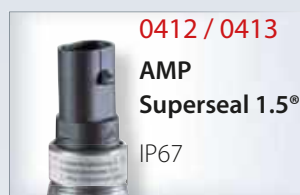
0410 / 0412 / 0414 / 0416 / 0418 / 0422 / 0424

Diaphragm pressure switches, up to 42 V
with supplementary functions

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 300 bar¹⁾
- Burst pressure safety up to 400 bar¹⁾

Plug-in types for diaphragm pressure switches

Deutsch DT04-2P	0410 - XXX XX - X - 001	0410 - XXX XX - X - 002
AMP Superseal 1.5°	0412 - XXX XX - X - 001	0412 - XXX XX - X - 002
Packard MetriPack 280	0414 - XXX XX - X - 001	0414 - XXX XX - X - 002
Deutsch DT04-3P	0416 - XXX XX - X - 001	0416 - XXX XX - X - 002
AMP Junior Timer®	0418 - XXX XX - X - 001	0418 - XXX XX - X - 002
M12x1 DIN EN 61076-2-101-A (PIN 1+3)	0422 - XXX XX - X - 001	0422 - XXX XX - X - 002
M12x1 DIN EN 60947-5-2 (PIN 1+2 / PIN 1+4)	0424 - XXX XX - X - 001	0424 - XXX XX - X - 002



Adjustment range (tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	-------------	---------------------------	--------------------------

04XX Diaphragm pressure switches

0.1 - 1 (± 0.2) bar	G 1/4	04XX - X 03 03 - X - 001	04XX - X 04 03 - X - 002
	G 1/8	04XX - X 03 28 - X - 001	04XX - X 04 28 - X - 002
	M 10x1 cyl.	04XX - X 03 13 - X - 001	04XX - X 04 13 - X - 002
	M 10x1 con.	04XX - X 03 01 - X - 001	04XX - X 04 01 - X - 002
	M 12x1.5	04XX - X 03 02 - X - 001	04XX - X 04 02 - X - 002
	NPT 1/8	04XX - X 03 02 - X - 001	04XX - X 04 02 - X - 002
0.5 - 3 (± 0.3) bar	G 1/4	04XX - X 23 03 - X - 001	04XX - X 24 03 - X - 002
	G 1/8	04XX - X 23 28 - X - 001	04XX - X 24 28 - X - 002
	M 10x1 cyl.	04XX - X 23 13 - X - 001	04XX - X 24 13 - X - 002
	M 10x1 con.	04XX - X 23 01 - X - 001	04XX - X 24 01 - X - 002
	M 12x1.5	04XX - X 23 02 - X - 001	04XX - X 24 02 - X - 002
	NPT 1/8	04XX - X 23 04 - X - 001	04XX - X 24 04 - X - 002
1 - 10 (± 0.5) bar	G 1/4	04XX - X 07 03 - X - 001	04XX - X 08 03 - X - 002
	G 1/8	04XX - X 07 28 - X - 001	04XX - X 08 28 - X - 002
	M 10x1 cyl.	04XX - X 07 13 - X - 001	04XX - X 08 13 - X - 002
	M 10x1 con.	04XX - X 07 01 - X - 001	04XX - X 08 01 - X - 002
	M 12x1.5	04XX - X 07 02 - X - 001	04XX - X 08 02 - X - 002
	NPT 1/8	04XX - X 07 04 - X - 001	04XX - X 08 04 - X - 002

Supplementary functions²⁾

Resistor	Diagnostics function	R XX XX
Varistor	Overvoltage protection	V XX XX
NTC thermistor	Filter monitoring	N XX XX

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.

Article number: 04XX - XXX XX - X - 00X

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Other versions available depending on minimum order quantity (see p. 67)

0410 / 0412 / 0414 / 0416 / 0418 / 0422 / 0424

Diaphragm pressure switches, up to 42 V
with supplementary functions

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 300 bar¹⁾
- Burst pressure safety up to 400 bar¹⁾

Plug-in types for diaphragm pressure switches

Deutsch DT04-2P	0410 - XXX XX - X - 001	0410 - XXX XX - X - 002
AMP Superseal 1.5®	0412 - XXX XX - X - 001	0412 - XXX XX - X - 002
Packard MetriPack 280	0414 - XXX XX - X - 001	0414 - XXX XX - X - 002
Deutsch DT04-3P	0416 - XXX XX - X - 001	0416 - XXX XX - X - 002
AMP Junior Timer®	0418 - XXX XX - X - 001	0418 - XXX XX - X - 002
M12x1 DIN EN 61076-2-101-A (PIN 1+3)	0422 - XXX XX - X - 001	0422 - XXX XX - X - 002
M12x1 DIN EN 60947-5-2 (PIN 1+2 / PIN 1+4)	0424 - XXX XX - X - 001	0424 - XXX XX - X - 002

Adjustment range (tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	---------------------------	---------------------------

04XX Diaphragm pressure switches

10 - 20 (± 1) bar	G 1/4	04XX - X 11 03 - X - 001	04XX - X 12 03 - X - 002
	G 1/8	04XX - X 11 28 - X - 001	04XX - X 12 28 - X - 002
	M 10x1 cyl.	04XX - X 11 13 - X - 001	04XX - X 12 13 - X - 002
	M 10x1 con.	04XX - X 11 01 - X - 001	04XX - X 12 01 - X - 002
	M 12x1.5	04XX - X 11 02 - X - 001	04XX - X 12 02 - X - 002
	NPT 1/8	04XX - X 11 04 - X - 001	04XX - X 12 04 - X - 002
20 - 50 (± 2) bar	G 1/4	04XX - X 15 03 - X - 001	04XX - X 16 03 - X - 002
	G 1/8	04XX - X 15 28 - X - 001	04XX - X 16 28 - X - 002
	M 10x1 cyl.	04XX - X 15 13 - X - 001	04XX - X 16 13 - X - 002
	M 10x1 con.	04XX - X 15 01 - X - 001	04XX - X 16 01 - X - 002
	M 12x1.5	04XX - X 15 02 - X - 001	04XX - X 16 02 - X - 002
	NPT 1/8	04XX - X 15 04 - X - 001	04XX - X 16 04 - X - 002

Supplementary functions²⁾

Resistor	Diagnostics function	R XX XX
Varistor	Overvoltage protection	V XX XX
NTC thermistor	Filter monitoring	N XX XX

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
FFKM	Chemical acids, diluted alkalis, ketones, ester's, alcohols	6
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.

Article number:

04XX - XXX XX - X - 00X

M.6
hex 24
PS PLUS



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Other versions available depending on minimum order quantity (see p. 67)



M.6

hex 24
PS PLUS



0411 / 0413 / 0415 / 0417 / 0419 / 0423 / 0425

Piston pressure switches, up to 42 V with supplementary functions

- Zinc-plated steel (CrVI-free)
- Overpressure safety up to 600 bar¹⁾
- Burst pressure safety up to 700 bar¹⁾

Plug-in types for piston pressure switches

Deutsch DT04-2P	0411 - XXX XX - X - 001	0411 - XXX XX - X - 002
AMP Superseal 1.5*	0413 - XXX XX - X - 001	0413 - XXX XX - X - 002
Packard MetriPack 280	0415 - XXX XX - X - 001	0415 - XXX XX - X - 002
Deutsch DT04-3P	0417 - XXX XX - X - 001	0417 - XXX XX - X - 002
AMP Junior Timer*	0419 - XXX XX - X - 001	0419 - XXX XX - X - 002
M12x1 DIN EN 61076-2-101-A (PIN 1+3)	0423 - XXX XX - X - 001	0423 - XXX XX - X - 002
M12x1 DIN EN 60947-5-2 (PIN 1+2 / PIN 1+4)	0425 - XXX XX - X - 001	0425 - XXX XX - X - 002

Adjustment range (tolerance at room temperature)	Male thread	Article number NO → :	Article number NC → :
---	----------------	---------------------------	---------------------------

04XX Piston pressure switches

50 - 150 (± 5.0) bar	G 1/4	04XX - X 19 03 - X - 001	04XX - X 20 03 - X - 002
	G 1/8	04XX - X 19 28 - X - 001	04XX - X 20 28 - X - 002
	M 10x1 cyl.	04XX - X 19 13 - X - 001	04XX - X 20 13 - X - 002
	M 10x1 con.	04XX - X 19 01 - X - 001	04XX - X 20 01 - X - 002
	M 12x1.5	04XX - X 19 02 - X - 001	04XX - X 20 02 - X - 002
	NPT 1/8	04XX - X 19 04 - X - 001	04XX - X 20 04 - X - 002

Supplementary functions²⁾

Resistor	Diagnostics function	R XX XX
Varistor	Overvoltage protection	V XX XX
NTC thermistor	Filter monitoring	N XX XX

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.	1
EPDM	Brake fluid, water, hydrogen, oxygen, acetylene, etc.	2
FKM	Hydraulic fluids (HFA, HFB, HFD), petrol/gasoline, etc.	3
HNBR	Hydraulic/machine oil, ester-based bio-oils	9

Refer to page 24 for the temperature range and application thresholds of sealing materials.

Article number:	04XX - XXX XX - X - 00X
-----------------	-------------------------

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

²⁾ Other versions available depending on minimum order quantity (see p. 67)

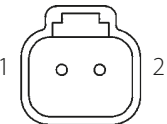
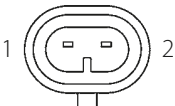
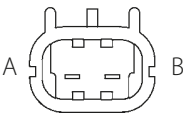
Pressure switches *PLUS*

Plug-in types for diaphragm and piston pressure switches

M.6
hex 24
PS *PLUS*

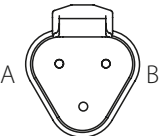
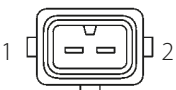
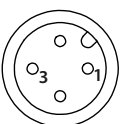
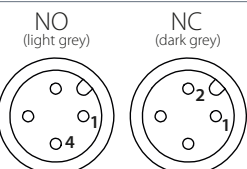


Technical details of plug-in types

0410 / 0411	0412 / 0413	0414 / 0415
		
Deutsch DT04-2P	AMP Superseal 1.5®	Packard MetriPack 280®
IP67, IP6K9K	IP67	IP67
H ≈ 61 mm	H ≈ 61 mm	H ≈ 62 mm
		

- ◀ Model / type
- ◀ Connector
- ◀ Protection class
- ◀ Overall height
- ◀ Contact assignment



0416 / 0417	0418 / 0419	0422 / 0423	0424 / 0425
			
Deutsch DT04-3P	AMP Junior Timer®	M12x1 DIN EN 61076-2-101-A	M12x1 DIN EN 60947-5-2
IP67, IP6K9K	IP65, IPx4K	IP67	IP67
H ≈ 63 mm	H ≈ 54 mm	H ≈ 51 mm	H ≈ 51 mm
	 Not recommended for new applications	 NO / NC (black)	 NO (light grey) NC (dark grey)
		1: brown 3: blue	1: brown 2: black 4: white

- ◀ Model / type
- ◀ Connector
- ◀ Protection class
- ◀ Overall height
- ◀ Contact assignment



M.7
30 A/F

Pressure switches 30 A/F

Changeover with silver contacts



- Attachment options for wall fitting and block style enable clearly structured, accessible, easy-maintenance installation
- Switching pressure can be adjusted easily by user
- High overpressure safety
- Socket devices enable simple installation on the machine

Pressure switches 30 A/F

Technical details

M.7
30 A/F



Temperature resistance of sealing materials:	NBR (diaphragm pressure switch)	-40 °C ... +100 °C
	NBR (piston pressure switch)	-30 °C ... +100 °C
	EPDM	-30 °C ... +120 °C
	FKM (diaphragm pressure switch)	-5 °C ... +120 °C
	FKM (piston pressure switch)	-15 °C ... +120 °C
Switching frequency:	200 / min	
Mechanical life expectancy:	1,000,000 cycles (for diaphragm pressure switches, life expectancy value only applies for switching pressures up to 50 bar)	
Pressure rise rate:	≤ 1 bar/ms	
Hysteresis:	Type 0159:	approx. 10 ... 30 % (not adjustable)
	Types 0161, 0162, 0175:	approx. 10 ... 30 % (factory adjustable)
Vibration resistance:	10 g; 5 ... 200 Hz sine wave; DIN EN 60068-2-6	
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27	
Housing material:	Aluminium	
Protection class:	IP65 with Socket device fitted, otherwise IP00	
Weight	Types 0159, 0161, 0162:	approx. 240 g
	Type 0175:	approx. 310 g

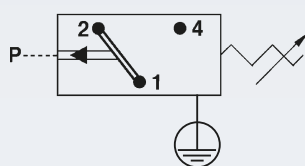
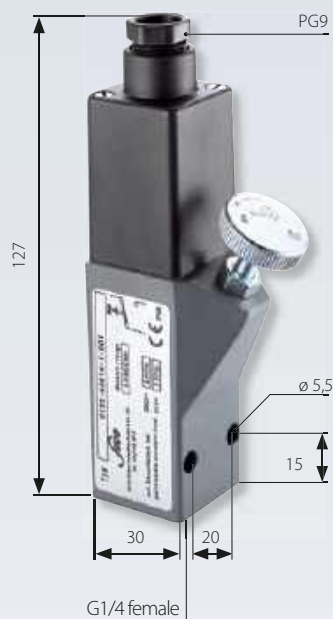
Electrical values	0159	0161 / 0162 / 0175
Rated working voltage U_e :	Rated working current I_e :	
250 V AC 50 / 60 Hz, AC 12	2.5 A	5 A
250 V AC 50 / 60 Hz, AC 14	1 A	1 A
24 V DC, DC 12 / DC 13	2 / 2 A	3.5 / 3.5 A
50 V DC, DC 12 / DC 13	1 / 0.5 A	2 / 1 A
75 V DC, DC 12 / DC 13	0.75 / 0.4 A	1 / 0.5 A
125 V DC, DC 12 / DC 13	0.3 / 0.2 A	0.3 / 0.2 A
250 V DC, DC 12 / DC 13	0.3 / 0.2 A	0.25 / 0.2 A
Rated insulation voltage U_i :	300 V	
Rated impulse withstand voltage U_{imp} :	2.5 kV	
Conventional thermal current I_{the} :	6 A	
Switching overvoltage:	< 2.5 kV	
Rated frequency:	DC and 50 / 60 Hz	
Nominal current of short-circuit mechanism:	to 2.5 A	to 6.3 A
Conditional short-circuit current:	< 350 A	
Tightening torque of terminal screws:	< 0.35 Nm	
Connector cross-section:	0.5 - 1.5 mm ²	



M

Diaphragm / piston pressure switch up to 250 V

- Aluminium housing
- Changeover with silver contacts
- Overpressure safety up to 200 / 600 bar¹⁾
- Switching point continuously adjustable by turning knurled screw whilst system in operation



$p_{\max}$ in bar	Adjustment range in bar	Tolerance at room temperature in bar	Thread	Article number
----------------------	----------------------------	---	--------	----------------

With female G 1/4 thread

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

Seal material – Application areas

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

Refer to page 75 for the temperature range and application thresholds of sealing materials.



Article number:	0159 - XXX 14 - X - 001
-----------------	-------------------------

0161 / 0162

Diaphragm / piston pressure switch up to 250 V

- Aluminium housing
- Changeover with silver contacts
- Overpressure safety up to 200 / 600 bar¹⁾
- Socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis adjustable at factory

p_{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Dimension A in mm	Article number
---------------------	----------------------------	---	----------------------	----------------

With female G 1/4 thread

0161 Diaphragm pressure switches

200 ¹⁾	0.5 – 1	± 0.2	15	0161 - 436 14 - X - 001
	0.5 – 5	± 0.2 – 0.5		0161 - 437 14 - X - 001
	1 – 10	± 0.5		0161 - 438 14 - X - 001
	10 – 50	± 1.0		0161 - 439 14 - X - 001
	50 – 100	± 3.0 – 5.0		0161 - 440 14 - X - 001

0161 Piston pressure switches

600 ¹⁾	100 - 400	± 5.0 - 9.0		0161 - 441 14 - X - 001
-------------------	-----------	-------------	--	-------------------------

Block style (with O-ring NBR 5 x 1.5 mm)

0162 Diaphragm pressure switches

200 ¹⁾	0.5 – 1	± 0.2	15	0162 - 436 14 - X - 001
	0.5 – 5	± 0.2 – 0.5		0162 - 437 14 - X - 001
	1 – 10	± 0.5		0162 - 438 14 - X - 001
	10 – 50	± 3.0		0162 - 439 14 - X - 001
	50 – 100	± 3.0 – 5.0		0162 - 440 14 - X - 001

0162 Piston pressure switches

600 ¹⁾	100 - 400	± 5.0 - 9.0	19.5	0162 - 441 14 - X - 001
-------------------	-----------	-------------	------	-------------------------

Seal material – Application areas

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

Refer to page 75 for the temperature range and application thresholds of sealing materials.

Article number: 016X - XXX 14 - X - 001

1 Adjusting the set point

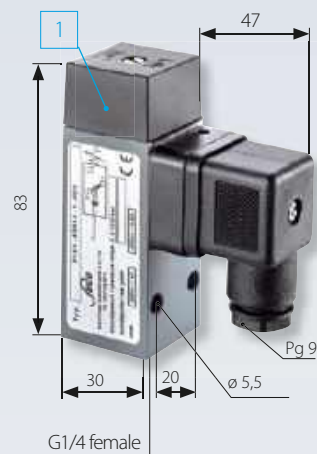
To adjust the set point, undo the locknut and adjust the set screw M16 using a screwdriver. Clockwise screwing increases the switching pressure. After adjusting, tighten the locknut again.

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

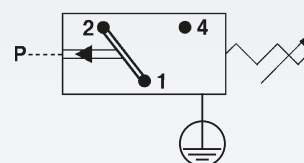
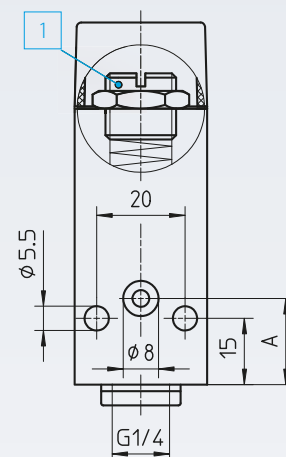
M.7
30 A/F

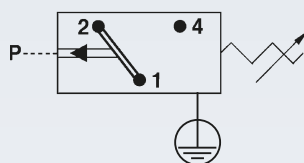
suco

0161 with female thread



0162 Block style





0175

Diaphragm pressure switches up to 250 V

- For low pressure, high accuracy
- Aluminium housing
- Changeover with silver contacts
- Overpressure safety up to 25 bar¹⁾
- Socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis adjustable at factory

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Thread	Article number
----------------------------	----------------------------	---	--------	----------------

With female thread

0175 Diaphragm pressure switches

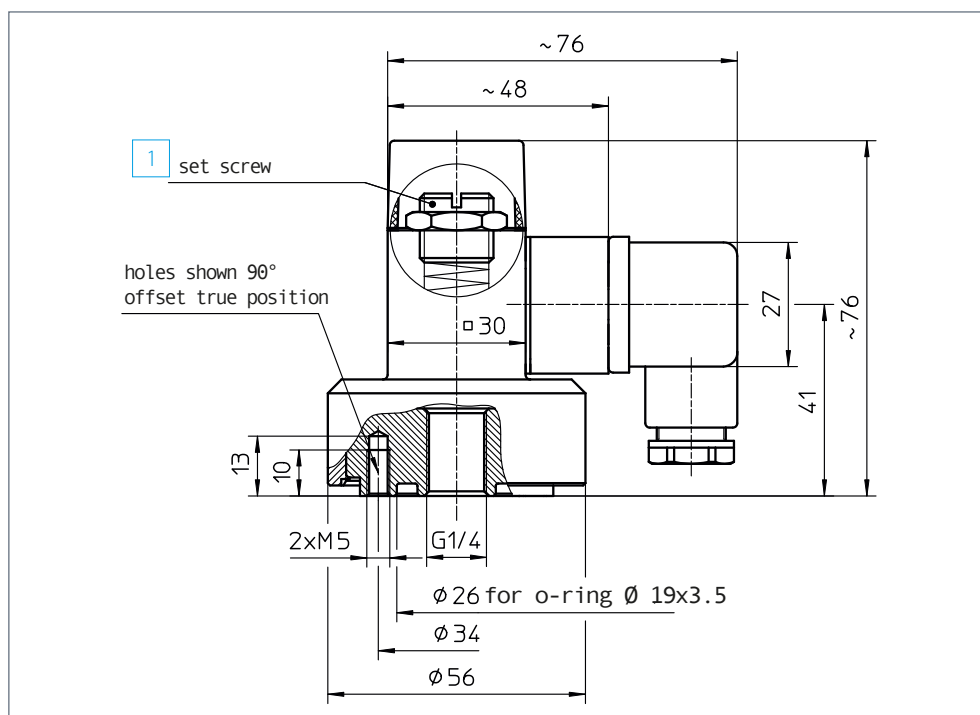
25 ¹⁾	0.1 – 1	± 0.1 – 0.2	G 1/4 female	0175 - 435 14 - 1 - 001
------------------	---------	-------------	--------------	--------------------------------

Seal material – Application areas

NBR	Hydraulic/machine oil, air, nitrogen, etc.
	Temperature resistance: -30 °C ... +100 °C

Article number:

0175 - 435 14 - **1** - 001



1 Adjusting the set point

To adjust the set point, undo the locknut and adjust the set screw M16 using a screwdriver. Clockwise screwing increases the switching pressure. After adjusting, tighten the locknut again.

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

Explosion-protected pressure switches

To ATEX standard



- ATEX-certification for use in potentially explosive areas
- Switching point can be easily adjusted by the user whilst system in operation
- Compact design
- Excellent price/performance ratio

Explosion-protected pressure switches

Technical details

M.8
ATEX



Technical explanations

Explosion-protected pressure switches are classified according to the respective combustible material-type. This division is:

Gases and vapours 0165	Dusts 0340 / 0341	Methane dust not suitable
----------------------------------	-----------------------------	-------------------------------------

Our pressure switches are generally designed for use with gases, vapours or dust.

Our explosion-protected pressure switches are not approved for use with methane dust (mining applications).

The table provides an overview of the zone divisions, equipment groups and equipment categories.

Conditions in potentially explosive atmosphere

Com- bustible materials	Temporary behaviour of com- bustible materials in potentially explosive area	Categori- sation of potentially explosive areas	Marking required on equipment to be used	
			Equipment group	Equipment category
Gases Vapours	are present continually, frequently or for long periods	Zone 0	II	1G
	occur occasionally	Zone 1	II	2G or 1G
	are unlikely to occur, and if so, are then only seldom or for short periods	Zone 2	II	3G or 2G or 1G
Dusts	are present continually, frequently or for long periods	Zone 20	II	1D
	occur occasionally	Zone 21	II	2D or 1D
	occur 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



Explosion-protected pressure switches

Technical details

Type:	0165		0340 / 0341
ATEX protection zone:	1 and 2		22
Combustible Material:	Gases and vapours		Dusts
Rated working voltage:	10 ... 250 VAC	10 ... 250 VDC	10 ... 250 VAC
Rated working current:	10 mA ... 1 A	10 mA ... 250 mA	10 mA ... 2 A
Temperature resistance:	NBR		-20 °C ... +80 °C
	EPDM		-20 °C ... +80 °C
	FKM (diaphragm pressure switch)		-5 °C ... +80 °C
	FKM (piston pressure switch)		-15 °C ... +80 °C
Switching frequency:	200 / min		
Mechanical life expectancy:	1,000,000 cycles		
Pressure rise rate:	≤ 1 bar/ms		
Hysteresis:	0 ... 30 % (depending on type, non-adjustable)		
Vibration resistance:	10 g; 5 ... 200 Hz sine wave; DIN EN 60068-2-6		
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27		
Cable length:	Standard length approx. 2m with wire end sleeve, also available in lengths of approx. 5m.		
Cable cross-section:	3 x 0,75 mm ²		3 x 0,5 mm ²
Housing material:	Aluminium		Zinc-plated steel (CrVI-free) anodised aluminium
Protection class:	IP65		
Weight:	approx. 380 g		approx. 230 g

0165

Diaphragm / piston pressure switches up to 250 V

ATEX 0102 Cc II 2G Ex d II C T6 / T5 X (gas-protected zones 1 and 2)

- Aluminium housing
- Changeover with silver contacts
- Operating voltage up to 250 V
- Overpressure safety up to 200 / 600 bar¹⁾

p _{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Thread	Article number
----------------------------	----------------------------	---	--------	----------------

0165 Diaphragm pressure switches

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

600 ¹⁾	20 – 100	± 3.0 – 5.0	G 1/4 female	0165 - 450 14 - X - 001
	25 – 250	± 5.0 – 7.0		0165 - 452 14 - X - 001
	100 – 400	± 5.0 – 9.0		0165 - 451 14 - X - 001

Seal material – Application areas

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

Refer to page 82 for the temperature range and application thresholds of sealing materials.

Article number: 0165 – XXX 14 – X – 001

Piston pressure switches only have limited suitability for use with gases (refer to Page 14 for explanations).

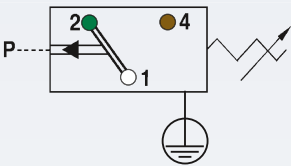
¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

M.8
ATEX



Contact assignment:

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



0340 / 0341

Diaphragm / piston pressure switches up to 250 V

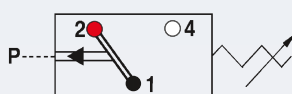
ATEX CE II 3D IP65 T90°C (dust protection zone 22)

- Zinc-plated steel housing (CrVI-free), with anodised aluminium protective cap
- Changeover with silver contacts
- Operation voltage up to 250 V, protection class 2, protective insulation $\square$
- Overpressure safety up to 300 / 600 bar¹⁾



Contact assignment

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



p_{max} in bar	Adjustment range in bar	Tolerance at room temperature in bar	Thread	Article number
----------------------------	----------------------------	---	--------	----------------

0340 Diaphragm pressure switches

300 ¹⁾	0.3 – 1.5	± 0.2	G 1/4	0340 - 457 03 - X - 003
	1 – 10	$\pm 0.5 - 1.0$		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
-------------------	----------	-----------	-------	-------------------------

Seal material – Application areas

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

Refer to page 82 for the temperature range and application thresholds of sealing materials.



Article number:

034X - XXX 03 - X - XXX

Piston pressure switches only have limited suitability for use with gases (refer to Page 17 for explanations).

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

Vacuum switches

for negative pressure from 950 mbar to 100 mbar



- Switching point can be adjusted when fitted on site¹⁾
- High overpressure resistance
- Long service life even under harsh conditions
- 0150 series available as changeover contacts up to 250 V
- 0151 series available as NC or NO up to 42 V

¹⁾ Pressure switches can also be supplied preset at factory.
Our preset switches are sealed with lacquer paint, set points are embossed on the housing.

Vacuum switches

Technical details

M.9

Vacuum



Type:	0150	0151
Operating voltage:	10 ... 250 VAC/DC	10 ... 42 VAC/DC
Rated current (resistive load):	Refer to electrical values below	10 mA ... 4 A
Switching power:	Refer to electrical values below	100 VA
Temperature resistance of sealing materials:	-20 °C ... +100 °C	-15 °C ... +120 °C
Switching frequency:	200 / min	
Mechanical life expectancy:	1,000,000 cycles	
Pressure rise rate:	≤ 1 bar/ms	
Vibration resistance:	10 g; 5 ... 200 Hz sine wave; DIN EN 60068-2-6	
Shock resistance:	294 m/s ² ; 14 ms half sine wave; DIN EN 60068-2-27	
Housing material:	Aluminium	Brass
Protection class:	IP65 with socket device	IP65, terminals IP00
Weight:	approx. 270 g	approx. 140 g

0150 Electrical values (also refer to page 14 for technical explanations)

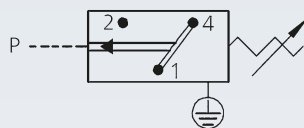
Rated working voltage U_e	Rated working current I_e (usage category)
250 VAC 50 / 60 Hz	5 A (AC 12)
250 VAC 50 / 60 Hz	1 A (AC 14)
24 VDC	3,5 / 3,5 A (DC 12 / DC 13)
50 VDC	2 / 1 A (DC 12 / DC 13)
75 VDC	1 / 0,5 A (DC 12 / DC 13)
125 VDC	0,3 / 0,2 A (DC 12 / DC 13)
250 VDC	0,25 / 0,2 A (DC 12 / DC 13)
Rated insulation voltage U_i :	300 V
Rated impulse withstand voltage U_{imp} :	2,5 kV
Conventional thermal current I_{the} :	6 A
Switching overvoltage:	< 2,5 kV
Rated frequency:	DC and 50 / 60 Hz
Nominal current of short-circuit mechanism:	up to 6,3 A
Conditional short-circuit current:	< 350 A
Tightening torque of terminal screws	< 0,35 Nm
Connector cross-section:	0,5 ... 1,5 mm ²

M

0150

Vacuum switch up to 250 V with changeover contact

- Aluminium housing
- Operating voltage up to 250 V
- Changeover with silver contacts
- Overpressure safety up to 20 bar¹⁾
- Socket device similar to DIN EN 175301 (DIN 43650)
- Hysteresis approx. 50 – 150 mbar (cannot be changed)



p _{max} in bar	Adjustment range in mbar (relative)	Tolerance at room temperature in mbar	Thread	Article number
----------------------------	--	--	--------	----------------

0150 Vacuum switch

20 ¹⁾	100 – 950	± 50	G 1/8 female	0150 - 456 15 - 4 - 001
------------------	-----------	------	--------------	-------------------------

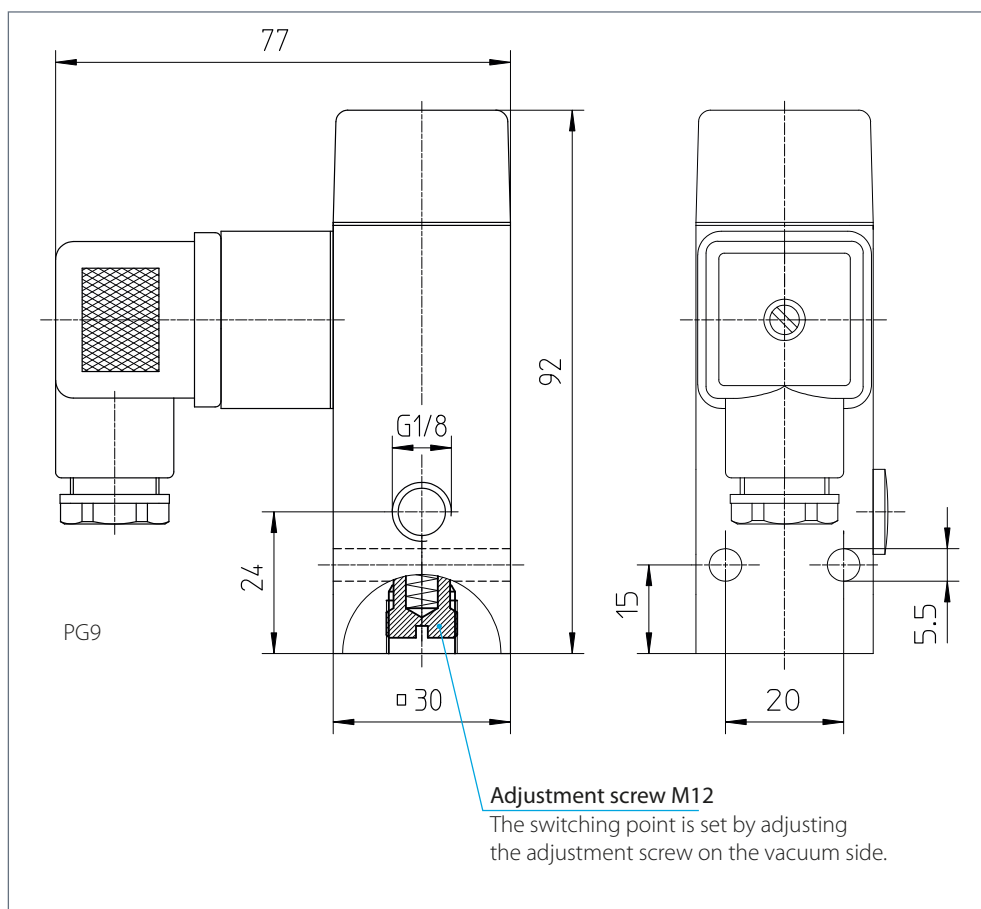
Seal material – Application areas

ECO	Air, oils, greases, fuel/gasoline	4
-----	-----------------------------------	---

Temperature resistance: -20 °C ... +100 °C

Article number:

0150 - 456 15 - 4 - 001



¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

0151

Vacuum switch up to 42 V, NO or NC

- Brass housing
- Spade or M3 screw terminal
- Operating voltage up to 42 V
- Overpressure safety up to 35 bar¹⁾

p _{max} in bar	Adjustment range in mbar (relative)	Tolerance at room temperature in mbar	Thread	Article number
----------------------------	--	--	--------	----------------

0151 Vacuum switches with M3 screw terminal

35 ¹⁾	200 – 950	± 100	G 1/8 female	NO → : 0151 - 452 15 - 3 - 001
------------------	-----------	-------	--------------	------------------------------------

NC → :|

0151 - 453 15 - 3 - 001

0151 Vacuum switches with spade terminal

35 ¹⁾	200 – 950	± 100	G 1/8 female	NO → : 0151 - 454 15 - 3 - 001
------------------	-----------	-------	--------------	------------------------------------

NC → :|

0151 - 455 15 - 3 - 001

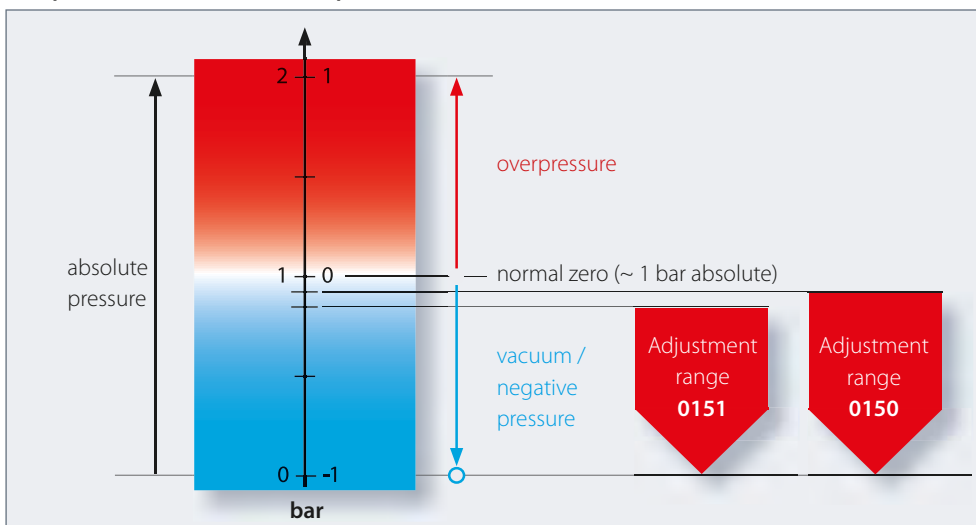
Seal material – Application areas

FKM	Air, oils, greases, fuel/gasoline	3
-----	-----------------------------------	---

Temperature resistance: -15 °C ... +120 °C

Article number: 0151 - 45X 15 - 3 - 001

Comparison of absolute/relative pressures



Note: Required set points in the vacuum range must be specified relative to atmospheric pressure (normal pressure) in the ordering process.

¹⁾ Static value. Dynamic value is 30-50 % lower. Values pertain to the hydraulic/pneumatic part of the pressure switch.

M.9 Vacuum



Switches are also available on request with outer thread or integrated connector.



Accessories

Mating plugs, Socket devices and Thread adapters



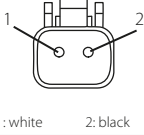
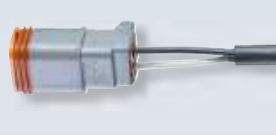
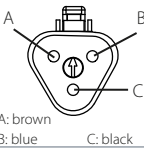
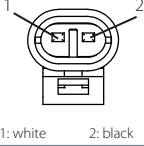
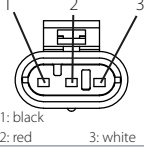
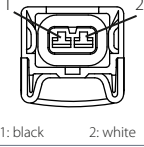
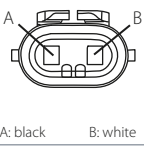
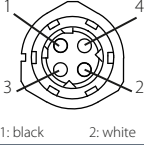
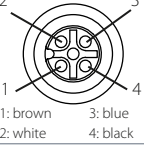
- High-quality accessories
- Developed for our products
- Aligned to our products
- Originals from the manufacturer

Mating plugs

For pressure switches with integrated connector

M.10
Accessories

suco

Deutsch DT06-2S (for DT04-2P) 2 x 0,5 mm ² Radox cable, IP65	suitable for series 0110 / 0111 0410 / 0411	Article number: 1-1-10-653-118	  1: white 2: black
Deutsch DT06-3S (for DT04-3P) 3 x 0,75 mm ² PUR cable, IP67	suitable for series 0116 / 0117 / 0136 / 0137 0416 / 0417	Article number: 1-1-36-653-160	  A: brown B: blue C: black
TE AMP Superseal 1.5®, 2-pin 2 x 0,5 mm ² Radox cable, IP65	suitable for series 0112 / 0113 0412 / 0413	Article number: 1-1-12-653-113	  1: white 2: black
TE AMP Superseal 1.5®, 3-pin 3 x 0,5 mm ² Radox cable, IP65	suitable for series 0132 / 0133	Article number: 1-1-32-653-158	  1: black 2: red 3: white
TE AMP Junior Timer, 2-pin 2 x 0,5 mm ² Radox cable, IP65	suitable for series 0118 / 0119 0418 / 0419	Article number: 1-1-18-653-116	  1: black 2: white
Packard MetriPack 280, 2-pin 2 x 0,5 mm ² Radox cable, IP65	suitable for series 0114 / 0115 0414 / 0415	Article number: 1-1-14-653-114	  A: black B: white
Bayonet DIN 72585 A1-2.1 2 x 0,5 mm ² Radox cable, IP65	suitable for series 0120 / 0121	Article number: 1-1-20-653-112	  1: black 2: white
M12 DIN EN 61076-2-101-LF, 4-pin 4 x 0,34 mm ² PUR cable, IP65	suitable for series 0122 / 0123 / 0124 / 0125 0134 / 0135 / 0424 / 0425	Article number: 1-1-00-653-162	  1: brown 2: white 3: blue 4: black

All mating plugs with 2 m cable

M

Socket devices and protective caps

- IP65 socket devices or IP54 rubber protective caps for increased protection
- Simple installation with plug-in socket devices

			
Rubber protective cap With central cable feed-through for 1.5 - 5 mm cable diameter With rubber protective cap fitted: IP54 Suitable for voltages up to 42 V	Rubber protective cap With two cable feed-throughs for 1.7 - 2,2 mm cable diameter With rubber protective cap fitted: IP54 Suitable for voltages up to 42 V	Rubber protective cap With two cable feed-throughs for 1.7 - 2,3 mm cable diameter With rubber protective cap fitted: IP54 Suitable for voltages up to 42 V	Socket device cCSAus approval Housing: Polyamide PG9 screw fitting (tightening range 6 - 9 mm) With socket device fitted: IP65 Suitable for voltages up to 250 V
suitable for series 0151 / 0163 / 0164 / 0166 0167 / 0168 / 0169	suitable for series 0151 / 0163 / 0164 / 0166 0167 / 0168 / 0169	suitable for series 0170 / 0171 / 0180* / 0181* / 0183* / 0186* / 0187* 0190 / 0191 / 0196 / 0197 (*up to 42 V)	suitable for series 0170 / 0171 / 0180 / 0181 0183 / 0186 / 0187 0190 / 0191 / 0196 / 0197
Article number: 1-1-66-621-010	Article number: 1-1-66-621-003	Article number: 1-1-70-621-007	Article number: 1-1-80-652-002

			
Socket device to DIN EN 175301-803-A (DIN 43650) PG9 screw fitting (tightening range 6 – 9 mm) terminals for wire cross- sections: 0.34 ... 1.5 mm² (AWG 22 ... AWG 16), tightening torque for terminal screw 0.4 Nm With socket device fitted: IP65 Suitable for voltages up to 250 V	Socket device With indicator lamp to DIN EN 175301-803-A (DIN 43650) PG9 screw fitting (tightening range 6 – 9 mm) terminals for wire cross- sections: 0.34 ... 1.5 mm² (AWG 22 ... AWG 16), tightening torque for terminal screw 0.4 Nm With socket device fitted: IP65 Suitable for voltages up to 24 or 250 V	Socket device M12x1 DIN EN 61076-2-101 A straight, 4-pin Terminals for wire cross-section 0.75 mm² (AWG 18), tightening torque for terminal screw 0.4 Nm With socket device fitted: IP65 Suitable for voltages up to 48 V	Socket device M12x1 DIN EN 61071-2-101 D Angled, 4-pin Terminals for wire cross-section 0.75 mm² (AWG 18), tightening torque for terminal screw 0.4 Nm With socket device fitted: IP65 Suitable for voltages up to 48 V
suitable for series 0150 / 0161 / 0162 / 0175 0184 / 0185 / 0194 / 0195	suitable for series 0150 / 0161 / 0162 / 0175 0184 / 0185 / 0194 / 0195	suitable for series 0122 / 0123 / 0124 / 0125 0134 / 0135 / 0424 / 0425 and for all transmitters and electronic pressure switches with an M12 connector	suitable for series 0122 / 0123 / 0124 / 0125 0134 / 0135 / 0424 / 0425 and for all transmitters and electronic pressure switches with an M12 connector
Article number: 1-1-84-652-009	Article number: for 24 VDC: 1-1-84-652-011 for 250 VAC: 1-1-84-652-010	Article number: 1-6-00-652-016	Article number: 1-6-00-652-017

Thread adapters

For requirements at short notice and for realising custom solutions

- The materials and shapes of thread adapters are aligned perfectly to our switches and transmitters
- Thread adapters are supplied with seals



For G 1/8 female

Vacuum switch
with thread code 15



For G 1/4 DIN EN ISO 1179-1 (DIN 3852-E)

All pressure switches and transmitters
with thread code 41

Dual nipple brass	
G 1/8 shape E DIN EN ISO 1179-2 includes sealing ring NBR	G 1/8 shape A DIN ISO 16030 includes sealing ring stainless steel / NBR
NPT 1/8-27	NPT 1/4-18
hex 15 h = 25 mm	hex 24 h = 28 mm
Article number:	Article number:
1-1-00-420-014	1-1-00-420-029

Thread adapters stainless steel (1.4305 / AISI 303)					
G 1/4 DIN EN ISO 1179-1 (DIN 3852-E) female thread					
M10 x 1 shape A DIN 3852-1	M14 x 1.5 shape E DIN 3852-E includes sealing ring FKM	NPT 1/4-18	NPT 1/4-18	9/16-18UNF includes O-ring FKM	9/16-18UNF includes O-ring FKM
hex 22 h = 30,5 mm	hex 22 h = 35 mm	hex 22 h = 35,5 mm	hex 22 h = 35,5 mm	hex 22 h = 33 mm	hex 22 h = 33 mm
Article number:	Article number:	Article number:	Article number:	Article number:	Article number:
1-1-00-420-020	1-1-00-420-028	1-1-00-420-021	1-1-00-420-021	1-1-00-420-027	1-1-00-420-027

M.10

Accessories



For G1/4

All hex 24 and hex 27 pressure switches with thread code 03



For M14x1.5 ISO 6149-3

Pressure switch series 0183 with thread code 45



For G1/4

All hex 24 and hex 27 pressure switches with thread code 03

Thread adapters

zinc-plated steel (CrVI-free)

G 1/4
female thread
includes sealing ring FKM



R 1/4

hex 24
h = 30 mm

Article number:

1-1-00-420-009



3/8-24 UNF-2A

hex 24
h = 26 mm

Article number:

1-1-00-420-013

M14 x 1.5
DIN EN ISO 6149-1
female thread



G 1/4

hex 24
h = 26 mm

Article number:

1-1-83-420-006



M12 x 1.5

hex 24
h = 26 mm

Article number:

1-1-83-420-007



NPT 1/8-27

hex 24
h = 26 mm

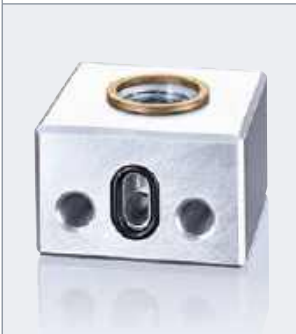
Article number:

1-1-83-420-008

Adapter

Aluminium

G 1/4
female thread
includes copper sealing ring



Block style
includes
NBR O-ring

35 A/F
h = 22 mm

Article number:

1-1-00-420-025